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Trois Éssais sur l'Analyse Économique du Droit de la Consommation

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À Monique

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Résumé :

Les consommateurs disposent d'une rationalit limit e et sont sujets divers biais cognitifs. La th se tudie les cons quences des biais de rationalit sur le comportement des consommateurs ainsi que les implications sur la politique de consommation. Chacun des trois chapitres de la th se est consacr un biais particulier (surestimation de la qualit , erreurs d'anticipation de l'utilit , biais de projection) dans un contexte concurrentiel d termin . Les deux premiers chapitres sont b tis sur des mod les de duopole standards auxquels sont int gr s des biais de rationalit : le premier est un duopole avec diff renciation horizontale inspir de Dixit (1979), tandis que le second envisage un mod le de diff renciation verticale adapt de Gabszewicz & Thisse (1979). Le troisi me chapitre tend trois p riodes la mod lisation du biais de projection propos e par Loewenstein et al. (2003). J'aboutis la conclusions que, si les biais cognitifs conduisent dans certains cas des choix sous-optimaux (chapitres 1 et 2), les consommateurs na fs peuvent galement tre avantag s par rapport aux agents sophistiqu s (chapitre 3). Ce constat plaide en faveur d'une intervention circonstanci e et mesur e sur le march . Enfin, des recommandations de politiques conomiques sont formul es: je pr ne une approche renouvel e du droit de la consommation, qui ne serait plus fond principalement sur l'information du consommateur mais davantage sur des mesures de redressement cognitif. De exemples de mesures concr tes sont discut s tout au long de la th se.

Descripteurs :

Economie du droit comportementale - Biais de rationalit - Protection des consommateurs - Contrat d'adh sion.

Abstract:

Consumers have bounded rationality and exhibit cognitive biases. The thesis studies the consequences of such biases on consumer choice and implications on consumer policy. Each chapter of the thesis investigates one specific bias (quality bias, utility misperception and projection bias) in a given market structure. The first two chapters focus on standard duopoly models, in which cognitive biases are incorporated: I build a horizontally

differentiated duopoly based on Dixit (1979) in chapter 1, and a vertically differentiated duopoly inspired by Gabszewicz & Thisse (1979) in chapter 2. As for the third chapter, it extends to three periods, in a monopolistic framework, the projection bias model proposed by Loewenstein et al. (2003). I come to the conclusion that, while cognitive biases sometimes lead to suboptimal consumption decisions (chapters 1 and 2), naive consumers can be better off than their sophisticated counterparts (chapter 3). This observation pleads in favor of a non-systematic and context dependant legal intervention to counter cognitive errors. I argue in favor of a new approach of consumer policy, that would focus less on information disclosures in favor of debiasing schemes. Examples of such debiasing policies are discussed throughout the thesis.

Keywords:

Behavioral Law and Economics - Consumer bias - Consumer policy - Standard form contracts.

On gouverne mal quand on gouverne trop. Un homme qui traite avec un autre homme, doit tre attentif et sage ; il doit veiller son int r t, prendre les informations convenables, et ne pas n gliger ce qui est utile. L'office de la loi est de nous prot ger contre la fraude d'autrui mais non pas de nous dispenser de faire usage de notre propre raison. S'il en tait autrement, la vie des hommes sous la surveillance des lois ne serait qu'une longue et honteuse minorit ; et cette surveillance d g n rerait elle-m me en inquisition.

Discours préliminaire du premier projet de Code civil, présenté le 1er Pluviôse an IX par MM. Portalis, Tronchet, Bigot-Préameneu et Maleville.

Contents

Introduction en Fran ais

1 Le droit de la consommation, un droit de protection

Historiquement, le droit de la consommation a vocation à protéger une partie considérée comme faible et démunie contre un cocontractant, plus informé, aguerri au monde des affaires et mieux armé pour les négociations commerciales. Dans cette perspective, l'un des outils privilégiés du législateur consiste à améliorer, tant quantitativement que qualitativement, l'information dont dispose la partie faible. Les avancées de l'économie comportementale amènent à s'interroger sur la pertinence et l'efficacité de cette approche parfois rudimentaire du droit de la consommation. Le droit de la consommation a-t-il uniquement vocation à protéger le consommateur contre son cocontractant, ou aussi contre ses propres défaillances ? La mission première du droit de la consommation réside dans la protection du consommateur contre les éventuels abus d'un partenaire plus puissant, mieux informé et mieux armé. Cette mission de protection, désormais classique, relève de l'essence même du droit de la consommation (1). D'autres préoccupations sont apparues plus récemment comme la nécessité de prendre en compte la rationalité limitée du consommateur (1.2).

1.1 Le r le classique du droit de la consommation : prot ger le consommateur contre son cocontractant

Tendant r duire l'asym trie inh rente toute relation de consommation, le droit de la consommation repose la fois sur des fondements juridiques (section1.1.1) et conomiques (section1.1.2), qui ont conduit l' mergence d'une branche autonome du droit (section 1.1.3).

1.1.1 Les fondements juridiques

Juridiquement, l' mergence du droit de la consommation repose sur un triple constat, comme l'ont r sum Temple & Calais-Auloy dans leur ouvrage *Droit de la consommation* [30] : *« a) les consommateurs sont naturellement en position de faiblesse ; b) la loi a pour fonction de protéger le faible contre le fort ; c) le droit civil classique est impuissant à assurer la protection des consommateurs »* (page 22). Ainsi la n cessaire protection de la partie faible (section 1.1.1.1), conjugu e l'inad quation du droit commun pour assurer cette protection dans le cas des contrats de consommation (section 1.1.1.2), ont conduit l' mergence du droit de la consommation.

1.1.1.1 La p otet ion d la partie faible

Josserand soulignait dans son essai consacr *« La Protection des Faibles par le Droit »* (1935) [87] que le l gislateur a pour pr occupation croissante de prot ger le faible et de garantir un minium d' quit et de loyaut dans les relations sociales : *« La protection des faibles est assurément une des préoccupation constante du législateur comtemporain »* (page 221). Ce constat s'impose avec une acuit toute particuli re concernant la relation de consommation, laquelle se caract rise par un d s quilibre structurel entre un consommateur n ophyte et peu inform , d'une part, et un professionnel aguerri aux affaires et parfaitement inform , d'autre part. Le consommateur est la partie faible plusieurs titres : en premier

lieu il ignore tout du bien ou du service qu'il s'appr te acqu rir, tandis que le professionnel d tient ces informations. Le consommateur ne peut pas tre un expert dans l'ensemble des secteurs d'activit o il est amen contracter. C'est cette ignorance qui le rend faible, par rapport un professionnel qui est par hypoth se sp cialiste dans son secteur d'activit . En second lieu, le consommateur est en situation de faiblesse car il n'est pas r dacteur du contrat. Il doit en effet se plier aux dispositions contractuelles choisies par le professionnel, qui r dige dans la quasi-totalit des cas le contrat. Or le r dacteur poss de d'embl e un avantage sur son contractant, puisqu'il peut ins rer dans la convention des clauses qui lui sont favorables. C'est d'ailleurs ce constat qui justifie les r gles relatives l'interpr tation des contrats dict es aux articles 1156 et suivants du Code civil. L'article 1162 nonce que *« dans le doute, la convention s'interprète contre celui qui a stipulé et en faveur de celui qui a contracté l'obligation »*. La jurisprudence a fait de cet article une interpr tation favorable au consommateur, puisqu'elle en a d duit que toute ambiguit est d favorable au r dacteur du contrat. Malgr quelques r gles pouvant s'interpr ter en faveur du consommateur, le droit commun des contrats s'est r v l incapable de prot ger efficacement la partie faible compte tenu des sp cificit s de la relation de consommation.

1.1.1.2 L'inaptitude du droit commun à protéger le consommateur

Le droit des contrats repose sur plusieurs fondements th oriques difficilement compatibles avec la nature des contrats de consommation. Au premier chef se trouve la th orie de l'autonomie de la volont , qui irrigue l'ensemble du droit commun des contrats depuis la r daction du Code civil de 1804. Dans la lign e de la philosophie des Lumi res, chaque individu, parce qu'il est dot de raison, est cens tre en mesure de d fendre ses propres int r ts. Ainsi Terr , Simler et Lequette [156] r sument-ils : *« chaque individu étant le meilleur juge de ses intérêts, on peut présumer que ceux-ci sont parfaitement respectés par les engagements qu'il a volontairement souscrits »* (page 31). Les articles 1101 et suivants du Code civil sont le reflet de cette hypoth se centrale : chaque individu est tenu par les contrats qu'il a librement conclus. Dans l'esprit des r dacteurs du Code civil, le contrat est le fruit d'une n gociation, plus ou moins quilibr e, entre les parties. Le principe de libert

contractuelle d coule pr cis ment de ce que chacun peut n gocier comme il l'entend.

Or le contrat de consommation tel que nous le connaissons aujourd'hui est tr s loi- gn de l'id al du contrat n goci de gr gr qui est envisag dans le Code civil. Dans l' crasante majorit des cas, il s'agit de contrats d'adh sion r dig s par le professionnel. Le contrat est « prendre ou laisser », si bien que le consommateur n'a aucun pouvoir de n gociation. Face la g n ralisation des contrats d'adh sion, les notions d'autonomie de la volont et de libert contractuelle sont d nu es de sens. En quoi consiste la libert d'un consommateur qui ne peut que signer ou refuser un contrat dont les conditions lui sont impos es ? Partant de ce constat, Kessler (1943) [95] s'interroge sur le concept de libert dans le cas de la relation de consommation. Peut-on m me voquer la libert d'un agent qui ne peut qu'accepter ou refuser une offre pr -r dig e ? Kessler estime que l'intention de contracter se r sume alors la soumission aux dispositions contractuelles impos es par la partie forte. Kessler (1943) r sume en ces termes le consentement dans le cadre d'un contrat d'adh sion : *"His contractual intention is but a subjection more or less voluntary to terms dictated by the stronger party, terms whose consequences are often under- stood only in a vague way, if at all"* [95] (page 632).

La libert du consommateur, qui se limite la seule possibilit de refuser un contrat, est ainsi r duite comme une peau de chagrin. En outre, la possibilit m me de ne pas contracter est elle aussi discutable : un consommateur peut-il par exemple refuser un contrat d'assurance, un contrat d'abonnement la t l phonie mobile ou une convention de compte courant ? La concurrence permet au consommateur de choisir le contrat qui lui convient, r pondront les tenants du lib ralisme. Si cette affirmation est th oriquement rassurante, elle n'est gu re convaincante quand l'ensemble des offres sur un march est rigoureusement identique Ainsi Kessler (1943) soulignait d j ce ph nom ne et observait que la libert du consommateur de choisir le contrat n' tait que th orique : *"The weaker party, in need of the goods or services, is frequently not in a position to shop around for better terms, either because the author of the standard contract has a monopoly (natural or artificial) or because all competitors use the same clauses"*[95] (page 632).

Face la g n ralisation des contrats d'adh sion, ce sont l'ensemble des r gles et des

concepts du Code civil fran ais, et plus g n ralement du droit commun, qui se trouvent remis en question. Les notions de consentement et de libert contractuelle sont vid es de leur substance, si bien que les dispositions protectrices du Code civil r v lent diverses lacunes. Un exemple suffira s'en convaincre. L'article 1116 du Code civil pr voit que *« le dol est une cause de nullité de la convention lorsque les manœuvres pratiquées par l'une des parties sont telles, qu'il est évident que, sans ces manœuvres, l'autre partie n'aurait pas contracté. Il ne se présume pas et doit être prouvé. »* En l'absence d'obligation d'information pesant sur le professionnel, la preuve de l'intention dolosive serait bien souvent impossible rapporter, ou trop co teuse au regard des faibles sommes en cause dans les contrats de consommation. L'obligation g n rale d'information pr vue l'article L.111-1 du Code de la consommation vise pr cis ment pallier cette lacune : la seule violation de cette disposition entra ne la nullit du contrat, sans qu'il soit n cessaire de prouver une quelconque intention dolosive.

L'analyse conomique classique rejoint la perspective juridique dans la mesure o la relation de consommation est avant tout caract ris e par son asym trie.

1.1.2 Les fondements conomiques

La caract ristique principale de la relation de consommation r side dans son asym trie : elle met face face un consommateur ignorant et un professionnel aguerri. Du point de vue de l'analyse conomique, cette asym trie se r sume deux ph nom nes : un probl me informationnel d'abord (section 1.1.2.1), un d s quilibre dans les co ts de transaction que les agents sont pr ts supporter ensuite (section 1.1.2.2).

1.1.2.1 L'asym trie d'information

Le professionnel dispose par hypoth se d'informations pertinentes dont le consommateur n'a pas connaissance. Ainsi en est-il par exemple de la qualit r elle du produit, de sa dur e de vie, du co t de ses composants etc. C'est d'ailleurs cette asym trie d'information qui justifiait d j les garanties la charge du vendeur en droit romain[1]. La relation de consom-

[1]Voir Deroussin (2007) [44], pages 221 à 231.

mation est donc caract ris e en premier lieu par les nombreuses asym tries d'information, comme l'illustre l'article fondateur d'Akerlof [1].

Dans la lign e de cette analyse, le droit de la consommation consiste pour l'essentiel mettre la charge du professionnel une s rie plus ou moins longue et pertinente d'obligations d'information. L'article L.111-1 du Code de la consommation, qui pr voit une obligation g n rale d'information la charge du professionnel, prouve que l'objectif premier de cette branche du droit est de r sorber une asym trie d'information inh rente toute relation consommateur/professionnel. D'autres articles du Code de la consommation en attestent galement : les obligations d'informations pesant sur le fournisseur d'acc s internet (article L.121-83), celle pesant sur le professionnel pour les contrats conclus distance (article L.121-17) et pour les contrats de cr dit la consommation (article L.311-6).

Au-del de l'asym trie d'information, la relation de consommation est galement marqu e par une asym trie dans les co ts de transaction que les agents sont pr ts supporter pour la conclusion d'un contrat.

1.1.2.2 L'asym trie d s les o ts de transac ion

Le contrat de consommation porte bien souvent sur un montant faible, voire insignifiant. L' tude minutieuse de chaque clause par le consommateur avant la conclusion du moindre contrat est inconcevable. Le consommateur devrait alors consacrer la majeure partie de son existence plucher les conditions g n rales de vente et autres documents paracontractuels. La situation du professionnel en revanche est bien diff rente. Les contrats de consommation sont des contrats d'adh sion, conclus l'identique dans des milliers d'exemplaires, si bien que l'enjeu financier est nettement plus important. Du point de vue du professionnel, il est donc parfaitement rationnel et efficace d'investir dans la r daction et l' tude de chaque contrat propos sur le march .

Ainsi le contrat de consommation rec le-t-il un second d s quilibre majeur : les parties ne sont pas dispos es subir les m mes co ts pour n gocier et conclure le contrat. De fa on tr s pragmatique, une perte de quelques centimes pour chaque consommateur repr sente un gain potentiellement colossal pour le professionnel. Ce constat est lourd de

cons quences en termes d'incitations : les consommateurs ne sont pas incit s investir la moindre ressource dans la n gociation d'un contrat dont l'enjeu financier est insignifiant, tandis que le professionnel au contraire a tout int r t soigner la r daction d'un contrat. Ce d s quilibre joue en faveur du professionnel qui anticipe la n gligence de son partenaire et peut ainsi lui faire signer un contrat dont il sait qu'il n'est pas conforme aux dispositions l gales. Ce m canisme est notamment d nonc par Issacharoff [81] : *"I further assume that the presence of better-resourced and more strategic partners on the other side of the transaction allows the repeat-player sellers to manipulate consumer error to systematic advantage"*. Certains auteurs estiment n anmoins que la pression concurrentielle incite les firmes n gocier les dispositions contractuelles, si bien que l'asym trie originelle dans le pouvoir de n gociation serait naturellement r sorb e gr ce au m canisme du march . Cette position est notamment d fendue par Johnston (2007) [83] mais ne repr sente pas l'opinion dominante, qui reconna t que l'asym trie des co ts de transaction g n rent une s rie de cons quences n gatives pour les consommateurs, comme l'expliquent en d tails Gilo & Porat (2007) [67].

Cette asym trie se retrouve au stade du contentieux dans l'hypoth se o un diff rend surgirait dans l'ex cution du contrat. Pour le consommateur, les sommes en jeu dans un litige sont souvent tr s faibles et ne justifient pas d'investir des frais importants dans un proc s. Le consommateur n'est donc pas incit faire valoir ses droits en justice. Les r gles proc durales de droit commun ne fournissent pas de moyens d'action adapt s aux consommateurs. Ce constat est l'origine de l'am nagement de proc dures particuli res d rogatoires du droit commun, comme les actions de groupe[2]. Apr s de longs d bats, les actions de groupe ont t introduites en droit fran ais par la loi 2014-344 du 17 mars 2014 relative la consommation. Les conditions d'application demeurent n anmoins extr mement restrictives, si bien que les retomb es concr tes sont d cevantes.

Ce sont donc deux th ories conomiques classiques qui justifient les obligations d'information en mati re consum riste et ont conduit l' mergence du droit de la consommation dans la seconde moiti du XX^{e} si cle.

[2]Pour une analyse économique des actions de groupe, voir Demougin (2009) [43].

1.1.3 L' mergence du droit de la consommation

Partant de ce constat que la relation de consommation est par essence d s quilibr e, le l gislateur s'est attach insuffler une once d' quit dans une relation par nature fonci rement asym trique. Les moyens utilis s par le l gislateur consistent pour l'essentiel imposer au professionnel des obligations d'information. Dans la lign e de la philosophie des lumi re qui sous-tend le Code civil, il est implicitement admis que chacun est en mesure de prendre une d cision clair e, sous r serve qu'il dispose des information pertinentes.

Le Code de la consommation fran ais r sume parfaitement cette approche quelque peu rudimentaire de la politique de consommation. L'article L.111-1 dudit code est ainsi r dig : *« Avant que le consommateur ne soit lié par un contrat de vente de biens ou de fourniture de services, le professionnel communique au consommateur, de manière lisible et compréhensible les informations suivantes »*. S'ensuit une longue num ration d' l ments devant obligatoirement tre transmis au consommateur pr alablement la signature du contrat. En outre, le Code de la consommation regorge d'obligations sp ciales d'information ayant trait par exemple la vente distance et au d marchage domicile [3], ou encore au cr dit la consommation [4]. La politique de consommation repose donc prioritairement sur la volont de fournir au consommateur un maximum d'informations, plus ou moins pertinentes, et au risque parfois de le submerger.

Les r formes successives du droit de la consommation s'inscrivent dans cette lign e. Mentionnons titre d'exemple la loi du 9 juillet 2001 « relative aux communications lectroniques et aux services de communications audiovisuelles », qui ajoute une section intitul e « contrats de services de communications lectroniques » aux article L.121-83 et suivants du Code de la consommation. Ces dispositions mettent la charge du fournisseur de services de communications lectroniques une obligation d'information renforc e,

[3] L'article L.121-16 du Code de la consommation définit la notion de *contrat conclu distance et hors tablissement*, tandis que l'article L.121-17 énumère les informations devant être transmises au consommateur.

[4] Des dispositions particulières sont prévues aux articles L.311-6 et L.311-7 du Code de la consommation. Le premier texte prévoit que *« pr alablement la conclusion du contrat de cr dit, le pr teur ou l'interm diaire de cr dit donne l'emprunteur, par crit ou sur un autre support durable, les informations n cessaires la comparaison de diff rentes offres et permettant l'emprunteur, compte tenu de ses pr f rences, d'appr hender clairement l' tendue de son engagement (...) »*.

portant notamment sur la dur e du contrat, les tarifs pratiqu s, les frais de r siliation, les modes de r glements des diff rends etc. Plus r cemment, la loi du 17 mars 2014 comportant un chapitre II intitul « am liorer l'information et renforcer les droits contractuels des consommateurs et soutenir la durabilit et la r parabilit des produits » d taille dans diverses dispositions les informations devant tre fournies au consommateur au stade pr -contractuel.

Le droit de la consommation tel qu'il merge en France dans les ann es 1970, et tel qu'il est encore con u aujourd'hui, a donc pour mission premi re de prot ger le consommateur contre les ventuels abus d'un professionnel en position de force. Les apports de l' conomie comportementale au cours des derni res d cennies m nent penser que le r le du droit de la consommation ne se cantonne pas r duire l'asym trie propre la relation de consommation.

1.2 L' clairage de l' conomie comportementale : la n cessit de prot ger le consommateur contre ses propres faiblesses

L' conomie comportementale apporte un clairage nouveau sur la relation de consommation[5] : ce n'est plus uniquement l'inf riorit du consommateur face au professionnel qui soul ve des difficult s, mais aussi les d faillances intrins ques chaque agent. Le constat que le mod le classique de l'agent parfaitement rationnel et maximisateur ne permet pas de d crire et encore moins de pr dire le comportement r el des consommateurs s'est progressivement g n ralis . La doctrine observe de fa on quasi-unanime que le consommateur r el a peu de points communs avec l'agent rationnel des mod les classiques (1.2.1). Du constat th orique aux pr conisations de politiques conomiques, le pas n'est pas vident franchir : les cons quences en termes de politique consum riste font l'objet d'intarissables d bats (1.2.2).

[5]Sur les apports de l'économie comportementale du droit, au-delà de la question consumériste, voir Jolls, Sunstein et Thaler (1998) [86].

1.2.1 Un constat unanime : le r le pr pond rant des biais cognitifs des agents dans la prise de d cision

Partant du constat que les consommateurs sont tr s loign s du paradigme de l'agent co-nomique parfaitement rationnel, les travaux doctrinaux (section 1.2.1.1) aussi bien que les instances politiques (section 1.2.1.2) se sont interrog s sur une politique de consommation adapt e. Les retomb es concr tes sont pourtant demeur es timides (section 1.2.1.3).

1.2.1.1 Le reœu l d l'hypoth se de rationalit parfaite d sa la th orie o nomique

Les avanc es th oriques. Depuis les travaux fondateurs de Simon en 1957 [139] puis de Kahneman et Tversky partir des ann es 1970 [91] et [159] il est unanimement admis que les agents disposent d'une rationalit limit e. Le processus d cisionnel n'est plus per u comme une succession d' tapes parfaitement logiques et coh rentes, mais au contraire comme un enchev trement de raisonnements, d' motions, d'erreurs et d'approximations (Janis & Mann (1979) [82]).

Dans cette perspective, les motions peuvent jouer des r les vari s dans la prise de d cision, comme l'a notamment soulign Elster (1996) dans un article intitul ffRationality and the Emotionsffi[52]. L'auteur recense sept fa ons dont les motions peuvent interf rer dans un processus consid r comme rationnel. Deux grandes tendance nous int resseront plus particuli rement. Selon une premi re approche, les motions refl tent une intuition profonde qui ne serait pas accessible par un raisonnement purement rationnel. Les motions servent alors de guide la prise de d cision et deviennent paradoxalement une b quille sur lesquelles les agents peuvent s'appuyer en cas d faillance de la rationalit , en leur donnant acc s des informations qui chappent la raison. Elster (1996) r sume cette situation : *"Fifthly, some argue that emotions promote rational decision-making by acting as tie-breakers in case of indeterminacy. Sixthly, some argue that emotions promote rational decision-making by providing information that is otherwise unavailable"* (page 1391). Dans le m me ordre d'id e, Hirshleifer (1984) [74] soutient que les carts par rapport au mod le de l'homo œconomicus peuvent pr senter un avantage conomique. *"The economist must go*

beyond the economic man, precisely because of the advantage of not behaving like economic man" (page 21). L'auteur fournit des exemples attestant qu'un comportement *a priori* non utilitariste peut aboutir un r sultat conomiquement rationnel. Selon une premi re approche, les motions sont donc un compl ment, voire m me un palliatif, la rationali .

La th se oppos e, plus classique, selon laquelle les motions constituent au contraire une entrave une prise de d cision rationnelle, est galement envisageable. Elles sont ce titre nuisibles et m ritent d' tre ma tris es. Ainsi Elster (1996) mentionne-t-il : *"Seventhly, however, one might argue more conventionally that emotions interfere negatively with belief formation by inducing self-serving or overly optimistic beliefs"* (page 1391). L'objet de la th se consiste d crire les cons quences des biais des consommateurs sur l' quilibre du march et d'envisager les politiques pertinentes pour y rem dier en cas de besoin. Dans cette perspective, les motions sont consid r es comme une source d'erreur, et ce plusieurs titres : elles conduisent des croyances erron es d'abord, et entra nent un comportement incoh rent au regard de ces croyances ensuite. Le postulat implicite dans la th se est donc que les motions, parmi d'autres ph nom nes, loignent les agents du choix optimal qui serait celui d'un acteur parfaitement rationnel. La th se s'int resse plus particuli rement aux biais et erreurs du consommateurs.

Le consommateur moyen a spontan ment recours des heuristiques lui permettant, malgr l'abondance d'informations et la complexit du contexte, de prendre une d cision jug e satisfaisante[6]. Si les heuristiques aident la prise de d cision, elles constituent aussi bien souvent une source d'erreur, comme le soulignent Thaler & Sunstein (2008) dans leur ouvrage *Nudge* [158]. Biais en faveur du status quo, effet de cadrage, effet d'ancrage, exc s de confiance en soi ou encore biais de repr sentativit ou biais de disponibilit sont autant de ph nom nes psychologiques loignant les agents d'un processus rationnel de prise de d cision[7]. ĳ nsi certains auteurs comme Rabin (2002) [122] ont-ils milit pour une prise en compte syst matique des apports de l' conomie comportementale dans l'ensemble de la science conomique. Sans n cessairement remettre en question la pertinence de la th orie

[6]Korobkin & Ulen (2000) résument ainsi : *ffThere is simply too much experimental evidence that individuals frequently act in ways that are incompatible with the assumptions of rational choice theoryff*[98](page 1055).

[7]Pour une explication des processus cognitifs à l'œuvre, voir *Thinking fast and Slow* de Kahneman [92].

classique dans certains champs disciplinaires, la prise en compte de la rationalit limit e du consommateur s'est progressivement impos e comme une vidence. Certains auteurs vont m me jusqu' consid rer que le paradigme d'un consommateur biais face une firme rationnelle serait devenu la norme dans les mod les d' conomie industrielle. Tel est notamment le point de vue d'Ellison (2006) [50] : *"In the recent psychology and economics-motivated literature the rational firm-irrational consumer assumption has become the norm, and the question of what firms do to exploit irrationality is often the primary focus"*.

Les consommateurs constituent en effet une proie particuli rement vuln rable : amen s prendre un grand nombre de d cisions dans des secteurs parfois complexes, ils ne sont pas en mesure de r colter et traiter toute l'information pertinente. Korobkin (2003) [97] insiste sur le grand nombre de dimensions que les agents doivent consid rer dans chaque contrat de consommation. Il montre que les consommateurs n'ont ni les capacit s cognitives, ni les incitations conomiques pour tudier l'ensemble des dimensions du contrat. Ils se concentrent donc prioritairement sur les clauses saillantes, qui ne sont pas n cessairement les plus importantes. Comme le souligne Issacharoff (2010) [81], le consommateur risque alors de se faire exploiter par une firme qui, pour sa part, a des incitations soigner l'ensemble des dispositions contractuelles. L'auteur insiste sur l'inefficacit des obligations d'information pour prot ger un consommateur biais , qui ne sera pas en mesure de traiter l'ensemble des donn es. Certains vont d'ailleurs jusqu' mettre en garde contre les dangers de telles obligations. H llman (2007) [72] souligne que les obligations d'informations pourraient paradoxalement aboutir prot ger le professionnel contre toute action en responsabilit de la part du consommateur : il suffirait de prouver que l'information a t fournie pour viter que sa responsabilit soit engag e.

La remise en a use de l'ap roche t assique du droit de la o nsommation. La prise en consid ration de la rationlit limit e du consommateur est lourde de cons quences quant la politique l gislative mettre en œuvre. Comme l'expliquent Barr, Mullainathan & Shafir (2013) [15] la simple mise disposition d'informations ne garantit pas la qualit de la d cision finale : *"Information cannot be thought of as naturally yielding knowledge, and knowledge cannot be assumed to generate the requisite behavior"*(page 442). Ce constat

remet en question la pertinence des obligations d'information la charge du professionnel.

De fa on similaire, Faure & Luth (2011) [54] insistent sur l'incapacit du consommateur traiter toutes les informations auxquelles la loi lui garantit l'acc s. Les auteurs estiment que l'approche traditionnelle du droit de la consommation n'est gu re pertinente. Ils pr - conisent une intervention substantielle du l gislateur, c'est- -dire un contr le du contenu des contrats, qui seraient soumis l'approbation pr alable d'une autorit administrative.

Dans la m me ligne de pens e, Ben-Shahar & Schneider [23] consacrent un ouvrage au risque de surcharge informationnelle pesant sur le consommateur. Constatant que l'acc s et le traitement de l'information repr sentent n cessairement un co t, les auteurs montrent que ce co t, dans le cas des contrats de consommation portant sur un faible montant, exc de largement le gain potentiel qui en d coule.

Il est remarquable que certaines institutions se soient galement saisies du probl me de la surcharge informationnelle. Le rapport au titre particuli rement explicite du Better Executive and National Consumer Council intitul « Warning : Too much information can harm »[69] est r v lateur du malaise des pouvoirs publics. Les auteurs y insistent sur l'importance de la qualit de l'information, qui doit tre accessible et ais ment utilisable. Ils proposent d'utiliser avec parcimonie et discernement les obligations d'information, afin d' viter de potentiels effets pervers. Le rapport envisage un test en cinq tapes, qui permettrait au gouvernement de v rifier *ex ante* la pertinence de l'information pour le consommateur.

Ce rapport ne constitue qu'une illustration d'une tendance g n rale : les avanc es th o- riques et la prise en compte par la doctrine des biais de rationalit ont eu de nombreux chos aupr s des institutions.

1.2.1.2 La prise de conscience par les institutions politiques

Que ce soit l' chelle nationale ou internationale, les avanc es th oriques de l' conomie comportementale sont prises en compte par les pouvoirs publics. des degr s divers, les institutions nationales aussi bien qu'internationales semblent se pr occuper des apports potentiels de l' conomie comportementale.

A l' ch lle Europ enne. Au niveau europ en, il convient de mentionner les nombreux rapports qui mettent en vidence le r le pr pond rant des biais de rationalit dans le comportement des agents. iA nsi celui de la Commission Europ enne intitul *"Applying Behavioural Sciences to Policy-making"* [162] est-t-il particuli rement difiant. De m me, le rapport du Joint Research Group intitul *"Behavioural Insights Applied to Policy"* [111] refl te l'int r t croissant des institutions pour les question li es aux approches comportementales. Dans ce dernier rapport, les auteurs passent en revue d'innombrables politiques guid es par les sciences comportementales au sein de divers pays europ ens, dans des domaines aussi vari s que les transports, la concurrence, la sant , l'environnement ou l'emploi. Comme en attestent ces exemples, la pr occupation des institutions est d'irriguer toutes les politiques publiques de l'apport des sciences comportementales. Cette approche prouve que ces derni res ne sont plus per ues comme un champ disciplinaire part, mais au contraire comme une approche indispensable de toute politique publique.

Au del des publications th oriques, certaines initiatives de la Commission europ enne m ritent d' tre mentionn es. La Commission a mis en place un site web d'apprentissage la consommation[8]. Si l'impact de cette mesure reste d licat valuer, la d marche est pour sa part difiante : l'acte de consommation n'est plus per u comme une activit anodine, instinctive et simple. Il doit au contraire faire l'objet d'un enseignement, qui incombe en partie aux pouvoirs publics.

A l' ch lle a tionale. Au niveau national, il est remarquable que certains pays aient int gr au sein de leur gouvernement des quipes charg es de r fl chir aux implications des sciences comportementales sur les politiques publiques. Le pionnier en la mati re a t le Royaume-bU i, qui int gra son gouvernement d s 2010 le Behavioral Insight Team. Cette instance, partiellement privatis e depuis, est aujourd'hui d tach e du gouvernement mais poursuit des missions d'int r t public pour les minist res. Famili rement baptis e la premi re « Nudge Unit », le Behavioral Insight Team a inspir plusieurs pays.

Les Etats-bU is ont emprunt la voie trac e quelques ann es plus t t par le Royaume-bU i. Fond en 2014, le Social and Behavioral Science Team, plac sous l' gide du National

[8]Le site est accessible à l'adresse suivante : http ://www.consumerclassroom.eu/.

Science and Technology Council, fait partie de Bureau Ex cutif du pr sident. Le Social and Behavioral Science Team est investi d'une double mission. Son objectif premier est d'aider les citoyens prendre les bonnes d cisions dans divers domaines, par exemple en mati re d' pargne, d'emprunt, d'inscription l'universit etc. Citons ici un exemple de mesure adopt e pour inciter les agents pargner. Selon le premier rapport annuel du Social and Behavioral Science Team, l'envoi d'un simple courrier lectronique aux agents f d raux permet de doubler le taux de participation au plan d' pargne *"Thrift Saving Plan"*[144]. La seconde mission du Social and Behavioral Science Team consiste int grer les avanc es des sciences comportementales dans tous les domaines de r gulation afin de rendre les politiques publiques plus efficaces. Le but poursuivi par le gouvernement am ricain est donc de faire en sorte que les sciences comportementales ne se cantonnent pas un d partement unique, mais qu'elles irriguent au contraire l'ensemble des actions du Gouvernement. Dans cette perspective, le Pr sident Obama, dans un d cret du 15 septembre 2015, insiste sur l'utilisation des sciences comportementales par toutes les instances gouvernementales [9].

D'autres pays ont manifest leur intention d'aller dans la m me direction. Ainsi Angela Merkel a-t-elle indiqu qu'elle comptait s'inspirer de l'exemple anglo-saxon pour int grer son gouvernement une quipe sp cialis es en sciences comportementales[10]. En France, si le gouvernement n'est pas all jusqu' int grer une quipe enti rement d di e aux sciences comportementales, il n'est pas rest indiff rent la question. Le rapport publi par la Conseil d'Analyse Economique en septembre 2012 [61] est r v lateur des pr occupations actuelles du l gislateur fran ais : *« cette vision comportementale de l'agent économique qui considère que le consommateur n'est pas parfaitement rationnel est susceptible de créer un arbitrage entre deux objectifs : protéger le consommateur d'un côté, et préserver le droit de choisir en toute responsabilité de l'autre »*. Concilier la protection du consommateur contre ses propres faiblesses, sans porter atteinte sa libert de choix, tel est le nouveau

[9]Le décret *Using Behavioral Science Insight to Better Serve the American People* est disponible sur le site de la Maison Blanche à l'adresse suivante : https ://www.whitehouse.gov/the-press-o ce/2015/09/15/executive-order-using-behavioral-science-insights-better-serve-american

[10]Article du journal *Die Welt* du 12 mars 2015 intitulé *Merkel will die Deutschen durch Nudging erziehen* (http ://www.welt.de/wirtschaft/article138326984/Merkel-will-die-Deutschen-durch-Nudging-erziehen.html).

d fi du l gislateur.

Au niveau th orique, les apports de l' conomie comportementale la politique de consommation ne sont plus contest s. Les innombrables rapports publi s par les institutions aussi bien que par les chercheurs s'accordent sur l'imp rieuse n cessit de prendre en consid ration le comportement r el des agents. Pour autant, l'int gration concr te de ces donn es dans le droit positif n'est pas une t che ais e.

1.2.1.3 Qu lqu s exemþ es de retomb es o nc tes

A ce jour, les mesures concr tes pour incorporer les enseignements de l' conomie comportementale dans le droit de la consommation restent timides. Certaines avanc es m ritent toutefois d' tre mentionn es.

La r glementation du recours aux options par d faut constitue une r ponse au biais du statu quo. Partant du constat que les consommateurs changent rarement l'option par d faut, une directive europ enne du 25 octobre 2011 a limit les possibilit s d'utiliser de telles pratiques sur internet[11]. Les consommateurs tant galement sensibles un effet de cadrage, la Commission Europ enne est intervenue pour encadrer la fa on dont les informations nutritionnelles sont pr sent es sur les produits alimentaires. Il a t observ que les consommateurs r agissent de fa on plus favorable une indication du type *« à 80 % sans matières grasses »* plut t qu' la m me information nonc e sous la forme *« Seulement 20 % de matière de grasses »*. Afin d'inciter les agents r duire la consommation de produits riches en mati res grasses, un r glement europ en de 2006 a interdit toute mention du type *« à X % sans matières grasses »* [12]. Toujours en Europe, en r ponse l'impulsivit des agents, un droit de r tractation a t mis en place au profit des consommateurs.

[11] La directive 2011/83/UE relative aux droits des consommateurs du 25 octobre 2011 prévoit ainsi en son article 22 : *ffAvant que le consommateur soit li par un contrat ou une offre, le professionnel doit obtenir le consentement expr s du consommateur tout paiement suppl mentaire la r mun ration convenue au titre de l'obligation contractuelle principale du professionnel. Si le professionnel n'a pas obtenu le consentement expr s du consommateur, mais qu'il l'a d duit en ayant recours des options par d faut que le consommateur doit rejeter pour viter le paiement suppl mentaire, le consommateur peut pr tendre au remboursement de ce paiementff*

[12] Annexe du règlement CE N 1924/2006 du Parlement Européen et du Conseil en date du 20 décembre 2006

La directive pr cit e du 25 octobre 2011 a rallong de sept quatorze jours ce d lai de r tractation [13].

Des mesures plus originales ont parfois t mises en œuvre dans d'autres pays europ ens. Le Danemark, la Su de et la N rv ge ont adopt un logo commun pour signaler les aliments consid r s comme particuli rement sains. Dans un souci de lutte contre l'ob sit , et afin d'encourager la consommation de produits sains, le label « Green Keyhole » a t cr . Cette mesure simple joue sur la saillance des informations : le logo r sume lui seul un certain nombre de crit res jug s pertinents pour les consommateurs soucieux de leur sant . Egalement dans le domaine de la sant , l'Islande fut le premier pays r glementer la pr sentation en magasin des produits contenant du tabac. Les paquets de cigarettes doivent depuis 2001 tre stock s l'abri du regard des consommateurs. De nombreux pays ont suivi cette voie en r glementant, des degr s variables, la disposition des produits contenant du tabac dans les magasins (mentionnons sans pr tendre l'exhaustivit la Tha lande, la Croatie, le Canada, l'Australie etc.). Cette mesure joue sur l'architecture du choix : le simple fait de ne pas mettre en vidence les produits dangereux pourrait en r duire la consommation. Mentionnons enfin le cas du Gouvernement estonien, qui a mis la disposition des citoyens un « calculateur de sel » pour leur permettre de comparer facilement la dose de sel contenu dans leur alimentation. Comme le souligne le rapport europ en susmentionn « Behavioral Insights Applied to Policy »[111] cette mesure repose sur des leviers comportementaux tels que la saillance et la personnalisation (page 23).

Certaines mesures l gislatives et r glementaires t moignent de la volont des pouvoirs publics d'incorporer dans le syst me juridique les apports de l' conomie comportementale. Ces mesures restent n anmoins anecdotiques. Les propositions concr tes pour incorporer les avanc es de l' conomie comportementales dans le droit positif demeurent h las timides. Cette timidit a deux sources : en premier lieu la difficult formuler un constat clair et g n ral. Comme le souligne Rachlinski (2003) [123], les mesures de politiques publiques mettre en œuvre d pendent avant tout des caract ristiques du march concern . Aucune

[13]La pertinence de cette mesure, face à des consommateurs potentiellement sensibles à l'e et de dotation est discutable. Il est en e et à craindre que la propension à retourner un bien diminue avec le temps écoulé depuis l'achat. Compte tenu de ce biais, la politique opposée, consistant à laisser un délai de rétractation bref, aurait pu être une autre piste

recommandation syst matique ne pouvant tre formul e, toute r gulation doit tre soigneusement valu e au regard du contexte. En second lieu, il n'existe aucun consensus sur le r le du l gislateur face aux biais de rationalit des citoyens. Incombe-t-il au l gislateur de prot ger les citoyens, et plus particuli rement les consommateurs, contre leurs propres erreurs ? A cette vaste question, nous tenterons d'apporter des l ments de r ponse dans les sections suivantes.

1.2.2 Des cons quences d battues : le r le contest du l gislateur face aux biais des consommateurs

Le r le du droit de la consommation se trouve renouvel par les apports de l' conomie comportementale. Il ne s'agit pas uniquement de prot ger le consommateur contre les ventuels abus de son cocontractant, mais aussi contre ses propres faiblesses. L'enjeu consiste trouver un arbitrage entre la protection des agents et la pr servation de leur libert . Dans cette perspective, le paternalisme lib ral et le d biaisement sont les deux voies envisageables (section 1.2.2.1), mais font l'objet de vives critiques. Apr s avoir mentionn les arguments qui s'opposent toute intervention du r gulateur (section 1.2.2.2), nous pr senterons la position d fendue par la pr sente th se (1.2.2.3).

1.2.2.1 Lutter contre les biais cognitifs : paternalisme lib ral et d biaisement

Le paternalisme lib ral comme condition de la libert individuelle. Plusieurs concepts ont t forg s par la doctrine pour trouver une fa on d'aider les agents prendre une d cision jug e meilleure, sans porter une atteinte substantielle leur libert individuelle. Ainsi en est-il du *paternalisme asymétrique*, d fini par Camerer et al. [31] comme toute r gulation qui cr e des b n fices importants pour ceux qui en profitent, sans nuire aux autres agents[14]. La notion de paternalisme asym trique est *a priori* s duisante et semble r pondre parfaitement au d fi du l gislateur : par d finition, le paternalisme asym trique

[14]La définition proposée par Camerer et al. est précisément la suivante : *« A regulation is asymetrically paternalistic if it creates large benefits for those who make errors, while imposing little or no harm on those who are fully rational »*[31](page 1112).

permet d'aider le consommateur prendre la bonne d cision sans entraver sa libert . C'est que le concept p che par une certaine circularit . Les auteurs ont en effet d fini la notion par les r sultats qu'elle permet d'atteindre, sans apporter de pr cision sur les moyens mettre en œuvre. Le concept de paternalisme asym trique pr sente une autre lacune : de nombreuses mesures sont difficiles classer entre politique paternaliste et lutte contre des externalit s n gatives. Pour ces deux raisons, la notion de paternalisme lib ral semble plus convaincante.

Sunstein & Thaler (2003) [154] proposent de d finir le *"libertarian paternalism"* (traduit en fran ais par paternalisme lib ral) comme l'ensemble des mesures qui aident les agents prendre les bonnes d cisions, *selon leurs propres critères*, tout en leur laissant la possibilit de ne pas utiliser le m canisme qui leur est propos .[15] Dans l'expression *« libertarian paternalism »*, le substantif *paternalism* renvoie l'intervention dans le choix des agents, tandis que l'adjectif *libertarian* refl te la volont de pr server int gralement la libert de choix de chacun [16]. Il s'agit donc d'un paternalisme faible dans la mesure o les agents restent *in fine* libre de leur choix. Le concept de paternalisme lib ral a t longuement d velopp dans l'ouvrage *Nudge* [158].

Les auteurs y insistent notamment sur l'in luctabilit de la manipulation des agents biais s. Sunstein & Thaler soutiennent en effet que l'architecture du choix, c'est- -dire la fa on dont les diff rentes options sont pr sent es, a n cessairement un impact sur la d cision finale des agents (Nudge, chapitre 5, pages 86 et suivantes). Or il n'existe aucune pr sentation neutre des choix, si bien que la manipulation des biais par l'architecte du choix est in vitable. Cet argument est galement d velopp dans le c l bre article « Libertarian paternalism is not an oxymoron »(Sunstein & Thaler, 2003 [153]). D s lors, la question n'est pas tant de savoir si les agents vont tre manipul s, mais plut t de d terminer par qui. Prenons l'exemple des consommateurs dans une situation de choix, qui peuvent tre manipul s soit par leurs cocontractants (par exemple une firme), soit par l'Etat. A priori, un agent priv est peu soucieux du bien- tre des citoyens, tandis que l'Etat s'attachera

[15] Dans la présente thèse, nous utiliserons la traduction « paternalisme libéral ».

[16] Ainsi Sunstein & Thaler (2003) expliquent-ils précisément l'ambition du paternalisme libertarien : *fiIt tries to influence choices in a way that will make choosers better off, as judged by themselves. (...) People should be free to opt out of specified arrangements if they choose to do soff* [154] (pages 1161 et 1162).

au contraire organiser l'architecture du choix de fa on ce que les citoyens prennent la meilleure d cision pour eux-m mes et selon leurs propres crit res. L'exemple mentionn plus haut concernant la pr sentation du taux de mati re grasse dans les produits laitiers est loquent. Puisqu'il n'existe pas de r daction neutre, l'architecte de choix manipule n cessairement la d cision de consommation. Il choisit entre une premi re r daction qui incite la consommation de mati res grasses, ou seconde qui rend au contraire plus saillante l'information et tend r duire la consommation des produits concern s.

Allant encore plus loin, Sunstein & Thaler (2003 [154] [153] et 2008 [158]) soutiennent que l'intervention du r gulateur est une condition de r alisation de la libert effective des agents. En pr sence de biais de rationalit , les agents ne disposent que d'une libert th orique et sont en r alit ali n s par leurs limitations cognitives. Il incombe alors au r gulateur de permettre chacun d'atteindre une libert r elle et effective. Paradoxalement, l'intervention du r gulateur devient dans cette perspective une condition de l'exercice des libert s individuelles. Il s'agit, pour reprendre l'expression de Deffains et Ferey (2014) [38] du *"rôle du droit dans la création des conditions cognitives de la liberté"* (page 271).

Le d b aisement. Le d biaisement ou redressement cognitif, selon la terminologie utilis e par Deffains & Ferey (2014) [38] consiste rendre les individus conscients de leurs erreurs afin de leur permettre de se comporter de fa on coh rente avec leurs propres pr f - rences. L'objectif est de *« fournir aux individus les moyens cognitifs pour lutter contre les heuristiques et les biais »* (Ferey, 2011 [55]). Le d biaisement partage donc avec le paternalisme lib ral un objectif commun : limiter les cons quences des biais de rationalit des agents. Les deux tendent faire en sorte que les agents biais s, notamment les consommateurs dans les cas qui nous int ressent plus particuli rement, ne soient plus sujets aux biais et erreurs de raisonnement.

Si le paternalisme lib ral et le d biaisement poursuivent un m me but, les m thodes employ es divergent fondamentalement, du moins th oriquement. Comme le soulignent Ferey & Deffains (2014) [38], le paternalisme lib ral consiste utiliser (bon escient selon les crit res du r gulateur) les biais des agents pour orienter leurs choix. Il s'agit en somme d'une manipulation pour le bien des individus. Le d biaisement au contraire tend

r v ler aux agents leurs erreurs afin de leur permettre de les corriger par eux-m mes. A la manipulation s'oppose la transparence.

Pour l'essentiel, le d biaisement consiste fournir des informations au consommateur sur son propre comportement et le mettre en garde contre certaines erreurs. On songe ici aux nombreuses obligations d'information la charge du professionnel dans les relations de consommation. Si certaines dispositions tendent r sorber une simple asym trie d'information entre les agents[17], d'autres peuvent s'analyser comme des mesures de d biaisement. La directive europ enne du 30 avril 2004 concernant les march s d'instruments financiers contraints les op rateurs mettre en œuvre des politiques de d biaisement. Le but est de permettre chaque investisseur potentiel de mieux conna tre son profil d'investisseur et de prendre une d cision adapt e [18]. D'autres propositions de r gulation, encore au stade de projet ce jour, peuvent galement s'analyser en des mesures de d biaisement. Dans le rapport du Conseil d'A alyse d'Analyse Economique pr cit [61], les auteurs sugg rent que les consommateurs aient le droit d'obtenir gratuitement de leur fournisseur, et dans un format standardis , l'historique de leur consommation et facturation (notamment dans le domaine de la t l phonie, de l'Internet, de l' nergie et des services financiers). Afin que des entreprises concurrentes ou des interm diaires puissent informer le consommateur sur les alternatives disponibles, ces fichiers doivent pouvoir tre t l charg s par des tiers qui le consommateur en donne le droit (proposition 4 du rapport). Cette mesure constitue bien une politique de d biaisement : l'objectif est de permettre au consommateur d'avoir connaissance de sa propre consommation. Le document r capitulatif devrait permettre d' viter les biais d'optimisme, la sous-estimation de la consommation ou d'autres erreurs r currentes. De fa on g n rale, toutes les mesures inspir es de la r glementation RECAP (*Re*cord, *E*valuate, *C*ompare *A*lternative *P*rices) telle que d finie par Sunstein & Thaler (2008) [158] (page 99), permettant de comparer un produit avec les biens ou services des

[17] Mentionnons à titre d'exemple l'obligation d'information sur l'absence de délai de rétractation dans certains contrats. Cette obligation d'information est prévue par l'arrêté du 1 décembre 2014 relatif aux modalités d'information sur l'absence de délai de rétractation au bénéfice du consommateur dans les foires et salons. Il s'agit ici simplement d'informer le consommateur sur l'étendue de ses droits dans un contexte d'asymétrie informationnelle flagrant.

[18] Cet exemple développé dans le chapitre 2, section 2.6.3.2

concurrents, constituent des politiques de d biaisement[19].

La dichotomie en apparence tranch e entre d biaisement et paternalisme lib ral m rite toutefois d' tre nuanc e. Certaines interventions ne se classent pas ais ment dans l'une ou l'autre des cat gories. Dans le rapport pr cit du CAE [61], les auteurs proposent galement la mise en place d'une plate-forme de *rating* en ligne administr e par la Direction G n - rale de la Concurrence, de la Consommation et de la R pression des Fraudes (DGCCRF). Cette plate-forme permettrait aux consommateurs d'avoir facilement et gratuitement acc s une information centralis e, neutre, et fiable. Ce type de mesure, rev t une dimension paternaliste, tout en permettant de d biaiser les agents. Le paternalisme r side dans les arbitrages qui seront n cessairement op r s par l'architecte de choix. La pr sentation n' tant jamais neutre, la plate-forme orienterait in vitablement la d cision des consommateurs. Ce constat s'impose d'ailleurs pour tout outil destin informer les agents. N anmoins, il s'agit galement d'une mesure de redressement cognitif, dans la mesure o l'objectif est de permettre aux agents de prendre par eux-m me une d cision non biais e, avec toute l'information pertinente. De m me, l'obligation faite aux compagnies a rienne en Grande-Bretagne d'afficher d s le d but du processus d'achat les surco t li s au paiement par carte est la fois une mesure de d biaisement et une politique paternaliste [20]. Le d biaisement consiste mettre les consommateurs en situation de faire un choix clair d s le d but du processus d cisionnel. La dimension paternaliste r side pour sa part dans le fait que le cadrage du prix est en partie d cid par le r gulateur.

Ces quelques exemples montrent que la fronti re entre d biaisement et paternalisme lib ral n'est pas toujours ais e tracer. Certains auteurs adoptent d'ailleurs une acception large du d biaisement, qui semble int grer le paternalisme lib ral. Kahn, Luce & Nowlis (2006) [88] distinguent le d biaisement direct du d biaisement indirect. Le d biaisement direct, qui consisterait mettre en lumi re les erreurs de choix des agents afin de les inciter prendre des d cisions plus coh rentes, ne serait envisageable que pour les biais dont les

[19]Pour de plus amples développement sur ces réglementations, voir la section 2.6.3.2.

[20]Pour plus de détails sur cet exemple, voir section 2.6.3.2 et OFT Press release 58/12 (5 July 2012) : "Airlines to scrap debit card surcharges following OFT enforcement action", disponible à l'adresse suivante : http ://webarchive.nationalarchives.gov.uk/20140402142426/http :/www.oft.gov.uk/news-and-updates/press/2012/58-12.

agents ont conscience ou, tout le moins, peuvent prendre conscience. Le d biaisement indirect en revanche, qui consiste agir sur le contexte de choix, serait efficace y compris lorsque les agents n'ont pas conscience de leurs erreurs. Dans cette derni re acception, le d biaisement se rapproche du paternalisme lib ral, puisqu'il implique une forme de manipulation.

Paternalisme et d biaisement deviennent alors, de fa on paradoxale, une condition d'exercice de la libert . Ce constat est paradoxal dans la mesure o la libert repose sur une manipulation dont les agents n'ont pas conscience. Toute la difficult consiste alors d terminer jusqu'o une telle manipulation est justifiable, au nom de la poursuite du bien- tre de chacun. A cette question, les libertariens r pondent de fa on simple et tranch e : toute atteinte la libert individuelle est non seulement injustifiable, mais galement dangereuse.

1.2.2.2 Les d g ers all gu s de toute intervention paternaliste ou d red essement o gnitif

Les tenants du lib ralisme avancent plusieurs s ries d'arguments pour contester la l gitimit , l'efficacit , ou l'utilit des mesures de paternalisme lib ral, et dans une moindre mesure des politiques de d biaisement.

La o ntestation de la l gitim des interventions dans les choix individuels. La premi re critique majeure adress e au paternalisme lib ral r side dans la difficult , r elle ou suppos e, mener une analyse de bien- tre en pr sence de biais de rationalit . D'apr s les opposants toute mesure paternaliste ou de redressement cognitif, le planificateur social n'aurait pas les informations n cessaires pour se prononcer sur les pr f rences r elles des agents, dans la mesure o rien ne lui permettrait de d terminer, dans un contexte o ces pr f rences sont changeantes, lesquelles doivent tre privil gi es. Saint-Paul (2011) [132] consid re pour sa part que le r gulateur n'a ni les informations ni la l gitimit pour ordonner les pr f rences des agents. Une telle t che impliquerait que le r gulateur se livre un classement des fonctions d'utilit , gr ce une *« méta fonction d'utilité »*, qui n'existe

pas [21]. D s lors, aucune mesure du bien- tre ne serait envisageable et par cons quent aucune intervention du r gulateur.

Rappelons en effet que toute assertion sur les cons quences d'une politique publique en termes de bien- tre social repose sur l'axiome des pr f rences r v l es. D velopp par Samuelson (1938 [133] et 1948 [134]), l'axiome des pr f rences r v l es nous enseigne que les choix observables des agents permettent d'en d duire leurs pr f rences. Cet axiome, simple en apparence, est la condition fondamentale rendant possible toute assertion sur la variation de bien- tre suite la mise en œuvre d'une politique publique : c'est parce que les choix individuels ne sont que le reflets des pr f rences que l'on peut calculer et comparer, gr ce l'observation de ces choix, le bien- tre social avant et apr s la mise en œuvre d'une politique publique. En d'autres termes, si nous souhaitons mesurer l'effet sur le bien- tre d'une politique de d biaisement en observant les simples choix des agents avant et apr s l'intervention du r gulateur, il est n cessaire de supposer que l'un de ces choix refl te les pr f rences des agents. D s lors que les choix des agents ne refl tent plus leurs pr f rences, toute mesure de la variation de bien- tre devient d licate. Or en pr sence de biais, il existe par hypoth se un d crochage entre les choix des agents et leur pr f rences. C'est ce d calage qui rend d licate toute recommandation de politique publique en pr sence d'agents non rationnels.

La mod lisation peut permettre de contourner cette difficult , notamment par le biais de deux m thodes alternatives. Certains auteurs traitent un agent unique dont les pr f - rences sont instables comme plusieurs agents en interaction. Les *« multi-selves models »* permettent de repr senter les pr f rences changeantes des agents, non conformes aux hy- poth ses conomiques classiques. La m thode consiste repr senter les agents comme un ensemble de joueurs distincts ayant chacun leurs pr f rences. Le processus de prise de d - cision s'apparente alors la solution d'un jeu au sens de la th orie des jeux, plut t qu'au r sultat d'un programme de maximisation. Depuis les travaux fondateurs de May (1954) [114], cette m thode est couramment utilis e aussi bien en conomie, qu'en psychologie

[21] *"It is impossible, in fact, to establish such a result, for one needs a criterion for comparing alternative utility functions ; that is, one would have to impose some 'meta-utility function' in order to tell us that a given utility function is better than another"* (page 87).

ou en marketing. La seconde strat gie envisageable consiste tablir une meta fonction d'utilit qui permettrait de classer les diff rentes fonctions de pr f rences. Par exemple, on peut estimer que les pr f rences long terme des agents sont plus stables, refl tent leur choix froid et r v lent donc leurs vraies pr f rences. Spiegler (2011) [147] adopte parfois cette d marche, tout en reconna ssant qu'elle implique n cessairement une dose d'arbitraire. Spiegler explique ainsi qu'en pr sence de biais de rationalit , le r gulateur doit n cessairement prendre partie en privil giant une fonction de pr f rence au d triment d'une autre. Par exemple, si l'on admet que les agents pr f rent, ou devraient pr f rer manger sainement, alors les politiques paternalistes tendant r duire la consommation de gras seraient l gitim es. Les opposants au paternalisme contestent pr cis ment ce postulat de d part : qu'est-ce qui permet d'affirmer que les agents pr f rent effectivement manger sainement ? Spiegler (2011) [147] estime que dans certains cas, notamment pour les addictions, notre jugement repose sur une simple intuition : *"Furthermore, in many cases our welfare judgement are aided by strong intuitions"* (page 20). Un tel jugement semble in vitable : *"There is no escape from such judgements when changing tastes seem to be an intrinsic aspect of the economic situation"*([147] page 20).

Les libertariens soutiennent que ces divers subterfuges ne r pondent pas un probl me fondamental : l'impossibilit d'une intervention de l'Etat dans la mesure o les pr f rences des agents ne peuvent pas tre d termin es. Cette critique essentielle porte sur la possibilit m me d'une intervention publique en pr sence d'agents biais s. Selon les libertariens, toute intervention du l gislateur reposerait in vitablement sur un jugement de valeur implicite concernant les pr f rences des agents. C'est pr cis ment ce jugement de valeur, qui n'aurait pas sa place au sein d'une analyse conomique scientifique et rigoureuse. En somme, la formule de Mill dans son ouvrage ffOn Libertyffi(1859) r sume parfaitement cette premi re critique, portant sur l gitimit des interventions paternalistes : *"Neither one person, nor any number of persons, is warranted in saying to another human creature of ripe years, that he shall not do with his life for his own benefit what he chooses to do with it."*

La contestation de l'efficacité des mesures tendant à orienter les choix individuels. Le deuxième argument des opposants au paternalisme a trait aux risques inhérents à toute intervention du régulateur. Est ici souligné le risque, inévitables selon certains, de dériver d'un paternalisme libéral vers un paternalisme liberticide. L'argument n'est guère nouveau puisque Jean Carbonnier s'inquiétait déjà, dans son ouvrage *Droit et Passion du Droit sous la Ve République* (1996) [32], des conséquences néfastes d'un excès de protection. Au sujet du droit de la consommation alors naissant, le doyen Carbonnier exprimait ses craintes en ces termes : *« Le droit de la consommation se signale également par des originalités ambiguës. D'abord il infantilise. Sa présomption diffuse est qu'en face du professionnel, le non-professionnel est comme un enfant (...). Le risque, pour la société, est que les adultes prennent l'habitude de se comporter en enfants »* (page 182). En somme, un excès de protection priverait les citoyens de leur faculté de réflexion et les maintiendrait dans un état de minorité.

Dans la littérature économique, le risque de s'engager sur une *« pente glissante »* a été souligné par Rizzo & Whitman (2007 [129] et 2009 [130]). Dans l'article intitulé *"Paternalist Slopes"* [129], les auteurs soutiennent que le paternalisme libéral, de par l'imprécision qui le caractérise, est particulièrement sujet au phénomène de la pente glissante. Ainsi les auteurs estiment que *"when words and concepts have fuzzy boundaries, it becomes difficult to defend sharp distinctions"*(page 7). Le risque serait d'autant plus grand que le législateur a souvent intérêt à légiférer des lois de façon relativement vague, afin de laisser aux juges une marge d'interprétation. Rizzo & Whitman (2009) [130] mettent en garde contre les dangers du paternalisme si le régulateur est sujet aux mêmes biais que les agents concernés par la régulation.

Les dangers de dérives et de réglementation excessive ont également été soulignés par d'autres auteurs, dont Glaeser (2006) [68] et Epstein (2006) [53]. Ce dernier propose le concept de *« rebiaising »* pour décrire une éventuelle manipulation des agents privés par la puissance publique. Si l'on prend en considération l'hétérogénéité des agents, il se peut qu'une mesure de débiaisement pour certains entraîne au contraire un « rebiaisement »pour d'autres individus (Epstein, 2006, [53] page 131). Loin de préserver la liberté individuelle,

comme le soutient Sunstein (1997), l'intervention publique porterait en elle un risque de manipulation et d'ali nation.

Au del de l'argument de la *pente glissante*, les interventions paternalistes entra neraient galement une deuxi me s rie de cons quences potentiellement dangereuses long terme. Une intervention trop pouss e du l gislateur supprimerait *de facto* toute possibilit de se tromper. Or c'est gr ce leurs erreurs que les citoyens apprennent, progressent et parviennent finalement des d cisions satisfaisantes. Eradiquer la possibilit m me d'une erreur conduirait supprimer le processus d'apprentissage. Cet argument rejoint la th se soutenue par Elster (1989) dans son ouvrage *Nuts and Blots for the Social Science* [51] (page 57) qui revendique une forme de droit l'erreur : *"The opportunity to choose, including the right to make wrong choices, is a valuable, in fact indispensable means to self-improvement"*. L'erreur permettrait de progresser et serait un des jalons indispensables du processus d'apprentissage.

Cette s rie d'arguments, selon laquelle trop de protection infantiliserait les citoyens et conduirait, *in fine*, les priver de leur libre arbitre, a t reprise r cemment par diff rents auteurs. Ainsi Klick & Mitchell (2006) [96] consid rent-ils que les mesures paternalistes ne permettent pas aux agents d'apprendre et appellent sans cesse davantage de r gulation. L'originalit de leur approche consiste appr hender les biais de rationalit comme un ph nom ne endog ne, d pendant de la r gulation en vigueur. Les auteurs soutiennent que la multiplication de mesures paternalistes conduirait in vitablement une augmentation des biais chez des agents ayant perdu toute autonomie. N anmoins, Klick & Mitchell (2006) apportent imm diatement une piste pour viter cet cueil. Ils distinguent les mesures proprement paternalistes, d'une part, des mesures de d biaisement, d'autre part. En duquant les agents, sans pour autant les guider dans leur choix, le r gulateur pourrait leur permettre de prendre, seuls, la bonne d cision. L' ducation des agents, par opposition des mesures proprement paternalistes, constituerait donc un moyen de les prot ger sans porter atteinte la libert de chacun.

La o ntestation de l'utilit des intervention paternalistes et de d biaisement. Une derni re s rie d'arguments consiste soutenir que le march fournit des r ponses

efficaces et suffisantes aux biais de rationalit des agents. Cette critique remet en cause l'utilit des mesures paternalistes. Divers auteurs d'horizons diff rents soutiennent que la remise en question de l'hypoth se de rationalit parfaite des agents n'implique pas n cessairement que le march ne serait pas un moyen d'allouer les ressources efficacement. L'argument est d clin aussi bien par les juristes que les conomistes. Selon Lucas de Leyssac & Parl ani, *« la spirale de vertu que la compétition installerait rendrait inutile la protection du consommateur par le droit »* (*Droit du marché*, Lucas de Leyssac & Parl ani, page 87, [36]). La m me id e est exprim e par Calais-Auloy & Temple dans leur manuel *Droit de la Consommation* [30] : *« Les professionnels sont les mieux placés pour renseigner les consommateurs. (...) Leur simple intérêt commercial les conduit à fournir spontanément des informations aux consommateurs »* (page 55).

De nombreux travaux en conomie aboutissent la m me conclusion. Par exemple Sudgen (2008) [151] explique que le march reste efficace en pr sence de pr f rences incoh - rentes. D'apr s cet auteur, la concurrence permettrait m me de r pondre aux incoh rences des agents. L'id e centrale de Sugden (2008) r side dans le fait que les firmes ont sans cesse des incitations r pondre aux demandes des consommateurs, quand bien m me leurs go ts seraient changeants [22]. L'id e selon laquelle le march fournirait de bonnes incitations aux firmes, m me en pr sence de consommateurs biais s, a galement t avanc e par Bebchuk & Posner [16]. Ces auteurs soutiennent que la r putation des firmes servirait de r gulateur sur le march . Dans la mesure o les firmes veulent prot ger leur r putation, elles n'auraient pas int r t exploiter les consommateurs biais s, mais seraient au contraire incit es les duquer. Dans ce contexte, l'intervention du r gulateur serait parfaitement inutile, et socialement co teuse. Le premier chapitre de la pr sente th se apporte des pistes de r - flexion sur la validit de ce type d'arguments en pr sence de consommateurs biais s. Il sera notamment d montr que la r putation ne peut servir d'incitation que sous des conditions tr s restrictives, qui ne sont pas coh rentes avec l'hypoth se de biais de rationalit (voir

[22] Sugden [151] soutient ainsi que le fonctionnement du marché n'implique aucunement que les consommateurs aient des préférences cohérentes : *ffthese market economies do show systematic and coherent responses to consumers' transient and incoherent preferences. (...) These properties of the market process give us grounds for confidence that mutually advantageous transactions will tend to be discovered and realized - even though we cannot specify the preferences that these transactions will satisfy.ff*

section 1.6.1.1).

Cet exemple illustre un ph nom ne plus g n ral : ce sont pr cis ment les biais de rationalit qui rendent difficile voire impossible la r gulation par le march . La notion de *« défaillance comportementale de marché »*, forg e par Bar-Gill (2008) [8], r sume ce ph - nom ne [23]. Bar-Gill (2011) [9] explique ainsi : *"Modern, neoclassical economics recognizes that even perfectly competitive markets can fail. The standard market failures are attributed to externalities and to asymmetric information. Behavioral economics adds a third market failure. The behavioral market failure, with its emphasis on misperception and bias, is a direct extension of the imperfect information problem. (...) Put bluntly, competition forces sellers to exploit the biases and misperceptions of their customers"*. Dans la m me ligne de pens e, plusieurs auteurs se sont attach s montrer et expliquer l'existence d'une *« malédiction du débiaisement »*, malgr une pression concurrentielle sur le march . Le terme *"curse of debiasing"* a t propos initiallement par Gabaix & Laibson (2006) [60] dans le contexte de biens accessoires d'autres. Les auteurs soutiennent que les consommateurs ont tendance se focaliser sur le prix du bien principal (par exemple le prix d'une imprimante) et n gliger le prix du bien accessoire (en l'occurrence le prix des cartouches indispensables l'utilisation de l'imprimante).

La pr sente th se contribue mettre en vidence l'existence et la persistance de *défaillances comportementales de marché* et envisager les interventions possibles du l gislateur.

1.2.2.3 Le point d vu d fendu dans la pr sente th se

La probl matique g n rale de la th se consiste tudier les cons quences des biais de rationalit des consommateurs sur le march et, dans un second temps, les incitations des firmes duquer les consommateurs. Chaque chapitre de la th se est consacr un contexte particulier, tant en ce qui concerne la nature du biais que la structure du march . Les deux premiers chapitres portent sur les biais de perception de qualit ou de l'utilit dans un

[23] Bar-Gill (2008) mentionne les *ffbehavioral market failureff* que nous traduisons par *ffl faillance comportementale de march ff*

duopole, tandis que le troisi me chapitre s'int resse au biais de projection dans un cadre monopolistique. Partant du postulat qu'il convient d' tudier au cas par cas les cons quences des biais de rationalit sur le march afin d' viter une intervention syst matique, la th se se propose de d terminer, dans trois cas de figure distincts, sous quelle forme et quelles conditions une ventuelle intervention du r gulateur serait pertinente.

Une intervention non syst matique du r gulateur. J'ai tent d'adopter une approche nuanc e et mesur e : il ne s'agit pas de plaider pour la mise en place syst matique de politiques paternalistes ou de mesures de d biaisement, mais de d terminer les conditions et les formes dans lesquelles une intervention du r gulateur peut accro tre le bien- tre social. Dans la lign e de Issacharoff (2010) [81] et de Rachlinski (2003) [123], j'aboutis la conclusion que les firmes peuvent avoir des incitations d biaiser les consommateurs[24]. Pour autant, il existe aussi des situations dans lesquelles la concurrence ne suffit pas viter que ces biais nuisent aux agents. Tout est question de circonstances et l'objet de la th se consiste pr cis ment d limiter ces diff rentes situations afin de circonscrire l'intervention du r gulateur aux cas les plus pertinents. Pour reprendre la formule de Jolls, Sunstein et Thaler (1998) [86], l'un des apports de la th se r side dans l'impossibilit de refuser d'embl e toute intervention paternaliste *"bounded rationality pushes toward a sort of anti-antipaternalism - a skepticism about antipaternalism, but not an a rmative defense of paternalism"* (page 1541).

La th se fournit galement une r ponse aux critiques des libertariens, qui s'opposent toute mesure paternaliste et toute politique de d biaisement. Les libertariens estiment que le r gulateur n'a ni la l gitimit ni les informations pour porter un jugement sur les choix des agents. Si cet argument para t conceptuellement convaincant, il ne r siste gu re l'examen de cas particuliers. Qu'il s'agisse d'une surestimation de la qualit (chapitre 1), d'une anticipation erron e de l'utilit future (chapitre 2), ou d'un biais de projection (chapitre 3), il est possible de consid rer que les pr f rences du consommateur r v l es *ex*

[24]Dans certains cas, les firmes sont incitées à débiaiser elles-mêmes les agents (voir chapitres 1 et 2). Dans d'autres situations, les biais cognitifs n'ont pas d'e et néfaste sur le bien-être social, si bien qu'une intervention n'est pas utile (chapitre 3).

post lors de l'utilisation effective du bien reflètent sa fonction d'utilité réelle. Les préférences au stade du choix sont au contraire biaisées par les erreurs de perception. Aucun jugement de valeur n'est ici nécessaire pour mener une analyse de bien-être, puisque ce sont les préférences de l'agent *ex post* qui servent de critère[25]. En résumé, le *"knowledge problem"* du paternalisme libéral, pour reprendre l'expression de Rizzo & Whitman (2009 [131]), n'est souvent que théorique. L'examen des cas concrets permet en réalité d'ordonner les préférences des agents sans porter de jugement. Ce constat rejoint l'assertion de Jolls & Sunstein (2004) [84] qui estiment que le débiaisement consiste bien souvent à rectifier un jugement qui est unanimement considéré comme erroné : *"When people are committing a clear factual error, there is a broad agreement that the government may legitimately concern itself with correcting the error"*(page 57). Les trois chapitres de la thèse se focalisent sur des situations dans lesquelles les consommateurs commettent incontestablement des erreurs, si bien que la légitimité d'une intervention législative pour les guider vers un meilleur choix n'est guère contestable.

Une intervention centrée sur les mesures de débiaisement. Il convient dans un second temps de déterminer les modalités d'intervention sur le marché. A l'instar de Klick & Mitchell (2006) [96] qui se prononcent en faveur du débiaisement, par opposition à des interventions paternalistes, je me suis principalement interrogée sur l'opportunité d'éduquer les consommateurs, car cette modalité d'intervention m'a semblé plus respectueuse de la liberté.

Une fois admis le principe du débiaisement, se pose alors la question des mesures concrètes à mettre en œuvre. Cette dimension cruciale est également mentionnée dans chaque chapitre. Selon la nature du biais et les caractéristiques du marché, différents modes d'intervention sont envisageables. Dans le chapitre premier, je m'intéresse à la publicité comparative comme outil de redressement cognitif. Dans un cadre d'analyse où les firmes débiaisent les consommateurs de leur concurrent pour les attirer au sein de leur propre clientèle, il m'a semblé pertinent de mentionner la publicité comparative comme mesure

[25]Pour une discussion plus approfondie sur les préférences *ex ante* et *ex post*, voir les chapitres 1 section 1.5.1 et 2 section 2.6.3.

de d biaisement mise en œuvre par des agents priv s (voir la section 1.6.3.2). Quant au chapitre 2, il recense des mesures plus centralis es tendant faciliter la comparaison entre certains aspects des produits, notamment les prix. Partant du constat que la fa on de pr senter les prix peut modifier radicalement la perception qu'en ont les consommateurs, le d biaisement peut r sider dans le fait d'imposer une pr sentation uniforme des prix pour les biens complexes (voir la section 2.6.3.2).

De fa on g n rale, j'ai souvent privil gi les politiques de d biaisement[26] par opposition aux intervention paternalistes. La focalisation sur les mesures d' ducation apporte une r ponse certaines critiques des opposants toute intervention du r gulateur au nom de la libert individuelle. Puisque le principe du d biaisement consiste r v ler aux agents leurs propres erreurs, afin de leur laisser la possibilit de prendre une d cision clair e, il ne porte pas atteinte la libert de chacun.

D limitation du ch mp d tude. La th se se concentre exclusivement sur les relations de consommation, c'est- -dire les relations mettant en pr sence un consommateur et un professionnel. Or les biais de rationalit peuvent aussi toucher les relations entre professionnels, que ce soit dans un contexte concurrentiel ou dans un cadre contractuel. Dans le cas d'une relation de concurrence, il est fr quent qu'une firme use des leviers comportementaux pour influer sur le comportement de son rival ou pour modifier la perception qu'en ont les consommateurs. Ainsi l'exemple tudi au chapitre 1 (section 1.6.3.2) concernant l'arriv e d'un nouveau concurrent sur le march grenoblois de l' lectricit , alors r serv un op - rateur historique, peut tre analys travers le prisme des biais de rationalit . Dans cet exemple, l'abus de position dominante de l'op rateur historique a consist user d'un biais de persuasion. Ce ph nom ne a plus g n ralement t tudi par Reeves & Stucke (2011) [127] : les auteurs s'int ressent l'utilisation des biais de rationalit dans les pratiques anti-concurrentielles.

Si de telles pratiques entre professionnels ont un impact sur le march et peuvent *in fine* affecter le comportement du consommateur, elles se distinguent de la probl matique de la

[26]Les termes de débiaisement et d'éducation sont considérés comme synonymes.

pr sente th se. Comme expliqu ci-dessus, la relation de consommation pr sente certaines sp cificit s qui la diff rencie notamment d'une relation entre concurrents. Ce sont ces particularit s qui justifient l'existence du droit de la consommation et qui m nent s'interroger sur la pertinence des mesures existantes. Dans la mesure o la th se a pour ambition d'analyser les cons quences des biais de rationalit sur le comportement du consommateur et sur le r le du droit de la consommation, il m'a paru logique d'exclure du champ d'analyse ce qui ne rel ve pas directement d'une relation de consommation.

Dans ce travail de recherche, je m'interroge sur les cons quences des biais de rationalit et sur la fa on dont ils peuvent tre jugul s par le l gislateur. Ce faisant, une question importante est pass e sous silence : je ne tra te pas de l'origine des biais cognitifs. Les biais sont-ils li s la nature profonde des agents (par exemple une tendance surestimer ses capacit s, une aversion au risque qui favoriserait le *statu quo* etc.) ? Sont-ils au contraire suscit s par les firmes ? Il est en effet tout fait concevable que les firmes soient en mesure de cr er ou d'amplifier les biais des consommateurs, notamment en recourant certaines m thodes de vente ou pratiques de marketing.

Deux exemples suffiront s'en convaincre : mentionnons en premier lieu la vente li e et tout autre m canisme qui tend d tourner l'attention du consommateur vers un produit accessoire. Ce type de pratiques consiste rendre particuli rement saillantes des dimensions du produit auxquelles le consommateur rationnel ne devrait pas attacher d'importance (par exemple le fait d'avoir gratuitement un produit dont il n'aura pas l'usage), afin qu'il ne se concentre pas sur les l ment plus fondamentaux tels que la qualit du bien[27]. De fa on similaire, la technique du *"customer poaching"* qui consiste d tourner les clients d'un concurrent en leur proposant des offres sp cifiques, peut amplifier certains biais[28]. Par exemple la myopie des consommateurs qui se focalisent sur les prix court terme en n gligeant le co t total du bien ou du service pourrait tre amplifi e par le ph nom ne du poaching.

[27]Le danger réside donc dans l'acquisition de biens non désirés ou inutiles. Ce risque étant avéré, certains pays, dont la France, encadre strictement les ventes liées ainsi que l'o re de cadeau accessoirement à l'achat d'un bien. Pour l'exemple de la France, voir le chapitre 2, section 2.6.3.2.

[28]Sur la technique du *ffcustomer poachingff* voir Belleflamme & Peitz (2010) [19] (pages 181-187).

D terminer l'origine des biais est lourd de cons quences en termes de politique cono-mique : si les biais sont g n r s par les firmes, il pourrait tre plus efficaces d'interdire d'embl e les pratiques concern es plut t que de d biaiser les consommateurs. Dans la me-sure o la th se s'int resse avant tout aux cons quences des biais, et non pas leur origine, j'ai pr f r exclure cette question du champ d'analyse.

2 Pr sentation des chapitres

La th se se compose de trois articles, consacr s chacun l' tude d'un biais particulier dans un contexte donn . La probl matique commune, qui se d cline au sein de chaque chapitre, consiste tudier les cons quences des biais de rationalit sur l' quilibre du march . Dans un second temps, la th matique du d biaisement est syst matiquement abord e. Il s'agit de d terminer sous quelles conditions le march fournit des incitations en faveur du d biaisement. En filigrane se pose donc la question d'une ventuelle intervention l gislative pour contraindre les firmes duquer les consommateurs.

En ce qui concerne la m thode, chaque chapitre se concentre sur un biais de rationalit pr cis, dans un contexte concurrentiel d termin . Les deux premiers papiers ont pour point de d part un mod le de duopole standard. Qu'il s'agisse d'un duopole avec diff renciation horizontale (chapitre 1) ou verticale (chapitre 2), les mod les pr existants sont l g rement amend s pour prendre en compte les biais de rationalit . Afin d' tudier l'effet des biais sur l' quilibre du march , il suffit ensuite de comparer les quilibres avec et sans biais. Cette m thodologie pr sente l'avantage de la simplicit . La mod lisation dans le troisi me chapitre est sensiblement diff rente : il ne s'agit plus d'int grer un biais de rationalit dans un mod le standard, mais de construire un mod le enti rement fond sur les biais des agents.

Enfin, les conclusions pr sent es dans chaque chapitre sont coh rentes et compl mentaires. J'insiste en premier lieu sur le fait que le march seul ne permet pas de garantir le d biaisement des consommateurs. Pour autant, il ne s'agit pas de l gif rer de fa on syst matique et irr fl chie : selon les caract ristiques du march , notamment la nature du biais consid r ou encore le co t du d biaisement, il pourra tre efficace d' duquer ou non les

consommateurs.

2.1 Biais de perception de la qualit dans un duopole avec diff renciation horizontale

Pr sentation de la probl matique et de la m thodologie

Le premier chapitre de la th se porte sur les biais de perception de la qualit des produits dans un duopole la Cournot. Le c t offre du march est compos de deux firmes mono-produits proposant chacune un bien sur le march , les deux produits tant substituables et diff renci s verticalement. Le c t demande du march est constitu d'une multitude de consommateurs qui surestiment la qualit des produits. Dans ce contexte, la question qui m'int resse consiste d terminer si les firmes ont des incitations d biaiser les consommateurs qui surestiment la qualit du bien propos par leur concurrent afin d'attirer ces agents vers leur propre produit[1]. La premi re intuition consiste r pondre par l'affirmative : sous r serve des co ts de d biaisement, les firmes auraient des incitations duquer les consommateurs de leur concurrent en esp rant que ces agents d biais s transf reront leur demande vers leur propre bien. Ce m canisme de transfert de la demande est d'autant plus important que les biens sont substituables. *A priori*, on serait donc tent s de croire que les firmes duquent d'autant plus les consommateurs de leur concurrents que le degr de substituabilit entre les produits est lev . Le premier chapitre remet justement en question cette intuition en montrant que plusieurs forces antagonistes s'exercent sur les firmes, si bien que la substituabilit des produits ne joue pas n cessairement en faveur de l' ducation des consommateurs.

Le mod le est inspir du duopole avec diff renciation horizontale propos par Dixit (1979) [45]. L'originalit du chapitre consiste int grer dans ce mod le pr existant la surestimation de la qualit . Le but de la th se tant d' tudier les incitations des firmes

[1]Ce chapitre se cantonne donc au cas de *ffl biaisement asym trique*ff selon la terminologie développée dans le chapitre 2, au sens où la perception des consommateur n'est corrigée que concernant l'un des deux produits.

duquer ou exploiter les consommateurs, la m thode g n rale consiste simplement comparer les profits des firmes dans ces deux cas de figure. Partant de l'hypoth se que les firmes sont des agents rationnels et maximisateurs, nous pouvons en d duire qu'une firme aura int r t duquer les consommateurs si une telle strat gie entra ne une augmentation de son profit.

Les principaux r sultats

Je montre que le march admet deux quilibres : un quilibre que j'appelle *"consumer exploitative"* dans lequel les consommateurs restent biais s, d'une part ; et un quilibre dans lequel les consommateurs sont duqu s, d'autre part. Il s'agit alors d' tudier les conditions dans lesquelles l'un ou l'autre de ces quilibres s' tablit sur le march . En d'autres termes, j' tudie les diff rents param tres qui poussent les firmes exploiter ou, au contraire, duquer les consommateurs.

L'id e centrale de ce chapitre est que le march fournit aux firmes des incitations antagonistes. *A priori*, on pourrait s'attendre ce que les firmes soient d'autant plus incit es duquer les consommateurs de leur concurrent que les biens sont substituables, dans la mesure o les agents seraient alors susceptibles de transf rer leur demande d'un produit vers un autre. En d'autres termes, le degr de substituabilit entre les biens devrait avoir un effet positif sur les incitations des firmes duquer les consommateurs.

De fa on contre-intuitive, je montre que la substituabilit des produits exerce en r alit deux effets oppos s sur les incitations des firmes. D'une part, *« l'e et transfert de demande »* existe effectivement et joue en faveur d'une augmentation des incitations duquer les consommateurs. Ce premier effet n'est gu re surprenant. D'autre part, un second effet, que j'appelle *« e et prix »*, doit aussi tre pris en compte. *« L'e et prix »* renvoie au fait que le pouvoir de march des firmes, et par cons quent le prix des biens, diminue quand le degr de substituabilit augmente. Si ce r sultat est classique, la nouveaut consiste en tudier les cons quences sur les incitations des firmes duquer les consommateurs. D'apr s cet *« e et prix »*, le prix du march est d'autant plus faible que les biens sont substituables. Or les firmes d biaisent les consommateurs de leur concurrents

dans l'espoir de voir augmenter la demande qui leur est adress e. Ainsi la hausse du profit cons cutive une augmentation de la quantit vendue - d coulant elle-m me d'un transfert de demande entre les biens - sera d'autant plus faible que les produits seront substituables. En conclusion, *« l'e et prix »* a finalement un impact n gatif sur les incitations des firmes duquer les consommateurs.

En soulignant que le march ne garantit pas que les firmes duquent les agents, ce premier chapitre s'inscrit dans la lign e de divers articles portant sur la *« malédiction du débiaisement »*. Comme mentionn ci-dessus (1.2.2.2), la notion de *"curse of debiasing"* a t forg e par Gabaix & Laibson (2006) [60] pour d crire les situations dans lesquelles, malgr la concurrence sur le march , les firmes n'ont pas d'incitation d biaiser les consommateurs. C'est pr cis ment la conclusion laquelle j'arrive dans le cas particulier d'un duopole avec diff renciation horizontale. En pr cisant toutefois qu'il existe aussi un quilibre dans lequel les consommateurs sont d biais s, ce chapitre plaide en faveur d'une intervention nuanc e et circonstanci e du r gulateur, dans la lign e de Rachlinski (2003) [123].

Le deuxi me chapitre de la th se est proche du premier tant par la probl matique abord e, que par la m thode utilis e.

2.2 Erreurs d'anticipation d'utilit dans un duopole avec diff renciation verticale

Le second chapitre de la th se s'inscrit dans la lign e du premier en termes de m thodologie : partant nouveau d'un mod le de duopole standard[2], cette fois-ci avec diff renciation verticale, j'y ai ajout des biais de rationalit . La m thodologie est donc similaire, en ce qu'il s'agit d'amender un mod le pr existant afin d'y int grer les biais de rationalit des consommateurs. Dans le second chapitre, les consommateurs sont sujets des erreurs d'anticipation de l'utilit future que leur procurera la consommation des biens. De telles erreurs d'anticipation peuvent tre li es diff rents m canismes cognitifs : un exc s d'optimisme

[2]Le modèle est inspiré de Shy (1996) [138] (pages 310-315) et de Belleflamme & Peitz (2010) [19] (page 120-123).

(le consommateur pense qu'il aura l'usage d'un bien tr s sophistiqu alors qu'un produit plus simple lui aurait procur la m me satisfaction), une mauvaise appr ciation des prix (notamment en cas de tarification complexe) etc. Par opposition au premier chapitre, qui ne porte que sur la surestimation de la qualit des biens, le mod le pr sent dans ce chapitre est plus g n ral et se pr te diff rentes analyses. La port e du mod le est galement plus large en ce que j' tudie aussi bien une surestimation qu'une sous-estimation de l'utilit , alors que seule la surestimation de la qualit tait envisag e dans le chapitre premier. Dans ce contexte, j' tudie les cons quences des biais de perception sur l' quilibre du march d'abord ; et je m'int resse ensuite, comme dans le chapitre pr c dent, aux incitations des firmes d biaiser les consommateurs.

Pr sentation de la probl matique et de la m thodologie

Le second chapitre d crit un duopole avec diff renciation verticale. Le march se compose donc de deux firmes A et B positionn es respectivement aux points a et b sur l'axe de qualit $[0, 1]$. Le c t demande du march est constitu d'un continuum de consommateurs r partis sur l'intervalle $[0, 1]$. La position du consommateur sur l'axe $[0, 1]$ repr sente ainsi sa disposition payer pour la qualit du bien. L'utilit du consommateur cro t avec la qualit du bien mais tous les agents n'ont pas la m me disposition payer pour la qualit .

Le cœur du mod le consiste distinguer entre l'utilit anticip e au stade de l'achat, d'une part, et l'utilit effectivement ressentie *ex post* par les consommateurs, d'autre part. La question du d biaisement devient pertinente d s lors que le choix du consommateur au stade de l'achat ne maximise pas son utilit *ex post*. Afin de traduire cette id e, j'introduis les notions de rationalit *ex ante*, rationalit *ex post* et de rationalit *objective*. Au stade de la consommation, le consommateur ne conna t pas l'utilit que lui aurait procur l'autre bien. Il ne peut que sp culer ce sujet. Le choix rationnel *ex post* peut ainsi diverger du choix *objectivement rationnel*. Ces trois notions de rationalit permettent de d limiter les cas dans lesquels une intervention du r gulateur pourrait accro tre le bien- tre des consommateurs, sans qu'il soit n cessaire de porter un jugement sur les diff rentes fonctions d'utilit du consommateur. En ce sens, ce chapitre fournit des l ments de r ponse

aux critiques libérales adressées à toute mesure paternaliste (sur ce point, voir la section 1.2.2.2). Une fois admise la possibilité d'une intervention du régulateur en faveur de l'éducation des consommateurs, encore faut-il déterminer les conditions d'efficacité d'une telle politique. L'intervention du régulateur n'est utile que dans l'hypothèse où les firmes n'ont pas spontanément d'incitation à éduquer les agents. Le cœur de ce chapitre consiste donc à déterminer quand les firmes éduquent et quand elle exploitent les consommateurs.

A cet égard, la méthode est proche de celle utilisée dans le premier chapitre. Il s'agit dans un premier temps de calculer les profits des firmes qui font face à des agents biaisés. Dans un second temps, je calcule le profit des offreurs qui débiaisent les consommateurs, en prenant en compte les coûts éventuels de débiaisement. Cette méthodologie relativement simple me permet d'aboutir à des résultats convaincants et cohérents avec ceux du premier chapitre.

Les principaux résultats

Alors que le chapitre 1 se focalisait sur les incitations des firmes à éduquer les consommateurs de leur concurrent, plusieurs types de mesures d'éducation sont envisagées dans ce second chapitre : chaque firme peut mener des actions de débiaisement portant sur le bien de son concurrent, son propre bien, ou les deux biens simultanément. Dans les deux premiers cas de figure, j'utilise le terme de *« débiaisement asymétrique »* pour signifier que le débiaisement ne touche que l'un des deux produits. Dans le troisième cas, au contraire, j'emploie l'expression *« débiaisement symétrique »*.

Le premier résultat novateur du chapitre 2 concerne les cas de débiaisement symétrique. Je montre que, dans le cas où la mesure d'éducation porte sur les deux biens en concurrence sur le marché, les incitations des firmes à éduquer les consommateurs ne dépendent pas tant de l'intensité du biais relatif à leur propre bien, que de l'asymétrie dans la structure des biais. Le paramètre clef qui détermine les incitations des firmes réside en effet dans l'écart entre les biais relatifs aux deux biens. L'intuition derrière cette observation est la suivante : dans le cadre d'un duopole avec différenciation verticale, une firme aura intérêt à éduquer

les consommateurs si la structure des biais lui est plus d favorable qu' son concurrent[3]. Cette premi re conclusion, bien qu'elle soit assez intuitive, apporte un clairage nouveau la litt rature sur le d biaisement, qui ne mentionne pas, ma connaissance, l'importance de l'asym trie dans les biais de perception dans le contexte d'un duopole.

Toujours dans le cas du d biaisement sym trique, et dans la lign e du premier chapitre de la th se, je mets en vidence deux forces antagonistes s'exer ant sur les firmes. *A priori*, plus l'asym trie dans les biais est forte, plus une des deux firmes (celles qui est d savantag e par la structure des biais) aura int r t duquer les consommateurs. Cette premi re intuition est vraie, mais m rite d' tre nuanc e. Au-del de *« l'e et prix »*, qui joue en faveur de l' ducation des agents, un effet *« pouvoir de marché »* peut jouer dans le sens oppos . En premier lieu, *« l'e et prix »* renvoie au fait qu'une firme aura int r t duquer les consommateurs dans l'hypoth se o les biais entra nent une diminution de son prix. Plus cet effet prix est important, plus l'incitation au d biaisement est grande. En second lieu, et de fa on plus surprenante, je souligne l'existence d'un *« e et pouvoir de marché »*. Les biais des consommateurs peuvent entra ner une diff renciation artificielle des produits, procurant ainsi aux firmes un pouvoir de march suppl mentaire. Selon le sens et l'intensit des biais relatifs aux deux biens, ce second effet peut venir temp rer le premier en jouant en sens inverse.

En ce qui concerne pr sent le *débiaisement asymétrique*, les deux m mes effets sont l'œuvre et peuvent inciter les firmes duquer soit leurs propres consommateurs, soit les consommateurs de leur concurrent. De fa on contre-intuitive, ce chapitre met en vidence que les firmes n' duquent pas n cessairement les consommateurs qui sous-estiment l'utilit g n r e par la consommation de leur propre bien. Ce constat s'explique par la pr pond rance de l'effet *« pouvoir de marché »* mentionn ci-dessus. La sous-estimation de la qualit entra ne certes une diminution du prix, mais elle peut aussi permettre la firme d'accro tre son pouvoir sur un segment du march . C'est le m me ph nom ne qui explique qu'une firme n'aura pas toujours int r t duquer les consommateurs qui sur-estiment l'utilit procur e par le bien de son concurrent.

[3]Cette assertion est vraie dans l'hypothèse où le marché est couvert.

Ainsi les deux premiers chapitres de la thèse, qui sont regroupés au sein d'une même partie, se caractérisent par leur complémentarité et leur cohérence. Dans les deux cas, j'étudie les incitations des firmes à duquer les consommateurs, qu'il s'agisse de leur propre bien ou du bien de leur concurrent. Dans les deux cas également, je montre que les firmes sont susceptibles d'adopter plusieurs stratégies selon les caractéristiques du marché. Ces deux chapitres plaident donc en faveur d'une intervention mesurée et circonstanciée du législateur pour inciter les firmes à duquer les consommateurs. Le troisième et dernier chapitre diffère légèrement des précédents tant par la méthodologie utilisée que par la problématique abordée.

2.3 Le choix de la durée de l'engagement contractuel en présence d'un biais de projection [4]

Le dernier chapitre de la thèse porte sur les biais de projection dans le cas d'engagement moyen ou long terme. Le biais de projection consiste à surestimer la ressemblance entre les préférences actuelles et les préférences futures, comme l'expliquent Loewenstein, O'Donoghue & Rabin (2003) [108]. Les agents victimes d'un tel biais peuvent prendre des décisions sous-optimales lorsqu'ils sont amenés à s'engager dans la durée. Afin d'éviter cet écueil, et de permettre aux consommateurs de reconsidérer leurs choix à une fréquence régulière, le législateur intervient *via* deux mécanismes : la réglementation de la durée des contrats d'une part, et l'encadrement des frais de résiliation anticipée d'autre part. Le troisième chapitre de la thèse s'interroge aussi sur la pertinence de ces dispositifs de protection.

Présentation de la problématique et de la méthodologie

A la différence des deux premiers chapitres, il ne s'agit plus d'intégrer un paramètre représentant les biais de rationalité dans un modèle standard, mais de construire un modèle entièrement fondé sur la présence du biais de projection. Le point de départ du chapitre

[4] Ce chapitre est une version adaptée d'un article écrit avec Maïva Ropaul, ancienne doctorante du CRED ayant soutenu sa thèse au mois de décembre dernier.

est la mod lisation du biais de projection propos e par Loewenstein, O'Donoghue & Rabin [108]. Ces auteurs repr sentent le biais de projection de la fa on suivante : l'anticipation de l'utilit ressentie la p riode $t+1$ est une combinaison lin aire de l'utilit ressentie la p riode t et de l'utilit r elle en $t+1$. Selon les coefficients affectant chaque terme, l'agent sera plus ou moins biais . Dans le chapitre 3, deux cas polaires sont envisag s : les agents sont soit compl tement biais s (ils pensent que leur disposition payer ne variera pas) soit parfaitement rationnels (ils anticipent sans erreur leur disposition payer pour les p riodes suivantes).

A partir de cette repr sentation simple du biais de projection, nous construisons un mod le trois p riodes. Le c t offre du march est compos d'un monopole multi-produit. La firme offre un contrat court (une p riode) et un contrat long (deux p riodes), sachant que ce dernier peut faire l'objet d'une r siliation anticip e par le consommateur. A la p riode 0, les agents d cident de s'engager dans un contrat long ou court. A la p riode 1 les agents consomment et prennent par ailleurs une d cision pour la p riode suivante : rester dans le contrat conclu pr c demment, conclure un nouveau contrat court, ou alors r silier le contrat en cours et conclure un nouveau contrat. Enfin, la p riode 2 les agents se contentent de consommer, conform ment au choix effectu la p riode pr c dente.
La d marche g n rale consiste comparer :

- l' quilibre qui s'instaure sur le march en l'absence de r glementation sur la dur e du contrat et les frais de r siliation anticip e avec l' quilibre en vigueur quand le march est r glement ;
- dans les deux cas mentionn s ci-dessus, les prix destin s aux consommateurs na fs d'un c t , et aux consommateurs sophistiqu s, de l'autre.

fA n de mener bien l'analyse, on consid re que les deux types d'agents ne peuvent pas tre simultan ment pr sents sur le march . On envisage successivement le cas d'un march compos d'agents na fs, puis celui d'un march comportant uniquement des agents sophistiqu s. Cette m thode nous permet d'aboutir deux s ries de r sultats : la premi re concerne la situation des agents na fs par rapport aux consommateurs sophistiqu s ; la seconde a trait la pertinence de la r glementation des frais de r siliation anticip e.

Les principaux r sultats

L'apport principal de ce chapitre consiste montrer que les consommateurs na fs ne sont pas toujours dans une situation pire que les agents sophistiqu s. Tout d pend en effet de l' volution de la disposition payer des consommateurs. Si les agents ont une disposition payer croissante, le biais de projection conduit une sous-estimation de leur disposition payer. La firme n'est donc pas en mesure de capturer l'int gralit du surplus du consommateur na f. En un sens, la na vet prot ge les consommateurs contre une augmentation du prix. Les consommateurs sophistiqu s en revanche anticipent parfaitement leur disposition payer d s le stade du choix. La firme peut donc fixer un prix gal cette disposition payer, ce qui lui permet de capturer compl tement le surplus du consommateur. En pr sence d'une disposition payer croissante, les agents na fs sont avantag s par rapport aux consommateurs sophistiqu s : ils paient moins que leur disposition, ce qui leur procure un surplus positif. En revanche, si les agents ont une disposition payer d croissante, le biais de projection est d favorable aux consommateurs na fs. Ces derniers surestiment leur disposition payer et se retrouvent finalement avec une d sutilit nette. Le premier apport de ce papier consiste donc montrer que les biais cognitifs, dans certains cas particuliers, peuvent entra ner des cons quences positives en termes de bien- tre.

Si le biais de projection a un effet positif sur le bien- tre du consommateur quand sa disposition payer est croissante, l'effet total sur le bien- tre social est n anmoins plus d licat mesurer. Le biais de projection conduit non seulement une diminution du prix, mais aussi une baisse de la quantit demand e. Cette diminution de la consommation entra ne une perte s che, c'est- -dire une r duction du bien- tre social. Ainsi le r gulateur, face la d cision d' duquer ou non les consommateurs, est-il confront une divergence d'int r ts entre le bien- tre du consommateur et le bien- tre total. Ce chapitre m ne donc s'interroger sur la d finition des objectifs poursuivis par la politique de consommation et sur les crit res de r solution d'un ventuel conflit entre plusieurs buts.

Enfin, le mod le montre que l'encadrement des frais de r siliation n'a un impact sur le march que si les agents ont une disposition payer d croissante. L'intuition derri re ce ph nom ne est relativement simple : si la disposition payer des consommateurs est

croissante, et que le prix de l'abonnement reste constant au cours des deux p riodes de consommation, rien ne justifie qu'il d cide de r silier son contrat l'issue de la premi re p riode[5]. Cette conclusion remet en question une politique r pandue consistant encadrer le montant des frais de r siliation anticip e. Ainsi sommes-nous invit s nous interroger sur d'autres mesures qui seraient ventuellement plus efficaces pour r guler un march sur lequel interagissent des agents biais s.

[5]Ce résultat est valable *ceteris paribus*. Si le prix des autres contrats proposés sur le marché changeait, alors la résiliation anticipée pourrait être rationnelle.

Introduction in English

1 Consumer law: a protective device against abuses of the cocontracting party and the consumer's own weaknesses

Consumer law is designed to protect the weaker contracting party, namely the consumer, against abuses and unlawful conduct from the professional. In this perspective, the legislator often imposes upon the professional party information disclosure requirements (section 1.1). However, the contributions of behavioral economics lead to rethink the goals and methods of consumer policy (section 1.2).

1.1 The standard role of consumer law under the assumption of perfect rationality

The first and main ambition of consumer law is to reduce the asymmetry which is consubstantial to any consumer-professional relation. This objective has legal (section 1.1.1) as well as economic rationales (section 1.1.2).

1.1.1 The legal rationales

From a legal point of view, the development of consumer law stems from the intrinsic asymmetry in the consumer/professional relation. As emphasized by Josserand (1935) [87], one of the legislator's main concern is to protect the weaker party. In the consumer/professional relation, the former is assuredly in a position of weakness. This asymmetry is first linked to an informational issue: while the professional party has all the relevant information about the good or service he offers on the market, the consumer is not in a position to acquire such knowledge for every contract he signs. The consumer can only make guesses about the product's quality or other attributes. Moreover, this fundamental imbalance is aggravated by the fact that the professional party drafts the contract, which enables him to insert in the contract clauses which are favorable to him.

The second phenomenon which accounts for the rise of consumer law is the incapacity of civil law to provide efficient responses to the asymmetries described above. Civil law is based on the assumptions of free will, which entails freedom of contract. Every individual is assumed to be able to understand, negotiate and conclude a contract in his best interest. However, in most cases, consumer contracts are standard form contracts and have very little in common with the ideal of a negotiated contracts. Consumers have no bargaining power and can only accept or refuse the contract. Hence, Kessler (1943) [95] questions the concept of "*freedom of contract*" applied to contracts of adhesion. In a context where freedom of contract is only a decoy, the rules of civil law, which rely on the fundamental assumption that each party gives a free and enlightened consent before entering into a contract, are no longer relevant.

1.1.2 The economic rationales

Two main economic theories shed an interesting light on the fundamental asymmetry which characterizes the consumer-professional relation. First, information asymmetry as defined by Akerlof (1970) [1], is inherent to any consumer-professsional relation. The professional party by essence has more information about the quality and other characteristics of the good or service he sells. Consumer law tends to reduce this asymmetry by imposing upon

the professional party various information disclosure requirements.[1]

Second, the consumer-professional relation is subject to a strong asymmetry in the transaction costs agents are willing to support. Consumer contracts are signed by the professional party on a large scale. Hence, the professional, who drafts the contract, has strong incentives to invest in drafting it to his advantage. On the contrary, consumers only sign one contract and the financial stakes are often low, such as consumers have no incentive to study each clause and verify whether they are satisfactory. Given those two asymmetries, the professional is in a position to potentially abuse from his contracting party.

In the standard vision of consumer policy, the legislator focuses mainly on reducing the asymmetry between the two agents. However, providing information to the consumer is only relevant if the latter can process and use it when needed. In other words, standard consumer law, which is concerned with informing consumers about the transaction they intend to conclude, implicitly relies on the assumption of perfect rationality. Focusing on information disclosure is no longer relevant if one admits that agents are endowed with a bounded rationality and are subject to cognitive errors.

1.2 The new aims of consumer law under the assumption of bounded rationality

While scholars as well as institutions seem to have acknowledged the importance of consumer bias in the decision making process (1.2.1), the role of the regulator regarding consumer irrationalities remains very controversial (1.2.2).

[1]The French consumer code provides a general information disclosure (article L.111-1), which is completed by a series of particular obligations in various fields, for instance concerning consumer loans (article L.311-6), distance contracts (article L.121-17) or internet subscription (article L.121-83).

1.2.1 A unanimous assessment: the ubiquity of cognitive biases

1.2.1.1 The dissension about the perfect rationality assumption in economic theory

Since the founding work of Simon [139] and Kahneman & Tversky (1974 [91] and 1986 [159]), it is unanimously admitted that agents, namely consumers, are endowed with a bounded rationality. As emphasized by Janis & Mann (1979) [82], decision making is a long and winding path, beset by emotions, errors and approximations. In this perspective, emotions can play various roles in the decision making process, as Elster explains (1996) [52] in "Rationality and the Emotions". The author enumerates seven ways in which emotions can interfere with rationality. Two main tendencies are of interest in the scope of the thesis: on one hand, emotions can help decision making in so far as they reveal information which is not intelligible to the mind: *"Some argue that emotions promote rational decision-making by acting as tie-breakers in case of indeterminacy (...). Some argue that emotions promote rational decision-making by providing information that is otherwise unavailable"* (page 1391). In the same line of thought, Hirshleifer (1984) [74] explains that passions and emotions, although they seemingly depart from rationality, can actually provide an economic advantage. *"The economist must go beyond the economic man, precisely because of the advantage of not behaving like economic man"* (page 21).

Second, emotions can hinder rational decision making. In this perspective, emotions are harmful and should be overcome. Elster (1996) explains: *"However, one might argue more conventionally that emotions interfere negatively with belief formation by inducing self-serving or overly optimistic beliefs"* (page 1391). The object of the thesis is to study the impact of consumer bias on the market outcome and implications in terms of legal policies. Hence, we focus on cases when emotions are an impediment to rationality and lead to suboptimal choices.

As Korobkin & Ulen (2000) [98] make clear, "*there is simply too much experimental evidence that individuals frequently act in ways that are incompatible with the assumptions of rational choice theory*" (page 1055). Consumers are particularly prone to cognitive biases since they need to take a great number of dimensions into account when they make

a decision. Korobkin (2003) [97] therefore argues that consumers have a tendency to focus on the most salient dimensions and to neglect others. Moreover, consumers face rational profit-maximizing firms and are therefore likely to be exploited. Issacharoff (2010) [81] for instance states that *"the presence of better-resourced and more strategic partners on the other side of the transaction allows the repeat-player sellers to manipulate consumer error to systematic advantage"* (page 57).

Under this assumption, the methods of consumer policy deserve to be reconsidered. Focusing on information disclosure is irrelevant when consumers are boundedly rational and can only gather, process and understand a limited amount of information. In this line of thought, Barr, Mullainathan & Shafir (2013) [15] assert that *"information cannot be thought of as naturally yielding knowledge, and knowledge cannot be assumed to generate the requisite behavior"* (page 442). In the same perspective, Faure & Luth (2011) [54] insist on consumers' incapacity to collect and analyze all the available information. The authors consider that the traditional approach of consumer law is not efficient and plead in favor of a substantial control of consumer contracts: they propose that an administrative authority verifies the content of consumer contracts. Finally, let us mention the book written by Ben-Shahar & Schneider [23], "More than you wanted to know". As the title reveals, the authors are concerned with information overload. They claim that information disclosures are not only inefficient but also dangerous as consumers can lose sight of the important and valuable information.

This assessment casts doubts on the relevance of the existing consumer policy, whose primary focus is to increase consumer information. In this regards, the report issued by the Better Executive and National Consumer Council is quite eloquent. The report is entitled "Warning: Too much information can harm" [69] and highlights the negative effects of information overload. It pleads in favor of a non-systematic use of information disclosures. This report illustrates a wider phenomenon: institutions are increasingly aware of the urge to take into account behavioral sciences while designing consumer policy.

1.2.1.2 The increasing awareness of institutions about the impact of cognitive biases on decision making

At the European level. Countless reports issued by European institutions insist on the role of cognitive biases in the decision making process. The name of the report issued by the European Commission in 2013 "Applying Behavioural Sciences to Policy-making" [162] is quite significant: behavioural sciences are more and more conceived as a key component of any public policy. Similarly, the report of the Joint Research Group called "Behavioural Insights Applied to Policy" [111] reflects the increasing concern of institutions about behavioral issues. The latter report studies several policies implemented across Europe and based on behavioral considerations in various fields such as transports, competition policy, health, environment or employment.

Beyond the theoretical work done by European institutions, some tangible initiatives deserve to be mentioned. The European Commission has created a web site dedicated to consumer learning.[2] While the actual impact of this measure is hard to assess, the process in itself is enlightening: consuming is no longer perceived as a simple and trifling act. Quite on the contrary, consuming needs to be learnt, and conducting the learning process falls to public authority.

At the national level. At the state level, it is worth noting that several countries have incorporated in their government behavioral teams, whose role is to think about and analyze the behavioral implications of public policy. The pioneer is the field was the United-Kingdom, who created the first "Nudge Unit" in 2010. The British Behavioral Insight Team has since then been detached from the government but still carries out projects of public interest.

Several more "Nudge Units" have been created since the British initiative. The American Social and Behavioral Science Team is part of the Executive Office of the President since 2014. The role of the Social and Behavioral Science Team is twofold: its first objective is to help citizens make better decisions in various fields such as saving plans, enrolling in

[2]The site is available at the following adresse: http://www.consumerclassroom.eu/.

college, loans etc. In its first annual report [144], the Social and Behavioral Science Team mentions several achievements, for instance regarding saving plans. The report relates that sending a simple letter to federal agents can double the participation rate in saving plans such as the *"Thrift Saving Plan"*. The second mission of the Social and Behavioral Science Team consists in incorporating the progress of behavioral sciences in all fields of public policy. Behavioral science is no longer perceived as a separate domain of public policy, but rather as a key component that needs to be taken into account at every level of regulation. In this regard, it is worth noting that President Obama signed an executive order in september 2015 to urge every Government Body to take into consideration the insights of behavioral sciences in their daily work. The executive order was given the striking name: "Using Behavioral Science Insight to Better Serve the American People".[3]

Other countries have also announced their will to follow the same path. For instance in Germany, Angela Merkel revealed that she intended to add a "Nudge Unit" to her government.[4] In France, there is to this day no special unit dedicated to the integration of behavioral insights in public policy. However, the government has shown some interest in the subject, as proves the report issued by the "Conseil d'Analyse Economique" in septembre 2012 [61]. The report "Consumer Protection: Bounded Rationality and Regulation" reflects the current concern about the effectiveness of consumer law under bounded rationality. The authors mention six main proposals to design consumer policy in accordance with the phenomenon of bounded rationality.

On the theoretical level, the hindsights of behavioral sciences seem to have been acknowledge by scholars as well as institutions. The practical implications of behavioral sciences however remain sparse. In the next paragraphs, we will mention some examples of consumer policy guided by behavioral concerns.

[3]The Executive Order "Using Behavioral Science Insight to Better Serve the American People" is available at the following address: https://www.whitehouse.gov/the-press-office/2015/09/15/executive-order-using-behavioral-science-insights-better-serve-american.

[4]See for instance the article *Merkel will die Deutschen durch Nudging erziehen* available at: http://www.welt.de/wirtschaft/article138326984/Merkel-will-die-Deutschen-durch-Nudging-erziehen.html).

1.2.1.3 Implementing behavioral sciences in consumer policy : a few examples

Depending on the bias that one wants to counter, several policies are conceivable. The *status quo* bias refers to the fact that agents have a tendency to prefer the current state. Such biases can lead to suboptimal choices if the starting option is not the one which maximizes consumer surplus. In order to limit the effect of the *status quo* bias on consumer choice, a European Directive regulates the use of default options on the internet.[5]

Consumers also respond to a framing effect, which refers to the fact that their choice depends on how options and information are presented, and not only on their actual value. It has been noticed that consumers' reaction to nutritional facts depend on how the fact is stated. For instance consumers react more to a claim that food contains X% fat rather than to a claim that food is X% fat-free. Hence, since the regulation EC No 1924/2006 of the European Parliament and of the Council of 20 December 2006 on nutrition and health claims made on foods, claims expressed as "X % fat-free" are prohibited. This regulation clearly aims at fighting against a framing effect which could lead consumers to under-estimate the amount of fat contained in food products.

In northern Europe, several countries adopted a common logo to signal healthy food. In Sweden, Denmark and Norway the "Green Keyhole" aims at giving clear, simple and comprehensible information to consumers who want to eat healthy food. Such policies are based on the belief that salient information has a greater impact on behavior. Similarly, many countries, the first of which was Island, regulate the presentation of tobacco products in stores. To various degrees, displaying tobacco products in front of customers is prohibited or regulated in Canada, Australia, Thailand and numerous other countries. Behind such regulation lies the implicit assumption that changing the choice architecture and making tobacco less salient can reduce consumption. Let us finally mention the free online salt calculator operated by the Estonian Government. According to the aforemen-

[5]Directive 2011/83/UE of 25 october 2011 on consumer rights provides at article 22: *« Before the consumer is bound by the contract or offer, the trader shall seek the express consent of the consumer to any extra payment in addition to the remuneration agreed upon for the trader's main contractual obligation. If the trader has not obtained the consumer's express consent but has inferred it by using default options which the consumer is required to reject in order to avoid the additional payment, the consumer shall be entitled to reimbursement of this payment »*

tioned report "Behavioral Insights Applied to Policy" [111], this measure aims at reducing salt consumption through behavioral levers such as salience and personalization.

As the previous examples illustrate, behavioral insights have some practical implications on consumer policy. However, the overall impact of behavioral sciences on policy and on consumer law in particular is feeble because of two main reasons: first, incorporating behavioral insights in practical policies is complicated. It requires to assess for every transaction type what biases consumers exhibit and what the best way to fight them might be. As Rachlinski (2003) [123] highlights, no general rule can easily be established, which renders any policy based on behavioral sciences costly and complex. Second, while the ubiquity of cognitive biases is no longer debated, there are endless controversies about the role of the regulator in the presence of such biases.

1.2.2 The debated role of the regulator to fight consumer bias

There is no unanimity as to whether the regulator should intervene to constrain the negative effects of consumer biases. We will first mention arguments in favor of such intervention (section 1.2.2.1); then turn to the opposite stance which is hostile to any intervention on the market (section 1.2.2.2); and finally mention the viewpoint defended in the thesis (section 1.2.2.3).

1.2.2.1 Fighting against cognitive biases through soft paternalism or debiasing

There are two main technics to counter the effect of cognitive biases on decision making: soft paternalism, on one hand; and debiasing, on the other.

Soft paternalism. Scholars have forged several concepts to describe a legal intervention aimed at protection agents without encroaching on individual freedom. Asymmetric paternalism has been defined by Camerer et al. (2003) [31] as follows: *"a regulation is asymmetrically paternalistic if it creates large benefits for those who make errors, while imposing little or no harm on those who are fully rational"* (page 1212). Similarly, Sunstein & Thaler (2003) [154] define libertarian paternalism as any policy which *"tries to*

influence choices in a way that will make choosers better o , as judged by themselves. (...) People should be free to opt out of specified arrangements if they choose to do so" (pages 1161 and 1162). Whether called asymmetric or libertarian, such *soft paternalistic* policies are designed to help agents make better decisions while imposing no restriction on their freedom of choice. The key feature of soft paternalism is that agents *in fine* remain free of their choices.

The concept of libertarian paternalism has been thoroughly studies by Sunstein & Thaler in their book "N dge: Improving Decisions About Health, Wealth, and Happiness" [158]. The authors insist on the unavoidable manipulation that agents are bound to go through. The gist of the argument, which is also put forward in the seminal article "Libertarian paternalism is not an oxymoron" (Sunstein & Thaler, 2003 [153]), is as follows: first, agents respond to framing effects, *status quo* effect etc. Second, there is no neutral way to frame a choice situation. Therefore, manipulation is unavoidable. Hence, the issue is not whether agents will be manipulate or not, but rather by whom. Let us focus for instance on consumers who make a purchase decision. They can either be manipulated by their contractor (such as a private firm) or by the regulator, whose concern is about social welfare. The above mentioned example about the way nutrition facts are displayed is enlightening. The seller must decide upon a way to convey to consumers information about the fat percentage in the product. He has a choice between two different presentation, neither of which is neutral. Since there is no neutral option, consumer behavior is necessarily manipulated by the way information is presented. In this sense, manipulation is unavoidable.

Going even further, Sunstein & Thaler (2003 [154] [153] and 2008 [158]) argue that paternalism is a means of enhancing individual freedom. They claim that biased agents only enjoy a virtual freedom which is not effective until they are freed from their own errors and misperceptions. In this perspective, debiasing seems more respectful of individual freedom.

Deb asig . Debiasing aims at helping agents become aware of their mistakes so that they can make better decisions on their own. The ultimate objective is to give agents the

means to act by themselves. Debiasing and soft paternalism strive towards a common goal: they both tend to constrain the effects of cognitive biases. Their means of action however are very different. As explained above, soft paternalism is a form of manipulation, in the name of the individual's own best interest. On the contrary debiasing tends to reveal errors and misperceptions to each agent, so that they can correct their behavior on their own. Agents are conscious that they are being debiased and decide whether or not they want to modify their behavior. While soft paternalism relies on manipulation, debiasing rests on increased transparency.

Debiasing mostly consists in giving relevant, simple and easy-to-use information to consumers. The information is often about their own behavior and repeated errors. In this regards, the European Directive Markets in Financial Instruments of 30 April 2004 is an interesting example of debiasing a debiasing policy. This directive aims at helping potential investor know their own *"type"*, in order to take the best suited decision, given their personal characteristics. [6]

Other regulation proposals, which have not yet been implemented, can be analyzed as debiasing policies. In the report issued by the French Conseil d'Analyse Economique, it is suggested that consumers should have the right to obtain from their service provider records of their use and billing, free of charge and in standard format (this proposal is particularly relevant in the case of telephony, Internet, energy and financial services). This information should be downloadable by third parties authorised by the consumer. This measure would enhance competition by allowing competitors or intermediaries to inform consumers of the alternatives they can provide. Such regulation is a debiasing policy insofar as it helps consumers have better knowledge of their own needs. The simple recap document should prevent optimism bias, consumption underestimation and other types of biases. More generally, any policy inspired from RECAP (*Re*cord, *E*valuate, *C*ompare *A*lternative *P*rices) regulation, as defined by Sunstein & Thaler (2008) [158] (page 99) falls into the category of debiasing.[7]

[6] See sections 2.6.3.2 for more details and 2.8.4 for an example of implementation in France.
[7] For a deeper discussion on RECAP regulation, see page 176.

1.2.2.2 The alleged dangers of soft paternalism and debiasing

Libertarians put forward several arguments to counter the legitimacy, the efficiency or the use of soft paternalism, and to some degree, debiasing policies.

On the legitimacy of soft paternalism and debiasing. The first main criticism addressed to soft paternalism concerns the complexity of carrying out a welfare analysis in the presence of consumer bias. According to the libertarian view, the regulator does not have the relevant information to determine the agents' true preferences in the presence of changing utility functions or inconsistent choices. In this line of thought, Saint-Paul [132] claims that *"it is impossible, in fact, to establish such a result, for one needs a criterion for comparing alternative utility functions; that is, one would have to impose some 'meta-utility function' in order to tell us that a given utility function is better than another"* (page 87). Yet, such a meta-utility function does not exist, which renders any assessment on welfare impossible in the presence of changing preferences.

In standard economic models where agents have stable preferences, welfare analysis implicitly rests on the axiom of revealed preferences. According to this axiom, which was first developed by Samuelson (1938 [133] et 1948 [134]), agents' preferences are revealed through their observable choices. This seemingly simple axiom is the necessary underlying condition that enables us to make any assessment about the welfare consequences of a given policy: it is only because we assume that individual behavior reflects individual preferences that we can use observable behavior to estimate welfare variations. Conversely, if one admits that agents act in a way that does not reflect their preferences, than it is not possible to derive an assessment about welfare from observable actions. Consumer biases precisely raise this issue by creating a discrepancy between the agents' observable behavior and their actual preferences.

Nonetheless, this problem does not render any welfare analysis impossible. Several methods help circumvent this issue: first, one can use multi-selves models to represent agents who have changing preferences. This method is widely used in economics since May's (1954) [114] founding work. Second, one can build a meta-utility function to order

the agents' various utility functions. For example, if one admits that agents' long-term preferences are more stable and shielded from their emotions, while short-term preferences reflect a hot state in which impulsions take over rationality, one might favor the former to carry out a welfare analysis. As this example illustrates, building such a meta-utility function often implies judging preferences. In the regard, Spiegler recognizes, *"there is no escape from such judgements when changing tastes seem to be an intrinsic aspect of the economic situation"*([147] page 20).

According to the libertarian view, this judgement raises an inextricable issue. As Mill (1859) summed up in his book "On Liberty": *"Neither one person, nor any number of persons, is warranted in saying to another human creature of ripe years, that he shall not do with his life for his own benefit what he chooses to do with it."*

On the effectiveness of soft paternalism and debaising. Libertarians also argue that soft paternalist measures are risky, since there is a natural tendency to go towards more paternalism. This slippery slope would lead to strong paternalist measure and to the denial of individual freedom. The slippery slope argument has been developed by Rizzo & Whitman (2007 [129] and 2009 [130]) in the article ffPaternalist Slopesffi[129]. The authors contend that libertarian paternalism is a blurry and vague notion, and is consequently particularly prone to the slippery slope phenomenon. Indeed, "*when words and concepts have fuzzy boundaries, it becomes difficult to defend sharp distinctions*"(page 7).

The dangers of sliding towards excess regulation have also been highlighted by Glaeser (2006) [68] and Epstein (2006) [53]. The latter coined the concept of "*rebiasing*" (page 131) to describe the fact that educating some agents might backfire on others. If agents are heterogeneous, a debiasing policy could be harmful to some agents. In this context, debiasing is no longer a means to enhance individual freedom, but becomes a new source of manipulation.

Beyond the slippery slope argument, too much regulation could have another negative effect in the long run. A systematic intervention to guide citizens towards what is considered to be a good decision would remove all opportunities to make errors. By doing so,

it is the learning process in itself that would disappear. As Elster (1989) [51] explains, "*the opportunity to choose, including the right to make wrong choices, is a valuable, in fact indispensable means to self-improvement*" (page 57). If one admits that making errors is a necessary step towards a better decision process, then excessive regulation that wipes out all learning opportunities becomes detrimental to consumers, and more generally citizens.

In the same line of thought, Klick & Mitchell (2006) [96] allege that regulation leads to a vicious circle of more regulation, which ultimately increases biases. The authors regard cognitive biases as endogenous, insofar as they depend on the existing regulation.

On the use of soft paternalism and debiasing. The last major argument proffered by libertarians is that legal interventions to counter the effects of cognitive biases are useless, since the market remains efficient even if agents are not perfectly rational. For instance Sudgen (2008) [151] contends that the market is an efficient way of allocating resources even if consumers exhibit inconsistent preferences. Sugden's key argument lies in the fact that firms always have incentives to cater to consumer demand, in spite of potentially inconsistent preferences.

The idea that the market is the best response to consumer bias has also been suggested by Bebchuk & Posner [16]. The authors claim that even in the presence of cognitive bias, the market for reputation deters firms from exploiting consumers. Since firms have no incentives to exploit consumer bias, a legal intervention would be useless and represent a social cost. In the first chapter of the thesis I discuss this argument and show that the market for reputation relies on rational consumer behavior (see section 1.6.1.1).

This example illustrates the more general phenomenon referred to as *"behavioral market failures"*. The concept was coined by Bar-Gill (2011) [9] to describe the fact that market mechanisms do not function in the presence of boundedly rational agents. The thesis points out such behavioral market failures and explores possible remedies.

1.2.2.3 The viewpoint defended in the thesis

The general research question consists in studying the consequences of consumer bias on the market outcome and the firms' incentives to educate consumers. Each chapter of the

thesis focuses on a specific bias and a particular market structure. Acknowledging that no general assessment about the consequences of consumer bias can be made, I consider that a systematic legal intervention is not relevant. I plead in favor of a non-systematic and circumstantial intervention.

A non systematic intervention to counter the effects of consumer bias. Throughout the thesis, I try to have a nuanced stance and not to plead in favor of mechanic and reckless legal interventions to counter the effects of consumer bias. In line with Issacharoff (2011) [81] and Rachlinski (2003) [123], I come to the conclusion that firms sometimes have incentives to spontaneously engage in consumer education. In such cases, no legal intervention is required. However, there are also situations when firms tend to exploit or cater to consumer misperception. One should therefore define, depending on the market structure and on the bias, whether a legal intervention is welfare enhancing. One of the contribution of the thesis is to highlight that a contextual analysis should always be carried out before making any assessment on the relevance of a legal intervention. As Jolls, Sunstein et Thaler (1998) [86], put it, "*bounded rationality pushes toward a sort of anti-antipaternalism - a skepticism about antipaternalism, but not an affirmative defense of paternalism*" (page 1541).

I also develop in the thesis some counterarguments against the libertarian stance. In the libertarian perspective, any legal intervention to constrain the effects of cognitive bias is bound to be inefficient because the regulator does have the required information about the agents' true preferences. While this argument seems conceptually appealing, it does not withstand the study of practical cases. Whether consumers overestimate future quality (chapter 1), make inaccurate anticipations of future utility (chapter 2), or exhibit a projection bias (chapter 3), one can consider that preferences revealed *ex post* after the good has been used reflect the agent's *"true"* utility. Conversely, preferences at the decision stage are biased by various misperceptions. In those cases, no judgement about consumer preferences is required to assess which are the *"true"* preferences.[8] In a nutshell, the *"knowledge*

[8]For a discussion about *ex ante* and *ex post* preferences, see chapter 1 section 1.5.1 and chapter 2 section 2.6.3.

problem of paternalism" (Rizzo & Whitman (2009) [131]) is often a theoretical issue which can easily be dismissed. This observation is consistent with Jolls & Sunstein (2004) [84] who consider that debiasing often consists in correcting a judgement which is unanimously considered erroneous: *"When people are committing a clear factual error, there is a broad agreement that the government may legitimately concern itself with correcting the error"* (page 57). In the three chapters of the thesis, I focus on cases when consumers indisputably make errors, which renders the first libertarian criticism irrelevant.

Giving priority to debiasing policies. Once the possibility of a legal intervention is accepted, it is necessary to define what type of regulation is most relevant. The dilemma consists in helping consumers make better decisions without infringing on individual freedom. I plead in favor of debiasing policies, as opposed to soft paternalism which is less respectful of freedom of choice.

In each chapter, I give examples of debiasing policies which could help constrain the negative effects of consumer bias. For instance in chapter 1, I mention comparative advertising as a means of debiasing by private agents (see section 1.6.3.2). The case of comparative advertising is particularly relevant in chapter 1, since it focuses on the firms' incentives to debias their competitor's customers in order to attract them. In the second chapter I study centralized debiasing policies carried out by the regulator. Acknowledging that price obfuscation enhances consumer misperception, I address the issue of price format regulation (see section 2.6.3.2).

The boundaries of the research question. In the thesis I focus exclusively on consumer contracts, that is to say contacts signed by a consumer, on one side, and a professional party, on the other side. Yet, cognitive biases can also occur in relations between professional parties. For instance in the case of competitors, one firm can use behavioral levers to influence the other firm's behavior, or to affect consumers' perception of the competing products. The example studied in chapter 1 about the entry of a new competitor on the electricity market in the French city of Grenoble provides an interesting illustration of the persuasion biais in a competition context (see section 1.6.3.2). Scholars such as Reeves

& Stucke (2011) [127] study more generally the use of cognitive bias in anti-trust practices.

While such practices do have an impact on the market and ultimately affect consumers, they are different from the research question of the thesis. As explained above, the consumer/professional contractual relation is characterized by several key features (information asymmetry, imbalance in the financial stakes etc.) which explain the emergence of a specific branch of law, namely consumer law. The present thesis questions the relevance of consumer law as it currently exists to protect consumers against their own misperceptions. The issue of behavioral anti-trust is connected to, but different from, our research question. Therefore, I chose to exclude behavioral anti-trust from the scope of the thesis.

I focus on the consequences of consumer bias on the market and on legal interventions to counter such negative aftermaths. By doing so, I do not explain where behavioral baises come from. Are cognitive biases linked to deep-rooted tendencies in human behavior (such as optimism, risk aversion etc.) ? On the contrary, are they created or amplified by firms? One can indeed think of various situations when firms could create or increase consumer biases, notably through sales practices or marketing technics.

Let us mention for example bundling or tied selling. These practices aim at diverting the consumers' attention towards an aspect of the good or product to which a rational consumer would not have paid attention (typically the fact that a secondary product, which the consumer did not intend to buy, is offered at a low price). The danger lies in the fact that consumers end up buying a product they do not need nor want. To avoid such situation, bundling is strictly regulated in some countries (about the French example, see chapter 2, section 2.6.3.2). Similarly, customer poaching can enhance consumer myopia. Customer poaching refers to the fact that firms make distinct offers to their rival's customers in order to attract them (see Belleflamme & Peitz (2010) [19], pages 181-187). If consumers are myopic and have a tendency to focus on the short-term prices, while overlooking the total price of the good, the misperception might be magnified by poaching strategies where the short-term price is particularly attractive.

Defining the origin of the bias has major implications on policy recommendations. If the bias is intrinsic to the consumer, debiasing is a relevant policy. If the bias is created

or enhanced by firms, it might be more efficient to forbid at the outset practices which are likely to trigger misperceptions. In so far as I focus on the consequences of consumer bias rather than on their cause, I decided to exclude the issue of the origin of the bias from the scope of the thesis.

2 Chapter overview

The present thesis is composed of three articles, each of which analyses the consequences of consumer bias on the market outcome in a specific context, in order to determine if and when a legal intervention is required to foster consumer education. The two first chapters share a common methodology: I start from a standard duopoly model in which I incorporate consumer misperception. The methodology allows for a simple comparison between the equilibrium with and without consumer bias. The last chapter uses a different method, insofar as the model is entirely built on the presence of consumer misperception. In contrast to the models presented in Chapters 1 and 2, I don't add consumer bias in a standard model, but rather construct a model based on the presence of consumer misperception. In this last chapter, I study the choice of contract duration when consumers are subject to a projection bias.

Hence, the first two chapters are presented in one first part entitled "Incorporating consumer bias in standard duopoly models", whereas the last chapter constitutes on its own the second part of the thesis.

2.1 Quality bias in a vertically differentiated duopoly

The first chapter tackles the issue of quality misperception in a Cournot-type duopoly. The supply side of the market is composed of two single-product firms, offering substitute commodities which are horizontally differentiated. The demand side of the market is composed of a multitude of biased consumers, who overestimate the good's quality. In this context, I study the firms' incentives to educate consumers in order to attract their rival's

customers. To the extent that the goods are substitutes, one expects firms to educate their competitor's customers in the hope that the latter will transfer their demand to the substitute commodity. Moreover, one could think that the firms' incentives to educate consumers become stronger as the substitutability degree increases. In this first chapter I challenge those intuitions and show that the market exerts two opposite forces on the firms' incentives to educate consumers.

First, there is a *demand transfer e ect*, according to which firms are more likely to educate consumers when they anticipate a strong transfer of demand ensuing from consumer education. Hence, the substitutability degree has a positive effect on the firms' incentives to educate consumers. Second, I show that a *price e ect* also arises. As the degree of substitutability increases, the firms' market power, and consequently prices, decrease. Therefore, the additional profit firms can expect to perceive following consumer education decreases as the goods become better substitutes.

I show that the market allows for two equilibria: on one side, a *consumer exploitative* market equilibrium, in which neither firm educates consumers; on the other side a market outcome whereby consumers are fully educated.

This chapter is consistent with Gabaix & Laibson (2006) [60], who show that a *"curse of debiasing"* might occur even when there is competition on the market. Moreover, I show that there exists an equilibrium whereby consumers are educated and therefore conclude that consumer education is not always necessary nor efficient. In line with Rachlinski (2003) [123], I argue that a legal intervention to encourage consumer education should depend on the context and on the market characteristics.

The second chapter is similar to and consistent with the first one, regarding the methodology as well as the results.

2.2 Utility misperception in a horizontally differentiated duopoly

Once again, I start from a standard duopoly model in which I add consumer misperception. The supply side of the market is composed of two firms offering substitute commodities. In contrast to the model presented in the first chapter, I focus this time on a vertically differentiated duopoly. Hence, the demand side of the market is composed of a continuum of consumers located on the interval $[0, 1]$, depending on their willingness to pay for quality. Classically, I define consumer utility as an increasing function of product quality. The novelty in the model lies in the distinction between the utility anticipated *ex ante* at the decision stage, on one side; and the utility felt *ex post*, on the other side. For a rational agent, there should be no discrepancy between the *ex ante* and the *ex post* utility. I focus on biased consumers who can either over- or under-estimate their future utility. In this context, I study the firms' incentives to educate consumers. I draw a distinction between *symmetric education*, which refers to a situation in which firms educate all consumer, and *asymmetric education*, which indicates that firms reveal the *ex post* utility concerning one good only. Depending on the direction of consumer misperception, firms can have incentives to educate their own consumers or, on the contrary to focus on their rival's customers.

The main result of the paper is that, in the case of *symmetric debiasing*, the firms' incentives to educate consumers depend not so much on the degree of consumer bias, but rather on the disparity in the misperception regarding the two goods. The intuition behind this result is that, in a duopoly and under the assumption that the market is covered, a firm has incentives to educate consumers if the structure of consumer misperception is more detrimental to that firm than to its rival.

To conclude, the two chapters constituting the first part of the thesis are strongly complementary and consistent. In both chapters, I study the firms' incentives to educate consumers in a duopoly framework. Whether goods are vertically or horizontally differentiated, I show that the firms' strategies depend on the market characteristics and on the

relative degree of consumer misperception. I therefore plead in favor of a nuanced and non-systematic legal intervention, in order to foster, when relevant, consumer education.

2.3 The choice of contract duration in the presence of projection bias [1]

The last chapter of the thesis tackles the issue of contract duration in the presence of projection bias. As explained by Lowensteing et al. (2003) [108], the projection bias refers to the fact that agents *"tend to exaggerate the degree to which their future taste will resemble their current tastes"*. We study how agents choose between a long-term and a short-term contract when they exhibit a projection bias. Our modeling of projection bias is strongly inspired by Lowensteing et al. (2003) [108]. We extend their model to three periods. The supply side of the market is a monopoly offering two contracts, which differ with regards to their duration. In this framework, we study the consequences of consumer bias on the market outcome.

We come to several strong conclusions. First and foremost, we show that naive agents are not always worse off than their sophisticated counterparts. More precisely, if consumers have decreasing willingness to pay, naivete protects consumers from a price increase. Hence, naive consumers end up paying less than sophisticated ones. This result is compelling: even in a monopolistic context, which is least favorable to consumer, naivete can have a positive effect on consumer welfare.

However, we also argue that in the presence of increasing willingness to pay, naivete leads to a deadweight loss on the market. Hence, the legislator faces a conflict between consumer protection and the maximization of the social surplus. This paper raises the more general question of the ultimate objectives of consumer policy: does the regulator aim at maximizing consumer or social welfare? Legal recommendations depend on the answer to this question.

[1] This chapter is a revised version of a paper written with Maïva Ropaul, former PhD student at the CRED.

Part I

Incorporating consumer bias in standard duopoly models

1 Consumer education: why the market doesn't work

1.1 Introduction

The average consumer, who concludes dozens of contracts each week, has little in common with the ideal of the fully informed, perfectly rational utility-maximizing agent: he has neither the information nor the time to search for the optimal contract. When making a decision, agents are potentially subject to two kinds of flaws: informational issues on one side, and cognitive biases on the other side. The first category relates to the consumers' access to information, and has been thoroughly studied in the economic literature.[1] The latter category of flaws embraces various types of errors in processing information. At the crossroads between economics and psychology, cognitive biases have been thoroughly studied by Kahneman & Tversky (1974) [91]. The authors show that agents use simplifying heuristics when making decisions under uncertainty. While such heuristics are useful and can even be necessary, they sometimes lead to systematic errors. In recent economic literature, *"cognitive biases"* is a vast and fluctuating notion, which encompasses various situations, ranging from the *status quo* bias, to time-inconsistent preferences or bounded willpower. [2]

In the Industrial Organization literature, Ellison (2006) [50] distinguishes between three uses of the term *"bounded rationality"*: firstly, bounded rationality can refer to the rule-

[1] Among countless contributions, Akerlof's (1970) [1] seminal paper tackles the problem of asymmetric information on the second-hand car market.

[2] For a review of rationality biases and their legal implications, see Jolls, Sunstein & Thaler (1998) [86].

of-thumb approach, which considers that agents behave in some simple way, rather than solving a maximization problem. Secondly, the explicit bounded rationality approach takes into account the costs of cognition, which might lead agents to settle for second-best solutions. Finally, a third branch of the literature examines what happens in industrial organization settings when consumers are subject to behavioral biases identified in the psychology and economics literature.

This chapter is concerned with *consumer bias* in the second and third meanings mentioned above: I first consider that consumers suffer from behavioral limitations. Moreover, I take into account the cost of cognition, which raises the thorny question of consumer education. The key feature of biased consumers, as opposed to agents facing incomplete information, lies in their tendency to self-deception. [3] Typically, an overconfident consumer might buy an expensive high quality smartphone, thinking many functionalities will be useful, when he actually can barely use the basic functions. In this event, the problem is not related to informational issues, but rather to the consumer's perception of his own needs and desires. Among other examples, the cell phone market offers blatant illustrations of agents overestimating their needs, as highlighted by Bar Gill & Stone (2009) [13]. Another famous and striking example concerns overoptimistic individuals. Such agents are likely to get a yearly subscription to the gym, dreaming they will work out every day, but fail to live up to their expectations. [4] In the aforementioned examples, consumer misperception is intrinsic, insofar as it stems from the individual's mere illusions.

Nonetheless, rational profit-maximizing firms will not ignore consumer biases. On the contrary, rational firms react to consumer misperception by modifying their own behavior. The core issue is then to determine how firms respond to consumer biases. This concern has become central in various fields of economics such as Consumer Economics and Industrial Organization. Regarding the latter, Ellison highlights (2006) [50]: «*the rational firm-irrational consumer assumption has become the norm, and the question of what firms do to exploit irrationality is often the primary focus*»

[3] Ellison (2006) [50] offers a review of the literature concerning consumer irrationalities. For a recent description of consumers' cognitive biases and their implication on consumer law, with an emphasis on French law, see Gabaix, Landier & Thesmar (2012) [61].

[4] This specific issue has been addressed by Della Vigna & Malmendier (2006) [40].

This paper describes the firms' reactions when they are facing boundedly rational consumers. Let us first emphasize that a firm's strategic behavior depends on the type of consumer misperception. For example, the firm's strategic responses change depending on whether it faces lazy inert consumers, overoptimistic individuals or time-inconsistent buyers. In the first case, firms might try to ease a change in behavior, for instance with consumer poaching strategies.[5] In the case of overoptimistic consumers, who overestimate their capacity to use a product, firms might enhance this bias. One can think for instance of an advertising campaign the would emphasize how simple and user-friendly the product is for new consumers. While firms may have a natural tendency to exploit consumer misperception, the precise form this exploitation might take depends on the bias. Therefore, it appears necessary to limit the analysis to one specific category of consumer bias. Quality misperception will be the center of my attention. This seemingly homogenous category of consumer bias actually refers to two slightly different situations: it first pertains to quality misperception *stricto sensu*, that is a situation in which a consumer over- or underestimates the quality of the product he considers buying. This case could for instance refer to a piece of clothing whose true quality is revealed after having being washed. Quality bias can also refer to a misperception of desired attributes, in which case the consumer inaccurately evaluates his own needs or desires concerning certain characteristics of the product. Think for instance of a consumer who decides to buy a very sophisticated computer because he over-estimates his needs and his capacity to use a product. This bias leads to an excessively high valuation of the product and ultimately a higher willingness to pay for the good. In this case, the error does not pertain to the quality itself but rather to the agent's need and capacity to use a product. In both cases, quality misperception results in a shift of the demand curve, compared to the rational consumer benchmark.

When facing consumers with a quality bias, firms generally have two options: they can either enhance and cater to consumer misperception, or debias and educate consumers. In the first case, firms will respond to consumer biases, possibly even amplify their mispercep-

[5]Consumer poaching refers to the fact that firms make di erent o ers to their rival's past customers in order to attract them (Belleflamme & Peitz (2015) [20], page 261). Such strategies can be a means to fight against consumer inertia and are very frequent in the banking sector or on the cell-phone markets.

tion, in order to increase their profit. Such policies are *consumer exploitative*, in the sense that firms use consumer biases and flaws to their benefit. In practical terms, a rational firm might modify it's price schemes to enhance consumers' limited comparison capacity. [6] When consumers have limited attention, a relevant strategy could consist in launching an advertising campaign that will focus the consumers' attention on one single product attribute, thus allowing the firm to score particularly low on all other characteristics. [7]

However, firms do not always have incentives to exploit consumers misperception. On the contrary, they can debias or educate consumers if they expect such a strategy to increase their profit. While this approach might seem startling at first glance, several reasons can account for this behavior. Consider the case of quality misperception. If consumers underestimate the quality of a given product, revealing it's true quality allows firms to charge higher prices. Conversely, if consumers overestimate the product quality of competing firms, debiasing the rivals' customers might be a means of recruiting them. This paper focuses on this latter situation, in order to elucidate when the market forces favor consumer debiasing. Intuitively, one expects that debiasing the competitor's customers to attract them would be efficient in the case of substitute goods. One also expects debiasing to improve consumers' situation, as it increases the accuracy and availability of information. This paper aims at questioning these intuitions.

In a duopoly framework with substitute goods and quality mispercetion, the paper tackles the following issue: do firms have incentives to debias their competitor's customers in order to attract them? I first compare the market outcome with and without consumer debiasing, revealing that consumer education is not necessarily an efficient strategy from the firms' perspective. Indeed, an equilibrium whereby neither firm has incentives to educate their rival's customers might emerge. Surprisingly, the substitutability degree between the two commodities does not always exert incentives in favor of consumer debiasing. To account for this result, one can show that the substitutability degree has conflicting effects on the firms' profit, simultaneously via prices and quantities.

[6] On this subject, see for example Piccione & Spiegler (2012) [148].
[7] For an analysis of advertising as a means of enhancing consumer bias, see Zhou (2008) [168].

I next focus on the implications of consumer bias on welfare. Quality overestimation triggers a shift of the demand curve towards the right and ultimately results in overconsumption, compared to the rational consumer benchmark. I argue that unstable preferences should not stand in the way of assessing the effect of bias on welfare. In line with the literature on advertising, I consider that the post-debiasing preference can serve as a benchmark to carry out the welfare analysis. I discuss two alternative welfare criteria and show that, in both cases, consumer debiasing improves consumer welfare. Moreover, one should keep in mind that educating consumers is efficient only if the freshly revealed information can actually be used to improve consumers' decision-making process. This implies that newly debiased consumers should be able to transfer their demand to a substitute good, the quality of which is accurately estimated.

Those results have direct implications concerning legal policy. I first argue that, in some cases, firms have incentives to educate consumers about the quality of their rival's product. This conclusion makes a strong argument in favor of comparative advertising. I also show that spontaneous debiasing does not always occur. Since one cannot always rely on firms to counter consumer misperception, the opportunity of a compulsory debiasing policy deserves to be discussed.

Although the literature concerning the interactions between biased consumers and rational firms is flourishing, there is a void when we get to the specific issue of consumer debiasing in the presence of quality misperception and substitute goods. This paper aims at filling this void. The rest of the paper is organized as follows. Section 2 contains the literature review and section 3 presents the model. It consists in a standard duopoly framework with substitute commodities, in which I incorporate consumer biases. Section 4 is dedicated to studying the market equilibria. I focus on the two polar cases, which are the equilibrium with total consumer education and the equilibrium with maximal consumer exploitation. Section 5 focuses on the welfare analysis, which leads to legal policy implications in section 6. Section 7 is devoted to discussions and extensions. Finally, a few concluding remarks are presented in section 8.

1.2 Literature Review

This paper contributes to the thriving literature that studies the interactions between fully rational profit-maximizing firms and biased consumers. It is more precisely related to the field concerned with consumer debiasing. While I focus on quality misperception, the issue of consumer education is not limited to this specific bias.[8] For instance Karle & Peitz (2012) [94] study the case of consumer misperception resulting from a shift in the agent's reference point. They show that, although debiasing would always be socially efficient, it only occurs when it leads to a price increase. Another form of misperception studied in the literature concerns inaccurate estimations of future demand. Regardless of where the overestimation stems from, firms generally have incentives to cater to the biased demand. More specifically, when the misperception is linked to hyperbolic discounting, DellaV gna & Malmendier (2004) [42] argue that firms will exploit consumers by adapting their price formats. Similarly, if the misperception is due to consumer myopia, Gabaix & Laibson (2006) [60] argue that, in the particular case of goods with add-ons, firms exploit consumers' bounded rationality. According to the authors, myopic consumers generally focus on the prices of base goods, while overlooking those of add-ons. This myopia bias leaves the door wide open for consumer exploitation. Consequently, although the market offers substitute goods, a *"curse of debiasing"* occurs, whereby no firm wants to compete with a debiasing strategy. The conclusions I draw are consistent with Gabaix & Laibson (2006) [60], but apply to a different context. First, I focus on quality misperception, while Gabaix & Laibson (2006) studied myopia in the specific case of goods with add-ons. Second, I do not study the firms' incentives to educate their own customers, but rather the possibility that they might debias their rival's clients. While the results and conclusions I find are consistent with the paper of Gabaix & Laibson (2006), they apply to a different context and lead to other policy recommendations.

Surprisingly, the issue of quality misperception and consumer debiasing, has bee forsaken by the literature. As far as quality misperception is concerned, attention has been drawn mostly on the decision-making process itself, rather than on the relevance of a legal

[8] For a classification of consumer bias, see Huck & Zhou (2011) [80].

intervention to limit the effects of consumer biases. For instance, Huck & Tyran (2007) [79] argue that a simple heuristic to counter quality misperception consists in buying from the same supplier as long as he delivers high quality. Thus *"reciprocal consumers"*, who stop buying a product as soon as its quality is no longer satisfactory, should exert a positive externality on all potential consumers. While this issue could seem a bit remote from my concern, it is actually closely related to the question of debiasing: the authors indeed contend that the reciprocity heuristic can serve as a substitute mechanism for consumer education. Similarly, Bebchuk & Posner (2006) [16] argue that the firms' reputation might suffice to constrain the effect of consumer misperception, which makes an argument against any form of legal intervention to fight consumer bias. Taking the opposite stance, I argue in the following sections that a legal intervention can be, in some instances, an efficient response to quality overestimation.

1.3 The model: a Cournot-type duopoly with quality misperception

The market I study consists in a duopoly: two firms are facing a multitude of homogenous consumers. The firms are standard profit-maximizing agents, while consumers suffer from quality misperception. Although the category of "quality bias" is quite disparate, quality misperception always results in a shift of the demand curve: the "biased demand" departs from the demand that would emerge with fully rational agents. Consequently, this model can describe any kind of quality misperception, ranging from an overestimation of the product quality, to a false appreciation of the desired product attributes.

I consider that the rational consumer demand reveals consumers' *true* preferences and therefore serves as a benchmark. It is worth noting that the mere idea of consumers having *true preferences* is debated in the literature. Indeed, if consumer preferences are context dependent or time inconsistent, how can one decide which are the *real preferences*? In this perspective, Rizzo & Whitman (2009) [131] insist on "*the knowledge problem of paternalism*" and question the relevance of debiasing. While this issue does deserve to be

addressed, I contend that in the specific case of quality misperception rational consumer preferences can justifiably serve as a benchmark.[9]

1.3.1 Assumptions and Interpretation

Let us first go over the assumptions and next their interpretation.

1.3.1.1 Assump ions

The differentiated duopoly which is at the foundation of this model was first proposed by Dixit (1979) [45]. The key feature of the present model lies in the incorporation of consumer biases. The supply side of the market is composed of two firms, 1 and 2. Firms 1 and 2 respectively supply q_1 and q_2 at prices p_1 and p_2.

In this simple framework, each consumer has the following utility function: $V = y + U(q_1, q_2)$, where y designates the composite good, whose price p_y satisfies $p_y = 1$. Consumers maximize $U(q_1, q_2) \quad \sum_{i=1}^{2} p_i q_i$. Following Dixit (1979) [45] and Singh & Vives (1984) [142], I specify the following quadratic utility function U:

$$U(q_1, q_2) = \hat{}_1 q_1 + \hat{}_2 q_2 \quad 1/2(\quad q_1^2 + \quad q_2^2 + 2 \quad q_1 q_2) \tag{1.1}$$

Concavity of U requires the parameters to satisfy the following assumptions, for $i \quad \{1, 2\}$, $j \quad \{1, 2\}$ and $i = j$:

$$\hat{}_i > 0, \qquad > 0, \quad \hat{}_i \qquad \hat{}_j \quad > 0 \text{ and } \qquad > | \quad |$$

The two later assumptions guarantee that direct demands can be defined and are of the right sign. Indeed, $U(q_1, q_2)$ yields the following direct demand functions $q_i = a_i \quad b_i p_i + g p_j$ with $a_i = \frac{\hat{\alpha}_i \beta - \hat{\alpha}_j \gamma}{\beta^2 - \gamma^2}$, $b = \frac{\beta}{\beta^2 - \gamma^2}$ and $g = \frac{\gamma}{\beta^2 - \gamma^2}$. [10] In order for a_i and g to be defined and positive, the analysis is restricted to the case : $\hat{}_i \qquad \hat{}_j \quad > 0$ and $\quad > | \quad |$. [11]

[9] See section 1.5.1 for a discussion on the notion of true preferences

[10] See appendix 1 for details.

[11] For more technical details regarding this utility function, see Motta (2004) [115] and Shy (1996), p. 136 [138].

1.3.1.2 Interpretation

The utility function $U(q_1, q_2) = \hat{}_1 q_1 + \hat{}_2 q_2 \quad 1/2(\quad q_1^2 + \quad q_2^2 + 2 \quad q_1 q_2)$ is worthy of several remarks, namely concerning the parameters $\hat{}_i$ and . When products are nonidentical, $\hat{}_i$ represents the absolute advantage in demand for good i, while captures the cross-price effect. The assumption $>|\quad|$ implies that the own price effect dominates the cross-price effect. The assumption is standard in the literature. In the next paragraphs, those two parameters are studied in greater details.

The effect of consumer misperception on the absolute advantage in demand: The parameters $\hat{}_i$ capture the absolute advantage in demand for each commodity. Such an advantage can of course result from a relative preference for one of the goods, for instance, because it offers higher quality or because one firm enjoys a better reputation. However, the same effect could also be due to an overestimation of the product quality. Indeed, if consumers overrate the quality of the good offered by firm 1, the latter will benefit from a higher absolute advantage in demand compared to the situation with rational consumers. This paper studies the effect of an absolute advantage in demand ensuing from consumer misperception.

In order to capture quality misperception, the parameters $\hat{}_i$ vary in the bounded interval $[\__i, \bar{}_i]$. The values $\__i$ correspond to the rational consumers' preferences. By constraining the analysis to $\hat{}_i \quad \__i$, I focus on quality overestimation, as opposed to quality underestimation. Quality overestimation therefore is captured by the parameter $\hat{}_i$ when it departs from its minimal value $\__i$. Consumers are all the more biased as $\hat{}_i$ gets closer to $\bar{}_i$. The existence of an upper-bound $\bar{}_i$ indicates that consumer misperception is always limited. It also implies that I do not tackle the issue of the firms' incentives to enhance quality misperception, but deliberately narrow down the analysis to the question of debiasing. [12]

[12] In this regards, a related yet different issue, studied for instance in Zhou (2008) [168] could consist in investigating when firms have incentives to enhance consumer misperception in order to generate an underestimation of their competitors' good.

The cross price effect : Recall that consumer utility is described by the function $U(q_1, q_2) = \hat{}_1 q_1 + \hat{}_2 q_2 \quad 1/2(\ q_1^2 + \ q_2^2 + 2\ q_1 q_2)$. The sign of is a crucial parameter of the model as it determines the nature of the relation between the goods. The marginal utility is equal to:
$\frac{\partial U}{\partial q_i} = \hat{}_i \quad q_i \quad q_j$. When is positive, consuming the two commodities together decreases the marginal utility, which implies that the commodities are substitutes. On the contrary, if is negative, a joint consumption of the two goods will increase consumers' marginal utility, which means the goods are complements.

This paper tackles the specific question of firms' incentives to debias their competitor's customers in order to attract new consumers. The analysis is therefore limited to the case of substitute goods, that is to say > 0. To understand more precisely how influences the substitutability degree let us turn to the cross price elasticity, which I denote $E_{q_i p_j}$:

$$E_{q_i p_j} = \frac{\frac{\gamma}{\beta}}{\frac{\gamma^2}{\beta}} \frac{p_j}{q_i}. \tag{1.2}$$

I define an index of product substitutaility as $\frac{\gamma}{\beta}$. The index can also be analyzed as measure of inverse product differentiation. This substitutability index takes values in $(0, 1)$ and attains its minimum value when goods are almost perfectly independent, that is when 0. In this case, $E_{q_i p_j}$ also tends towards 0, which is consistent with the goods being independent. On the other hand, as goods become better substitutes, when , the index tends towards 1 and, quite logically, the cross price elasticity tends towards $+\ $. The index $\frac{\gamma}{\beta}$ captures the degree of substitutability and will prove to be very useful throughout the analysis.

1.3.2 Modeling debiasing

In this framework, each firm can debias its rival's customers in order to attract them. Any debiasing scheme carried out by a firm implies costs. The debiasing expenditures incurred by firms 1 and 2 are respectively denoted c_1 and c_2. I also assume that firms are able to carry out specific debiasing policies which only affect the demand for the competing good,

not for their own good.

In this chapter, consumer debiasing only affects the competitor's customers, exclusive of the firms own clients. One can then define the function $f(c_j)$ such as: $\hat{}_i = f(c_j)$, with $i = j$. I assume further, for the sake of simplicity, that the variables $\hat{}_i$ are piecewise linear functions of the debiasing costs c_i. One can write:

$$\begin{cases} \hat{}_1 = \max(\bar{}_1 \quad {}_2c_2; \_1) \\ \hat{}_2 = \max(\bar{}_2 \quad {}_1c_1; \_2) \end{cases} \tag{1.3}$$

where $\_i$ represents the minimal value of $\hat{}_i$. This minimal value $\_i$ corresponds to the rational consumer's perception. As for the parameters $_i$, they represent the efficiency of debiasing strategies carried out by the firms. This choice of modeling is consistent with the focus on quality overestimation: consumers' perception will never reach the point where they underestimate a product's quality, regardless of the debiasing expenditures. Therefore, c_i is also necessarily bounded. I denote $\bar{c}_i$ the maximal value of c_i, such as $\_j = f(\bar{c}_i)$. Accordingly, c_i can take any value within the interval $[0; \bar{c}_i]$.

1.3.3 The timing of the game

Firms have perfect information regarding the quality of their good, of their rival's good and of consumer misperception. Formally, both firms have perfect knowledge of $\bar{}_i$ and $\_i$ for $i \quad (1, 2)$. Firms also know how efficient and costly consumer debiasing will be. In other words, the functions $\hat{}_i = f(c_j)$ are known by firms. Under these assumptions, the timing of the game is as follows: firms first compete in quantity, as in a standard Cournot duopoly, the only difference being that consumers are biased. The equilibrium prices and quantities with biased agents are defined below as $\bar{q}_i$ and $\bar{p}_i$. The profits are studied in sections 1.3.4 and 1.3.5 below.

At a second stage, firms decide whether or not to engage in consumer debiasing. Since the profit functions are convex with regards to the debiasing expenditures c_i, a firm will either choose not to debias or to debias completely. No intermediate equilibrium is con-

ceivable.[13] Hence, firms simply compare their profit when consumers are biased, on one hand, and their profit when consumers are debiased, on the other hand. As we are facing rational profit maximizing firms, the decision to engage or not in debiasing policies is only guided by profit maximization. This mechanism is described in the following section 1.4. We next focus on cases when firms' optimal strategy is not to educate. After the decision has been made, the regulator ponders whether consumer debiasing is socially efficient. We tackle this issue in section 1.5 dedicated to the consequences of consumer bias and to a welfare analysis.

1.3.4 Equilibrium prices and quantities without consumer debiasing

At this stage, I focus on the market outcome in the absence of consumer debiaising. Neither of the two firms chooses to debias its rival's customers. In this situation, the equilibrium prices and quantities are equal to: [14]

$$\bar{q}_i = \frac{2 \bar{} _i \quad \bar{} _j}{4 \ 2 \quad 2} \text{ and } \bar{p}_i = \frac{(2 \bar{} _i \quad \bar{} _j)}{4 \ 2 \quad 2} \tag{1.4}$$

for $i = j$; $i = (1, 2)$ and $j = (1, 2)$. Note that $\bar{q}_i$ and $\bar{p}_i$ depend on the substitutability index $\frac{\gamma}{\beta}$, as shown in the expressions below:

$$\bar{q}_i = \frac{2 \bar{} _i \quad \frac{\gamma}{\beta} \bar{} _j}{4 \quad \frac{\gamma}{\beta}} \text{ and } \bar{p}_i = \frac{2 \bar{} _i \quad \frac{\gamma}{\beta} \bar{} _j}{4 \quad (\frac{\gamma}{\beta})^2} \tag{1.5}$$

This latter expressions allow the reader to see at once that the index $\frac{\gamma}{\beta}$ exerts conflicting forces on the equilibrium prices and quantities. Firstly, as the index increases, the quantity $\bar{q}_i^c$ decreases, which can be seen in the term $(\ \frac{\gamma}{\beta} \bar{} _j)$. When the goods are substitutes, it makes sense that the quantity of each good depends on the absolute advantage in demand of the other commodity. This *"quantity e ect"* gets more intense as the substitutability index increases. Secondly, quantities also tend to increase with the substitutability index

[13] The calculus is in appendix 2 below.
[14] See appendix 1 for proof.

$\frac{\gamma}{\beta}$, as the denominator $(4 \quad \frac{\gamma}{\beta})$ decreases. This second effect, which I call the *"price e ect"*, can easily be accounted for: as the substitutability index increases, firms have less market power to raise their prices. Prices thus decrease with $\frac{\gamma}{\beta}$, which has a positive effect on the consumption of both goods.

In equilibrium, $\bar{q}_i^c$ and $\bar{p}_i^c$ yield the following profit:

$$^{-}_{i} = \frac{(2 \quad ^{-}_{i} \quad ^{-}_{j})^2}{(4 \quad ^{2} \quad ^{2})^2} \tag{1.6}$$

Consumers initially suffer from quality misperception. We want to determine whether firms might have incentives to educate consumers. We therefore turn our attention to the market equilibrium with consumer education.

1.3.5 Equilibrium prices and quantities with consumer debiasing

Let us now shift our attention to the situation in which firms educate their rival's customers. In this event, according to (1.3), $\hat{}_1 = ^{-}_1 \quad _2c_2$ and $\hat{}_2 = ^{-}_2 \quad _1c_1$, with $c_i \quad [0; \bar{c}_i]$. Firms can choose any value of c_i ranging from 0 to $\bar{c}_i$. The polar case $c_i = 0$ corresponds to the situation mentioned above, when firms choose not to educate at all consumers. At the other extreme, when $c_i = \bar{c}_i$, consumers are fully educated, in the sense that their perception of the good is accurate ($\hat{}_i = \_i$). They no longer suffer from a quality bias. For any value of c_i in $]0; \bar{c}_i]$, the equilibrium levels of prices and quantities are equal to:

$$\hat{q}_i = \frac{2\hat{}_i \quad \frac{\gamma}{\beta}\hat{}_j}{4 \quad \frac{\gamma}{\beta}} \text{ and } \hat{p}_i = \frac{2\hat{}_i \quad \frac{\gamma}{\beta}\hat{}_j}{4 \quad (\frac{\gamma}{\beta})^2} \tag{1.7}$$

In equilibrium, $\hat{q}_i$ and $\hat{p}_i$ yield the following profit:

$$\hat{}_i = \frac{(2 \quad \hat{}_i \quad \hat{}_j)^2}{(4 \quad ^{2} \quad ^{2})^2} \quad c_i \tag{1.8}$$

In this simple framework, I ask the following question: do rational profit maximizing firms have incentives to engage in debiasing consumers in order to attract their rival's customers? To address this question, I consider in the next section the possible market equilibria.

1.4 The market equilibria: consumer exploitation versus consumer education

In this section, I study the various market equilibria and examine the parameters which determine the prevalence of one situation over the others. In order to define a set of sufficient and necessary conditions for each market outcome to arise, I study the sign of the derivatives of the profits with respect to the debiasing expenditures. I start by showing that the profit functions are always convex, which allows us to draw a distinction between two situations: if the first derivatives of the profit functions are positive, one obtain a symmetric Nash equilibrium whereby both firms educate consumers. On the contrary, strictly negative derivatives of the profit functions yield a market outcome without any debiasing.[15] This method allows me to define conditions under which firms educate or exploit consumer bias. Depending on the market characteristics, there are four possible equilibria, represented in the table below.

[15] See appendix 2 for details.

Firm 1

Firm 2		Debiasing	No debiasing
	Debiasing	$\Pi_i = \frac{\beta(2\beta\underline{\alpha}_i - \gamma\underline{\alpha}_j)^2}{(4\beta^2-\gamma^2)^2} \quad \bar{c}_i$	$(\Pi_1 = \frac{\beta(2\beta\underline{\alpha}_1 - \gamma\bar{\alpha}_2)^2}{(4\beta^2-\gamma^2)^2}, \Pi_2 = \frac{\beta(2\beta\bar{\alpha}_2 - \gamma\underline{\alpha}_1)^2}{(4\beta^2-\gamma^2)^2} \quad \bar{c}_2)$
	No debiasing	$(\Pi_1 = \frac{\beta(2\beta\bar{\alpha}_1 - \gamma\underline{\alpha}_2)^2}{(4\beta^2-\gamma^2)^2} \quad \bar{c}_1, \Pi_2 = \frac{\beta(2\beta\underline{\alpha}_2 - \gamma\bar{\alpha}_1)^2}{(4\beta^2-\gamma^2)^2})$	$\Pi_i = \frac{\beta(2\beta\bar{\alpha}_i - \gamma\bar{\alpha}_j)^2}{(4\beta^2-\gamma^2)^2}$

Table 1.1: Payo matrix with quality overestimation

In the next paragraphs, I more precisely focus on the two polar cases, that is to say the equilibrium where both firms fully educate consumers on one hand (section 1.4.1), and the opposite situation when neither of the firms debiases consumers on the other hand (section 1.4.2). I study the conditions under which those two equilibria emerge.

1.4.1 The fully educated consumer market outcome

Let us start with the situation which is most favorable to consumers, namely the case when both firms educate completely their competitor's customers.

Proposition 1: The symmetric market outcome whereby both firms completely educate their competitors' customers prevails if and only if the following conditions hold:[16]

$$\begin{cases} 2\frac{\gamma}{\beta}(2\_{1} \quad \frac{\gamma}{\beta}\_{2}) > \frac{\beta}{\epsilon_1}[4 \quad (\frac{\gamma}{\beta})^2]^2 \\ 2\frac{\gamma}{\beta}(2\_{2} \quad \frac{\gamma}{\beta}\_{1}) > \frac{\beta}{\epsilon_2}[4 \quad (\frac{\gamma}{\beta})^2]^2 \end{cases} \tag{1.9}$$

Interp etation:

One sees at first glance that the parameters $\ _i$ for $i \quad (1,2)$, which represent the efficiency of the debiasing strategies carried out by firms, greatly influence the market outcome. Firms are more likely to educate consumers when the debiasing strategies are efficient, that is to say when they have a strong effect on the absolute advantage in demand for the rival's good.

Secondly, the substitutability index $\frac{\gamma}{\beta}$ is a key parameter in the firms' decision making process, through two simultaneous mechanisms: the right hand sides in (1.9) become smaller as $\frac{\gamma}{\beta}$ increases, making the conditions less restrictive; whereas the effect of $\frac{\gamma}{\beta}$ on the left hand side is ambiguous, such as it is not possible to determine once and for all whether an increase of the substitutability index renders the constraints more or less restrictive. Let us examine in greater details the mechanisms at work.

[16] As explained in appendix 2, the profit functions are convex with respect to the debiasing expenditure. Hence, if profit functions are increasing with respect to the debiasing expenditures, the firm's best response will be to educate consumers. Hence, having increasing profit functions with respect to the debiasing expenditure is a necessary and su cient condition for the fully educated consumer market outcome to prevail.

sA explained above, prices decrease with , as $p_i = \hat{}_i \quad q_i \quad q_j$. [17] The intuition behind this phenomenon is that when the goods become better substitutes, firms have less market power to increase their prices. As the cross-price elasticity increases ($\frac{\gamma}{\beta}$ increases), the firms' incentives to debias consumers decline. Simply put, a more intense competitive pressure yields lower prices and weakens the incentives to attract new customers. This first ffi effectffiis captured by the term $\frac{\gamma}{\beta}\_j$ on the left hand side of the equations in (1.9). ON te that this price effect only has an impact on the term (2_j), while $4\frac{\gamma}{\beta}\_i$ increases with the substitutability index. Therefore, this price effect exerts a negative and bounded force on the firm's incentives to educate consumers.

On the other side, however, better substitutes imply that, at least in a duopoly framework, the rival's customers are more likely to transfer their demand to the debiasing firm. This transfer of demand from one firm to its competitor naturally increases the incentives to educate consumers. This second ffi effectffiis captured by the term on the right hand side of the conditions in (1.9): an increase in $\frac{\gamma}{\beta}$ loosens the constraint and renders an equilibrium with consumer education more likely.

The two polar cases, when goods are either independent or perfectly substitutable, lead to compelling results. First, the extreme case when $\frac{\gamma}{\beta} \quad 0$ is worth mentioning. In this event, the terms on the left hand side of the equations tend towards 0, while the right hand side is always positive. eH nce, the conditions are impossible to hold. Simply put, if the goods are independent, firms have no incentive to educate their rival's customers, since they will by no means benefit from such a strategy.

Second, if the index $\frac{\gamma}{\beta}$ tends towards 1[18], than conditions in system (1.9) imply that $\frac{\alpha_i}{\alpha_j} \quad (0,5; 2)$.[19] This conditions means that the symmetric market outcome whereby both firms educate their rival's customers can emerge only if the parameters $\_i$ for $i \quad (1, 2)$ are relatively close to each other. This conditions can be interpreted as follows: if a firm has a large advantage in demand compared to the other firm (the absolute advantage in demand is more than twice as large as the advantage of other firm), then it will have no incentive

[17] See appendix 1 for details.

[18] When goods are perfectly substitutable, the index is equal to one. In this case, the own price e ect is equal to the cross price e ect, which is a theoretical case.

[19] To find this condition, one solves simultaneously $2(2\_i \quad \_j) > 0$ for $i \quad \{1, 2\}$; $j \quad \{1, 2\}$ and $j = j$.

to debias consumers. The intuition is that quality overestimation for the rival's good is insignificant compared to the absolute advantage in demand for the firm's own product. Hence, that firm will have no incentive to educate its rival's customers.

Depending on the market characteristics, that is to say on the value of the various parameters, an equilibrium with consumer education might be possible. The expressions in in system (1.9) call for a graphic representation. We can trace on the same graph the quadratic functions on the left hand side of the equations in (1.9) and the quartic functions on the right hand side. Proposition 1 can be restated as follows: there is a Nash equilibrium in which both firms educate consumers if there exists an area in which each quadratic function on the left hand side of the equations in (1.9) is superior to the corresponding quartic function on the right hand side. In the first graph below, the area is hatched in red.[20]

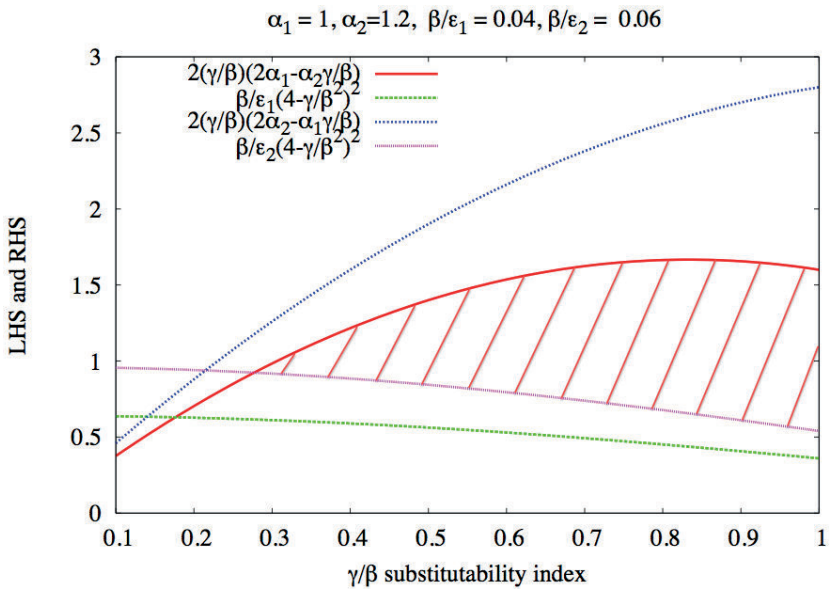

Figure 1.1: Symmetric market equilibrium with complete consumer education

In the second graph below, the parameters are such as there is no possible symmetric equilibrium with consumer education.

[20]The graph is traced for a given value of , while varies. Hence $\frac{}{1}$ and $\frac{}{2}$ do not vary.

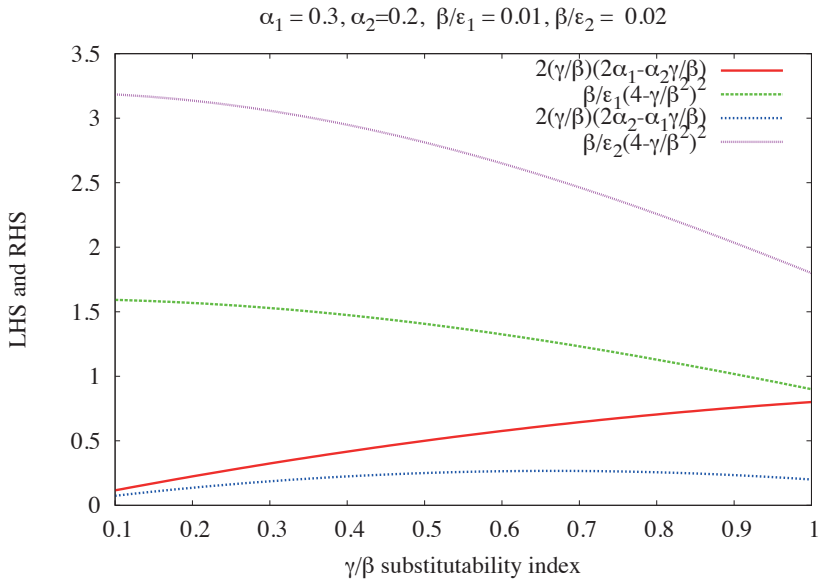

Figure 1.2: No possible symmetric market equilibrium with consumer education

The two graphs above show that, depending on the market characteristics, an equilibrium with consumer education might or might no emerge. Hence, one can't always rely on firms to educate consumers. The firms' incentives depend primarily on the market characteristics.

1.4.2 The fully biased consumer market outcome

Let us now turn to the second polar case, which is less favorable to consumers: the symmetric market outcome whereby neither of the firms engages in consumer debiasing.

Proposition 2: The symmetric market outcome whereby neither of the firms educates the rival's customers arises if and only if the following conditions hold:

$$\begin{cases} 2\frac{\gamma}{\beta}(2^{-}{}_{1} \quad \frac{\gamma}{\beta}{}^{-}{}_{2}) < \frac{\beta}{\epsilon_1}[4 \quad (\frac{\gamma}{\beta})^2]^2 \\ 2\frac{\gamma}{\beta}(2^{-}{}_{2} \quad \frac{\gamma}{\beta}{}^{-}{}_{1}) < \frac{\beta}{\epsilon_2}[4 \quad (\frac{\gamma}{\beta})^2]^2 \end{cases} \tag{1.10}$$

Interp etation

Consider that when firms exploit consumer misperception, they give up the possibility of attracting new customers through debiasing. This opportunity cost is crucial to understand the effect of $\frac{\gamma}{\beta}$ on the firms' incentives to exploit consumer misperception. While the same price and quantity effects are at work, their consequences are, quite logically, inverted.

Concerning the price effect, recall that a greater substitutability degree entails lower prices. Therefore, the firms' incentives to exploit customers is increasing with $\frac{\gamma}{\beta}$. This price effect is captured by the term $2(\frac{\gamma}{\beta})^{2\ -}{}_{j}$ on the left hand side of the equations in (1.10). The force at work is simply the counterpart of the price effect mentioned above: lower prices imply that recruiting new customers through debiasing will generate smaller profits, which deters firms from educating consumers, or conversely, fosters consumer exploitation.

Let us now turn to the quantity effect, which refers to the transfer of demand that firms give up by exploiting consumers instead of debiasing them. One understands that this loss of potential new customers is all the more important as the goods are better substitutes. This opportunity cost accounts for the second ffi effectffi encapsulated in the terms on the right hand side of the equations. Accordingly, as the goods become better substitutes, firms are deterred from exploiting consumer misperception. Once again, the polar case when $\frac{\gamma}{\beta}$ 0 is compelling. In this event, the conditions in (1.10) always hold: in the presence of independent goods, firms have no incentives to educate their rival's customers.

To sum up, the substitutability degree exerts two distinct forces on the firms' incentives to educate or to exploit consumers, via prices and quantities. A better substitutability degree yields lower prices, which deters firms from recruiting new customers. Meanwhile, better substitutes also imply a greater potential transfer of demand ensuing from consumer debiasing, which exerts the opposite force on the firms' incentives. This latter effect seems to be prevailing, but does not strike out the possibility of consumer exploitation.

1.5 A welfare analysis: when is debiasing socially efficient?

In the next paragraphs, I study the welfare effects of consumer bias. Choosing a criteria to carry out the welfare analysis in the presence of unstable preferences is delicate. While the issue does deserve to be mention, changing preferences should not stand in the way of a welfare analysis, as we will see in section 1.5.1. Since preferences are unstable, various welfare criteria are conceivable. We will discuss two of them in section 1.5.2.

1.5.1 Welfare analysis with unstable demand functions

Specifying the exact consequences of quality misperception on consumer welfare is quite tricky, as the utility functions themselves are different for biased consumers on one hand, and debiased agents on the other hand. The difficulty consists in defining a welfare criteria which allows us to compare the situations *ex ante*, before debiasing, and *ex post*, after debiaising. Nonetheless, this barrier should not stand in the way of a welfare analysis.

Welfare analysis classically rests on the assumption that consumer choice reflects consumer preferences. The axiom of revealed preferences, first put forward by Samuelson (1938 [133] and 1948 [133]) is a key assumption as it allows to analyze consumer welfare based on their observable behavior. This axiom implies a minimal consistency requirement in consumer behavior. As soon as agents are not consistent, any statement on welfare becomes tricky. If purchase decisions no longer reflect preferences, they can not serve as a basis for investigating welfare. Consumer bias results in a gap between consumer choice and consumer preferences: purchase decisions, by definition, do not reflect consumer preferences. Hence, welfare assessments should not rest only on observable purchase decisions. In order to evaluate the consequences of consumer bias on welfare, one should therefore compare the situation before and after debiasing.

However, this comparison is not obvious in the presence of changing preferences. Should one consider the *ex ante* or the *ex post* preferences ? In this respect, the issue of comparing consumer utility before and after debiaising is very similar to the debate that arose

concerning the effect of advertising on consumer welfare. Both advertising and debiasing result in a shift of the demand curve, and therefore raise the issue of how one should carry out a welfare analysis.[21] Advertising consists in increasing consumer willingness to pay for a given product. If successful, advertising results in an shift of the demand curve towards the right. Debiasing, on the other hand, consists in revealing consumers' true willingness to pay. In the case of quality overestimation, debiasing results in a shift of the demand curve towards the left (true quality is revealed and demand decreases). In a sense, the the two mechanism are symmetric.

Assessing the welfare effects of advertising has risen acute methodological debates, which are quite similar the to issues occurring in the case of debiasing. In a controversial paper, Dixit & Norman (1978) [46] argue that, although advertising changes consumer taste, one can carry out a welfare analysis by using either the preadvertising taste, or the postadvertising taste. *"With advertising, the two natural extremes are the preadvertising and postadvertising tastes, i.e., the respective utility functions from which the pre- and the postadvertising demands can be derived. In evaluating welfare, one would use the former if he thought the advertising was pure deception, and the latter if he thought the resulting tastes represented the consumer's true interests."*[22] The authors consider that the choice of a utility function ought to depend on the effect of advertising on consumers' perception. If advertising reveals valuable information, the post-advertising taste should prevail. Conversely, if advertising triggers errors in consumer taste, the pre-advertising taste is relevant.

The gist of the argument put forward by Dixit & Norman is perfectly relevant for the issue of consumer debiasing. If one considers that the agents' true preferences are revealed after debiasing, than one should logically use the post-debiasing demand function to pursue a welfare analysis. Concerning the specific case of quality overestimation, one can consider that consumer preference after debiasing corresponds to their true preferences. Hence it seems logical to carry out a welfare analysis by considering the post-debiasing taste. This

[21] I mention here the case of persuasive advertising, as opposed to informative advertising. While the latter in constrained to giving basic information about products, the former modifies consumer tastes (see Shy (1996) [138] and Belleflamme & Peitz (2010) [20].

[22] On this issue, see for example Fisher & McGowan (1979) [57] and Shapiro (1980) [137].

is the stance adopted in the welfare analysis in the following paragraphs.

1.5.2 The choice of a welfare criteria

Various approaches are possible to carry out a welfare analysis. I first mention the net loss due to overconsumption, and next turn to the monetary loss incurred by consumers.

1.5.2.1 The net loss resulting from overconsumption

Let us first study the net loss resulting from overconsumption. In this chapter, I focus on quality overestimation. Therefore, when consumers are biased, they necessarily buy more than what they would have bought, had they been perfectly rational. The overconsumption corresponds to the quantities educated consumers would not have bought. However, consumers do have a positive willingness to pay for the excess quantities. The net loss corresponds to the difference between their willingness to pay for the excess quantity after debiasing and the price they are charged.

Representing this loss graphically can be quite helpful. In order to represent the consequences of overconsumption, keep in mind that debiasing results in a shift of the demand curve towards the left. Indeed, if consumers are completely biased, the utility function $U(q_1, q_2)$ yields the inverse demands:[23]

$$p_i = \bar{}_i \qquad q_i \qquad q_j \text{ for } i = j, i \quad (1,2), j \quad (1,2)$$

A debiasing policy results in a decrease if the absolute advantage in demand from $\bar{}_i$ to $\_i$. Hence, the demand function for good i after debiasing is equal to $p_i = \_i \qquad q_i \qquad q_j$. Graphically, debiasing is represented by a parallel shift of the demand function towards the left, as show in figure 1.3 below.[24]

Hence, the deadweight loss due to overconsumption, defined as the quantities debiased consumers would not have bought, corresponds to the area hatched in red in figure 1.3.

[23] See system (1.16) in the appendix below (section 1.9.1).
[24] insert note on advertising

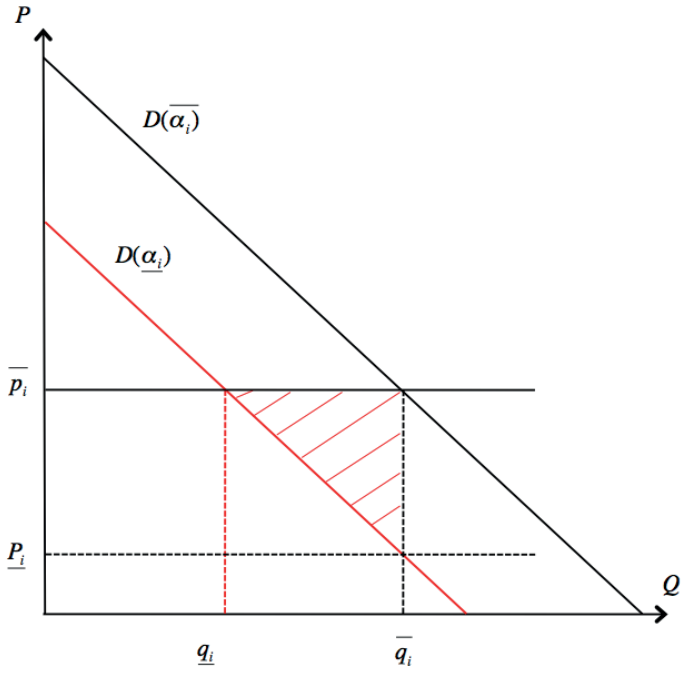

Figure 1.3: Net loss ensuing from overconsumption in the presence of biased consumers

In this framework, one can calculate the net loss resulting from over-consumption of good i. At this stage, only α_i varies.

$$NL_{\alpha_i} = \frac{1}{2}(\bar{q}_i - \underline{q}_i)(\bar{p}_i - \underline{p}_i) \tag{1.11}$$

Recall that according to (1.4), at equilibrium prices and quantities are equal to:

$$\bar{q}_i = \frac{2\bar{\alpha}_i - \bar{\alpha}_j}{4 - \beta^2} \text{ and } \bar{p}_i = \frac{(2\bar{\alpha}_i - \beta\bar{\alpha}_j)}{4 - \beta^2}$$

Moreover, $\bar{\alpha}_i - \underline{\alpha}_i = \beta c_j$.

It follows, that the expression of the dead-weight loss ensuing from an overconsumption of good i in the equation (1.11) above is equal to:

$$NL_{\alpha_i} = 2\frac{(\beta c_j)^2}{(4 - \beta^2)^2} \tag{1.12}$$

Let us now consider that both firms educate their rival's costumers. In this case, the

total deadweight loss resulting from overconsumption is equal to NL:

$$NL = NL_{\alpha_1} + NL_{\alpha_2} = \frac{1}{2}\frac{(2 \quad {}_2c_2 \qquad {}_1c_1)^2}{(4 \quad {}^2 \qquad {}^2)^2} + \frac{1}{2}\frac{(2 \quad {}_1c_1 \qquad {}_2c_2)^2}{(4 \quad {}^2 \qquad {}^2)^2}$$

Finally, one can write the expression of the deadweight loss as follows:

$$NL = \frac{}{2(4 \quad {}^2 \qquad {}^2)^2}[(2 \quad {}_2c_2 \qquad {}_1c_1)^2 + (2 \quad {}_1c_1 \qquad {}_2c_2)^2] \tag{1.13}$$

The NL represents the difference between the price $\bar{p}_i$ actually paid by consumers and their post-debiasing demand curve $D(\__i)$. This method takes into account consumers post-debiasing willingness to pay for the good, which is sensible insofar as we consider that post-debiasing tastes reveal the agents' true willingness to pay. In the next paragraph, we also use the post-debiasing tastes to measure the welfare effects of consumer education but we determine the monetary loss due to over-consumption.

1.5.2.2 Cos n umers' mon n tary loss ensuing from overo nsumption

In this section, I determine what amount of money consumers spend because of quality overestimation. When one calculates the net loss (as in the previous paragraph), one takes into account consumer willingness to pay after debiasing. Conversely, in this approach, I only focus on the money spent by biased consumers because of quality overestimation, regardless of their actual willingness to pay for the good. Therefore, the financial loss calculated in the following paragraphs is, by definition, larger than the net loss studied above. Figure 1.4 represents the monetary loss ensuing from overconsumption.

I start from an initial situation in which agents are biased and consume $\bar{q}_i$ at price $\bar{p}_i$. As explained above, I then calculate the quantities $\underline{q}_i$ an educated consumer would buy *at the same price* $\bar{p}_i$. I compare $\bar{q}_i$ and $\underline{q}_i$, which represents the excess consumption due to quality overestimation. I can then express the financial loss endured by consumers due to quality overestimation. Note that I consider a situation in which both firms *simultaneously* educate their rival's customers, such as $\hat{}_1$ and $\hat{}_2$ both vary concomitantly.

In this framework, consumer debiasing avoids excess spending. Let us denote ML the

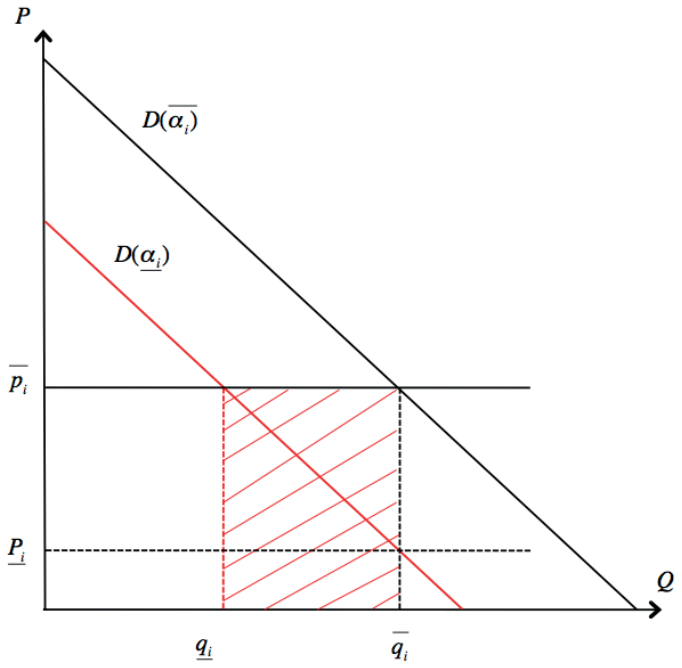

Figure 1.4: Monetary loss ensuing from overconsumption in the presence of biased consumers

amount saved by consumers because of the debiasing policy when both firms educate. ML corresponds to the monetary loss incurred by biased agents. Formally, both $_1$ and $_2$ decrease. Hence, $ML = \quad q_1\bar{p}_1 + \quad q_2\bar{p}_2$

After some calculation, one can show that the monetary saving ensuing from a debiasing policy is equal to:

$$ML = \frac{(2 \quad {}_2c_2 \qquad {}_1c_1)(2 \quad {}^{2}- {}_1 \qquad {}^{-}{}_2)}{(4 \quad {}^{2} \qquad {}^{2})^2} + \frac{(2 \quad {}_1c_1 \qquad {}_2c_2)(2 \quad {}^{2}- {}_2 \qquad {}^{-}{}_1)}{(4 \quad {}^{2} \qquad {}^{2})^2}$$

The value of ML does not depend on the post-debiasing willingness to pay for the good. It only corresponds to the excess spending due to overconsumption.

1.5.2.3 Specifying a welfare condition.

On the outset, specifying a welfare condition consists in defining a threshold above which consumer debiasing is not considered to be socially efficient. Whether one focuses on

the net loss or on the monetary savings consumers enjoy after debiasing, the relevant question is not so much to figure out when debiasing increases consumer welfare (which is always true), but rather to determine when mandatory debiasing should be implemented. Compulsory consumer education should not be systematic: it is an efficient policy as long as the increase in welfare exceeds the costs of debiasing.

- If one considers the deadweight loss, the condition can be written: $NL > c_1 + c_2$.
- If one studies the monetary gain consumers enjoy because of debiasing policies, the condition becomes: $ML > c_1 + c_2$.

Beyond the trivial assertion that the benefits should outweigh the costs of debiasing, this welfare condition lends itself to a second interpretation: consumers should be willing to bear the cost of debiasing.

1.6 Legal Policy Implications

At this stage, one straightforward statement deserves to be underscored: a curse of debiasing might occur even in the presence of substitute goods. In other words, the market does not necessarily suffice to avoid consumer exploitation. Since both market outcomes are *a priori* feasible, the key issue is to determine whether market mechanisms help to overcome the adverse consequences of consumer biases. As sum up Kahneman & Tversky (1986) [159], *"the claim the the market can be trusted to correct the e ect of individual irrationalities cannot be made without supporting evidence, and the burden of specifying a plausible corrective mechanism should rest upon those who make this claim.*ffiSince this claim has not received so far any convincing evidence (section1.6.1). I argue that a legislative intervention can be, in some instances, an efficient way to counter consumer bias (section1.6.2). I finally mention the various ways debiasing can be carried out (section1.6.3).

1.6.1 The deficiencies of market mechanisms to fight consumer misperception

Several arguments, none of which are fully compelling, have been put forward to show that, while consumer bias is a true issue, the market itself can overcome ffi*behavioral market failures*ffiBar Gill (2008) ([8]). Among other examples, the market for reputation (section 1.6.1.1) and the right to withdraw from a contract (section 1.6.1.2) are often presented as efficient responses to consumer biases.

1.6.1.1 The market for reputation

Bebchuk & Posner (2006) [16] argue that the market for reputation can serve as an efficient means to counter consumer misperception. More precisely, the authors contend that firms will be deterred from taking advantage of consumers in order to protect their reputation. In a sense, this viewpoint pleads against any legislative intervention as the market itself should constrain the adverse effects of consumer bias. This complete reliance on market forces is very optimistic, since the conditions under which the market for reputation is efficient are extremely restrictive. Not only is it necessary for consumers to have accurate and immediate feedback concerning the reputation of each firm, but it is also required that consumer boycott influences directly and substantially the firms' reputation. Moreover, reputation building is particularly problematic for credence goods, as a persistent uncertainty concerning the quality of the good will always endure.

Finally, recall that consumers are by definition boundedly rational. The biases affecting their consumption decisions might well hinder their analysis of information concerning the firms' reputation. Several mechanism might interfere: first, one could imagine that biased consumers do not analyze and process all the relevant information. For instance they might overlook information regarding a firm towards which they have a positive bias. Second, one could also suppose that biased agents overreact to information regarding the firms' reputation. Typically consumers might be more sensitive to criticisms than to laudatory information. A major flaw in the argument of Bebchuk & Posner (2006) [16] and other authors who praise the market for reputation as a response to consumer bias, is that they

do not bother to give an account of how this market functions in the presence of such biases. In other words, it seems somewhat inconsistent to admit that consumer misperception *is* an issue that deserves to be dealt with, and simultaneously that consumers are rational enough to overcome their own misperception, by analyzing public information on the market.

1.6.1.2 The right to withdraw law

The right to withdraw refers to any legal mechanism which allows consumers to change their mind after the contract has been concluded. The right to withdraw can be a response to two distinct problems: uncertainty about the quality of the good, on one hand; and impulsive shopping, on the other hand. Ben-Shahar & Posner (2006) [22] study the efficiency of the right to withdraw as a response to quality misperception. The gist of their argument is quite intuitive: the right to withdraw allows consumers to cancel a contract whenever it does not meet their expectations. Therefore if consumers overestimate the quality of a good *ex ante*, they can simply return it to the seller after having tried it during a reasonable period of time. The authors argue that consumers should have the opportunity to actually use the good and return it if they realize *ex post* that they are disappointed, which raises the issue of product depreciation. The optimal time and scope of the right to withdraw should *"balance the buyer's gain from the reduction of uncertainty and the seller's loss in terms of depreciation cost"* (page 8). In order to counter this problem, the authors prepose a different version of the withdrawal right, which would give the buyer the option to return the good and pay the depreciation loss to the seller. Ben-Shahar & Posner plead in favor of a default right to withdraw, rather than a mandatory one, namely in the case of distance contracts involving complex goods which do not depreciate. They argue that default right to withdraw can serve as a signal of product quality, which is obviously not the case of a mandatory rule.

My contention is that such an *ex post* remedy, though it might be helpful in some instances, does not suffice to fight against consumer exploitation on a large scale. First, the right to withdraw necessarily raises costs, since it entails transaction costs and other indirect costs (return costs, costs of searching for a new product, opportunity cost of the

time spent to return the product etc.). Such costs can either weigh on consumers or on firms. In the latter case, one can expect firms to transfer the cost of the withdrawal right to consumers through a price increase. Therefore, regardless of who theoretically pays the return costs, this process can ultimately lead sophisticated agents, who do not use their right to withdraw, to subsidize naive agents. Such effects are not taken into account by the advocates of the right to withdraw as a response to consumer bias.

Second, as Ben-Shahar & Posner (2011) admit themselves, withdrawal right is necessarily limited to goods that do not depreciate or for which the depreciation can be measured. The scope of such a measure is by essence very limited. In addition, the withdrawal right is complicated to implement since it implies quantifying product depreciation in monetary terms.

Third, the right to withdraw necessarily relies on the consumers' own initiative: returning a good after purchase implies that consumers are aware of their right and actually decide to use it. When facing boundedly rational agents, each of those two steps comes across several impediments: informational issues, inertias biases or endowment effects are only some of the hindrance consumers have to overcome. Moreover, as Hoepnner (2012) [76] argues, cooling-off periods can generate perverse incentives in the presence of boundedly rational consumers. In a nutshell, the mere presence of a cooling-off period might result in an inefficiently high number of contracts signed, while an inefficiently low proportion will actually be cancelled. Once again, the intuition behind this mechanism is quite simple: the possibility of getting out of the contract persuades consumers to sign the contract in the first place; once the contract has been finalized however, only very few consumers actually use their right to withdraw, since changing the default situation is costly. Hence, the right to withdraw can counterintuitively become a trap for biased consumers

To sum up, *ex post* remedies are not always efficient to counter the adverse consequences of consumer irrationality. While the right to withdraw or other *ex post* measures can work for some agents, they are unable to fight consumer exploitation on a large scale. In this context, a legal intervention can be a relevant means to tackle consumer bias. The

next paragraph studies the possibility of influencing *ex ante* the market outcome through mandatory debiasing. The aim is to avoid the occurrence of the consumer exploitative equilibrium in favor of an equilibrium with consumer education.

1.6.2 Changing the market equilibrium through consumer debiasing

In practical terms, *consumer debiasing* mostly consists in compulsory information disclosures concerning the good or the product consumers consider purchasing prior to signing the contract. A strong argument in favor of mandatory debiasing through consumer information is that such a policy is perfectly respectful of both consumers' free will and firms' freedom of commerce and industry. As far as consumers' free will is concerned, this form of regulation is actually one of the least intrusive and pernicious measures conceivable. Consumer debiasing via mandatory information disclosure is perfectly transparent: consumers are in no way being manipulated and their choices remain perfectly free. [25] On the contrary, consumer debiasing allows each individual to make a decision with *all* the relevant information, which is perfectly consistent with the respect of *"consumer sovereignty"*.[26] In fact, such a policy enhances consumers' free will, as it allows for truly enlightened decisions.

Several arguments against consumer debiasing deserve to be mentioned and most of them dismissed. Concerning the concept of *consumer exploitation* itself, one might object that consumers are not truly being exploited, since they are *intrinsically* biased. While this issue does deserve to be addressed, the objection does not hold: first of all, firms are involved in a strategic behavior to maximize their profit by taking advantage of consumer misperception. This strategy results in a gap between the consumers' expected utility *ex ante* and their true utility *ex post*. In this sense, consumer misperception is effectively being used to their detriment and to the firms' advantage. Secondly, one should wonder where the

[25] Contrary to the framing e ect for instance, the object of such a legal policy is by no means to influence consumers' decisions without their knowledge. In their influential book entitled *Nudge*, Sunstein & Thaler (2008) [158], explain how the framing e ect can bend the individuals' choices, precisely without them realizing that they are being manipulated.

[26] Jolls, Sunstein & Thaler (1998) [86].

seemingly intrinsic misperception originates. Why do consumers overestimate the quality of a good in the first place? Of course, consumer misperception sometimes stems from the individual's deep rooted psychological bias, such as overoptimism. However, it seems reasonable to suppose that in most instances quality misperception is triggered by some outside information, particularly by advertising. Although quality biases are considered to be intrinsic in the previous model, as it focuses on their effect on the market outcome rather than on their cause, one should keep in mind that misperception can be generated or at least enhanced by firms. Consequently, the market equilibrium whereby both firms benefit from consumer biases is a *consumer exploitative* market outcome.

Regarding the means of fighting against consumer exploitation, one might object that compelling firms to debais their competitors' customers would result in disparagement. However, the previous analysis does not imply that firms should be constrained to debias *their rival's* customers. Requiring firms to disclose information about their own products is also an efficient answer to the lack of incentives to spontaneously debias consumers. At this stage, the relevant question is not so much to determine who should be in charge of consumer education but rather if a legislative intervention is necessary to limit the perverse effects of consumer bias. While the issue of how the costs of debiasing should be allocated is beyond the scope of this article, the question of what *consumer debiasing* exactly stands for does deserves to be mentioned.

1.6.3 What is consumer debiasing?

Consumer debiasing can refer to any action undertaken by private agents (such as firms) or by the regulator to prevent agents from taking decisions on the basis of biased erroneous perceptions. In the present chapter, the bias only refers to quality overestimation. Hence, debiasing consists in revealing to consumers the true quality of the commodities. Several means are conceivable to help consumers form accurate estimation of quality.

1.6.3.1 A legal duty to inform

A common method of consumer debiasing lies in the legal duty to inform imposed upon firms. In most case, debiasing simply consists in increasing the amount of information that the professional party is legally obliged to disclose prior to signing the contract. The French consumer code offers in this regard a very compelling example: beyond the general information duty provided for at the first article [27], several articles mention specific information disclosure duties. Among other examples, let us mention contracts for electronic communication[28], distance contracts and door-step selling [29], food products [30] etc.

As emphasized by Faure & Luth (2011) [54], increasing mandatory information disclosure is not an adequate response to consumers' limited cognitive ability. Indeed, mandatory disclosures can lead to information overload. When facing boundedly rational agents, the potential backfire effects of overwhelming information flows should not be neglected. While the issue of information overload is relevant, it does not render any information disclosure inappropriate but rather suggests that the information should be made accessible and intelligible to consumers. Barr, Mullainathan and Shafir (2013) [15] also highlight that *"information cannot be thought of as naturally yielding knowledge, and knowledge cannot be assumed to generate the requisite behavior"*. They insist on the importance of presenting information in a simple, comprehensible manner.

A similar argument is thoroughly developed by Ben-Shahar & Shneider (2014) [23] in their book entitled *More Than You Wanted to Know, The failure of Mandated Disclosure*. The authors bluntly wonder, about information disclosure: *"How could a regulatory technique be so common and yet so bad?"* They shed light not only on the shortfall of information disclosure but also on its dangers. The main risk consists in overwhelming consumers with loads of information that they are unable to process, such as, paradoxically, even the most important pieces of information remain unknown.

The risk of overwhelming consumers with useless and incomprehensible information has

[27] Article L.111-1 of the French consumer code states a number of information the professional party need to give to the buyer.
[28] Article L.121-83 of the French consumer code.
[29] Article L.121-17 of the French consumer code.
[30] Article L.112-13 of the French consumer code.

also been pointed out by regulation authorities themselves. A report issued in Novembre 2007 by the Better Regulation Executive and National Regulation Council in the United Kingdom is in this respect very compelling. The report entitled *Warning: Too Much Information Can Harm*[69] tackles the issue of how information should be presented to consumers so that they can actually process and use it. The report observes that *"many pieces of information were simply not having the impact on consumer behaviour they set out to achieve. Consumers rejected much of the information because it was not helpful or was presented in a complex or unappealing format"*. The report comes up with several recommendations about various aspects of information disclosure such as improving the design of information, focusing on consumer understanding of messages, seeking for innovative approaches to communicate with consumers, testing information provision requirements with consumers before implementation etc.

To sum up, information requirements do not appear to be in all instances an efficient response to consumer debiasing. Hence, other means of debiasing need to be considered. Several means of debiasing are conceivable. In the next paragraph, we focus on comparative advertising since it is the most consistent method with regards to the model presented above.

1.6.3.2 Comparative adverstising

The notion of comparative advertising and the legal framework. The model focuses on firms revealing information about the quality of their rival's good in order to attract customers to buy their own product. In this context, the issue of comparative advertising naturally comes to mind. Comparative advertising is defined by the Federal Trade Commission as *"advertising that compares alternative brands on objectively measurable attributes or price, and identifies the alternative brand by name, illustration or other distinctive information"*.[31] In France, comparative advertising is defined by article L. 121-8 of the Consumer Code as *"advertising which compares goods or services by identifying, either implicitly or explicitly, a competitor or goods or services offered by a competitor."*

[31]Statement of Policy Regarding Comparative Advertising, 13th August 1979, available at https://www.ftc.gov/public-statements/1979/08/statement-policy-regarding-comparative-advertising.

While the definitions are quite similar in Europe and in the United States, the approaches towards comaprative advertising are radically different.

The Federal Trade Commission has been since the 70s' very favorable to comparative advertising, which is perceived as a means to facilitate rational and informed decision-making for consumers. In the above mentioned statement of August 1979, the Federal Trade Commission highlights the advantages of comparative advertising: *"The Commission has supported the use of brand comparisons where the bases of comparison are clearly identified. Comparative advertising, when truthful and non-deceptive, is a source of important information to consumers and assists them in making rational purchase decisions. Comparative advertising encourages product improvement and innovation, and can lead to lower prices in the marketplace. For these reasons, the Commission will continue to scrutinize carefully restraints upon its use."* In the United States, comparative advertising is admitted and can exceptionally be banned, namely when it turns into disparaging.

French, and more generally European regulation take an opposite stance. According to article L. 121-8 of the Consumer Code, comparative advertising *"is legal only if: 1) It is not deceiving or likely to induce an error; 2) It focus on goods or services satisfying the same needs; 3) It objectively compares one or several essential, relevant, verifiable and representative characteristics of the goods or services, amongst which prices."*[32] One understands at first glance that comparison is perceived as a possible danger rather than a means of information.[33]

The relevance of comparative advertising to counter quality overestimation. The present chapter of the thesis, in line with previous economic research, makes an argument in favor of comparative advertising. For instance Barigozzi & Peitz (2007) [14] argue that comparative advertising, as opposed to generic advertising, *"provides information which is easily converted in operational knowledge by consumers"* (page 215). Barnes

[32]French Law directly stems from the European Directive 97/55/EC of European Parliament and of the Council of 6 October 1997.

[33]It is quite striking that until an *ffordonnanceff* of August 23, 2001, the advertiser was legally obliged to send the ad to his competitor prior to the actual broadcasting. This legal obligation illustrates the great suspicion in France towards comparative advertising.

and Blakeney (1992) insist on the lower cost of information provided through comparative advertising (cited in Shy (1996) [138]). The issue of consumer bias is a new argument in favor of comparative advertising. Depending on the market characteristics, firms might want to reveal information about their rival's good. Therefore, excessive legal restriction on comparative advertising could hinder an efficient way of educating consumer. A simple example illustrates how comparative advertising can reduce quality overestimation. The French optician Visual launched an advertising campaign in which the consumer was asked: *"When you are o ered a second pair of glasses, are you always sure about its quality?"* Implicitly, this advertisement referred to the wide-spread practice of several competing firms, among which Afflelou who filed a case for disparagement.[34] Such comparative advertising has the positive effect of making salient to consumers the potential defects of a given product. More generally, comparative advertising has the potential to give consumers valuable information at a low cost and to bring their attention on a particular aspect of the product they might have otherwise overlooked. While comparative advertising does have undeniable virtues, in can also lead to disparagement. Comparative advertising requires particular caution, as illustrates the French case brought before the Court of Grenoble in 2005 concerning electricity distribution. Following the opening to competition of the electricity distribution from 2004, new companies arrived on the market. In several cities, they carried out comparative advertising campaigns to claim that their prices were lower than that of the historic operator. In the city of Grenoble, the historic operator responded with an aggressive communication campaign. A case for disparagement was filed and recognized first by the Commercial Court[35], next by the Court of Appeal [36] and finally the French Competition Authority [37]. The latter considered that the disputed acts also constituted an abuse of dominant position. This example pleads in favor of great prudence and discernment when promoting comparative advertising.

[34]The final decision of the French Supreme Court dismisses the case and considers that A elou was not the only operator on the market who o ered such discounts and was not directly aimed by the advertisement. The decision was issued in July 2006 (Cass. com., 4 juillet 2006 N 03-11.759).
[35]Commercial Court of Grenoble, ordonnance of June, 14th, 2005.
[36]Grenoble Court of Appeal, July 20th 2005.
[37]Decision n 09-D-14 of March, 25th, 2009.

However, the relevant form of comparative advertising to counter consumer misperception deserves to be discussed. Economic literature traditionally makes a distinction between informative and persuasive advertising. Comparative advertising can be either persuasive or informative, as emphasized by Barigozzi & Peitz (2007) [14]. Whether informative or persuasive advertising would be relevant to debias consumers in the case of quality overestimation is not straightforward. Informative advertising carries basic product information, such as prices, availability, store locations etc. Generally, informative advertising is limited to simple basic information and aims at increasing the share of consumers who know about the product (Belleflamme & Peitz, 2010, [20], p. 148). Persuasive advertising, on the other hand, tends to enhance consumer tastes for a given product (Shy (1996) [138], p. 283). Technically, persuasive advertising increases consumers' willingness to pay for a good and results in a shift of the demand curve.

In the situation modeled above, consumers know about the product, its price, availability etc. Hence, standard informative advertising about basic product information is not relevant. After debiasing, consumers have a new demand curve, which reflects their post-debiasing taste. In this sense, debiasing seems closer to persuasive advertising. However, advertising through debiasing also has an informative dimension, since it plays a *"constructive role"* (Belleflamme & Peitz, p. 148, [20]) and helps consumers make better decisions. Therefore, the relevant form of advertising is both informative and comparative. It should make the consumer more aware of some aspects of the product and consequently modify his willingness to pay.

To conclude, the present model sustains the idea that comparative advertising can provide, to some extent, an efficient answer to consumer bias. Making comparative advertising less restrictive in Europe could be an interesting path to follow.[38] Note however that debiasing through comparative advertising is only possible when firms have financial incentives to educate consumers. In other cases, such as the situation described in proposi-

[38]This seems to be the current stance of the European institutions. The directive 2006/114/CE of December 12, 2006 concerning misleading and comparative advertising states that *ffComparative advertising, when it compares material, relevant, verifiable and representative features and is not misleading, may be a legitimate means of informing consumers of their advantage. It is desirable to provide a broad concept of comparative advertising to cover all modes of comparative advertising.ff*

tion 2 above, private initiative will simply not result in consumer debiasing. In such cases, the issue of mandatory education deserves to be explored. This question is left for future research.

1.7 Discussion and extensions

1.7.1 The issue of repeated transactions

While this paper focuses on a static framework, the issue of quality bias also lends itself to a dynamic analysis. Consumers often conclude repeated transactions with the same agent, notably for long-term subscriptions. In this context, one would expect cognitive bias to decline as consumers gain experience, and gradually come to the realization that their decisions are not optimal. Surprisingly, the literature tends to highlight the opposite phenomenon: even with repeated transactions, quality bias can enduringly alter consumer choice. In this respect, the market for cell phone subscriptions is a striking example. In their paper dedicated to the cell phone market Bar Gill & Stone (2009) [13] emphasize that consumers usually overestimate or underestimate their future consumption. Furthermore, this false appreciation of future usage is persistent. To explain this behavior, the authors argue that the three-part tariff is a response to consumers' misperception and exacerbates their cognitive bias.

Generally, one would like to understand why consumers keep buying the same good, *in spite* of their misperception. If they are disappointed *ex post*, should consumers not refrain from repeating the same errors in the future? At least two complementary explanations can account for this seemingly inconsistent behavior: first of all, on top of quality misperception, consumers might also be subject to an inertia phenomenon. This inertia could for instance be due to a *status quo bias*, which affects the decision making process. One should also take into account the existence of switching costs. [39] Secondly, it could be that the true quality of the good will not be revealed *ex post* to consumers, who therefore carry on

[39]For an example of firms voluntarily inducing switching costs in order to amplify the adverse consequences of consumer bias (namely time inconsistent preferences), see DellaVigna & Malmendier (2004) [42].

with their misperceptions. In this respect, the standard Industrial Organization literature distinguishes investment goods from credence goods. Concerning the former category, the true quality of the goods will eventually be revealed to the consumer as he uses it.[40] On the contrary, consumers will never be able to determine exactly the value of credence goods.[41] Typically, a medical intervention, which could well have been unnecessary, falls into the category of credence goods. While learning is conceivable for experience goods, it is by definition not possible for credence goods, the quality of which will never be revealed.

The question of repeated transaction is important as it determines the nature of debiasing expenditure. Can the regulator hope to educate consumers once and for all, or should the debiasing policy be carried out prior to each purchase decision? The answer will depend on the assumptions about consumers' learning capacities.

With this in mind, the issue of quality misperception could be extended to a dynamic framework, in order to capture the persistence of behavioral bias in the case of repeated transactions.

1.7.2 Debiasing with backlash effects

A strong assumption in the previous sections was that firms can debias their competitor's customers without affecting at all their own clients. One could argue however that any debiasing strategy necessarily affects all consumers, as the information revealed concerning a given product is also relevant, to a certain extent, for substitute goods. Think for instance of an advertising campaign intended at recruiting the rival's customers, by revealing that the product scores particularly low on certain attributes, which did not, until then, attract the consumers' attention. A potential side effect of such a strategy could lie in a loss of the firm's own customers, as their attention will be particularly aroused concerning the

[40] The notion of *ffexperience goodff* stems from the distinction first drawn by Nelson (1970) [117]: in his seminal paper, Nelson (1970) [117] identified the search qualities of a good, which the consumer can assess prior to buying the good, and the experience qualities, which can only be evaluated after using the good. One can consider that investment goods relate to the experience qualities, as originally defined by Nelson (1970) [117].

[41] The concept of *ffcredence goodsff* was first introduced by Darby & Karny (1973) [35] and has now become standard in the Industrial Organization literature, as emphasized in Huck & Zhou (2011) [80].

product's quality.

Formally, those backlash effects can easily be captured by a slightly more sophisticated version of the model presented above. Instead of defining $\hat{}_i$ as a function of c_j only, I consider that $\hat{}_i$ depends simultaneously on c_i and c_j. Let us then denote: $\hat{}_i = f(c_j, c_i)$.

In line with the analysis carried out above, I consider that $\hat{}_i$ is a linear function of the debiasing expenditures in the interval $(\__i; \bar{}_i)$.

$$\begin{cases} \hat{}_1 = \max(\bar{}_1 \quad {}_2c_2 \quad {}'_1c_1; \__1) \\ \hat{}_2 = \max(\bar{}_2 \quad {}_1c_1 \quad {}'_2c_2; \__2) \end{cases} \tag{1.14}$$

In addition to the parameters mentioned above, the firms' profits depend on the magnitude of the backlash effects, which are encapsulated by the parameter ${}'_1$ and ${}'_2$.

Taking into account those potential backlash effects could enrich the analysis concerning the firms' incentives to educate consumers. One understands intuitively that if there is a consumer-exploitatitve ℕ sh equilibrium without backlash effect, this equilibrium is likely to emerge *a fortiori* when such effects reduce the firms' incentives to debias. The magnitude of this phenomenon depends on the values of ${}'_1$ and ${}'_2$ compared to ${}_1$ and ${}_2$. What matters is not so much the existence of side effects, but rather their intensity relative to the desired result of debiasing. The most interesting case is when the backlash effects are smaller than the direct effect of debiasing, since rational firms would otherwise not even consider the possibility of educating consumers. Formally, this implies that ${}'_1 < {}_1$ and ${}'_2 < {}_2$. If this observation seems sensible, it would be worthwhile to fathom deeper in this direction, as backlash effects might have various and potentially conflicting consequences on the firms' incentives.

Moreover, one expects the deterrent force of backlash effects to depend on the substitutability index $\frac{\gamma}{\beta}$. 𝔸 explained above, the index $\frac{\gamma}{\beta}$ exerts conflicting forces on the firms' incentives to educate consumers, even without backlash effects. The aftermaths of those opposite forces in the presence of backfire effects could lead to interesting observations.

1.7.3 Consumer bias in the presence of negative externalities: the issue of informational cascades

In the previous sections, I do not consider the negative externalities that can ensue from consumer bounded misperception. Various types of externalities can derive from consumer biases, namely if agents copy one another. As explained by Bikhchandani, Hirshleifer & Welch (1992), agents tend to follow the behavior of the preceding individual [26]. Mimicking the conduct of others can be a rational behavior in an imperfect information context. "*Although the outcome may or may not be socially desirable, a reasoning that takes into account the decisions of others is entirely rational even if individuals place no value on conformity for its own sake*" (page 995). If many agents act as described above, an information cascade occurs: a given belief or behavior rapidly spreads through the population. As summarize Kuran & Sunstein (1999) [100] the cascade refers to the fact that *"expressed perceptions trigger chains of individual responses that make these perceptions appear increasingly plausible through their rising availability in public discours"* (page 685).

Even though the individual act of copying a behavior can be rational under the assumption of imperfect information, the collective consequences can be disastrous. The problem with informational cascades in the presence of consumer bias is twofold:

- First, the cascades are self-reinforcing, since agents tend to act as their predecessor. If the starting point of the cascade is an erroneous belief or an irrational behavior, the rational act of copying the biased agent result in a wide-spread irrational behavior. As highlights Sunstein (2013) [152] "*the result of this set of influence can be social cascades, as hundreds, thousands, or millions of people come to accept a certain belief simply because of what they think other people believe*" (page 233). Hence, informational cascades can rapidly increase the negative consequence of consumer biases. If agents copy one another, the overall welfare effect of consumer bias is likely to be amplified by the informational cascade.
- Second, as Kuran & Sunstein (1999) explain, informational cascades can have distorting effects on regulatory policies [100]. The cascade typically brings a disproportionate attention to a given problem, while more important social issues are neglected.

> Kuran & Sunstein (1999) [100] therefore argue that "*a government that abides by public opinion in mechanical fashion would be committing an availability error of its own*" (page 739).

In the welfare analysis carried out above, I do not take into consideration the potential consequences of informational cascades. Those consequences are difficult to predict because several mechanisms interact. The fact that cascades spread rapidly pleads in favor of consumer education from the outset, that is to say at an early stage before the misperception spreads.

However, one should also be cautious of the availability bias. It could well be that attention is brought to an insignificant problem, by creating an informational cascade, in order to distract the public opinion from more important issues. To describe this phenomenon, the compelling notion of "availability entrepreneur" was forged by Kuran & Sunstein [100]. The "availability entrepreneur" refers to any agent who manipulate the content of public discourse to his advantage (Sunstein & Kuran, 1999 [100], page 687). The idea that some firms might have interests in manipulate the social perception of a given product is quite sensible. For instance, a firm might insist on the poor quality of its rival's product by highlighting the risk inherent to certain goods in order to attract customers into its own clientele based. One could think for example of an organic food brand that would dramatically exaggerate the dangers of pesticides or other products. Such mechanisms contribute to the creation of informational cascades and should be regarded with particular caution by the regulator.

As illustrated by the previous example, the presence of "availability entrepreneur" pleads in favor of increased caution when it comes to comparative advertising. Given the risk of firms creating cascade to deteriorate their rival's reputation, comparative advertising should be strictly regulated. In fact, Kuran & Sunstein [100] (1999) also emphasize that product disparagement laws help limit the risks of such cascades (pages 749-751). While comparative advertising can be an efficient means to trigger debiasing, one should also keep in mind the risks of abuse and misuse. Comparative advertising can also be used by availability entrepreneurs to enhance consumer misperception. Hence, a lenient regulation

on comparative advertising should go with a strict prohibition of disparagement.

1.8 Concluding remarks

This paper contributes to studying firms' strategic behavior when facing boundedly rational consumers, by focusing on the firms' incentives to educate consumers in a duopoly framework with substitute goods in the presence of quality misperception. Contrary to one's intuitions, I conclude that educating consumers in order to recruit them is not necessarily a dominant strategy for firms. I show that the substitutability degree between goods has conflicting effects on the firms' incentives to debias. This key observation makes a strong argument in favor of a legal policy to foster consumer debiasing, as one cannot rely on mere market forces.

Concerning the means of a legal intervention, compulsory consumer education, namely through information disclosure, is an efficient strategy, to the extent that it increases social welfare. While information disclosure can be a relevant response to consumer bias in some instances, one should keep in mind the risks of information overload. The issue of who debiasing should devolve upon remains open. In this regard, several options are conceivable: firstly, mandatory disclosure documents force firms to educate their own potential consumers. Another policy could involve comparative advertising, which can be viewed as a means of debiasing competing firms' customers, but is likely to favor disparaging. Finally, the intervention of a public institution would allow for centralized and regulated information. Although this third path is appealing at first glance, the issue of who the burden of debiasing should weigh on deserves deeper insight.

At last, this model does not allow for consumer heterogeneity, neither regarding consumer preferences nor concerning consumer misperception. This latter issue seems to be most important, as the coexistence of rational and biased consumers generally changes the market outcome. Along these lines, studying the interactions between heterogeneously rational consumers, on one hand, and the firms' incentives to engage in debiasing, on the other hand, appears to be a promising direction for future research.

1.9 Appendix

1.9.1 Appendix 1: The market outcome absent consumer education.

The choice of focusing on price competition is consistent with the fact that I constrain the analysis to substitute goods. Indeed, Singh & Vives (1984) [142] show that in the framework with substitute commodities, it is a dominant strategy for each firm to choose the quantity rather than the price. Nonetheless, the price competition model deserves to be mentioned. In the next paragraphs, I study the market outcome under quantity and then under price competition.

The market outcome under quantity competition: I study a duopoly where two competing firms 1 and 2 offer one commodity each. Let q_1 and q_2 represent the quantities of good offered respectively by firms 1 and 2. In this framework, consumers maximize $U(q_1, q_2) \quad \sum_{i=1}^{2} p_i q_i$, where q_i is the amount of good i and p_i its price.

Each consumer has the following utility function: $V = y + U(q_1, q_2)$, where y designates the composite good, whose price p_y satisfies $p_y = 1$. The consumer's budgetary constraint can then be written as follows:

$$R = y + p_1 q_1 + p_2 q_2 \tag{1.15}$$

I specify the utility function:

$$U(q_1, q_2) = \hat{}_1 q_1 + \hat{}_2 q_2 \quad 1/2(\quad q_1^2 + \quad q_2^2 + 2 \quad q_1 q_2)$$

This function yields the system of linear inverse demands:

$$\begin{cases} p_1 = \hat{}_1 \quad q_1 \quad q_2 \\ p_2 = \hat{}_2 \quad q_2 \quad q_1 \end{cases} \tag{1.16}$$

To study the case of quantity competition, I solve the following problem for i and j

$\{1,2\}$ and $i = j$: $\max_{q_i} \quad _i = \max_{q_i}(\hat{} _i \qquad q_i \qquad q_j)q_i$. In equilibrium, one obtains the following prices and quantities:

$$q_i = \frac{2 \quad \hat{} _i \qquad \hat{} _j}{4 \quad ^2 \qquad ^2} \text{ and } p_i = \frac{2 \quad ^2 \hat{} _i \qquad \hat{} _j}{4 \quad ^2 \qquad ^2}$$

The firms' profits are then equal to:

$$\hat{} _i = \frac{(2 \hat{} _i \qquad \hat{} _j)^2}{(4 \quad ^2 \qquad ^2)^2}$$

Th market outo me d r prie o mpetition: Note that this model can easily be extended to a Bertrand-type price competition duopoly. The utility function $U(q_1, q_2) = \hat{} _1 q_1 + \hat{} _2 q_2 \quad 1/2(\quad q_1^2 + \quad q_2^2 + 2 \quad q_1 q_2)$ entails the following system of direct demand functions:

$$\begin{cases} q_1 = \hat{a}_1 \quad bp_1 + gp_2 \\ q_2 = \hat{a}_2 \quad bp_2 + gp_1 \end{cases}$$

With:

$$\hat{a}_i = \frac{\hat{} _i \qquad \hat{} _j}{2 \qquad 2} \; ; \; b = \frac{}{2 \qquad 2} \; ; \; g = \frac{}{2 \qquad 2}$$

Let us denote q_i^b and p_i^b the equilibrium quantities and prices in a Bertrand-type price competition. One can verify that at the symmetric equilibrium, the quantities and prices are equal to:

$$q_i^b = \frac{2b^2 \hat{a}_i + bg\hat{a}_j}{4b^2 \quad g^2} \text{ and } p_i^b = \frac{2b\hat{a}_i + g\hat{a}_j}{4b^2 \quad g^2}.$$

Moreover, q_i^b and p_i^b yield the following profit :

$$\frac{b}{i} = \frac{b(2b\hat{a}_i + g\hat{a}_j)^2}{(4b^2 \quad g^2)^2}.$$

H wever, the market outcome under price competition does not need to be calculated. Indeed, the duality of the quantity and price problems allows us to solve the latter by simply replacing $\hat{} _i$ by $\hat{a}_i$, by b and by g. This duality which was first pointed out by [145], is due to the fact that the firms' problems under quantity and quality competition are the dual

of each other: in the first case, the problem for firm I is $\max_{q_i} \quad {}^{c}_{i} = \max_{q_i}(\hat{} _i \qquad q_i \qquad q_j)q_i$, whereas under price competition the problem is $\max_{p_i} \quad {}^{b}_{i} = \max_{p_i}(\hat{a}_i \quad bq_i + gq_j)p_i$.

While the duality between the price and the quantity models allows for a generalization of the results as far as the market outcome is concerned, the symmetry no longer holds when one turns to the issue of consumer education. When the goods are substitutes, firms have less capacity to raise their prices above marginal cost in Bertrand competition. This entails lower prices in Bertand than in Cournot, which could modify substantially the firms' incentives to educate consumers. Indeed, one would expect consumer debiasing to be less likely in Bertrand competition, as firms would not reap any profit from such a strategy. However, this intuition could be challenged by the fact that the index $\frac{\gamma}{\beta}$ has an ambiguous effect on the firms incentives. Although this paper focuses on the Cournot duopoly, the case of price competition is be worthy of further exploration.

1.9.2 Appendix 2: Proof of propositions 1 and 2.

In the presence of debiasing, and according to (1.8), $\ ^{c}_{i} = \frac{\beta(2\beta\hat{\alpha}_i - \gamma\hat{\alpha}_j)^2}{(4\beta^2-\gamma^2)^2}\ \ c_i$, for $i\ \ (1,2)$. Recall that according to (1.17).

$$\begin{cases} \hat{}_1 = \max(^{-}_1 \quad {}_2c_2; \_1) \\ \hat{}_2 = \max(^{-}_2 \quad {}_1c_1; \_2) \end{cases} \tag{1.17}$$

Wherefrom, for $i = 1$:

$$\frac{^1}{c_1} = \frac{2\ ^1}{(4\ ^2\quad ^2)^2}(2\ \ (^{-}_1 \quad {}_2c_2) \quad (^{-}_2 \quad {}_1c_1))\quad 1 \tag{1.18}$$

$$\frac{^2\quad ^1}{c_1^2} = 2\ \ [\frac{^1}{(4\ ^2\quad ^2)}]^2 \tag{1.19}$$

And for $i = 2$:

$$\frac{^2}{c_2} = \frac{2\ ^2}{(4\ ^2\quad ^2)^2}(2\ \ (^{-}_2 \quad {}_1c_1) \quad (^{-}_1 \quad {}_2c_2))\quad 1 \tag{1.20}$$

$$\frac{^2\quad ^2}{c_2^2} = 2\ \ [\frac{^2}{(4\ ^2\quad ^2)}]^2 \tag{1.21}$$

As $\frac{\partial^2 \ ^i}{\partial c_i^2}$ is always positive, the profit function is convex with respect to costs. Therefore, if the profit function is strictly increasing (respectively decreasing) the firm's best response will be to choose $c_i = \bar{c}_i$ (respectively $c_i = 0$). To finish the proof of propositions 1 and 2, I can now study the sign of the first derivative of the profit with respect to c_i.

Proof of proposition 1: I begin with the proof of proposition 1, that is to say the symmetric Nash equilibrium with consumer education. I focus on the case when $\frac{\partial \ ^i}{\partial c_i} > 0$. Let us focus first on $i = 1$.

$$\frac{^1}{c_1} > 0 \quad \frac{2\ ^1}{(4\ ^2\quad ^2)^2}(2\ \ (^{-}_1 \quad {}_2c_2) \quad (^{-}_2 \quad {}_1c_1)) > 1 \tag{1.22}$$

$$\frac{^{1}}{c_1} > 0 \quad 2\ (^{-}{}_{1} \quad {}_{2}c_2) \quad (^{-}{}_{2} \quad {}_{1}c_1) > \frac{(4\ ^{2} \quad ^{2})^2}{2\ {}_{1}} \tag{1.23}$$

I want to define the conditions which guarantee a symmetric Nash equilibrium such as $c_1 = \bar{c}_1$. I suppose that firm 2 sets c_2 at its maximal value and determine when firm 1's best response is to adopt the same strategy. If the profit function it is strictly increasing with regards to the debiasing costs, then c_1 necessarily equals $\bar{c}_1$. For $c_2 = \bar{c}_2$, one can then write:

$$\frac{^{1}}{c_1} > 0 \quad 4\ (^{-}{}_{1} \quad {}_{2}\bar{c}_2) \quad 2\ (^{-}{}_{2} \quad {}_{1}\bar{c}_1) > \frac{(4\ ^{2} \quad ^{2})^2}{{}_{1}} \tag{1.24}$$

$$\frac{^{1}}{c_1} > 0 \quad 4\ {}_{-1} \quad 2\ {}_{-2} > \frac{(4\ ^{2} \quad ^{2})^2}{{}_{1}} \tag{1.25}$$

$$\frac{^{1}}{c_1} > 0 \quad 4_{-1} \quad 2-_{-2} > -\frac{[4 \quad (\frac{\gamma}{\beta})^2]^2}{{}_{1}\ \frac{\gamma}{\beta}} \tag{1.26}$$

By symmetry, one can prove that for $i = 2$:

$$\frac{^{2}}{c_2} > 0 \quad 4_{-2} \quad 2-_{-1} > -\frac{[4 \quad (\frac{\gamma}{\beta})^2]^2}{{}_{2}\ \frac{\gamma}{\beta}} \tag{1.27}$$

Whence, if the following conditions hold, a symmetric Nash equilibrium whereby both firms completely debias their competitor's customers emerges:

$$\begin{cases} 4_{-1} \quad 2\frac{\gamma}{\beta}{}_{-2} > \frac{\beta}{\epsilon_1}\frac{[4-(-)^2]^2}{-} \\ 4_{-2} \quad 2\frac{\gamma}{\beta}{}_{-1} > \frac{\beta}{\epsilon_2}\frac{[4-(-)^2]^2}{-} \end{cases} \tag{1.28}$$

The previous condition is equivalent to:

$$\begin{cases} 2\frac{\gamma}{\beta}(2_{-1} \quad \frac{\gamma}{\beta}{}_{-2}) > \frac{\beta}{\epsilon_1}[4 \quad (\frac{\gamma}{\beta})^2]^2 \\ 2\frac{\gamma}{\beta}(2_{-2} \quad \frac{\gamma}{\beta}{}_{-1}) > \frac{\beta}{\epsilon_2}[4 \quad (\frac{\gamma}{\beta})^2]^2 \end{cases} \tag{1.29}$$

Proof of proposition 2: Let us now turn to the second symmetric Nash equilibrium, in which neither of the two firms educates customers. This equilibrium prevails if and only if

the profit functions are strictly decreasing with regards to the debiasing costs. For $i = 1$, this is equivalent to:

$$\frac{^{1}}{c_1} < 0 \quad \frac{2d}{(4 \ ^{2} \ \ ^{2})^2}(2 \ (^{-}{}_{1} \ \ {}_{2}c_2) \ \ (^{-}{}_{2} \ \ {}_{1}c_1)) < 1 \tag{1.30}$$

$$\frac{^{1}}{c_1} < 0 \quad 2 \ (^{-}{}_{1} \ \ {}_{2}c_2) \ \ (^{-}{}_{2} \ \ {}_{1}c_1) < \frac{(4 \ ^{2} \ \ ^{2})^2}{2 \ {}_{1}} \tag{1.31}$$

So as to study firm 1's best response to its rival's strategy, I suppose that $c_2 = 0$ and search for the conditions which entail $c_1 = 0$. With a similar argument as above, if the profit function is strictly decreasing with regards to the debiasing costs, then $c_1 = 0$. Therefore, for $c_2 = 0$ I have:

$$\frac{^{1}}{c_1} < 0 \quad 2 \ ^{-}{}_{1} \ \ ^{-}{}_{2} < \frac{(4 \ ^{2} \ \ ^{2})^2}{2 \ {}_{1}} \tag{1.32}$$

Finally, I determine by symmetry a condition relative to $c_2 = 0$. To conclude, there is a symmetric Nash equilibrium in which both firms choose not to educate consumers if:

$$\begin{cases} 4^{-}{}_{1} \ \ 2\frac{\gamma}{\beta}{}^{-}{}_{2} < \frac{\beta}{\epsilon_1}\frac{[4-(-)^2]^2}{-} \\ 4^{-}{}_{2} \ \ 2\frac{\gamma}{\beta}{}^{-}{}_{1} < \frac{\beta}{\epsilon_2}\frac{[4-(-)^2]^2}{-} \end{cases} \tag{1.33}$$

The previous condition is equivalent to:

$$\begin{cases} 2\frac{\gamma}{\beta}(2^{-}{}_{1} \ \ \frac{\gamma}{\beta}{}^{-}{}_{2}) < \frac{\beta}{\epsilon_1}[4 \ \ (\frac{\gamma}{\beta})^2]^2 \\ 2\frac{\gamma}{\beta}(2^{-}{}_{2} \ \ \frac{\gamma}{\beta}{}^{-}{}_{1}) < \frac{\beta}{\epsilon_2}[4 \ \ (\frac{\gamma}{\beta})^2]^2 \end{cases} \tag{1.34}$$

2 Utility misperception in a vertically differentiated duopoly

2.1 Introduction

Janis & Mann (1979) [82] describe man as *"a reluctant decision maker, beset by conflict, doubts and worry, struggling with incongruous longings, antipathies, and loyalties, and seeking relief by procrastinating, rationalizing, or denying responsibility for his own choices"* (p.15). This conception of man contrasts with the standard economic view of a rational utility-maximizing agent and leaves a door wide open for errors in the decision-making process. Acknowledging that every day consumption decisions are exacting and complex, the paradigm of perfect rationality has slowly given ground to a more realistic approach of consumer modeling. A growing literature studies consumer limited rationality and cognitive biases.

Various types of consumer biases have been studied by the literature. Articles dedicated to consumer bias generally focus on one specific type of irrationality and investigate the consequences on the market outcome. For instance hyperbolic discounting is the center of papers by DellaVigna & Malmendier (2004 [42] and 2006 [40]). Time-inconsistent preferences has been studied by Eliaz & Spiegler, (2006) [49], while the framing effect is analyzed by Piccione & Spiegler (2012) [148]. Grubb (2009) [70] focuses on overconfidence by studying consumers who believe they can predict their consumption more precisely than they actually can. Although classifying the numerous biases is an unrelenting task, Huck & Zhou (2011) [80] offer a simple and convincing typology. These authors identify three

different dimensions along which choices might be biased. Firstly, a search bias occurs when consumers do not choose the best suited product because they do not search in a rational way; secondly, quality biases refer to any situation in which consumers purchase a quality not fit for their needs; and finally a willingness to pay bias is characterized by the fact that *"consumers might pay too much for a given quantity of a good consumed"*. The present paper tackles the issue of willingness to pay bias, which ultimately results in a misperception of utility derived from consumption. In contrast to the definition proposed by Huck & Zhou, I consider both over- and under-estimation of willingness to pay by consumers.

In this chapter, I build a fairly general model which encapsulates utility misperception stemming from two phenomena: false appreciation of one's own needs, and price misperception. First, consumers can formulate inaccurate anticipations concerning their own needs or capacities to use a product. This situation corresponds to *"a misperception of desired attributes"* in the typology established by Huck & Zhou (2011) [80]. Think for instance of a consumer wanting to buy a camera. He might be attracted by a sophisticated, high quality and expensive reflex, thinking he will use many functionalities of the product. Once in his hands, the camera appears to be too complicated and the consumer realizes a small compact camera would have suited his needs. This example illustrates that agents can have wrong anticipations about their own needs, desires, capacities etc. Such errors might stem from a deep-rooted tendency to over-optimism or self-confidence. Second, utility misperception can also be due to a wrong appreciation of prices. This situation corresponds to *"a misjudgment of prices"* in the survey mentioned above (Huck & Zhou (2011) [80]. In the case of complex pricing systems, the total price of a product is not always easy to grasp. The choice of a computer offers a convincing example. A consumer who is not informed might overlook prices of softwares necessary to use the computer. The total price he will end up paying does not correspond to the headline price he expected to spend. More generally, any good with add-ons or with a complex pricing system, such as partition pricing, is likely to trigger some confusion in the mind of an average consumer. Price misjudgment can be due to intrinsic complexity or to voluntary obfuscation by firms.

The model proposed in this chapter can represent the two causes of utility misperception described above: false appreciation of one's own desires and needs, on one hand; and price misperception, on the other hand. This dichotomy is consistent with K szegi's (2014) [99] analysis. K szegi (2014) considers that *"the literature has explored two broad forms of false beliefs. First, an agent's false beliefs may be about the contract itself; (...) Second, an agent's false beliefs may be about her own behavior given the contract"* (p. 1104). This chapter is fairly general and lends itself to several interpretation in the sense that the model represents the two forms of false beliefs described by the literature.

While the previous chapter described a horizontally differentiated duopoly, this chapter focuses on a market with vertically differentiated commodities. I build on a standard vertically differentiated duopoly, in which I incorporate consumer bias. The bias consists in over- or under-estimation of utility derived from consumption. I study a covered market in which each consumer buys one unit of good. In this framework, I explore the consequences of consumer misperception on the market outcome. I investigate how a misperception of future utility affects the market equilibria, in terms of prices and quantities. I show that under some conditions, consumer misperception leads to a price increase and to suboptimal consumption decisions. For instance, consumers might realize *ex post* that choosing a different product would have provided a higher utility. I come to compelling conclusions regarding the effect of utility misperception on the equilibrium. I indeed show that the overall effect of consumer bias on prices depends on the bias asymmetry rather than the degree of the bias. In a saturated duopoly where consumers all buy one unit of good, what matters is not merely the intensity of consumer misperception, but the fact that agents are *di erently biased* regarding the two goods. This first results sheds a new light on the issue of consumer bias, as the literature has not studied so far the degree of bias asymmetry.

The second main result of the paper pertains to the firms' incentives to educate consumers. I tackle the issue of consumer education and define the conditions under which firms have incentives to debias consumers. I study both symmetric and asymmetric debiasing. The former refers to any debiasing policy which corrects consumers' valuation of both goods. In practical terms, symmetric debiasing can consist in revealing informa-

tion which is relevant for both commodities. One can think for instance of a firm who tries to increase the agents' willingness to pay for the entire product category, rather than for its specific good. A communication campaign which highlights the health benefits of eating dairy products in general falls into this category. Asymmetric debiasing describes education schemes which only impact the valuation of one product, either the debiasing firm's own good, or the competing firm's product. Such debiasing policy can consist in information disclosures, advertising, comparative advertising, the possibility of trying the product before buying it etc. Whether one considers symmetric or asymmetric debiasing, I take the opposite stance of the libertarian pro-market trend, and show that firms do not necessarily have incentives to spontaneously debias consumers.

I show that in a vertically differentiated duopoly, two potentially antagonistic forces determine the firms' behavior. On one hand, consumer misperception directly affects prices. If the anticipated utility is higher than the true utility felt *ex post*, firms can charge higher prices. This first effect is called "*price e ect*." On the other hand, prices also depend on the market power each firm enjoys. Recall that in a vertically differentiated duopoly, prices are an increasing function of product differentiation. Hence, if consumer misperception leads to a greater market power, it will ultimately result in a price increase. Conversely, when consumer misperception reduces product differentiation, one observes a drop in prices. Therefore, firms' incentives to educate consumers also depend on the distribution of market power in the presence consumer bias. This second effect is referred to as *"the market power e ect."* Depending on the direction and intensity of those two effects, firms either educate or exploit consumer misperception. I show that some cases of consumer debiasing are quite counterintuitive: a firm can have incentives to reveal an overestimation of the utility derived from her own product when the *"market power e ect"* is strong and the *"price e ect"* is weak. Similarly, firms do not always reveal an underestimation of the anticipated utility derived from their product. The optimal strategy depends on the two effects described above and on the degree of product differentiation. Such surprising results plead in favor of a circumstantial analysis in order to assess whether and when one should educate consumers.

The rest of the paper is organized as follows: section 2 presents related literature and section 3 describes the model. Section 4 defines and models consumer education. The main results are presented in section 5 while their policy implications are discussed in section 6. Finally, some concluding remarks are formulated section 7.

2.2 Literature review

This paper first contributes to the thriving literature dedicated to consumer bias in competition. As explain Huck & Zhou (2011) [80], this branch of economic literature examines *"competition in the presence of behaviourally biased or boundedly rational consumers"* in order to determine the impact of such biases on the market equilibra. In line with Spiegler (2006) [146], I focus on a vertically differentiated duopoly. Spiegler (2006) argues that, in a vertically differentiated framework with consumers choosing according to a boundedly rational process which reflects anecdotal reasoning, firms minimize the force of price competition by offering maximally differentiated goods. Our results are consistent with Spiegler (2006) [146]: I show that consumer bias can lead to an artificial product differentiation which weakens price competition. In contrast to Spiegler (2006) [146], who studies the specific case of market for *"quacks"* [1], I do not focus on one particular market.

The bias I study is utility misperception, which can be due to a wrong appreciation of prices. Hence, this chapter is related to the literature dedicated to price misperception. The literature has abundantly studied the effect of complex pricing on the market equilibrium. For example, Bar-Gill & Stone (2009) [13] focus on pricing on the cell phone market. They argue that the three-part tariff is a rational response implemented by firms to exploit consumer bias. Closer to our concern, Piccione & Spiegler (2012) [148] examine the effect of price comparability on the market outcome. They conclude that firms can soften competition by choosing different price frames from their rivals. Once again, this strategy results in artificial product differentiation, which is consistent with our conclusion.

The paper also investigates the issue of consumer education. Our results are consistent

[1] *"Quacks"* refers to non-medical treatments o ered to patients by healers with no particular qualification.

with a flourishing literature which argues that relying on the market to trigger consumer debiasing is overly optimistic. In this regard, our conclusions meet with DellaVigna & Malmendier's (2004) [42] seminal work. The authors show that firms facing time-inconsistent and naive agents have incentives to cater to consumer misperception. They argue that contractual design of investment and leisure goods are a response to consumer bias. In the same vein, Gabaix & Laibson (2006) [60] contend that a *"curse of debiasing"* might occur even in the presence of substitute goods. In the particular case of goods with adds-on, the authors show that firms respond to consumer bias by exploiting them. In a more general framework, which is not constrained to adds-on, I make similar observations: under some circumstances, firms have incentives to exploit consumer bias even when commodities are substitutable. I demonstrate that firms do not necessarily educate consumers on their own initiative. Depending on the direction and the degree of consumer bias, firms might have incentives to exploit or to educate consumers.

This conclusion is consistent with the first chapter of the thesis but applies to a different bias and a different market structure. While the first chapter focused on quality misperception in a horizontally differentiated duopoly, this chapter tackles the issue of utility misperception in a vertically differentiated duopoly. Hence, the conclusions I draw in this chapter are complementary to and consistent with the previous chapter (see Chapter 1 above), in which I studied the effect of the substitutability degree on the firms' incentives to educate consumers. Counterintuitively, I showed that the substitutability degree has two conflicting forces on the firms incentives to debias: a price effect on one hand, and a transfer of demand effect on the other hand. In the case of a vertically differentiated duopoly, the present paper offers a consistent conclusion. I also show that, in a duopoly framework, the market exerts two potentially conflicting forces on the firms' behavior: a market power effect and a price effect. The results I come to in the second chapter are consistent with the conclusion drawn in the previous chapter.

Moreover, the paper is also closely related to the strand of literature which tackles the issue of soft paternalism. While the aforementioned articles are somewhat technical and do not aim primarily at formulating policy recommendations, many scholars are concerned

with the implications of consumer biases on public policy. For instance, Lowenstein (1996) [103], Lowenstein & O'Donoghue (2006) [107], Rabin (2002) [122] or more recently Ayal (2011) [6] all plead in favor of a legal intervention to counter consumer baises. The central idea lies in the concept of *asymmetric* (Camerer, 2003, [31]) or *libertarian* (Sunstein & Thaler, 2003 [153]) paternalism. Behind a variety of labels there is one essential feature: paternalism is unavoidable, since the choice context always matters. The gist of the argument can be summarized in two points: firstly, consumer biases lead to a welfare decrease; secondly, even in a competitive framework, the market does not limit this drop in consumer welfare. In line with this strand of literature, I argue that a legal intervention can be necessary, in some instances, to counter the negative effects of consumer biases.

The opposite stance consists in a complete reliance on the market to provide consumer education, or at least to limit the consequences of consumer biases. Authors such as Bebchuk & Posner (2006) [16] or BenShahar & Posner (2011) [22] argue that consumer education is not only useless but also harmful. The former contend that in a competitive framework, firms have incentives to educate consumers in order to protect their reputation. The latter argue that the right to withdraw is an efficient policy to most cognitive biases. More generally, the keynote argument in this libertarian strand of literature is that competition provides sufficient responses to consumer biases and that intervening on the market could only be detrimental. Sugden (2008 [151] and 2004 [150]) and Sugden & Gaudeul (2012) [63] explore this argument at length. The present paper shows that in the case of utility misperception in a vertically differentiated duopoly, one cannot always rely on firms to counter consumer biases.

2.3 The model: a vertically differentiated duopoly with biased anticipations

We build a general model which can represent any bias affecting the utility consumers expect to derive from the consumption of a good. For instance, price misjudgment can lead to over- or under-estimation of future utility. Overconfidence and optimism can also gener-

ate such misperception. Consumers are considered to be *biased* when they systematically overestimate or underestimate their future utility. The paper elucidates the consequences of such biased anticipations in a duopoly framework.

2.3.1 Incorporating consumer biases in a vertically differentiated duopoly

2.3.1.1 Assump ions

The market consists in a duopoly with two single-product firms denoted A and B. Let the interval $[0, 1]$ represent the goods' quality. As a good gets closer to 1, its quality increases. The goods offered by firms A and B are respectively located at points a and b on the $[0, 1]$ interval. As our primary interest is to describe the consequences of consumer biases, the model does not focus on the firms' quality choice. Hence, the locations a and b are exogenous.[2] The goods are imperfect substitutes which differ only with regards to their quality ($a = b$).[3] For expositional convenience, I consider that firms A and B respectively offer low and high quality goods. Formally $0 \quad a < b \quad 1$.

The demand side of the market consists in a continuum of consumers uniformly distributed on the $[0, 1]$ interval. While all consumers have their ideal brand located at point 1, they don't all have the same willingness to pay for quality. Consumers' location on the $[0, 1]$ interval represents their willingness to pay for quality, or equivalently their taste for quality. Let $U_x(A)$ and $U_x(B)$ denote the *ex post* utility actually derived from the consumption of goods A and B.

$$\begin{cases} U_x(A) = r + ax \quad p_A & \text{if he buys brand A} \\ U_x(B) = r + bx \quad p_B & \text{if he buys brand B} \end{cases} \tag{2.1}$$

where p_A and p_B are the prices charged respectively by firms A and B. We focus on a covered market, where each consumer buys one unit of the good. If r is sufficiently large,

[2]The model is inspired from Shy (1996) [138] (p. 311-315) and Belleflamme & Peitz (2010) [19] (p. 220-222).

[3]If $a = b$, the goods are identical in terms of quality and consumers can indi erently choose between the two commodities. In this event, the issue of consumer bias becomes irrelevant.

all consumers buy one unit of good. The condition boils down to $r > \max(p_A; p_B \quad b)$. This condition implies that all consumers derive a positive utility from purchasing a unit of good A or good B and allows us to focus on a covered market.[4] Depending on the relative values of p_A and p_B, the market can collapse into a monopoly. As I want to focus on a market where both firms make positive profits, the analysis is restricted to $p_B \quad (b \quad a) \quad p_A \quad p_B$.[5]

The core feature of the model lies in the incorporation of cognitive biases in this standard duopoly model. The bias consists in a gap between the *ex ante* utility anticipated at the decision stage, and the actual *ex post* utility felt as the consumer uses the product. Let us define the *ex ante* anticipated utility $\tilde{U}_x$ of a consumer located at point $x \quad [0, 1]$, such as:

$$\begin{cases} \tilde{U}_x(A) = r + ax \quad p_A + \ _A & \text{if he buys brand A} \\ \tilde{U}_x(B) = r + bx \quad p_B + \ _B & \text{if he buys brand B} \end{cases} \tag{2.2}$$

where $_A$ and $_B$ respectively represents the agent's bias concerning the utility derived from goods A and B. Let us assume that $|\ _A|$ and $|\ _B|$ are sufficiently small so that the market remains covered in spite of consumer bias. Foramlly, the conditions boil down to $r \quad p_A > \quad _A$ and $r + b \quad p_B > \quad _B$, which can be written $r > \max(p_A \quad _A; p_B \quad _B \quad b)$. If the bias is positive, the two conditions are always true, provided that the market would be covered with unbiased agents (formally, $r \quad p_A > 0$ and $r + b \quad p_B > 0$). This observation is quite intuitive: if the market would be covered with consumers who make accurate anticipations, it remains covered when consumers come to overestimate their future utility. When the parameters $_A$ and $_B$ are negative, that is to say when consumers underestimate their future utility, the above-mentioned conditions require that the misperception should not be too large.

Just as in the case studied above with unbiased agents, I want to focus on a duopoly. Yet, depending on the values of $_A$ and $_B$, the duopoly can collapse into a monopoly. In order to avoid such situations, I focus on the case when both firms make positive profits.

[4] Additional conditions need to be verified for the outcome whereby the market is covered to constitute a Nash equilibrium. The conditions are studied in the appendix in section 2.8.1.

[5] Explanations are also relegated in the appendix, section 2.8.1

As explained in section 2.8.2 in the appendix, the duopoly outcome is sustainable if:

$$p_B \quad p_A \quad (b \quad a) \quad _B \quad _A \quad p_B \quad p_A \tag{2.3}$$

The interpretations is as follows: if there is an important asymmetry in the baises (formally $_B \quad _A$ is large) then the duopoly collapses in a monopoly.

2.3.1.2 Interp etation

The expression of consumer utility as depicted in (2.2) calls for several observations. Firstly, this model allows for utility over- and under-estimation. If $_i$ is positive, for $i = (A, B)$, the consumer over-estimates the utility derived from consumption of good i. Such a situation can correspond to price underestimation, to overconfidence or overoptimism. Conversely, a negative $_i$ reflects an underestimation of future utility. This latter situation basically occurs when agents are pessimistic about their capacity to use a product or when they overestimate the price. Note that the model virtually represents any type of consumer bias resulting in a misperception of future utility. The generality of the model makes the present paper relevant in a large scope of situations.

Let us define the parameter $_\epsilon = _A \quad _B$. Since $_A$ and $_B$ respectively represent the degree of consumer bias for commodities A and B, $_\epsilon$ captures bias asymmetry: it encapsulates the difference in the bias affecting the two types of goods. A large $|\ _\epsilon|$ means that consumers exhibit different biases for the two goods. Such a situation can either stem from a spread in the intensity of the bias, or more radically from different directions of misperceptions (for instance $\tilde{U}_x(A)$ is overestimated while $\tilde{U}_x(B)$ is underestimated).

2.3.1.3 Th timing of the game

The timing of the game is as follows:

- First, quality is given. The parameters a and b are defined. Nature also determines consumer bias. The parameters $_A$ and $_B$ are given.
- Second, firms decide upon their price so as to maximize their profits. Prices are expressed as functions of a, b, $_A$ and $_B$.

- Finally, firms decide whether or not to educate consumers. They compare their profits with biased consumers, on one hand; with their profits with debised consumers, on the other hand. The debiasing expenditures are taken into account at this stage to decide whether or not to educate consumers.

2.3.2 Determining the *rational decision* in the presence of consumer biais

Agents are considered to be rational when they act so as to maximize their utility. In the presence of consumer biais, the notion of rationality becomes blurry since the expected utility at the decision stage is likely to differ from the effective utility experienced after purchase. Should the *rational decision* depend on the *ex ante* utility or the *ex post* utility felt after consumption? In order to solve this issue, I distinguish between *ex ante* and *ex post* rationality. A decision is said to be *ex ante* rational if it maximizes the agent's anticipated utility. Conversely, a decision which maximizes the agent's effective utility after purchase is *ex post* rational. In our framework, the *ex ante* rational choice depends on the consumer's anticipations ($_A$ and $_B$). Formally, the *ex ante* rational decision is easily defined: choosing good A is *ex ante* rational if and only if $\tilde{U}_x(A)$ $\tilde{U}_x(B)$. Similarly, opting for good B is a rational decision at the decision stage if $\tilde{U}_x(B)$ $\tilde{U}_x(A)$.

Defining the *ex post* rational decision on the other hand is more tricky. After purchase, the consumer only learns the true utility derived from one of the goods, depending on his choice. Indeed, if good A (B) is consumed, $U_x(A)$ (respectively $U_x(B)$) is revealed. The utility consumers would have derived from the good which has not been consumed remains unknown: even after consumption, agents can only speculate on what the utility would have been, had they chosen the other product (if good A (respectively B) is bought, the *true* value of $U_x(B)$ ($U_x(A)$) is never revealed). Hence, the *ex post* utility depends on the actual utility felt after purchase *and* on the agent's mental construct of what his utility would have been, had he acted differently. We consider a decision to be *ex post* rational if and only if, given the information that the agent has, he does not feel any regret regarding his choice. Formally, buying good A is said to be *ex post* rational if and only if

$U_x(A)$ $\tilde{U}_x(B)$. This definition of *ex post* rationality provides an answer to the question *"does the consumer regret his choice ex post"*, rather than to the issue of whether a *better* choice was available, according to an objective criteria. This approach has the advantage of avoiding an element of paternalism since we adopt the consumer's standpoint. [6]

A third notion of rationality is necessary to capture the objectively rational decision. One could indeed define the rational decision by comparing the utility derived by a rational agent, on one hand, and a biased consumer, on the other hand. This latter approach adopts the view-point of an omniscient modeler. Hence, a decision which meets this criteria is referred to in what follows as *objectively rational*. Choosing good A is objectively rational if and only if $U_x(A) > U_x(B)$

The three concepts or rationality defined above will be help us assess the relevance of consumer education, whether carried out spontaneously by firms or implemented by the regulator.

2.3.3 Solving the model: the effect of biased utility anticipations on the market outcome

Recall that consumers located at point x $[0,1]$ have an *ex ante* utility $\tilde{U}_x$ such as:

$$\begin{cases} \tilde{U}_x(A) = r + ax \quad p_A + \ _A & \text{if he buys brand A} \\ \tilde{U}_x(B) = r + bx \quad p_B + \ _B & \text{if he buys brand B} \end{cases}$$

where p_A and p_B are the prices charged respectively by firms A and B.

According to the *ex ante* rationality concept defined above, consumers buy brand A if and only if $\tilde{U}_x(A) > \tilde{U}_x(B)$. With $\ _\epsilon = \ _A \quad _B$, this entails:

$$x < \frac{p_B \quad p_A + \ _\epsilon}{b \quad a}$$

With this in mind, one can easily show that firms A and B face demands D_A and D_B such as:

[6] For a deeper discussion about carrying out a welfare analysis in the presence of biased agents, see Spiegler (2011) [147] and see below 2.6.

$$D_A = \frac{p_B \quad p_A + \quad \epsilon}{b \quad a} \quad \text{and} \quad D_B = 1 \quad \frac{p_B \quad p_A + \quad \epsilon}{b \quad a} \tag{2.4}$$

In what follows, I study the effect of utility misperception on consumer choice and consequently on the firms' behavior.
In the presence of consumer bias, the equilibrium prices are equal to p_A and p_B:[7]

$$p_A = \frac{(b \quad a) + \quad \epsilon}{3} \text{ and } p_B = \frac{2(b \quad a) \quad \epsilon}{3} \tag{2.5}$$

One obtains the following profits:

$$_A(\ _A,\ _B) = \frac{[(b \quad a) + \quad _\epsilon]^2}{9(b \quad a)} \tag{2.6}$$

$$_B(\ _A,\ _B) = \frac{[2(b \quad a) \quad _\epsilon]^2}{9(b \quad a)} \tag{2.7}$$

Finally, we define a sufficient condition which guarantees that the equilibrium with a covered market is a ℵ sh equilibrium:[8]

$$r > \max\left[\frac{2(b \quad a) \quad 2\ _B \quad _A}{3}; \frac{(b \quad a) \quad 2\ _A \quad _B}{3}\right] \tag{2.8}$$

Interp etation. It is worth noticing that $_A(\ _A,\ _B)$ and $_B(\ _A,\ _B)$ both depend on $_A$ and $_B$. Consumer biases therefore exert two effects on profits, which I call the *"own good"* and the *"competing good"* effects:

- The *"own good e ect"* refers to the fact that a bias affecting the anticipated utility concerning a given product mechanically impacts the profit of the firm offering that good through a variation of the demand. Recall that $D_A = \frac{p_B - p_A +}{b-a}$ and $D_B = 1 \quad \frac{p_B - p_A +}{b-a}$ according to (2.4) above. Therefore, consumer misperception impacts the utility agents derive from a given product; which in turn determines the demand perceived by the firm; the equilibrium price; and ultimately the firm's profit.

[7] For details about solving the model, see section 2.8.1 in the appendix.
[8] for details about founding the condition, see the appendix page 186.

- The *"competing good e ect"* refers to the fact that profits also depend on the anticipated utility concerning the substitute commodity (for instance $_A$ depends on $_B$). To account for this mechanism, recall that goods A and B are substitutes, such as a transfer of demand from one good to the other is likely to take place when the market undergoes a change, namely in terms of perceived utility. Also keep in mind that we study a covered market: consumers necessarily buy one unit of good, so a decrease in the demand for one good mechanically increases the demand for the competing product. Through this substitutability effect, a variation in one perceived utility impacts both demands, as one can see in the expressions of demands in (2.4).

2.4 Consumer education in the presence of utility misperception

When facing biased agents, the key question consists in studying whether and how one should educate them. In the case of utility misperception, the model indeed shows that consumer bias can have negative aftermath on welfare.

2.4.1 Why worry about consumer education?

The model shows that biased utility anticipations can lead to suboptimal choices in the sense that decisions which appear to be rational at the decision stage are not *ex post* rational, and *a fortiori* not *objectively rational*. Such inefficiencies stem directly from the fact that agents base their behavior on false anticipations.

Some consumers should buy product A because $U_x(A)$ $U_x(B)$ but are tricked into purchasing good B since $\tilde{U}_x(B) > \tilde{U}_x(A)$. Similarly, for agents located at point x' on the $[0,1]$ interval such as $U_{x'}(B)$ $U_{x'}(A)$ it is *objectively* rational to buy good B. However, they will make a suboptimal choice and settle for good A if anticipations are such as $\tilde{U}_{x'}(A)$ $\tilde{U}_{x'}(B)$. Biased utility anticipations can reverse the agents' preferences and lead to irrational consumption decision, according to the *ex post* and the *objective* criteria defined above.

When consumer misperception leads to preferences reversal, and under the assumptions that consumers do not learn from previous errors, firms might repeatedly exploit consumers by setting in motion a *"money pump"*. A money pump is a series of trades that firms can propose to biased consumers, and that end up bringing them back to their starting point. It results in a transfer of money from one agent (in our case the consumer), to the another (the firm), and consequently in a decrease of the former's welfare. If we assume that consumers can make the same error several times, utility misperception allows firms to pump money out of the consumer. Let us go back to the initial situation described above: $\tilde{U}_x(B) > \tilde{U}_x(A)$ so the consumer buys good B. After consumption, the consumer does not know the true utility derived from good A, which has not been used. Hence he can only compare $U_x(B)$ with $\tilde{U}_x(A)$. He realizes after purchase that his decision does not meet the *ex post rationality* criteria, insofar as $U_x(B) < \tilde{U}_x(A)$. At this stage, the agent believes, on the basis of his anticipations regarding $\tilde{U}_x(A)$ that consuming good A would have provided him with a higher utility. Therefore, when a second occasion of purchasing occurs, the agent opts for good A. He now has perfect knowledge of $U_x(A)$, but no longer of $U_x(B)$. If he finds out that $U_x(A) < \tilde{U}_x(B)$ he'll decide to buy good B. This process can be repeated and allows the firm to pump money out of the biased agent. This simple example illustrates that consumer bias might lead to a money pump mechanism very similar to what occurs in the presence of intransitive preferences.[9]

One might argue that consumers are unlikely to repeat the same errors several times. On a theoretical level, there is much evidence that agents do not easily learn from there past experience. Having access to information does not imply that it will be retrieved and use when needed. As Kahneman (2001) [92] highlights, *"facts that we know do not always come to mind when we need them"* (page 46). He pursues: *"intelligence is not only the ability to reason; it is also the ability to find relevant material in memory and to deploy attention when needed."* Applied to consumers, this means that learning from past mistakes requires agents to analyze their past decision, to gather the information when needed and

[9]The money pump argument was first developed by Ramsey (1931) in "Truth and Probability", in The Foundations of Mathematics, (cited in Schick (1986) [135]) and has been debated since then. See for instance Cubitt & Sugden (2001) [34].

to act accordingly. The problem with consumption decisions is precisely that agents are not in a situation to deploy attention and act rationally. Firms can prevent such rational learning process to occur, namely through advertising. Persuasive advertising, which alters consumers' tastes (Belleflamme & Peitz, [19], page 135), can act during and even after consumption. Experimental research has indeed shown that advertising can influence how and what consumers learn from experience.[10] More interesting for our topic is the potential effect of advertising on consumer memory. There is some experimental evidence that advertising can substantially modify consumers' memory. According to Braun (1999) [28], postexperience advertising can create a situation where *"the language and imagery from the recently presented advertising become confused with consumers' own experiential memories"*. Simply put, being exposed to advertising after consumption is likely to create confusion in the consumer's mind between his true previous experience and the fictitious experience described in the advertising.

In the model presented above, such reconstructive memory process can lead to consumer exploitation via a *"money pump"* type of mechanism. The present model is only one illustration of a broader phenomenon: letting the market operate does not always provide an efficient answer in the presence of biased consumers. In the next section, I show that firms do not always engage spontaneously in consumer debiasing (section 2.5). Moreover, I argue that several freedom-enhancing policies are conceivable (section 2.6).

2.4.2 Modeling consumer education

Let us denote C_A and C_B debiasing expenditure incurred respectively by firms A and B. Firms are standard profit-maximizing agents: they educate consumers if and only if it generates a profit increase. The firms' programs thus boil down to solving $\max\left[\quad_A \quad C_A; \tilde{} \quad_A\right]$ and $\max\left[\quad_B \quad C_B; \tilde{} \quad_B\right]$, where $\quad$ and $\tilde{}$ respectively represent the profits with and without consumer education. In what follows, production costs are not considered since I focus

[10] Deighton (1984) [39] argues that advertising works by initially arousing expectations which are later confirmed during experience with the product. According to Hoch & Ha (1986) [75], advertising influences quality judgements by a ecting the encoding of the physical evidence. Advertising leads to expectations about the product, which in turn modifies how consumer value the good.

solely on the firms' incentives to educate consumers.

Consumer debiasing can take various forms, ranging from advertising to information disclosure. Some education schemes will have an impact on all consumers (some advertising campaigns), while others will target the firm's own customers or prospects (for instance disclosure information). Hence, I draw a distinction between two kinds of consumer debiasing:

- Symmetric debiasing refers to any action carried out by a firm that simultaneously affects the perception consumers have of the two goods. Formally, debiaising reveals the true value of $U_x(A)$ and $U_x(B)$. Since consumers accurately perceive the true value of both goods, they are able to make *objectively rational* decisions, as defined in section 2.3.2. Hence, symmetric education ensures that decisions are *objectively rational*, in the sense that there is no way to increase consumer welfare given the available options.
- Conversely, the term asymmetric debiasing is used when information concerning one good only is revealed. Two situations are then conceivable. Firms can first educate consumers regarding their own product. In this regard, information disclosure about one specific product is a typical example of an asymmetric education policy. Comparative advertising is a more controversial practice which would correspond to educating the rival's consumers. Asymmetric debiasing prevents the occurrence of some *ex post* irrational decisions, but does not guarantee that consumers act according to the *objective rationality* criteria.

In the next paragraphs, I determine the conditions under which firms have incentives to engage in debiasing.

2.5 Main results: when do firms spontaneously educate consumers?

Let us first study the case of symmetric education (section 2.5.1) and then move on to asymmetric debiasing (2.5.2).

2.5.1 Symmetric consumer education

In the following paragraphs, I determine when firms have incentives to implement a symmetric debiasing policy. Formally, since firms are rational profit-maximizers, they will educate consumers if and only if:

$$_A \quad C_A > \quad _A(\ _A;\ _B) \quad \text{and} \quad \quad _B \quad C_B > \quad _B(\ _B;\ _A)$$

Given the expression of profits in (2.6), the previous condition concerning firm A is equivalent to:

$$[(b \quad a)]^2 \quad [(b \quad a) + \ _A \quad \ _B]^2 > C_A$$

After some calculation, one obtains the following necessary and sufficient conditions.[11]

$$\begin{cases} \quad _\epsilon < 0 \\ 2(b \quad a) > \quad \frac{C_A}{} \quad \quad _\epsilon \end{cases} \tag{2.9}$$

Recall that, according to (2.3) the duopoly outcome is sustainable only if:

$$p_B \quad p_A \quad (b \quad a) \quad \ _B \quad \ _A \quad p_B \quad p_A$$

After debiasing has been carried out, $p_A = \frac{b-a}{3}$ and $p_B = \frac{2(b-a)}{3}$. After substitution, one obtains: $\frac{2(b-a)}{3} \quad _\epsilon \quad \frac{b-a}{3}$. The constraint on the left is always true since $_\epsilon < 0$. Hence, the condition finally boils down to $\quad _\epsilon < \frac{(b-a)}{3}$. To sum up, if firm A engages in symmetric debiasing, the outcome after debiasing is a duopoly and both firms still make positive profits if:

$$_\epsilon < \frac{(b \quad a)}{3}$$

.

Let us now verify that the outcome whereby firm A engages in symmetric education is a Nash equilibrium. This is true if neither firm has incentives to not cover the market after

[11] See section 2.8.3 in appendix for proof.

the debiasing policy has been implemented. Hence, one should verify that the outcome whereby all consumers are educated is a Nash equilibrium. A sufficient condition which guarantees that neither firm will decide not to cover the market is:[12]

$$r > \frac{2(b \quad a)}{3}$$

Moreover, from the second equation in system (2.9), one can derive a simple necessary condition. One can show that $2(b \quad a) > \quad \frac{C_A}{} \quad _\epsilon$ implies that:

$$(b \quad a) > \sqrt{C_A} \tag{2.10}$$

Let us now turn to the case of firm B. Similarly, firm B educates consumers if and only if:

$$\begin{cases} \quad _\epsilon > 0 \\ 4(b \quad a) > \frac{C_B}{} + \quad _\epsilon \end{cases} \tag{2.11}$$

Just a in the case of firm A one can derive a sufficient condition which guarantees that the outcome whereby firm B engages in symmetric debiasing is a duopoly. The market outcome is a duopoly if $p_B \quad p_A \quad (b \quad a) \quad _\epsilon \quad p_B \quad p_A$. After substituting p_B and p_A respectively by $\frac{2(b-a)}{3}$ and $\frac{b-a}{3}$ one obtains quite logically the same condition as above in the case of firm A, since prices are the same: $\frac{2(b-a)}{3} \quad _\epsilon \quad \frac{(b-a)}{3}$. This time $\quad _\epsilon > 0$ so the right part of the inequality is always true. Therefore, the condition boils down to:

$$_\epsilon \quad \frac{2(b \quad a)}{3}$$

Let us know turn to the condition which guarantees that the outcome is a Nash equilibrium. We want to verify that after debiasing, when the market is covered, neither firm A nor firm B has incentives to not cover the market by offering a higher price. Since debiasing is symmetric, consumers anticipate accurately the future utility derived from both goods after they have been educated. We are back to the situation described in section

[12] See appendix in section 2.8.1 for details.

2.8.1 without consumer bias. A sufficient condition which guarantees that the outcome is a N sh equilibrium is once again:

$$r > \frac{2(b \quad a)}{3}$$

Moreover, one can also derive a simple necessary condition from the second equation in 2.11. Indeed, $4(b \quad a) > \frac{C_B}{} + \quad_\epsilon$ implies that:

$$2(b \quad a) > \sqrt{C_B} \tag{2.12}$$

The table below summarizes the profit of both firms depending on their strategy to debias or not.

		Firm B	
		Debiasing	No Debiasing
Firm A	Debiasing	$\left(\frac{b-a}{9} \quad C_A; \frac{4(b-a)}{9} \quad C_B\right)$	$\left(\frac{b-a}{9} \quad C_A; \frac{4(b-a)}{9}\right)$
	N Debiasing	$\left(\frac{b-a}{9}; \frac{4(b-a)}{9} \quad C_B\right)$	$\left(\frac{(b-a+\quad)^2}{9(b-a)}; \frac{(2(b-a)-\quad)^2}{9(b-a)}\right)$

Table 2.1: Payo matrix with utility misperception and symmetric education

One can see that the strategy whereby both firms educate simultaneously is never a Nash equilibrium. This observation is quite sensible: since symmetric education corrects the biases regarding both goods, one if a given firm knows that it's rival will educate, than it's best response it not to educate. Hence, symmetric debiasing by both firms is not efficient, since the same result could be attained at a lower cost. The three other cells in the table are possible N sh equilibra. The prevailing equilibrium depends on the value of C_i and $_\epsilon$, as described in equations (2.9) and (2.11) above.

Grap ic representation The latter equations also call for a graphic representation. Let us define the functions $f(\quad_\epsilon)$ and $g(\quad_\epsilon)$ such as:

$$\begin{cases} f(\quad_\epsilon) = 2(b \quad a) \text{ if } \quad_\epsilon < 0 \\ f(\quad_\epsilon) = 4(b \quad a) \text{ if } \quad_\epsilon > 0 \end{cases} \qquad \begin{cases} g(\quad_\epsilon) = \frac{C_A}{} \quad_\epsilon \text{ if } \quad_\epsilon < 0 \\ g(\quad_\epsilon) = \frac{C_B}{} + \quad_\epsilon \text{ if } \quad_\epsilon > 0 \end{cases}$$

The graph below represents functions $f(\ \ _\epsilon)$ and $g(\ \ _\epsilon)$ for given values of $(b \quad a)$, C_A and C_B.

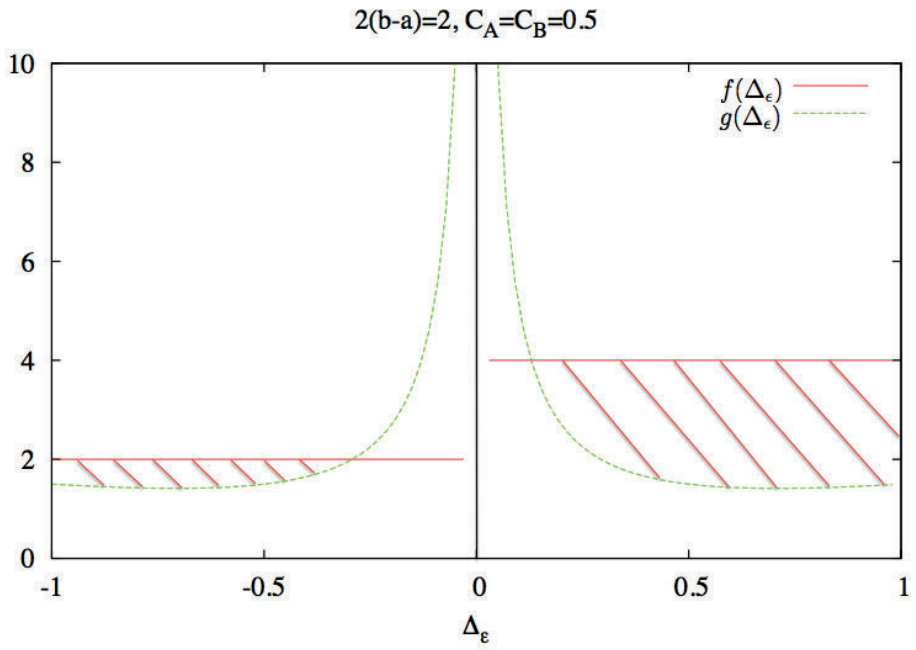

Figure 2.1: Symmetric debiasing when consumers make false utility anticipations.

Firm A is likely to educate on the left hand side of the graph, when $\ _\epsilon < 0$. Conversely, firm B is likely to educate on the right hand side if the graph when $\ _\epsilon > 0$. Firms educate only of $f(\ \ _\epsilon) > g(\ \ _\epsilon)$. Graphically, the horizontal line, which either represents $2(b \quad a)$ or $4(b \quad a)$ needs to be above the hyperbole. The areas in which consumer education takes place are hatched in red.

Recall that there is a ℵ sh equilibrium if $r > \frac{2(b-a)}{3}$. In this specific example a sufficient condition which guarantees that the outcome is a Nash equilibrium is $r > \frac{2}{3}$.

Interp etation The equations above require some interpretation. First, one sees at first glance firms can never educate consumer simultaneously since A educates only if $\ _\epsilon < 0$ and B if $\ _\epsilon > 0$. This can also be seen in table 2.1 since the strategy whereby both firms educate in never a ℵ sh equilibrium. This observation means that a given firm debiases

only if the structure of the bias has a negative impact on her profit, compared to the consequences on the rival's profit. Let us study the case of firm A more in depth. [13] Firm A is likely to educate consumers in three instances:

- In the first case, consumers underestimate the utility they derive from both goods, but the misperception is stronger for $U(A)$. Formally, $_A < 0$; $_B < 0$ and $_A < _B$.
- In the second case, consumers overestimate the utility they derive from both goods, but the misperception is stronger for $U(B)$. Formally, $_A > 0$; $_B > 0$ and $_A < _B$.
- In the last case, consumers respectively under- and overestimate the utility they derive from good A and good B. This implies $_A < 0$ and $_B > 0$.

To sum up, a firm will debias only if the structure the bias is detrimental for its profit. In a covered duopolistic market, the two biases $_A$ and $_B$ are both decisive for the firm's strategy.

Secondly, debiasing expenditures are key parameters of the firms' incentives. An increase in C_A or C_B renders the second conditions in (2.9) and (2.11) more restrictive. This effect is very clearly captured in equations (2.10) and (2.12), which are necessary but not sufficient conditions. Firms are logically more likely to educate consumers when costs are low.

Moreover, the degree of product differentiation $(b \quad a)$ also affects the firms' incentives to educate consumers. To account for this mechanism, recall that in a vertically differentiated duopoly, firms enjoy a greater market power as goods become more differentiated. Hence, as the degree of product differentiation increases, prices increase. Recall that prices respectively equal to:

$$p_A = \frac{(b \quad a) + \quad _\epsilon}{3} \quad \text{and} \quad p_B = \frac{2(b \quad a) \quad _\epsilon}{3}$$

As products become more differentiated, the profit increase ensuing from debiasing also increases. Hence, firms have more incentives to educate when goods are strongly differentiated. This mechanism account for the effect of $(b \quad a)$ in equations (2.9) through (2.12).

[13] I consider the case of firm A as an example. A similar analysis could be carried out for firm B.

Finally, as one sees in the second conditions mentioned in (2.9) and (2.11), the value of $|\ \ _\epsilon|$ also plays a crucial role in the firms' incentives.

Proposition 1: *In the case of symmetric consumer education, the parameter* $|\ \ _\epsilon|$ *exerts two conflicting forces on the firms' incentive to debias.*

In the second equations in (2.9) and (2.11), the term $\ \ _\epsilon$ appears twice. Let us study in greater details the two effect of $|\ \ _\epsilon|$ on the firms' incentives to educate consumers:

- A price effect, which has a positive impact on the firms' incentives to educate consumers. When $|\ \ _\epsilon|$ increases, prices p_A and p_B decrease. Recall that prices are equal to $p_A = \frac{(b-a)+\ \ }{3}$ and $p_B = \frac{2(b-a)-\ \ }{3}$.
  Hence, an increase in $|\ \ _\epsilon|$ reinforces the firms' incentives to educate consumers. This effect is respectively captured in the terms $\frac{C_A}{\epsilon}$ and $\ \ $ in equations (2.9) and (2.11). To intuition behind this mechanism is quite simple: each firm educates consumers when the structure of biases is detrimental to it's profit. Firm A educates only if $\ \ < 0$ and firm B if $\ \ > 0$. In both cases, asymmetry in consumer bias incites firms to educate consumers.
  Hence, according to this price effect, $|\ \ _\epsilon|$ has a positive effect on the firms' incentives to educate consumers.
- A market-power effect, which has a negative impact on the firms' incentives to educate consumers (the greater $|\ \ _\epsilon|$ the less likely firms are to educate consumers). The intuition is as follows: in a vertically differentiated duopoly, firms enjoy a local market power which depends on the degree of product differentiation. The more product are differentiated, the greater the market power. When consumers are asymmetrically biased, firms enjoy an extra-market power resulting from this *perceived* product differentiation. In other words, consumer misperception can result in an artificial product differentiation. In this case, educating consumers would result in a loss of market power. This mechanism accounts for the negative effect of $|\ \ _\epsilon|$ on the firms' incentives to educate consumers. This effect is respectively captured in the terms $\ \ _\epsilon$ and $\frac{C_B}{\ \ }$ on the right hand side of the equations in (2.9) and (2.11).

One particular case then comes to mind: if consumers are symmetrically biased, that is to say if $\ _A = \ _B$, than neither firm A nor firm B will educate. When $\ _A = \ _B$, the *"own good e ect"* of consumer bias is exactly counterbalanced by the *"competing good e ect"*, as defined in section 2.3.3. The final effect of misperception on the firms' profit is therefore equal to zero. Consequently, no firm has incentives to educate and consumer exploitation will always prevail, regardless of debiasing expenditures. This observation makes a strong argument in favor of consumer education even when debiasing does not reverse consumer preferences.

To sum up, several parameters determine under which conditions a firm will educate consumers who misperceive their future utility. In the case of symmetric education, debiasing expenditure and the degree of product differentiation have a predictable effect on the firms' incentives. More surprising is the asymmetry in consumer bias, which not only determines which firm is likely to educate (the sign of $\ _\epsilon$ is here relevant), but also whether education will take place (the value of $|\ _\epsilon|$ is significant). We come to consistent conclusions in the case of asymmetric education.

2.5.2 Asymmetric consumer education

Recall that asymmetric education refers to the fact that firms discriminate between their own product and the competing good. Two situations are then conceivable: firms can either educate consumers regarding their own product, in which case they expect a profit increase through the *"own good e ect"* described above. Firms can also reveal information concerning the rival's good when they anticipate a profit increase via the *"competing good e ect"*. In the following paragraphs, I study successively the two cases.

2.5.2.1 Deb asig o s umers o ne rning the firm's own produt

Since each firm only corrects the perception consumers have of its own product, the maximization programs become:

$$\max[\ _A(\ _B)\quad C_A;\quad _A(\ _A;\ _B)] \text{ and } \max[\ _B(\ _A)\quad C_B;\quad _B(\ _B;\ _A)]$$

After some calculation, one comes to the following proposition:[14]

Proposition 2: *Firms are likely to educate consumers regarding their own product in two instances:*

1. *If consumers underestimate future utility provided by the firm's own good, and product differentiation is sufficiently large. In this case, the price effect prevails.*
2. *If consumers overestimate future utility provided by the firm's own good and product differentiation is sufficiently small. In this case, the market power effect prevails.*

Formally, the following conditions need to be verified.

- Firm A educates consumers regarding the value of $U(A)$ in two cases:

  Underestimation of utility derived from consuming the firm's own good:

$$\begin{cases} \quad _A < 0 \\ 2(b \quad a) > \quad \frac{C_A}{\epsilon_A} \quad _A + 2 \ _B \end{cases} \tag{2.13}$$

  Overestimation of utility derived from consuming the firm's own good:

$$\begin{cases} \quad _A > 0 \\ 2(b \quad a) < \quad \frac{C_A}{\epsilon_A} \quad _A + 2 \ _B \end{cases} \tag{2.14}$$

  Once again, one can derive a sufficient condition which guarantees that the market does not collapse into a monopoly. After firm A has educated consumers regarding the true value of $U(A)$, prices are respectively equal to $p_A = \frac{b-a-\epsilon_B}{3}$ and $p_B = \frac{2(b-a)+\epsilon_B}{3}$. After substituting the values of p_A and p_B in condition (2.3), one obtaines:

$$\frac{(b \quad a) \quad 2 \ _B}{3} \quad _\epsilon \quad \frac{2(b \quad a) \quad 2 \ _B}{3}$$

[14] All the proofs are in section 2.8.3 in the appendix.

This condition guarantees that after A has educated consumers regarding an overestimation or underestimation of $U(A)$, both firms still make positive profits.[15]

Whether $\ _A > 0$ or $\ _A < 0$, we also need to define a condition which guarantees that the outcome whereby only firm A educates customers regarding the utility derived from good A is a Nash equilibrium. After firm A has debiased, the condition in equation (2.8) can be rewritten:

$$r > \max\left[\frac{2(b \quad a) \quad 2\ _B}{3}; \frac{b \quad a \quad \ _B}{3}\right]$$

- Firm B educates consumers regarding the value of $U(B)$ in two cases:

Underestimation of utility derived from consuming the firm's own good:

$$\begin{cases} \ _B < 0 \\ 4(b \quad a) > \quad \frac{C_B}{\epsilon_B} \quad \ _B + 2\ _A \end{cases} \tag{2.15}$$

Overestimation of the utility derived from consuming the firm's own good:

$$\begin{cases} \ _B > 0 \\ 4(b \quad a) < \quad \frac{C_B}{\epsilon_B} \quad \ _B + 2\ _A \end{cases} \tag{2.16}$$

Let us first make sure that when firm B educates regarding $U(B)$, the market does not collapse into a monopoly. After debiasing, prices are equal to $p_A = \frac{b-a+\epsilon_A}{3}$ and $p_B = \frac{2(b-a)-\epsilon_A}{3}$. After substituting the values of p_A and p_B in condition (2.3), one obtaines:

$$\frac{(b \quad a) + 2\ _A}{3} \quad \epsilon \quad \frac{2(b \quad a) + 2\ _A}{3}$$

We want to define a condition which guarantees that the outcome whereby only firm B educates customers regarding the utility derived from good B is a Nash equilibrium. After firm B has debiased, the condition in equation (2.8) can be

[15] This condition is relevant for the two cases of debiasing carried out by firm A mentioned in (2.13) and (2.14).

rewritten:

$$r > \frac{2(b \quad a) \quad _A}{3}$$

Graþ ic rep esentation A graphic representation can be done either regarding firm A or firm B. For the sake of simplicity, let us focus on firm A. The two cases mentioned above can be represented on a graph. Let us define $f(\ _A)$ and $g(\ _A)$ such as:

$$\begin{cases} f(\ _A) = 2(b \quad a) \\ g(\ _A) = \quad \frac{C_A}{\epsilon_A} \quad _A + 2\ _B \end{cases}$$

The two graphs below represent functions $f(\ _A)$ and $g(\ _A)$ for various values of $\ _B$. Firm A educates consumers if the horizontal line representing $f(\ _A)$ is above the hyperbole representing $g(\ _A)$ if $\ _A < 0$ (see equation 2.13) ; and when it is below the hyperbole if $\ _A > 0$ (see equation 2.14).

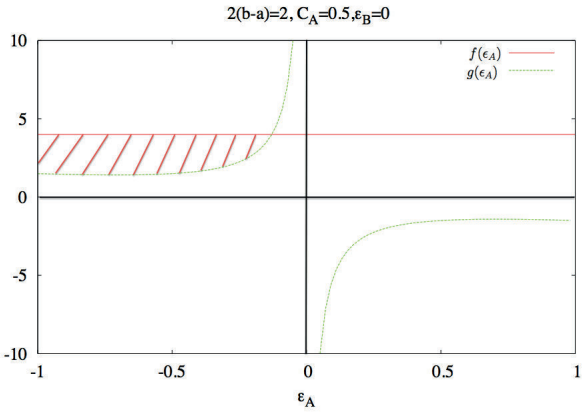

Figure 2.2: Asymetric debiasing when consumers underestimate the utility derived from the firm's own good

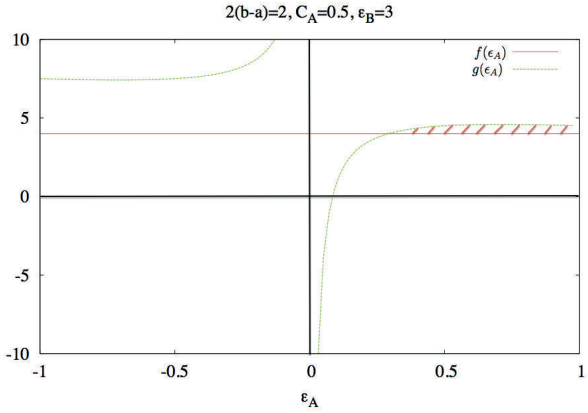

Figure 2.3: Asymetric debiasing when consumers overestimate the utility derived from the firm's own good

Interp etation In the previous paragraphs I study whether firms have incentives to educate customers about the utility derived from their own product. I focus on the *"own good e ect"* described in section 2.3.3. Just as in the case of symmetric education, firms respond to two incentives. On one hand, a price increase generates a greater profit. This

what I called *"the price e ect"*. On the other hand, a market power increase can also result in a higher profit, even if prices drop. This latter phenomenon is called *"market power e ect"*.

- The graph on the left (2.2) represents a situation in which firm A educates for certain values of $_A < 0$. This situation is quite intuitive: when consumers underestimate the utility they derive from good A, firm A has incentives to debias them if the expenditure C_A is reasonable. The area hatched in red represents the value of $_A$ for which firm A educates. In this case, debiasing is a response to the *"price e ect"* described in section 2.3.3: firms expects debiasing to trigger a price increase. This situation is captured in equations (2.13) and (2.15) above.
- The graph on the right (2.3) corresponds to the less intuitive situation when firm A reveals to consumers an overestimation of $\tilde{U}_A$. This situation is captured in systems (2.14) and (2.16) above. Such a situation is only possible if the bias affecting the competing product is large. In the example studied in graph (2.3), $_B = 3$. Recall that parameters $_A$ and $_B$ are bounded, such as $r \quad p_A > \quad _A$ and $r + b \quad p_B > \quad _B$. Hence, depending on the market parameters, the situation in which a firm debiases consumers who overestimate the utility derived from the consumption of the firm's own good might not be possible. Such a debiasing strategy requires restrictive conditions.

  Moreover, firms are more likely to debias concerning an overestimation of the utility derived from their product when differentiation is small. When differentiation is small, prices are low. Prices do not exert a strong incentive on firms. The *"market power e ect"* prevails: firms might be willing to charge lower prices in order to increase their market share.

Note that asymmetric education does not guarantee that consumers make an *objectively* rational decision. It only prevents some situations of *ex post* irrationality to occur. However, depending on the action implemented (whether $_A$ or $_B$ is revealed), some case of *objective irrationality* might still arise. For instance, if firm A reveals the true utility U_A, but the value of $\tilde{U}_B$ is strongly overestimated, consumers might still purchase good B

and realize *ex post* that $U_A > U_B$, which implies that the *ex ante* rational decision is not *objectively rational*.

To put it in a nutshell, consumer education can be triggered by the perspective of a price increase. This sensible situation is captured in equations (2.13) and (2.15). Counterintuitively, I show that consumer education can also result in a drop in prices if this negative effect is more than compensated for by an increase in the firm's market power. This situation is represented in cases (2.14) and (2.16). We come to very similar conclusions concerning the firms' incentives to debias consumers regarding the competing product.

2.5.2.2 Debasing consumers concerning the competing product

In some instances, firms might also have incentives to educate their rival's customers.

Proposition 3: *Firms are likely to educate consumers regarding their rival's product in two instances:*

1. *If consumers overestimate future utility provided by the rival's good and product differentiation is sufficiently large. The price effect prevails.*
2. *If consumers underestimate future utility provided by the rival's good and product differentiation is sufficiently small. The market power effect prevails.*

Once again, the formal conditions need to be mentioned:

- Firm A educates consumers regarding the value of $U(B)$ in two cases:

  Overestimation of the utility derived from consuming the competing good B:

$$\begin{cases} \quad _B > 0 \\ 2(b \quad a) > \frac{C_A}{\epsilon_B} \quad 2 \ _A + \ _B \end{cases} \tag{2.17}$$

Underestimation of the utility derived from consuming the competing good B:

$$\begin{cases} {}_B < 0 \\ 2(b \quad a) < \frac{C_A}{\epsilon_B} \quad 2 \ {}_A + \ {}_B \end{cases} \tag{2.18}$$

Once again, one can derive a sufficient condition which guarantees that the market does not collapse into a monopoly. After consumers have been educated, $p_A = \frac{b-a+\epsilon_A}{3}$ and $p_B = \frac{b-a-\epsilon_A}{3}$. ₳ ter substitution, the condition in (2.3) can be written:

$$\frac{(b \quad a) + 2 \ {}_A}{3} \qquad \epsilon \qquad \frac{2(b \quad a) + 2 \ {}_A}{3}$$

We now want to define a condition which guarantees that the outcome whereby only firm A educates customers regarding the utility derived from good B is a Nash equilibrium. ₳ ter firm A has debiased, the condition in equation (2.8) can be rewritten:

$$r > \frac{2(b \quad a) \quad {}_A}{3}$$

- Firm B educates consumers regarding the value of $U(A)$ in two cases:
  Overestimation of the utility derived from consuming the competing good A:

$$\begin{cases} {}_A > 0 \\ 4(b \quad a) > \frac{C_B}{\epsilon_A} \quad 2 \ {}_B + \ {}_A \end{cases} \tag{2.19}$$

Underestimation of the utility derived from consuming the competing good A:

$$\begin{cases} {}_A < 0 \\ 4(b \quad a) < \frac{C_B}{\epsilon_A} \quad 2 \ {}_B + \ {}_A \end{cases} \tag{2.20}$$

Once again, one can derive a sufficient condition which guarantees that the market does not collapse into a monopoly. After firm B has educated consumers regarding the value of $U(A)$, prices are $p_A = \frac{b-a-\epsilon_B}{3}$ and $p_B = \frac{2(b-a)+\epsilon_B}{3}$. After substituting the

values of p_A and p_B in condition (2.3), one obtaines:

$$\frac{(b \quad a) \quad 2 \ _B}{3} \quad \epsilon \quad \frac{2(b \quad a) \quad 2 \ _B}{3}$$

We finally want to define a condition which guarantees that the outcome whereby only firm B educates customers regarding the utility derived from good A is a Nash equilibrium. After firm B has debiased, the condition in equation (2.8) can be rewritten:

$$r > \max \left[\frac{2(b \quad a) \quad 2 \ _B}{3}; \frac{b \quad a \quad _B}{3} \right]$$

Graphic representation Once again, a graph is enlightening. As in the case of firms educating about their own product, let us focus on firm A (a similar graph could of course be done for firm B). Let us define $f(\ _B)$ and $g(\ _B)$ such as:

$$\begin{cases} f(\ _B) = 2(b \quad a) \\ g(\ _B) = \frac{C_A}{\epsilon_B} \quad 2 \ _A + \ _B \end{cases}$$

The two graphs below represent functions $f(\ _B)$ and $g(\ _B)$ for various parameters of $\ _A$. Firm A educates consumers if the horizontal line representing $f(\ _B)$ is above the hyperbole representing $g(\ _B)$ for $\ _B > 0$ and when it is below the hyperbole for $\ _B < 0$.

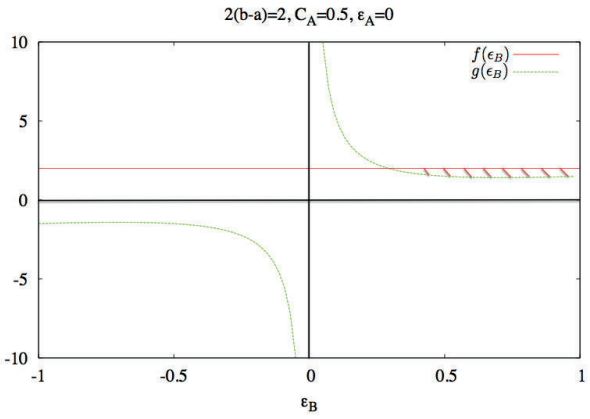

Figure 2.4: Asymetric debiasing when consumers overestimate the utility derived from the competing good

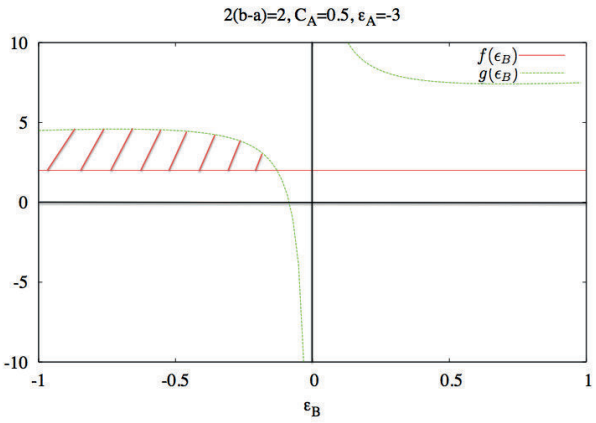

Figure 2.5: Asymetric debiasing when consumers underestimate the utility derived from the competing good

Interp etation A very similar analysis as in the case of firms revealing the value of their own product can be carried out. The following paragraphs determine when a firm has incentives to debias customers about utility derived from the competing product. I analyze the *"competing good e ect"*, according to the terminology proposed in section 2.3.3. Just as in the case of the *"own good e ect"* studied above in section 2.5.2.1, two mechanisms are at work.

- First, firms educate consumers concerning the rival's good if utility provided by that good is overestimated, as mentioned in (2.17) and (2.19). To account for this mechanism, recall that the demand perceived by a firm and prices charged depend negatively on the bias affecting the rival's good. This phenomenon clearly appears in the expressions of demands and prices in in equation (2.4) and (2.5) and refers to what I called the *"price e ect"* of consumer bias. A decrease in the expected utility of a given product indirectly triggers, through a substitutability mechanism, an increase in the profit of the competing firm. Therefore, firms have incentives to educate consumers who overestimate the utility derived from their rival's good.
- Second, firms can also have incentives to educate consumers who underestimate the utility derived from the rival's good. This counterintuitive situation is captured in equations (2.18) and (2.20) and is represented in graph (2.5). Just as in the case of

debiasing concerning the firm's own product, such a situation only occurs if the degree of differentiation is small. The interpretation is similar to the case mentioned above in Proposition 2 (firms educating consumers who overestimate the utility derived from their own product). When product differentiation is small, the price effect is negligible compared to the *"market power e ect"*. Hence firms might have incentives to charge lower prices if such a strategy allows them to increase their market power. Moreover, the bias affecting the firm's own product needs to be large. In the example of figure (2.18), $_A =$ 3. As explained in section 2.5.2.1, this condition might not always be verified since consumer bias is bounded.

Once again, just as in the case of firms revealing information about their own good, consumer education can be triggered either by the perspective of a price increase, or by that of a greater market power.

2.6 Policy implications

In the previous sections, I assessed when firms have incentives to spontaneously educate consumers, whether one considers symmetric or asymmetric debiasing policies. However, the debiasing conditions defined in propositions 1 through 3 do not enlighten us as to how firms can actually, in practical terms, carry out debiasing policies. In what follows, I first attempt to define and illustrate asymmetric and symmetric debiasing (section 2.6.1). I next determine a welfare criteria according to which firms should be forced to educate consumers (section 2.6.2), and finally mention several conceivable debiasing policies which do not encroach on the agents' freedom of choice (section 2.6.3).

2.6.1 What does debiasing stand for?

Depending on the bias and on the market structure, debiasing can refer to several phenomena. In this section, I try to investigate what debiasing can mean with regards to the model presented above. Let us first mention symmetric debiasing (section 2.6.1.1) and then turn to asymmetric debiasing (2.6.1.2).

2.6.1.1 Examples of symmetric debiasing policies

Symmetric debiasing refers to any policy which aims at reducing the bias concerning both products on the market. Formally, the debiasing firm simultaneously acts on $_A$ and $_B$. Typically, if consumers underestimate the utility derived by both goods, symmetric debiasing designates any policy that enhances the demand or increases the willingness to pay for the entire market. Think for instance of a situation in which consumers underestimate the utility derived from both goods ($_A < 0$ and $_B < 0$). If one firm engages in symmetric debiasing, the perceived utility derived from both goods will increase ($\tilde{U}_x(A) < U_x(A)$ and $\tilde{U}_x(B) < U_x(B)$).

At first glance, symmetric debiasing can seem close to *"cooperative advertising"* as defined by Friedman (1983) [59]. Advertising is said to be cooperative if *"it benefits everyone in the industry in much the same way"*. A very concrete example might be helpful to illustrate this phenomenon. Along with Friedman (1983), imagine for instance that consumers did not pay attention to which brand of milk or yoghurt they bought. Then advertising from a given firm for dairy products in general (regardless of the brand) would benefit all firms on the market. The communication campaign carried out by the leading firm Danone about the benefits of yoghurt in general for health is an illustration of cooperative advertising.[16] Danone's strategy rests on the assumption that debiasing consumers about the entire product category will prove to be profitable for its own profit.

However, symmetric debiasing is different from cooperative advertising in the sense that only one firm will ultimately benefits from it. Depending on the bias structure, the profit of firm A or firm B will increase (as explained in section 2.5.1, if $_\epsilon < 0$, firm A's profit will increase; and if if $_\epsilon > 0$, firm B's profit will increase). In other words, symmetric debiasing can never be *"cooperative"*, as in *"cooperative advertising"*. The reason is that the market is already covered at the pre-debiasing stage. Consumer education can only result in a transfer of demand from one firm to the other, but not in an increase of the

[16]The role of Danone Institute consists in promoting dairy product in general, not specifically the brand Danone, as explained on the website: *"Our Mission is to promote public health by developing and disseminating knowledge on the links between nutrition, diet and health. To accomplish our goals, we support research, inform and educate health and education professionals, develop and disseminate educational materials on nutrition for the general public."* (http://www.yogurtinnutrition.com/about-us/)

market demand. In the present model, firms are *"fighting over a fixed pie"*, to paraphrase Friedman (1983), which does not leave room for *"cooperative debiasing"*. This conclusion would probably be different in an uncovered market when firms can hope to increase the overall market demand.

2.6.1.2 Examples of asymmetric debiasing policies

Asymetric debiasing is more intuitive.

- The firm educates consumers concerning her own product: any advertising or information disclosure aimed at revealing the true utility of a given product can qualify as asymmetric debiasing.
- The firm debiases consumers regarding the utility of the competing product: such a policy might fall into the category of comparative advertising (see section 1.6.3.2 for a discussion on comparative advertising).

2.6.2 When is mandatory debiasing efficient?

Let us mention successively symmetric and asymmetric consumer education.

2.6.2.1 Symmetric debiasing

Recall that symmetric debiasing refers to any policy which aims at reducing consumer bias regarding the firm's own product as well as concerning the competing product. Since consumers know the true values of U_A and U_B at the decision stage, they make *objectively rational* decisions, whereas they could have made an *objectively irrational* choice had they remained biased. Therefore, consumers enjoy a welfare increase ensuing from debaising. This improvement in consumer welfare is equal to the difference in utilities resulting from the choice they would have made had they been biased, on one side, and the choice they actually make when they are debiased, on the other side. Formally, two situations are conceivable depending on the sign of ϵ, as explained section 2.5.1. Let us focus on the case of firm A, who educates consumers if $\epsilon < 0$.[17] The intuition is that firm A will

[17] An additional condition is required, as explained in equation (2.9).

educate consumers if, by doing so, she brings consumers to choose good A instead of good B. Consumers believe before debiasing that $\tilde{U}_B > \tilde{U}_A$, but they discover once educated that $U_A > U_B$. The welfare increase subsequent to consumer education is thus equal to $W_{sym} = U_A \quad U_B$.[18] Hence, forcing firm A to educate consumers is welfare increasing if and only if $C_A \qquad W_{sym}$. The same reasoning can be carried out for firm B. Finally, forcing firm to carry out symmetric debiasing policies generates an increase in social welfare if and only if:

$$\min[C_A, C_B] \quad |U_A \quad U_B| \tag{2.21}$$

The previous condition implies that mandatory debiasing will have an overall positive effect on social welfare. However, it could well be that the firm whose debiasing expenditures are lower will suffer from consumer education. Hence, it seems more sensible to argue that consumer debiasing should only be mandatory when one of the two following conditions is verified:

$$\text{Concerning firm } A\text{: } C_A \quad U_A \quad U_B \tag{2.22}$$

$$\text{Concerning firm } B\text{: } C_B \quad U_B \quad U_A \tag{2.23}$$

The conditions in (2.22) and (2.23) respectively entail that is it socially efficient to force firm A and B to engage in symmetric debiasing policies.

2.6.2.2 Asymmetric debiasing

A similar reasoning is carried out concerning asymmetric consumer debiasing about the firm's own good. The main difference is that consumers do not know *ex post* the true utility they would have derived from the unchosen option. Hence, the welfare increase

[18] Since consumers know the true utility of both goods, their welfare increases depends on U_A and U_B as opposed to $\tilde{U}_A$ and $\tilde{U}_B$.

ensuing from consumer education depends on the actual utility felt after purchase and on the consumer's perceived utility, had he acted differently.

Let us study more in depth, for explanatory purposes, the case of firm A educating consumers who underestimate U_A. We focus on the case represented in equation (2.13) and captured in the graph 2.2 but the gist of the argument remains relevant for all cases of asymmetric debiasing mentioned in section 2.5.2. Suppose that the rational choice *ex ante* is to buy good B because $\tilde{U}_B > \tilde{U}_A$. Firm A relveals the true value of U_A, which leads to a different preference ordering. Consumers now settle for good A since $U_A > \tilde{U}_B$. Hence, the welfare increase resulting from consumer education is equal to $W_{asymm_1} = U_A \quad \tilde{U}_B$.[19]

More generally, mandatory asymmetric debiasing about the firms own product is welfare increasing if and only if:

$$\text{Concerning firm A: } C_A < \tilde{U}_B \quad U_A \tag{2.24}$$

$$\text{Concerning firm B: } C_B < \tilde{U}_A \quad U_B \tag{2.25}$$

Let us now turn to the case when a firm debiases regarding the competing product. Firm A might reveal $_B$ when the value of U_B is overestimated. This corresponds to the situation described in equation 2.17 and represented in graph 2.4. In this case, debiasing reverse consumer preferences and they switch from good B to good A. The true value of U_B is revealed, while U_A remains unknown. Hence, the welfare variation is equal to $W_{asymm_2} = \tilde{U}_A \quad U_B$. More generally, we come to the following conditions: debiasing increases social welfare if and only if:

$$\text{Concerning firm A: } C_A < \tilde{U}_A \quad U_B \tag{2.26}$$

$$\text{Concerning firm B: } C_B < \tilde{U}_B \quad U_A \tag{2.27}$$

[19]Note that ΔW_{asymm} corresponds to the welfare increase perceived by the consumer, who compares U_A to $\tilde{U}_B$, since the true value of U_B remains unknown. One could also settle for a more *objective* approach by taking into account U_B, to the extent that it corresponds to the utility the consumer would have obtained if he had remained biased. This stance brings us back to ΔW_{symm} as defined in the case of symmetric education.

As explained above, asymmetric education enables consumers to make *ex post* rational decisions, but is does not guarantee that the decision is *objectively rational*, according to the typology presented in section 2.3.2. In this regards, symmetric education seems more efficient than asymmetric debiasing. However, in the process of choosing between the two types of debiasing, one should take costs into consideration, since they might depend on the implemented policy. More pragmatically, one should also ponder over the various policies firms can implement, with regards to the information they have and the legal constraints they face. We mention this issue in the following paragraphs.

2.6.3 Potential responses to consumer biases

Several arguments are repeatedly put forward to bring into disrepute any attempt at responding to consumer biases. I show in the following section that none of those arguments hold in the case of inaccurate utility anticipations.

2.6.3.1 The alleged impediments standing in the way of *soft-paternalism:*

The so called knowledge problem of soft paternalism. Opponents to soft paternalism constantly argue that policy makers are not in a position to determine the agents' true preferences, which supposedly renders useless, if not harmful, any legal intervention aimed at limiting the consequences of rationality biases. Concerning for instance time-inconsistent preferences, the issue of which preferences should be taken into account to implement public policies can indeed be quite tricky. Spiegler (2011) [147] explains that the choice of either one of the agent's preference relation, or even the use of a third preference relation, unavoidably introduces an element of paternalism. He further concedes that *"there is no escape from such judgements when changing tastes seem to be an intrinsic aspect of the economic situation."* More generally, some scholars consider that the mere existence of a cognitive biases renders any public policy impossible, or at least extremely paternalistic, in the sense that it necessarily implies a judgement on what the agents' true preferences *should be.* In this perspective, Saint Paul (2011) [132] considers that changing preferences constitute a major impediment in the way of any serious welfare analysis: *"It*

is impossible, in fact, to establish such a result, for one needs a criterion for comparing alternative utility functions; that is, one would have to impose some 'meta-utility function' in order to tell us that a given utility function is better than another"(page 87).

Such criticisms are irrelevant in the case of biased utility anticipations: since anticipations at the decision stage are by definition inaccurate, the *true* utility is unambiguously the one felt *ex post*. By contrast to a situation with time-inconsistent preferences, the agents' preferences do not change in this model. It is only the consumer's *perception* of his own utility which varies. Once his true utility is revealed, the issue of determining the true preferences is automatically solved. The soft paternalism opponents' argument, according to which one cannot determine the agent's *true* preferences is therefore not convincing in the case of biased utility anticipations.

The inefficiency of market mechanisms to respond to consumer bias. It is often said that the market itself offers efficient responses to consumer bias. The case of price misjudgment provides interesting examples of such arguments. While there is empirical and theoretical evidence that firms tend to obfuscate prices in order to hinder competition (see section 2.6.3.2 below), opponents to soft paternalism contend that firms actually have incentives to enhance price comparison. Gaudeul & Sugden (2012) [63] argue that if the market operates freely, competition will incite firms to use *"common standards"* (about package size, tariff structures, labeling etc). The gist of their argument is that following a common standard convention serves as a signal of product quality. Hence, firms naturally have incentives to use common standards, which have the positive effect of stimulating price competition. Moreover, they contend that common standards are efficient since firms who deviate are penalized by losing market shares.

This reasoning is similar to other pro-market arguments (such as the existence of a market for reputation) and is exposed to the same critics. As explained in the previous chapter (see section 1.6.1), relying on the market to counter the negative effects of consumer bias is only efficient if consumers act rationally: the market for reputation argument (Bebchuk & Posner (2006) [16]) implies that consumers can analyze accurately and easily firms' reputation and act accordingly. Bias agents could very well under- or over-react to

information concerning the firms' reputation. The right to withdraw argument (Ben Shahar & Posner (2006) [22]) rests on the assumption that consumers will use their right to withdraw and will not be subject to an endowment effect ; finally, the common standard argument is only relevant if consumers understand the signal of firms not choosing the common standard as lower quality and if they act accordingly.

The last leitmotiv of liberal anti-paternalist scholars is to pretend that any intervention on the market is by essence an infringement on individual liberty. Once again, this assertion can been dismissed, as we'll see in the following paragraphs.

2.6.3.2 None liberty-ab ig ing polic es

Various freedom-enhancing policies in favor of consumer education are conceivable, depending on the source of the bias. As explain Jolls & Sunstein (2006) [85] successful strategies for debiasing through substantive law requires to understand where the bias originates. Biased utility anticipations can stem from two sources: *"First, an agent's false beliefs may be about the contract itself; (...) Second, an agent's false beliefs may be about her own behavior given the contract"* (K szegi's (2014), p. 1104 [99]). Depending on the source of the mispercpetion, different responses are conceivable. The regulator can compel firms to frame prices in a certain way in order to enhance price comparison. Such policies fall into the category of soft paternalism. The regulator can also debias consumers by helping them avoid false beliefs and mistakes. I mention those two possible trend of regulation in the following paragraphs.

Eh in g o mpetition th ough prie o mparison. If utility misperception stems from misjudgment of prices, easing price comparison might be a relevant policy. The next paragraphs review the effects of price framing on consumer choice and mention possible regulatory responses.

Empirical evidence has shown that purchase decisions strongly depend on the way prices are framed. The framing effect has first been emphasized by Kahneman & Tvesrsky (1984) [159] and has since then been confirmed by various empirical studies. Several

field experiment suggest that drip pricing generate bias in favor of overconsumption. For instance Hossain & Morgan (2006) [77] study how the distribution of price between the actual product and the shipping fees on e-bay influences consumer behavior. They show that charging a high shipping cost and starting the auction at a low opening price leads to higher numbers of bidders and higher revenues, compared to lower shipping cost and higher auctions (for an unchanged total price). The authors consider that these results can be accounted for by boundedly rational bidding behavior such as separate mental accounts for different attributes of the price or disregard for shipping costs.

The Office of Fair Trading (OFT) also carried out several experiments to describe the precise consequences of framing on consumer choice, and ultimately on consumer welfare. In a report issued in May 2010 entitled "The Impact of Price Frames on Consumer decision Making" [47], the OFT analyses the effect of various price frames on consumer choice. Five types of prices are compared to a baseline straight per-unit price (sales price, drip pricing, complex pricing, time limited offers, baiting both). The study shows that price frames do result in welfare loss, and that the loss is highest for drip pricing. This study confirms that the choice of a pricing system is key for price comparability, and therefore for the final purchase decision. More generally, the experimental literature tends to show that irrational agents end up buying more and paying more when price is partitioned as opposed to a total price. The theoretic literature comes to similar conclusions about price obfuscation.

Gaibaix & Laibson (2006) [60] study a market of goods with add-ons. They present a model in which firms shroud the price of the add-ons and no competitor has incentives to educate consumer. The intuition is as follows: if the market is composed of both naive and sophisticated consumers, the latter take profit of non-exploitative firms and are less profitable for firms. Once naive consumers are debiased, they have incentives to remain with the exploitative but not consume the add-on. Hence, no firm can profitably attract newly informed customers and no firm educates customers. Piccione & Spiegler (2010) [148] examine a market where consumers consider switching firms. In contrast to standard search models, the authors show that some consumers only switch firms if prices offered by the competitor is better *and framed identically* than the price of the current firm. Hence,

firms can keep agents in their customer base by making price comparison harder.

To sum up, theoretical as well as empirical literature shows that price obfuscation can lead to suboptimal purchase decisions in the presence of cognitively limited agents. This conclusions leads to interesting policy recommendations. Some existing regulation can be analyzed as a means of fighting agains price obfuscation. In the financial field, the regulation concerning loans aims at facilitating price comparisons. Interest rates can indeed be presented in various ways, which can be quite confusing for neophyte consumers. Since the Truth in Lending Act (TILA) of 1968, lenders in the United States are required to present interest rates in a standard form known as the Annual Percentage Rate (APR). The TILA also explains how the rate should be calculated. This regulation clearly aims at improving price comparability in a technic and complex field.

Indirectly, tied selling and bundling can lead to price obfuscation and to suboptimal decisions. Hence, fighting against such practices can be a way to constrain the negative effects of consumer bias. A tying arrangement is an agreement between a seller and a buyer under which the seller agrees to sell a product or service (the tying product) to the buyer only on the condition that the buyer also purchases a different (or tied) product from the seller. In the United-States, tying arrangements may be challenged under Section 1 of the Sherman Act, which prohibits "contracts in restraint of trade", Section 3 of the Clayton Act, which prohibits exclusivity arrangements that may "substantially lessen competition", and Section 5 of the FTC Act, which prohibits unfair "methods of competition". In France, bundling is prohibited according to article L.122-1 of the Consumer Code. This article provides that combined offers are prohibited *"only if they constitute an unfair commercial practice"* as defined by the same code. The legal provisions in France as well as in the United-States are primarily aimed at enhancing competition. They can also be seen as a response to consumer bias, in the sense they help mitigate the negative effects of consumer irrationalities.

In a completely different field, airline companies in the United-Kingdom are know required to show all additional fees clearly and transparently at the beginning of the booking process in the headline price. It is a wide-spread practice among airline companies

to exclude several payment surcharges for paying by debit card from the headline price, in order to keep those prices low, and to add the surcharges at the very last step of the booking process. If consumers were perfectly rational, the time at which charges are added to the headline price should have no impact on their decision. However, in the presence of boundedly rational agents, this type of drip pricing is an impediment to competition. The process is as follows: consumers anchor the initial headline price and become attached to their original choice during the comparison process. At the end of the booking process, once the additional charges are added to the price, and the true total price becomes apparent, consumers no longer want to search again for a better deal. The OFT was concerned that such drip prices would hinder competition and increase final prices. In 2012, the OFT required airlines to include in headline prices all debit card charges, both on the airline website and on advertising.[20] This regulation clearly aims at facilitating price comparison from the beginning of the buying purchase.

In the banking sector, the French government recently implemented an interesting policy aimed at enhancing price comparison. A public online price comparator for banking tariffs is available since february 2016.[21] The user can choose one or several services from a list and all prices appear in a simple table. The obvious goal is here to enhance competition through price comparison in a field where tariffs are multi-dimensional and complex.

In light of the empirical and theoretical evidence mentioned above, a path for future regulation could consist in generalizing common standards and price formats in order to enhance price comparison. It is worth noting that the policies mentioned above all meet the criteria of soft paternalism, as described in the introduction. The regulator intervenes in order to frame prices and to help consumers make better choice according to their own standards. There is a form of manipulation insofar as consumers are not conscious of the regulator's intervention and of the effect of price frames on their final decision. In the

[20]OFT Press release 58/12 (5 July 2012): "Airlines to scrap debit card surcharges following OFT enforcement action", available at http://webarchive.nationalarchives.gov.uk/20140402142426/http:/www.oft.gov.uk/news-and-updates/press/2012/58-12.

[21]The comparator has been created after a meeting of the Comité consultatif du secteur financier. For more information, see http://www.economie.gouv.fr/lancement-du-comparateur-public-des-tarifs-bancaires.

next paragraphs, I mention policies which tend to inform consumers about themselves. The ultimate goal is to debias consumers who might have false beliefs about their own behavior. The policies studied in the following paragraphs do not imply any manipulation, since consumers are fully aware of the strategy and the aim pursued by the regulator.

Enhancing competition by informing consumers about themselves. When utility misperception stems from an error about the consumer's own behavior, a simple response to such errors consists in informing consumers about themselves. Surprisingly, firms are often better informed than consumers themselves about their needs. As highlight Kamenica, Mullainathan & Thaler [93] this is likely to occur on specific markets where modern data-gathering technologies allow for accurate predictions of individual behavior. Cell-phone and credit cards are typical examples of information asymmetry reversal because of consumer bias.

Following this observation, Thaler & Sunstein [158] introduced the idea of a new form of disclosure they call RECAP, which stands for *R*ecord, *E*valuate and *C*ompare *A*lternative *P*rices. The system would consist in enhancing transparency on the market rather than regulate prices. Firms would be required to publicly disclose their pricing schemes, on one hand; and to provide each consumer with information about his personal usage, on the other hand. Consumers could than send their usage file to other providers in order to compare final prices. In various countries, RECAP has come a long way among policy makers and regulation authorities. For instance in France, the "Conseil d'Analyse Economique" formulates several proposals in a report issued in 2012 and entitled "Consumer Protection: Bounded Rationality and Regulation" [61]. The fourth regulation proposal clearly is inspired from the RECAP regulation, first coined by Thaler & Sunstein: "Proposal 4 : Require that consumers have the right to obtain records of their use and billing, free of charge and in standard format, from the service provider (especially in the case of telephony, Internet, energy and financial services). In order for competitors or intermediaries to inform consumers of the alternatives they can provide, this information must be downloadable by third parties so authorised by the consumer." The strength of RECAP regulation is that it offers a response to the two types of misperception: both price misperception and the

lack of lucidity about one's own behavior can be countered by a RECAP-type regulation.

In the same train of thought, the concept of use-pattern mistakes has been forged by Bar Gill & Ferrari (2010) [12] to describe *"mistakes about how the consumer will use the product"*. The authors explain that, far from revealing valuable information, firms tend to respond to such mistakes in order to maximize their profit. Bar Gill & Ferrari (2010) [12] therefore plead in favor of mandatory use-pattern information disclosure. The European Markets in Financial Instruments Directive of 30, April 2004 (known as MiFID) offers an interesting example of regulation aimed at informing consumers about themselves. As stated in the introduction, *"One of the objectives of this Directive is to protect investors. Measures to protect investors should be adapted to the particularities of each category of investors (retail, professional and counterparties)."* Hence, financial institutions are required to determine, prior to signing any contract, the nature of the client or potential client (article 19 of the directive). This regulation rests on the assumptions that (i) customers do not know what type of investors they are ; (ii) customers are not able to figure out by themselves what their profile is ; (iii) banks do not have incentives to spontaneously educate customers. In this sense, regulation such as the MiFID can be analyzed as a means to constrain the professional party to help consumers act in the way which is best for them. Technically, banks require clients to fill out a test before signing any investment contract. The test should help the customer know more about his own profile and ultimately guide him towards the best decision. An example of such tests in France is provided in the appendix (section 2.8.4).

Such mandatory information disclosure is particularly relevant when firms are reluctant to spontaneously reveal product use information. Bar Gill & Board (2014) [11] indeed argue that firms have no incentives to reveal product use information because such information is common to all firms and do not allow firms differentiate themselves from their competitors. If one considers in accordance with Bar-Gill & Board (2011) [11] that product use information is common to all firms, then any education policy which requires firms to reveal product use information correspond to what I termed symmetric debiasing. As explained above, such policies allow consumers to make *objectively rational* decisions

and are in this regards more efficient than asymmetric education schemes. This makes an additional argument in favor of mandatory product use information disclosure. Any policy requiring firms to disclose information, whether the information concerns the good's inherent quality or the consumer's use-pattern, is knowledge-enhancing. In no event can such policies abridge one's liberty of choice. Even zealous opponents to paternalistic interventions such as Saint Paul (2011) [132] admit that *"the least objectionable libertarian paternalism consists in educating people about their own biases or about the objective they supposedly misperceive"* (page 85). There is no doubt that consumer education can only enhance individual liberty and lead to more efficient consumption decisions.

2.7 Conclusion

This chapter brings two major contributions to the literature dedicated to consumer education. First, the idea of focusing on the bias asymmetry rather than on the magnitude of consumer bias is novel in the literature and sheds a new light on the firms' behavior regarding consumer education. It follows that one should not consider solely the bias affecting one specific product, but should also take into consideration the way consumers perceive substitute commodities. Second, I show that in a vertically differentiated duopoly, firms are subject to two potentially opposite forces: a price effect, which incites firms to increase the perceived quality of their product; and a market power effect, which leads firms to seek stronger product differentiation. Depending on the degree of product differentiation and on the direction of consumer misperception, one of those two effects will prevail.

The conclusions have strong implications in terms of public policy. In order to assess when consumer education is relevant, one should not focus only on the intensity of the misperception, but rather on the bias asymmetry. As for the choice of an efficient debiasing policy, I oppose symmetric education, on one hand, to asymmetric debiasing, on the other hand. I argue that symmetric education is more efficient in the sense that it allows consumers to make *objectively rational* decisions. I more specifically consider that firms should be compelled to disclose information about consumers' use of their products, to the extent that they are better informed than consumers themselves. Moreover, mandatory product use information disclosures are by essence symmetric education schemes, since the information revealed is not specific to one good. This observation pleads in favor of such policies.

The paper opens tow promising paths for future research. First, it is worth determining precisely what type of information should be disclosed and how this information can be made intelligible to consumers. Second, one could focus on a market which is not covered. The results we come to would probably me mitigated if the model allowed firms to attract new customers.

2.8 Appendix

2.8.1 The market outcome without consumer bias

Assm p ion . Consumers are uniformly distributed on the $[0,1]$ interval. Two substitute goods which differ with regards to their quality are offered by firms A and B. The locations a and b on the $[0,1]$ interval represent product quality, with the convention that $b > a$, which means good B is of higher quality. Consumers make mutually exclusive single purchase. Consumers have the following utility function:

$$\begin{cases} U_x(A) = r + ax \quad p_A & \text{if he buys brand A} \\ U_x(B) = r + bx \quad p_B & \text{if he buys brand B} \end{cases}$$

Firms are assumed to have the same constant marginal cost, independent of quality. Without loss of generality, I assume that this cost is equal to zero.

I assume that prices are set such as all consumers buy one unit of one good. Hence, the market is covered, which holds only if r is sufficiently large. The parameter r needs to verify $r > \max(p_A; p_B \quad b)$.

For given qualities a and b, there is a consumer located at $\hat{x}$ who is indifferent between the two goods. The indifferent consumer satisfies $U_x(A) = U_x(B)$, which entails :

$$\hat{x} = \frac{p_B \quad p_A}{b \quad a}$$

Consumer located at point x on the $[0,1]$ interval such as $x < \hat{x}$ buy good a, whereas consume who verify $x > \hat{x}$ settle for good b. Profit functions depend on the relative prices p_A and p_B:

- if $p_A > p_B$, then $\quad_A = 0$ and $\quad_B = p_B$
- if $p_B \quad (b \quad a) \quad p_A \quad p_B$, then $\quad_A = p_A(\frac{p_B - p_A}{b-a})$ and $\quad_B = p_B(1 \quad \frac{p_B - p_A}{b-a})$.
- if $p_A < p_B \quad (b \quad a)$, then $\quad_A = p_A$ and $\quad_B = 0$

I focus on cases when there exists a duopolistic equilibrium, that is to say when both firms make a positive profit. Hence, the analysis is restricted to $p_B \quad (b \quad a) \quad p_A \quad p_B$.

Defi ng equi librium p ie s and profits under the assumption that the market is o vered In what follows, location on the quality axis are given, and firms determine prices according to a and b. In order to define equilibrium prices and profits, I first determine equilibrium prices as functions of locations a and b ; and next turn to the profits.

Determining prices as a function of a, b: For any given locations a and b, firms set prices such as $p_A(a,b)$ and $p_B(a,b)$ constitute a Nash equilibrium.
Firms solve the following program:

$$\max_{p_i} \quad {}_i(a,b,p_i,p_j) = \max_{p_i} p_i D_i$$

According to (2.4), the expressions of demands are: $D_A = \frac{p_B - p_A}{b-a}$ and $D_B = 1 \quad \frac{p_B - p_A}{b-a}$
H nce, the maximization constraint above is equivalent to:

$$\max_{p_A} \left[\frac{p_B \quad p_A}{b \quad a} \right] p_A \quad \text{and} \quad \max_{p_B} \left[1 \quad \frac{p_B \quad p_A}{b \quad a} \right] p_B \tag{2.28}$$

The first order conditions are given by:

$$\frac{{}^A}{p_A} = 0 \qquad \frac{p_B \quad 2p_A}{b \quad a} = 0 \tag{2.29}$$

$$\frac{{}^B}{p_B} = 0 \qquad 1 \quad \frac{2p_B \quad p_A}{b \quad a} = 0 \tag{2.30}$$

A ter substitution, one obtains $p_A(a,b)$ and $p_B(a,b)$:

$$p_A(a,b) = \frac{(b \quad a)}{3} \quad \text{and} \quad p_B(a,b) = \frac{2(b \quad a)}{3} \tag{2.31}$$

Determining profits as a function of a, b: Once prices are known, one can calculate profits ${}_A$ and ${}_B$ as functions of a, b.

$${}_A(a,b) = D_A p_A(a,b) \quad \text{and} \quad {}_B(a,b) = D_B p_B(a,b) \tag{2.32}$$

A ter replacing $p_A(a,b)$ and $p_B(a,b)$ by the expressions in (2.31), one obtains:

$$_A(a,b) = D_A\left[\frac{(b \quad a)}{3}\right] \tag{2.33}$$

$$_B(a,b) = D_B\left[\frac{2(b \quad a)}{3}\right] \tag{2.34}$$

Recall that according to (2.4) $D_A = \frac{p_B - p_A}{b-a}$ and $D_B = 1 \quad \frac{p_B - p_A}{b-a}$.

A ter substitution, the expressions of the profits $_i$ yield:

$$_A(a,b) = \frac{(b \quad a)}{9} \tag{2.35}$$

$$_B(a,b) = \frac{2(b \quad a)}{9} \tag{2.36}$$

Verifyig th t th re exists a Nash equilibrium under the assumption that the market is o vered In this section, I want to prove that when prices are such as $p_A^* = \frac{(b-a)}{3}$ and $p_B^* = \frac{2(b-a)}{3}$ as defined in equation (2.31) the market is a Nash equilibrium whereby neither firm has incentives to deviate. I first define a condition under which firm A's best response is to cover the market when $p_B = p_B^*$; and next turn to firm B's best response when A covers the market.

A sufficient condition which guarantees that firm A's best response is to cover the market: Let us assume that the market is covered so $p_B^* = \frac{2(b-a)}{3}$. If firm A does not cover the market, then $P_A > r$. This means that consumers located at point 0 do not purchase good A. Firm A's profit is then equal to:

$$_A = p_A\left[\frac{p_B^* \quad p_A}{b \quad a} \quad \frac{p_A \quad r}{a}\right]$$

A sufficient condition under which firm A never decides not to cover the market is therefore:

$$\frac{p_B^* \quad p_A}{b \quad a} \quad \frac{p_A \quad r}{a} < 0$$

Recall that $\frac{p_A - r}{a}$ is assumed to be positive since the market is not covered. Hence, a sufficient condition is $p_B^* \quad p_A < 0$.
Since $p_A > r$, the latter condition implies $\frac{2(b-a)}{3} < r$.
To conclude, firm A covers the market if:

$$\frac{2(b \quad a)}{3} < r$$

A sufficient condition which guarantees that firm B's best response is to cover the market:

If B does not cover the market there is a consumer who is indifferent between buying good B and not consuming at all. This consumer it locater at point $\bar{x} = \frac{p_B - r}{b}$.

When firm B does not cover the market, its profit is equal to:

$$_B = p_B \left[\bar{x} \quad \frac{p_B \quad p_A}{b \quad a}\right] = p_B \left[\frac{p_B \quad r}{b} \quad \frac{p_B \quad p_A}{b \quad a}\right]$$

A sufficient condition that guarantees that firm B will never decide not to cover the market is $p_B \quad r < p_B \quad p_A^*$. Since A covers the market, we know that $p_A^* < r$. Hence, the condition is always true, provided that A covers the market. In other words, when firm A covers the market, firm B's best response is always to cover the market.

Conclusion: **A suffi ent o ndition which guarantees that the o vered market ot o me is a Nash equilibrium is:**

$$\frac{2(b \quad a)}{3} < r \tag{2.37}$$

2.8.2 The market outcome with consumer bias

Assumptions. Let us define the *ex ante* anticipated utility $\tilde{U}_x$ of a consumer located at point $x \in [0,1]$, such as:

$$\begin{cases} \tilde{U}_x(A) = r + ax - p_A + \varepsilon_A & \text{if he buys brand A} \\ \tilde{U}_x(B) = r + bx - p_B + \varepsilon_B & \text{if he buys brand B} \end{cases}$$

The parameters ε_A and ε_B respectively represent consumer bias about goods A and B. We define $\varepsilon = \varepsilon_A - \varepsilon_B$. We suppose that r is sufficiently large so that all consumers prefer to buy one unite of either good rather than no good at all. The parameter r needs to verify $r > \max(p_A - \varepsilon_A; p_B - \varepsilon_B - b)$

The consumer located at point $\hat{x}' = \frac{p_B - p_A + \varepsilon}{b-a}$ is indifferent between goods A and B. Consumers located at point x such as $x < \hat{x}'$ (respectively $x > \hat{x}'$) buy good A (respectively B).

Therefore, profit functions are as follows:

- if $p_B - p_A < \varepsilon_B - \varepsilon_A$, then $\varepsilon_A = 0$ and $\varepsilon_B = p_B$
- if $p_B - p_A - (b-a) < \varepsilon_B - \varepsilon_A < p_B - p_A$, then $\varepsilon_A = p_A(\frac{p_B - p_A + \varepsilon}{b-a})$ and $\varepsilon_B = p_B(1 - \frac{p_B - p_A + \varepsilon}{b-a})$.
- if $\varepsilon_B - \varepsilon_A < p_B - p_A - (b-a)$, then $\varepsilon_A = p_A$ and $\varepsilon_B = 0$

We focus on cases when there exists a duopolistic equilibrium, that is to say when both firms make a positive profit. Hence, restrict the analysis to $p_B - p_A - (b-a) < \varepsilon_B - \varepsilon_A < p_B - p_A$.

Determining prices as a function of a, b and ε. For any given locations a and b, firms set prices such as $p_A(a,b)$ and $p_B(a,b)$ constitute a Nash equilibrium.

Firms solve the following program:

$$\max_{p_i} \pi_i(a, b, p_i, p_j) = \max_{p_i} p_i D_i$$

According to (2.4), the expressions of demands are: $D_A = \frac{p_B - p_A + \varepsilon}{b-a}$ and $D_B = 1 - \frac{p_B - p_A + \varepsilon}{b-a}$

Hence, the maximization constraint above is equivalent to:

$$\max_{p_A}\left[\frac{p_B \quad p_A + \quad \epsilon}{b \quad a}\right]p_A \quad \text{and} \quad \max_{p_B}\left[1 \quad \frac{p_B \quad p_A \quad \epsilon}{b \quad a}\right]p_B \tag{2.38}$$

The first order conditions are given by:

$$\frac{\quad A}{p_A} = 0 \qquad \frac{p_B \quad 2p_A + \quad \epsilon}{b \quad a} = 0 \tag{2.39}$$

$$\frac{\quad B}{p_B} = 0 \qquad 1 \quad \frac{2p_B \quad p_A \quad \epsilon}{b \quad a} = 0 \tag{2.40}$$

After substitution, one obtains $p_A(a,b)$ and $p_B(a,b)$:

$$p_A(a,b) = \frac{(b \quad a) + \quad \epsilon}{3} \quad \text{and} \quad p_B(a,b) = \frac{2(b \quad a) \quad \epsilon}{3} \tag{2.41}$$

Determining profits as a function of a, b and ϵ. Once prices are known, one can calculate profits $\quad_A$ and $\quad_B$ as functions of a, b and $\quad_\epsilon$.

$$\quad_A(a,b) = D_A p_A(a,b) \quad \text{and} \quad \quad_B(a,b) = D_B p_B(a,b) \tag{2.42}$$

After replacing $p_A(a,b)$ and $p_B(a,b)$ by the expressions in (2.41), one obtains:

$$\quad_A(a,b) = D_A\left[\frac{(b \quad a) + \quad \epsilon}{3}\right] \tag{2.43}$$

$$\quad_B(a,b) = D_B\left[\frac{2(b \quad a) \quad \epsilon}{3}\right] \tag{2.44}$$

Recall that according to (2.4) $D_A = \frac{p_B - p_A +}{b-a}$ and $D_B = 1 \quad \frac{p_B - p_A -}{b-a}$.

After substitution, the expressions of the profits $\quad_i$ yield:

$$\quad_A(a,b) = \frac{[(b \quad a) + \quad \epsilon]^2}{9(b \quad a)} \tag{2.45}$$

$$\quad_B(a,b) = \frac{[2(b \quad a) \quad \epsilon]^2}{9(b \quad a)} \tag{2.46}$$

The results in (2.45) and (2.46) are only relevant for $_a = \ _b$. If $_a = \ _b$ we are back to the standard situation without biased anticipations.

A suffic ent o id tion which guarantees that the equilibrium with a o vered market is a Nash equilib im . With a similar method as the one used in the absence of consumer bias, we can determine a sufficient condition when neither firms has incentives not to cover the market.

A sufficient condition which guarantees that firm A's best response is to cover the market:

Let us suppose that firm B covers the market so $p_B^* = \frac{2(b-a)-}{3}$. If firm A does not cover the market, its profit is equal to:

$$_A = p_A \left[\frac{p_B^* \quad p_A + \ _\epsilon}{b \quad a} \quad \frac{p_A \quad r \quad _A}{a} \right]$$

A sufficient condition which implies firm A will never decide not to cover the market is $p_B^* \quad p_A + \ _\epsilon < 0$, which is equivalent to $p_A > p_B^* + \ _\epsilon$.
Since $p_A > r \quad _A$, a sufficient condition is:

$$p_B^* + \ _\epsilon < r \quad _A$$

A ter substitution, one obtains:

$$r > \frac{2(b \quad a) \quad 2 \ _B \quad _A}{3}$$

A sufficient condition which guarantees that firm B's best response is to cover the market:

Let us suppose that firm A covers the market so $p_A^* = \frac{(b-a)-}{3}$. If firm B does not cover the market, than there is a consumer located at point $\bar{x} = \frac{p_B - r - \epsilon_B}{b}$ who is indifferent between buying good B and not buying at all. Firm B's profit is equal to:

$$_B = p_B \left[\frac{p_B \quad r \quad _b}{b} \quad \frac{p_B \quad p_A^* + \ _\epsilon}{b \quad a} \right]$$

A sufficient condition which implies firm B will never decide not to cover the market is

$p_B \quad r \quad {}_b < p_B \quad p_A^* + \quad {}_\epsilon$, which is equivalent to $p_A^* \quad {}_B \quad {}_\epsilon < r$.
After substitution, one obtains:

$$r > \frac{(b \quad a) \quad 2 \; {}_A \quad {}_B}{3}$$

Conclusion: **A sufficient condition which guarantees that the covered market outcome is a Nash equilibrium is:**

$$r > \max \left[\frac{2(b \quad a) \quad 2 \; {}_B \quad {}_A}{3}; \frac{(b \quad a) \quad 2 \; {}_A \quad {}_B}{3} \right] \tag{2.47}$$

This condition remains valid for ${}_A = 0$ and/or ${}_B = 0$. When ${}_A = {}_B = 0$ we are back to the case without bias mentioned above in section 2.8.2. This general condition can be adapted to each case when a firm debiases, either regarding her own product and/or the rival's good.

2.8.3 Debiasing conditions

I explain in detail the debiasing conditions for firm A. The same method is used for firm B.

1. **Regarding firm A:**

   (a) Symmetric education: Firm A educates consumers if and only if:

   $$_A \quad C_A > \quad _A(\ _A;\ _B) \tag{2.48}$$

   According to the expression of profits above (2.45), the condition (2.48) is equivalent to:

   $$[b \quad a]^2 \quad [(b \quad a) + \ _A \quad _B]^2 > C_A$$

   $$[2(b \quad a) + \ _A \quad _B][\ _B \quad _A] > C_A$$

   i. If $\quad _\epsilon > 0$:

   $$2(b \quad a) < \quad \frac{C_A}{_\epsilon} \quad _\epsilon$$

   Consequently, A debiases if:

   $$\begin{cases} \quad _\epsilon > 0 \\ 2(b \quad a) < \quad \frac{C_A}{} \quad _\epsilon \end{cases}$$

   This case is impossible since $(b \quad a) \quad 0$.

   ii. If $\quad _\epsilon < 0$:

   $$2(b \quad a) > \quad \frac{C_A}{_\epsilon} \quad _\epsilon$$

   (b) Asymmetric education:

i. Firm A educates consumers regarding her own good:

Firm A has incentives to educate consumers concerning good A if and only if:

$$_A(\ _B) \quad C_A > \quad _A(\ _A;\ _B) \tag{2.49}$$

Equation (2.49) is equivalent to:

$$[(b \quad a) \quad _B]^2 \quad [(b \quad a) + \ _A \quad _B]^2 > C_A$$

Two sub-cases can be distinguished:

$$\begin{cases} \ _A > 0 \\ 2(b \quad a) < \quad \frac{C_A}{\epsilon_A} \quad _A + 2 \ _B \end{cases}$$

and

$$\begin{cases} \ _A < 0 \\ 2(b \quad a) > \quad \frac{C_A}{\epsilon_A} \quad _A + 2 \ _B \end{cases}$$

ii. Fim A educates consumers regarding the rival's good

Firm A has incentives to educate consumers concerning good B if and only if:

$$_A(\ _A) \quad C_A > \quad _A(\ _A;\ _B) \tag{2.50}$$

Equation (2.50) is equivalent to:

$$[(b \quad a) + \ _A]^2 \quad [(b \quad a) + \ _A \quad _B]^2 > C_A$$

Two sub-cases can be distinguished:

$$\begin{cases} \ _B > 0 \\ 2(b \quad a) > \frac{C_A}{\epsilon_B} + \ _B \quad 2 \ _A \end{cases}$$

and

$$\begin{cases} {}_B < 0 \\ 2(b \quad a) < \frac{C_A}{\epsilon_B} + {}_B \quad 2 {}_A \end{cases}$$

2. **Regarding firm B:**

(a) Symmetric education: with an identical method as the one used for firm A, we can show that firm B educates consumers in two situations depending on the sign of ${}_\epsilon$:

i. If ${}_\epsilon < 0$:

$$\begin{cases} {}_\epsilon < 0 \\ 4(b \quad a) < \frac{C_B}{} + {}_\epsilon \end{cases} \tag{2.51}$$

This case is impossible.

ii. If ${}_\epsilon > 0$:

$$\begin{cases} {}_\epsilon > 0 \\ 4(b \quad a) > + \frac{C_B}{} + {}_\epsilon \end{cases} \tag{2.52}$$

(b) Asymmetric education: Similarly, one finds that, in the case of an asymmetric debiasing policy, firm B can educate consumers regarding good B or regarding good A. One finds the following conditions, with an identical method as detailed above:

i. Firm B educates consumers regarding her own good:
Firm B has incentives to educate consumers concerning good B if and only if:

$$ {}_B({}_A) \quad C_B > \quad {}_B({}_A; {}_B) \tag{2.53}$$

Two sub-cases can be distinguished:

$$\begin{cases} {}_B > 0 \\ 4(b \quad a) < \quad \frac{C_B}{\epsilon_B} \quad {}_B + 2 \ {}_A \end{cases}$$

and

$$\begin{cases} {}_B < 0 \\ 4(b \quad a) > \quad \frac{C_B}{\epsilon_B} \quad {}_B + 2 \ {}_A \end{cases}$$

ii. Firm B has incentives to educate consumers concerning good A if and only if:

$$ {}_B(\ {}_B) \quad C_B > \quad {}_B(\ {}_A; \ {}_B) \tag{2.54}$$

Two sub-cases can be distinguished:

$$\begin{cases} {}_A > 0 \\ 4(b \quad a) > \frac{C_B}{\epsilon_A} + \ {}_A \quad 2 \ {}_B \end{cases}$$

and

$$\begin{cases} {}_A < 0 \\ 4(b \quad a) < \frac{C_B}{\epsilon_A} + \ {}_A \quad 2 \ {}_B \end{cases}$$

2.8.4 Examples of debiasing policies

Below is a example of MIF test required by European Directive and used by a French banks.

Questionnaire Profil Investisseur
Connaissance et classification du client particulier

☐ **Evaluation** *(Demande d'ouverture d'un compte d'instruments financiers)*

☐ **Mise à jour** *(Suivi de la relation client et de la qualité du service fourni)*

La Directive concernant les Marchés d'Instruments Financiers (MIF), adoptée par l'Union Européenne, en vigueur au 1er novembre 2007, vise à une amélioration des services financiers, une plus grande concurrence et transparence des différents acteurs européens, ainsi qu'à la protection accrue des personnes physiques et morales dans le cadre de leurs opérations d'investissement. Cette Directive est appliquée par tous les établissements bancaires et financiers.

Conformément aux dispositions du Code monétaire et financier, ce questionnaire a pour objet de recueillir des informations relatives à votre connaissance et à votre expérience en matière de marchés et d'instruments financiers, ainsi que des informations relatives à vos objectifs de placement et à votre situation financière.

Ainsi, nous serons tenus de vous avertir dans le cas où certains titres et produits dérivés dits « instruments financiers complexes » sembleraient ne pas convenir à votre connaissance et expérience en matière d'investissement. De même, nous serons aussi en mesure de vous indiquer si nos prestations ne convenaient pas à votre situation.

Vos réponses nous permettront également de mieux satisfaire vos attentes en matière de placements en instruments financiers.

Ces informations sont couvertes par la règle du secret professionnel dans les conditions prévues par l'Article L511-33 du Code monétaire et financier, ces informations étant uniquement destinées à la Banque.

Conformément à la loi n°78-17 du 06 janvier 1978 modifiée, relative à l'informatique, aux fichiers et aux libertés, le Client accepte expressément que ces informations fassent l'objet d'un traitement et qu'elles soient communiquées à des tiers concourant au traitement interne de votre demande. Le Client peut à tout moment avoir accès à ces informations et les rectifier conformément à la Convention de services et de compte d'instruments financiers.

Titulaire du compte
Nom - Prénom : ……
N° de compte : ……
Profession : ……

Objectifs de placement en instruments financiers

Quels sont les objectifs de vos investissements ?

Attentes
- □ Constitution d'un capital
- □ Diversification de votre patrimoine
- □ Complément de revenu

Expérience en matière de marchés et d'instruments financiers

Détenez-vous un Compte Titres Ordinaire dans un autre établissement ? □ Oui □ Non

Détenez-vous un PEA dans un autre établissement ? □ Oui □ Non

Si oui, quelle est la durée de détention ? □ ‹ 2 ans □ 2 à 5 ans □ › 5 ans

Le cas échéant, sur quels types d'instruments financiers avez-vous réalisé des opérations ?

□ Investissements directs (actions, obligations…)

Lesquels ? □ Titres de créances négociables (TCN) □ Obligations □ EMTN
□ Actions □ Bons de souscriptions / Warrants
□ Contrats financiers (IFT) □ Autres

□ Produits en gestion collective (FCP, SICAV…)

Lesquels ? □ OPCVM monétaire □ OPCVM obligataire □ OPCVM actions
□ FIP/FCPI/FCPR □ SCPI □ Trackers
□ Autres

Combien d'ordres passez-vous par mois ?

□ ‹ 3 □ entre 3 et 10 □ › 10

Quel est le montant moyen par ordres ?

□ ‹ 1 000€ □ entre 1 000 et 10 000€ □ › 10 000€

Objectifs et connaissances en matière de marchés et d'instruments financiers

Parmi ces quatre catégories d'instruments financiers :

- *Quels sont vos objectifs de placement ? Indiquer dans quelle(s) catégorie(s) d'instruments financiers vous envisagez d'investir.*
- *Connaissez-vous ces catégories d'instruments financiers et les risques qui y sont associés ?*

	Catégorie 1	**Catégorie 2**	**Catégorie 3**	**Catégorie 4**
	PRODUITS MONETAIRES	PRODUITS OBLIGATAIRES	ACTIONS ET DIVERSIFIES	CAPITAL RISQUE, SRD ET DERIVES ACTIONS
Horizon d'investissement	Court terme	Moyen/long terme	Long terme	Long terme
Durée conseillée	Inférieure à 1 an	1 à 6 ans	Supérieure à 5 ans	Supérieure à 5 ans
Rendement recherché	Un rendement proche du marché monétaire	Un rendement moyennement élevé	Un rendement élevé	Le plus de rentabilité possible
Risque accepté	Quasi nul	Faible à moyennement important	Moyennement important à important	Important à très important
Objectifs de placement	□ Oui □ Non	□ Oui □ Non	□ Oui □ Non	□ Oui □ Non
Connaissance sur ces produits	□ Oui □ Non	□ Oui □ Non	□ Oui □ Non	□ Oui □ Non

De quelle façon envisagez-vous de gérer vos investissements ?

□ Sécuritaire	Priorité à la protection du capital
□ Prudent	Recherche de performance, prise de risque limitée
□ Equilibré	Recherche de performance, répartition équilibré entre risque et sécurité
□ Dynamique	Acceptation d'un risque élevé en contrepartie d'une performance potentielle importante

Revenus et Patrimoine

Revenus annuels		Eur	Autres biens et valeurs		Eur
Résidence principale		Eur	Autres immobilier		Eur
Avoirs	Notre établissement		Autre établissement		
Epargne bancaire		Eur			Eur
Epargne financière		Eur			Eur
Assurance vie		Eur			Eur
Dettes	Notre établissement		Autre établissement		
Encours de crédit		Eur			Eur
Autres engagements		Eur			Eur
Périmètre d'investissement					
Quel est votre périmètre d'investissement envisagé ?					Eur

Classification du client

Client non professionnel en investissements financiers

Cette classification vous assure le niveau de protection et d'information le plus élevé, particulièrement pour les cas où il vous serait proposé un conseil en investissement ou un produit complexe.

Vous conservez la possibilité de demander à tout moment à être affecté au groupe des « clients professionnels en investissements financiers » [1]

Fait à ……, le ……..

Signature du client

Signature du chargé de clientèle ayant recueilli les informations

[1] A la condition de satisfaire au moins à deux des trois critères suivants :

- Avoir occupé au moins un an, dans un secteur financier, une position professionnelle exigeant une connaissance de l'investissement en instruments financiers.
- Détenir un portefeuille d'instruments financiers d'une valeur supérieure à 500 000 EUR.
- Avoir réalisé en moyenne pendant les 4derniers trimestres au moins 10 opérations par trimestre d'un montant unitaire supérieur à 600 EUR.

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Part II

An example of modeling based on consumer bias

3 The price of freedom: choosing between long- and short-term contracts in the presence of a projection bias[1]

3.1 Introduction

Rational choice involves two guesses, asserts March (1978) [112]: *"a guess about uncertain future consequences and a guess about future preferences."* The present article focuses on guesses about future preferences. We more specifically tackle the case of consumers who exhibit a projection bias, which refers to the fact that agents *"tend to exaggerate the degree to which their future taste will resemble their current tastes,"* as defined by Loewenstein & Rabin (2003) [108]. Such anticipation errors are widespread and can lead agents to make suboptimal decisions. The issue of presentism, defined as *"a tendency to overestimate the extent to which the future experience of an event will resemble the current experience of the same event"* (Gilbert, 2002 [64]), is particularly pregnant when agents engage in a long-term contract, such as subscriptions. Indeed, when subscribing to a service for several months or years, consumers necessarily need to anticipate their future preferences, which leaves a door wide open for projection biases. In this context, any anticipation error at

[1]This chapter is a revised version of a paper written with Maïva Ropaul, who was at the time also writing her PhD at the CRED.

the decision stage is likely to modify consumer choice and ultimately consumer welfare in the long run. We therefore focus on the effect of projection bias in long-term contracts.

Our model applies to any long-term contract, ranging from cell phone contract to a gym subscription, which are particularly propitious fields for consumer biases, as emphasized respectively by Bar-Gill & Stone (2009) [13] and DellaVigna & Malmendier (2006) [40]. For any contract involving a commitment, duration is a key feature agents need to decide upon, thus making the time issue extremely salient. Intuitively, one expects the projection bias to lead consumers towards a contract whose characteristics do not meet their future preferences. For instance, on the cell phone market, one may engage in a long-term contract (typically two years) when it would have been wiser to settle for a shorter contract.

Moreover, choosing contract duration becomes notably important when getting out of a contract is difficult, if not impossible. Indeed, once the consumer is committed, canceling the contract or changing service providers can be complicated and often discouraging. On many markets, consumers undergo switching costs, which embrace any phenomenon that deters consumers from changing providers. The particularity of switching costs, as explained by Belleflamme & Peitz (2010) [19] *"is that consumers who have bought from a particular supplier in the past put a premium on continuing to purchase from the same supplier"* (page 167). Several types of switching costs are commonly studied by the IO literature, such as transaction costs (the time and the effort required to change suppliers), compatibility costs (for example between operating systems and applications), learning costs (the fact that consumers acquire knowledge about a specific product) etc.

The issue of switching costs is particularly acute on some markets. As Bar-Gill & Ben-Shahar (2014) [10] thoroughly explain about the cell phone market, many lock-in strategies are implemented by firms to deter consumers from changing operators. Among other examples, early termination fees (hereafter ETF) are a widespread and controversial practice, which we investigate in the paper. Insofar as ETF make changing suppliers more expansive, they constitute a switching cost. The particularity of ETF is that the cost is artificially added to the price by the firm. ETF can be beneficial to consumers to the extent that they guarantee a minimum commercial revenue for the operator, who can therefore

sell another service below its marginal cost. This is a common practice on the cell phone market where smart-phones are often subsidized by the price of the subscription. However ETF also have a negative effect, since they hinder competition and prevent consumers from modifying their choices in case of preference variations. While the effect of switching costs on price competition has been extensively studied by the IO literature,[2] this chapter brings a novel contribution by focusing on the consequences of early termination fees, when consumers exhibit a projection bias. We show that in some instances regulating the amount of ETF helps mitigate the negative consequences of consumer naivete.

A other type of legal intervention aims at enhancing competition by regulating contract duration : forcing firms to offer short-term contracts makes it easier for consumers to change providers and reduces the lock-in effects of switching costs. This type of regulation is used in Europe on the cell phone market: a directive of 2009 concerning the cell phone market contains several provisions about contract duration.[3] Article 30 of the directive states that: *"member States shall ensure that contracts concluded between consumers and undertakings providing electronic communications services do not mandate an initial commitment period that exceeds 24 months. Member States shall also ensure that undertakings o er users the possibility to subscribe to a contract with a maximum duration of 12 months."* The directive also regulates practices such as ETF, as it states that *"Member States shall ensure that conditions and procedures for contract termination do not act as a disincentive against changing service provider."* This European directive aims at enhancing competition and constraining lock-in strategies implemented by firms.[4]

The aim of this paper is to investigate the consequences of cognitive biases when consumers make long-term decisions. We determine under which conditions consumer naivete is detrimental to consumer welfare or to the social outcome. Naive consumers exhibit

[2]For an interesting review, see the report issued by the O ce of Fair Trading in 2003 entitled "Switching Costs. Part One: Economic Models and Policy Implications" [118].

[3]Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009 amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services.

[4]The European directive has been transposed in French law at articles L.121-83 through L.121-85-1 of the French Consumer Code.

a projection bias: at the time of purchase, they form inaccurate anticipations of future satisfaction derived from consumption. One would expect naivete to be detrimental to consumers and to generate a drop in consumer welfare. Indeed, it is a commonplace to justify protective measures of consumer law with the intuition that biases make consumers vulnerable to unbalanced contracts designed by firms. In this paper, we challenge this basic idea: we show that naivete is not always detrimental to consumers and that the overall effect on the market depends on several parameters.

In that perspective, we focus on a monopolistic market where the firm offers a long-term and/or a short-term contract. Focusing on a monopoly allows us to isolate the consequences of the firm's market power, regardless of strategic interactions. The demand side of the market is composed of homogeneous consumers who are either all naive or all sophisticated. The latter perfectly anticipate their future willingness to pay (WTP) and serve as a benchmark. Naive agents, on the other hand, exhibit a projection bias. Purchase decisions occur before the actual consumption period, which is delayed in time. There are two consumption periods, so consumers can either commit to a long-term contract for the two consumption periods right from the outset, or they can sign two consecutive short-term contracts. We compare the market outcome when the monopoly is facing only sophisticated agents, or only naive consumers in order to assess the effect of projection bias on consumer welfare and more generally on social welfare. The comparison is carried out in two alternative contexts. First, we consider an unregulated market, where no legal obligation weighs on the firm (section 3.4). Under these circumstances, the firm's objective is to offer one single contract to the homogenous population of consumers, in order to maximize its profit. Secondly, we consider a regulated market, where the firm must offer a short-term contract which provides equivalent services as the long-term contract (section 3.5). Our interpretation of the European directive mentioned above is that firms are obliged to offer exactly the same services in a short-term-contract as the ones provided in the long-term contract. Comparing the market outcome in those two different frameworks allows us to assess whether regulation helps mitigate the negative effects of consumer naivete. This approach has major implications for public policy, namely regarding the relevance of

contract duration regulation.

Counterintuitively, we show that naive consumers are not always worse off than sophisticated ones. The gist of our argument is as follows: when agents have an increasing WTP for a given service, naivete leads them to underestimate their future WTP. Hence, naive agents are protected from a price increase. Sophisticated consumers on the other hand accurately anticipate their future WTP. Insofar as the firm has perfect information, it will capture the surplus of sophisticated consumers. Conversely, in the presence of decreasing WTP, naivete leads agents to overestimate future preferences and consequently results in a drop in consumer welfare, compared to the situation of sophisticated agents.

Finally, the paper contributes to the theoretical literature on projection bias. Previous literature has mainly focused on behavior under temptation: for instance decision-making under the effect of hunger (Read & Van Leeuwen, 1998 [126]) or sexual arousal (Ariely & Loewenstein, 2006 [4]). Yet, projection bias can also occur when agents are not subject to temptation and lack of self control. We believe that a distinction deserves to be drawn between choice under temptation, which implies no attempt at anticipating future utility, on one hand; and projection bias *strico sensu*, which refers to a failure to accurately anticipate future tastes, on the other hand. We want to study the consequences of projection biases beyond the effect of *"hot/cold empathy gaps"* (Loewenstein & Schkade, 1999, [109]). We focus on a market where consumers are not subject to *"visceral urges"* as emphasized by Loewenstein (1996) [103], which enables us to isolate the effect of projection bias. We also assume in the model that prices are perfectly known by the consumers from the outset of the game. This assumption allows us to isolate the consequences of projection bias from other misperceptions linked to prices (price underestimation, myopia etc.).

The rest of the paper is organized as follows. Section 2 presents related literature while section 3 describes the model. Section 4 focuses on a market without any regulation regarding contract duration, and section 5 studies a regulated market. We discuss legal policy implications in section 6 and finally provide some concluding remarks in section 7.

3.2 Literature review

Acknowledging that agents do not comply with the perfect rationality assumption, economic literature strove in the past decades to describe more accurately the decision-making process. As highlighted by DellaVigna (2009) [41], research in Psychology and Economics suggests that individuals deviate from the standard model in three aspects: nonstandard preferences, nonstandard decision-making and nonstandard beliefs. We focus on nonstandard beliefs, and more specifically on the mispredictions of one's own preferences.

Loewenstein & Rabin (2003) [108] and Loewenstein & Schkade (1999) [109] offer a general review of how agents mispredict their own preferences. The emphasis is on the medical domain (Ubel & Loewenstein, 1997 [161]) or other major changes in life circumstances (Schkade & Kahneman, 1998 [136] and Loewenstein & Frederick, 1997 [105]). These previous papers are closely related to ours insofar as they focus on situations in which agents form biased predictions about their future preferences. In contrast to the aforementioned research, we focus on the feelings towards objects, which entails a fundamentally different cognitive process than reaction towards medical surgery or changes in life circumstances.

Preferences towards objects are also likely to be inaccurate: Loewenstein & Adler (1995) [104] show that people are unable to predict the change in their preferences due to the endowment effect, even when they are aware of such an effect. Similarly, DellaVigna & Malmendier (2004) [42] study agents with time inconsistent preferences. They argue that if agents are naive about their future preferences (they ignore their own time inconsistency), they will spend too much money on leisure goods and too little on investment goods. Consistent with the idea that agents mispredict their own tastes, Simonson (1990) [140] shows that subjects suffer from a *"diversification bias"*: in the food domain, people think they crave variety more than they actually do. The presence of a diversification bias has later been confirmed by Loewenstein & Read (1995) [125]. Also regarding food, Kahneman & Snell (1992) [90] emphasize that agents do not predict accurately how they will feel about eating repeatedly the same snack. Their main finding is the near zero correlation between subjects' anticipated and actual reaction. Simply put, people's ability to forecast experienced utility is very low.

Projection bias is one of the numerous phenomena leading agents to form false beliefs about their own future preferences. The empirical literature on the subject is quite sparse. Conlin, O'Donoghue & Vogelsang (2007) [33] test the effect of weather on catalog orders. They investigate whether colder days lead agents to overestimate the use that they will make of a cold-weather item, and hence generates an increase in return rates. Consistent with a projection bias, they find that a reduction in the order-date temperature increases the average return rate of a cold-weather item. In the same thread, Buss et al. (2015) [29] empirically study car purchases. They show that the choice of a car is highly dependent on the weather at the time of purchase in a way that is inconsistent with classical utility theory. The authors also argue that projection bias and salience are consistent with the observed behavior.

A to the theoretical literature dedicated to studying projection bias, it has focused mainly on decision-making under temptation. The main conclusion is that agents act as if their craving at the decision stage (usually for food or sex) will reflect their future preferences.[5] Read & Van Leeuwen (1998) [126] show that, if given the choice between a healthy and an unhealthy snack, agents are more likely to opt for the latter when they are hungry. The folk wisdom according to which shopping on a hungry stomach leads to overconsumption and to choosing less healthy food has been largely documented (e.g. Sunstein & Thaler, 2008 [158]).

Reflecting a general trend in the literature, Loewenstein & Rabin (2003) [108] analyze decision making under temptation as an expression of projection bias insofar as hungry people act as if their future taste for food will reflect their current hunger. However, we believe that decision under temptation is different from projection bias: as Elster (1996) [52] professes, beliefs can be distorted *"by cold mistakes in information processing or by hot mistakes caused by motivational biases"* (page 1391). We argue that projection bias describes the former situation only: projection bias implies a conscious projection of one's current preferences into the future and should therefore exclude any situation when agents are under the influence of *"visceral factors"* which lead them to be *"out of*

[5] Ariely & Loewenstein (2006) [4] and Loewenstein & Nagin (2007) [106].

control" (Loewenstein, 1996 [103]). By focusing on the projection bias on various markets where agents are not subject to overwhelming cravings (such as for instance the cell phone market) the present paper draws a clear and crucial border between visceral urges, on one side, and false anticipations of future preferences, on the other side.

Our model is based on the seminal work by Loewenstein & Rabin (2003) [108], which has been reinterpreted by Spiegler (2011) [147]. We build on their general model of projection bias and extend it to three periods. The model, which is presented in the following section, can be applied to any contract that implies a commitment.

3.3 The model

In the following paragraphs, we describe the general characteristics of the model, which will remain unchanged throughout the paper: we first explain how projection bias is modeled; we next mention the impediments which stand in the way of consumer learning; we finally turn to the assumptions on the monopoly's behavior.

3.3.1 Modeling Projection bias

We define a three-period game and assume that consumers' willingness to pay for the good or service changes over time. The set of possible actions remains the same throughout the three periods. Let X denote the complete set of actions consumers choose from. $x \quad X$ represents the quantity. At each stage, agents pick $x \quad X$, so as to maximize their utility. The key feature of the model lies in the fact that WTP varies in time.

- At period t_0, WTP is given by the function $u : X \quad \mathbb{R}$.
- Period t_1 corresponds to the first consumption period. At t_1, WTP is given by $v : X \quad \mathbb{R}$.
- Period t_2 corresponds to the second consumption period. Since we focus on a three period game, no anticipations are formed at this stage. At period t_2, WTP is given by $z : X \quad \mathbb{R}$.

Let us assume that WTP functions are linear, which entails that the agents' WTP per unit is constant. Formally, this assumption implies that:

$$\begin{cases} u(x) = u.x \text{ and } u'(x) = u \\ v(x) = v.x \text{ and } v'(x) = v \\ z(x) = z.x \text{ and } z'(x) = z \end{cases} \tag{3.1}$$

When deciding whether to subscribe to a long- or a short-term contract, consumers need to anticipate two parameters. First, they anticipate future prices. We assume that prices are perfectly known by all agents. At period t_0, all consumers have a perfect knowledge of prices for the following periods of the game. This assumption allows us to focus on the consequences of projection bias, as opposed to other misperception linked to prices.

Second, agents also need to anticipate their future willingness to pay for the product. The key feature of the model lies in the fact that WTP is not always accurately evaluated. There are two types of consumers on the market: sophisticated consumers anticipate accurately their future WTP while naive agents make inaccurate anticipations. Both types have the same WTP, as described above.

We more specifically focus on consumers who exhibit a projection bias, that is to say who exaggerate the degree to which their future tastes will resemble their current ones. The model is strongly inspired from Loewenstein & Rabin (2003) [108]. While the latter focus on a two period model, we extend the analysis to three periods.

Let $w_t^{t'}$ represent the anticipation at period t of the WTP at period t'. Consumers anticipate their future WTP according to the function $w_0^1 = \quad u + (1 \qquad)v$ with $\qquad [0,1]$. The parameter $\quad$ captures the degree of naivete: when $\quad = 1$, the agent is completely naive, in the sense that he believes his future WTP will be identical to his current one. When $\quad = 0$, the agent is perfectly sophisticated, since he accurately predicts his future tastes. The following table summarizes consumer anticipations.

Table 3.1: Projection bias in a three period model

Period	WTP	Anticipations for $t+1$	Anticipations for $t+2$
t_0	u	$w_0^1 = \quad u + (1 \qquad)v$	$w_0^2 = \quad w_0^1 + (1 \qquad)z$
t_1	v	$w_1^2 = \quad v + (1 \qquad)z$	
t_2	z		

In what follows, we focus on the two polar cases, when the consumer is either fully naive ($\quad = 1$) or completely sophisticated ($\quad = 0$).[6] In this context, consumers choose between a long-term and a short-term contract. The price of the long-term contract remains constant during the two periods, whereas the price of the short-term contract is subject to change. If consumers commit to a long-term contract and decide to terminate it before its term, early termination fees are charged by the firm. We denote $\quad$ the amount of early termination fees (ETF).

[6] Studying the intermediate situations with partially naive agents is an interesting path for future research.

The change in WTP can be due to several phenomena. One can first think of a change in the state of the world which would impact the agent's use of a given product. In the case of cell-phone subscription for instance, in line with standard assumptions in network economy, one's WTP naturally increases as the use of cell-phone becomes more common in the population. Such changes in the state of the world are particularly likely to occur on the cell phone market, which exhibits fast and constant evolution. Decreasing WTP can also be due to a downgrading effect. As more sophisticated and performing goods or services are available, consumers are willing to pay less for preceding products. To some extent, willingness to pay for a product can be thought of as an endogenous process: as agents learn to use and appreciate a new good, their WTP for it might increase. Conversely, if a consumer is disappointed by a product, his willingness to pay will decrease. In this case, projection bias is due to one's incapacity to predict his future use of a product. Our model encapsulates this specific case, but also applies to standard anticipation errors. Such errors are due, as explained above, to the agent's incapacity to predict their future desires.

3.3.2 What about consumer learning ?

The evidence on consumer bias is very abundant and the question of consumer learning is a key issue. Once we admit that consumers are likely to exhibit various types of biases, we are inescapably led to wonder about consumer learning: if consumers are able to learn by themselves from their mistakes and improve their decision making process, consumer bias becomes a minor issue.

The difficulty precisely consists in determining to what extent consumers are capable of learning. On this subject, Kahneman (2011) [92] provides a fairly pessimistic view. He argues that numerous cognitive flaws durably hinder consumer learning. In the broad line, Kahneman (2011) [92] claims that intuition, habits and heuristics take over rationality when agents are facing a decision. Even if the decision maker has all the correct and relevant information, *"facts that we know do not always come to mind when we need them"* (page 46). Moreover, some cognitive errors are hardwired. Kahneman & Tversky (1974) [91] consider that *"although the statistically sophisticated avoid elementary errors, such*

as the gambler's fallacy, their intuitive judgements are liable to similar fallacies in more intricate and less transparent problems" (page 1130).

In the specific case of cell phone contracts, there is an additional impediment in the way of consumer learning. The choice situation we consider deals with future consumptions. Recall that at period t, agents decide upon their consumption for period $t+1$. Hence, learning must necessarily rely on the recollection of past feelings and preferences. Such memory task is subject to the same misperception as anticipating future utility, as explained by Frey & Stutzer (2013) [58]. The latter argues that when learning implies memorizing past feelings, it is particularly hampered, since *"remembered utility and predicted utility become similar and relatively independent of the utility actually experienced"*(page 11).

Given the numerous obstacles which stand in the way of consumer learning, the issue of consumer bias does deserve to be tackled.

3.3.3 Assumptions on the monopoly's behaviour

3.3.3.1 Assumptions and notations

We focus on a covered market: all consumers are engaged in a contract at both periods. This assumption is quite sensible, namely if we apply the model to the cell-phone market.[7] Throughout this chapter, we consider that the monopoly is facing one type of agent only: the demand side of the market is composed either of sophisticated or of naive agents. In no instance can both consumer types be simultaneously present on the market. Moreover, we assume that the firm knows which type of consumers it has to deal with. Let us assume further that production costs, which we denote $c(x)$, are increasing and convex. Hence, $c'(x) > 0$ and $c''(x) > 0$.

We denote $P_{i_k}^J$ the price at period t_i with $i \in \{1, 2\}$ for the contract J (J can be either S for short-term contract or L for long-term contract). Let k represent the consumer type. If consumers are naive, $k = n$; and if consumers are sophisticated, $k = s$.[8] For instance,

[7] For example in France, the penetration rate of sim cards reached 120,5 % in september 2014 according the French Regulation Authority of Communication, called ARCEP [2].

[8] The subscripts s and n are only used when necessary to distinguish between contracts aimed at naive consumers from the ones designed for sophisticated agents.

$P_{1_n}^S$ is the price of the short-term contract aimed at naive agents at period t_1.

Let us denote the early termination fees consumers pay if they decide to end a long-term contract early. Finally, we call a contract set a succession of two contracts chosen by a consumer.

In this framework, we study the maximal profit the firm can expect de derive from each contract sets, under the assumption that the firm can steer all consumers towards a specific contract. In order to guarantee that consumers do choose the contract set under study, we set the price of other contracts at + . In what follows, we use a perfect information framework: firms know which type of consumers they are facing; and consumers know future prices.

3.3.3.2 The timing of the game

We study a three period game. One of the key features of the model is that there is a one period gap between the consumption decision and the actual consumption: based on their anticipations, consumers decide at period t_i upon their consumption for period t_{i+1}.

- At the first period t_0 the consumer type is given. Nature also determines at the outset WTP variations in time. Agents do not actually consume at this period but they they commit to a contract for the following periods of the game. While the firm knows the consumer type and WTP variations, consumers can either be naive or sophisticated: the former make accurate anticipations, and the latter exhibit a projection bias as defined above in section 3.3.1.
- At the second period t_1, agents consume according to the decision made at period t_0. In the specific case of cell-phone subscription, this period lasts twelve months. Consumers who subscribed to a long-term contract at t_0 remain engaged but can terminate their contract early at the end of period t_1 in exchange of a termination fee. Consumers who subscribed to a short-term contract are free of signing in for a second period or not. In this case, the price of the second short-term contract might differ from the price of the first contract.

  The monopoly determines the optimal contract according to the consumer type and

to WTP variations. The model rests on the key assumption that the firm can guide consumers towards the contract which maximizes its profits by setting the price of the other contract at + . For each consumer type (naive or sophisticated) and for each contract (long or short) the monopoly determines the quantity x^* and the price $P(x^*)$ which maximizes its profit. The price $P(x^*)$ corresponds to the total price charged for the quantity x^* and not to a per unit price.

At the end of period t_1 consumers also make their decision concerning the third period consumption.

- At the last period t_2 consumers simply consume according to the decisions that has been made at the previous period.

In what follows, we study the market outcome when there is no regulation on contract duration, and next in the presence of such regulation. In the absence of contract duration regulation, the monopoly is not bound to offer a short-term contract. Hence, there are two possible contract sets, (L, L) and (S, S). The monopoly offers the contract set which maximizes its profit. On some markets, providers are obliged to offer short-term contracts. In this instance, at each period consumers can choose from long- or short-term contracts. Hence, the available contract sets at both periods are $(L, L), (L, S)$ and (S, S). We study successively both cases in the following paragraphs.

This model allows us to compare prices and quantities aimed respectively at naive and at sophisticated consumers, in the absence of market regulation and when the market is regulated. We proceed as follows: we first determine the participation and incentive constraints which need to be fulfilled for the consumer to choose either the short- or the long-term contract; we next solve the firm's maximization program for each contract and for each consumer type. This allows us to assess which contract set the firm wants each consumer type to buy. We come to compelling conclusions concerning the effect of naivete on prices and quantities offered by the monopoly as well as concerning the effect of contract duration regulation.

3.4 The effect of projection bias in the absence of regulation concerning contract duration

In this section, we compare the situation of naive and sophisticated consumers when the market is not regulated. We proceed as follows: we first define the consumers' participation and incentive constraints for each contract set. We next solve the monopoly's maximization problem under the above-mentioned constraints, for sophisticated and naive consumers. We last compare prices and quantities offered to each consumer type and analyze the results.

3.4.1 The participation and incentive constraints

Regardless of the contract set chosen by consumers, there is one participation constraints which always has to be verified.

$$w_0^1(x_1) \quad P_1 \quad 0 \quad (PC_1)$$

The constraint (PC_1) guarantees that consumers anticipate a positive net utility from consumption at the first period.

This participation constraint defines the set of all possible contracts the firm can offer to consumers. Within the set , the firm can offer either a long-term contract or two consecutive short-term contracts.

- If the monopoly offers a long-term contract, two additional participation constraints have to be fulfilled, as well as a constraint concerning prices.

$$\begin{aligned} w_0^2(x_2) \quad P_2^L \quad 0 \qquad\quad & (PC_{2_L}) \\ w_1^2(x_2) \quad P_2^L(1 \quad) \quad & (PC_{3_L}) \\ P_1^L = P_2^L & \end{aligned}$$

The constraint (PC_{2_L}) implies that, given the price P_2^L consumers anticipate from the outset that he will want to consume at period 2. Hence, he decides to engage

in a long-term contract. As for the constraint (PC_{3_L}), it ensures that the consumer will not terminate the contract in t_1. Let us define $_1$ all the quadruples (x_1, P_1, x_2, P_2) which verify the three constraints (PC_1), (PC_{2_L}) and (PC_{3_L}). The constraint $P_1^L = P_2^L$, which guarantees that prices remain the same during the two periods, simply means that the two parties committed to execute the contract under the same terms during both periods.

- If the monopoly offers two short-term contracts, a different participation constraint has to be fulfilled.

$$w_1^2(x_2) \quad P_2^S \quad 0 \quad (PC_{2_S})$$

This constraint implies that the consumer will decide, at period 1, to sign a second short-term contract. Let us define $_2$ all the quadruples (x_1, P_1, x_2, P_2) which verify the two constraints (PC_1) and (PC_{2_S}).

3.4.2 Results

In the next paragraph, we determine prices the monopoly charges for each contract depending on the consumer type. We solve the firm's maximization programs for the two contracts and for the two consumer types, under the constraints mentioned above.

- For the contract set (L, L), the firm's program is as follows:

$$\max \quad = P_1^L + P_2^L \quad c(x_1) \quad c(x_2)$$

subject to

$$P_1^L = P_2^L$$

$$w_0^1(x_1) \quad P_1^L \quad 0 \qquad (PC_1)$$

$$w_0^2(x_2) \quad P_2^L \quad 0 \qquad (PC_{2_L})$$

$$w_1^2(x_2) \quad P_2^L(1 \quad) \qquad (PC_{3_L})$$

For the long-term contract, $x_1 = x_2$, since the contract remains unchanged during the two periods. Whenever $x_1 = x_2$ we simply denote the quantity x for the sake of

simplicity.

At equilibrium, the price and quantity are the solution of the following program: max $= 2\min[w_0^1(x), w_0^2(x), \frac{w_1^2(x)}{1-\theta}]$ $2c(x)$.

For the sophisticated consumer, the result is max $= 2\min[v(x), z(x)]$ $2c(x)$. Sophisticated consumers enjoy an average positive surplus over both consumption periods.

For the naive consumer, the result is max $= 2[u(x)$ $c(x)]$.[9] Naive consumers pay a total price $u(x^*)$ which differs from their WTP at periods t_1 and t_2. Depending on whether WTP is increasing or decreasing, consumers will have a positive or negative surplus.

- For the contract set (S, S), the firm's program is as follows:

$$\max \quad = P_1^S + P_2^S \quad c(x_1) \quad c(x_2)$$

subject to

$$w_0^1(x_1) \quad P_1^S \quad 0 \qquad (PC_1)$$

$$w_1^2(x_2) \quad P_2^S \quad 0 \qquad (PC_{2_S})$$

At equilibrium, the price and quantity are the solution of the following program: max $= w_0^1(x_1) + w_1^2(x_2)$ $c(x_1)$ $c(x_2)$. When the market is not regulated, it is possible that $x_1 = x_2$ for the short term contract.[10] For the sophisticated consumer, the result is max $= v(x_1) + z(x_2)$ $c(x_1)$ $c(x_2)$. Therefore, prices aimed at sophisticated consumers correspond exactly to their willingness to pay at both periods. The entire consumer surplus is captured by the monopoly.

For the naive consumer, the result is max $= u(x_1) + v(x_2)$ $c(x_1)$ $c(x_2)$. Naive consumers pay a total price $u(x_1^*)$ at period t_1 and $v(x_2^*)$ at period t_2. Prices therefore differ from WTP at periods t_1 and t_2. Depending on whether WTP is increasing or

[9] The firm's program when facing a naive consumer boils down to $\max \Pi = 2[\min(u(x), \frac{v(x)}{1-})$ $c(x)]$. The firm chooses simultaneously and the price P^L. The highest price the firm can charge is equal to $\min\left[u(x), \frac{v(x)}{1-}\right]$. Whether WTP are increasing or decreasing, the solution is always $u(x)$.

[10] When the market is regulated, the model does not allow for $x_1 = x_2$ as explained in section 3.5. In that case, we do not need to distinguish between x_1 and x_2 (see page 217).

decreasing, consumer will have a positive or negative surplus.

Hence, the firm's optimal strategy on the unregulated market is as follows:

- If the firm face sophisticated agents: the profit is always maximized with (S, S)
- If the firm face naive agents:
  - if WTP is increasing in time, the profit is maximized with (S, S).
  - if WTP is decreasing in time, the profit is maximized with (L, L).

3.4.3 Analysis

In this paragraph, we compare optimal prices and quantities aimed at naive and sophisticated consumers when WTP is increasing or decreasing. We assess the effect of naivete not only on consumer surplus but also on social welfare.

3.4.3.1 Decreasing WTP

Let us first mention briefly the case of decreasing preferences. Sophisticated consumers buy the contract set (S, S) and are charged a total price $v(x_1^*)$ and $z(x_2^*)$ respectively at periods t_1 and t_2. Their surplus is equal to zero. Naive consumers on the other hand buy the contract set (L, L) and are charged a per unit price u at both periods. The total price is equal to $u(x^*)$ at t_1 and t_2. However their WTP per unit is equal to v and z at periods t_1 and t_2. Since WTP is decreasing in time, they undergo a net disutility. This situation is represented in graph 3.1 below.

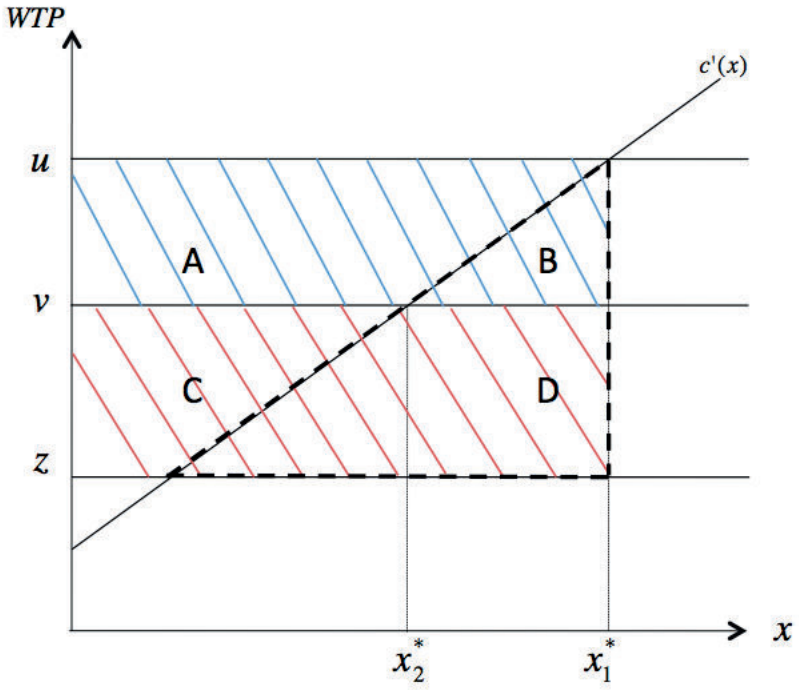

Figure 3.1: Disutility of naive consumers in the absence of regulation, with decreasing WTP for the contract set (L, L)

Recall that naive consumers buy the contract set (L, L) and pay $u(x^*)$ at both periods. At period t_1, naive consumers undergo a net disutility which is represented in the graph 3.1 by the area hatched in blue. This area can be divided in two zones: the trapezium A corresponds to the disutility due to the fact that consumers pay more than their WTP; the triangle B represents the excess consumption. At period t_2 the same phenomenon takes place. In addition to the disutility $A+B$, consumers undergo an extra disutility, since their WTP decreases. This additional disutility is represented by the area hatched in red. The same two components can be distinguished: trapezium C represents the disutility incurred because the price is above the agents' WTP, while trapezium D captures overconsumption compared to the rational agent's situation. At period t_2, the total disutility is equal to $A + B + C + D$.

Hence in the presence of decreasing WTP, naivete generates a loss in consumer surplus. This result is not surprising: consumer bias leads to overestimation of future WTP, which

allows the monopoly to charge prices above the agent's WTP at both consumption periods. In the case of decreasing WTP, naivete paves the way to consumer exploitation. The situation is reversed when WTP is increasing in time.

3.4.3.2 Inc easing WTP

In the presence of increasing WTP, we come to compelling and counterintuitive observations. The monopoly offers the contract set (S, S) to both naive and sophisticated agents, but prices aimed at each type are different.

- sophisticated consumers pay $v(x_1^*)$ and $z(x_2^*)$ respectively at periods t_1 and t_2. The firm captures the entire surplus of sophisticated agents;
- naive consumers pay $u(x_1^*)$ at period t_1 and pay $v(x_2^*)$ at period t_2. For naive agents, prices are lower than WTP at periods t_1 and t_2. When WTP is increasing, naive agents therefore enjoy a positive surplus.

Proposition 1: *In the absence of market regulation and with increasing WTP, naive consumers are better o than sophisticated agents. When WTP is increasing in time, both agents buy the contract set (S, S), the naive ones end up with a positive surplus while the surplus of sophisticated agents is entirely captured by the firm.*

The situation of naive consumers is represented in graph 3.2 below.

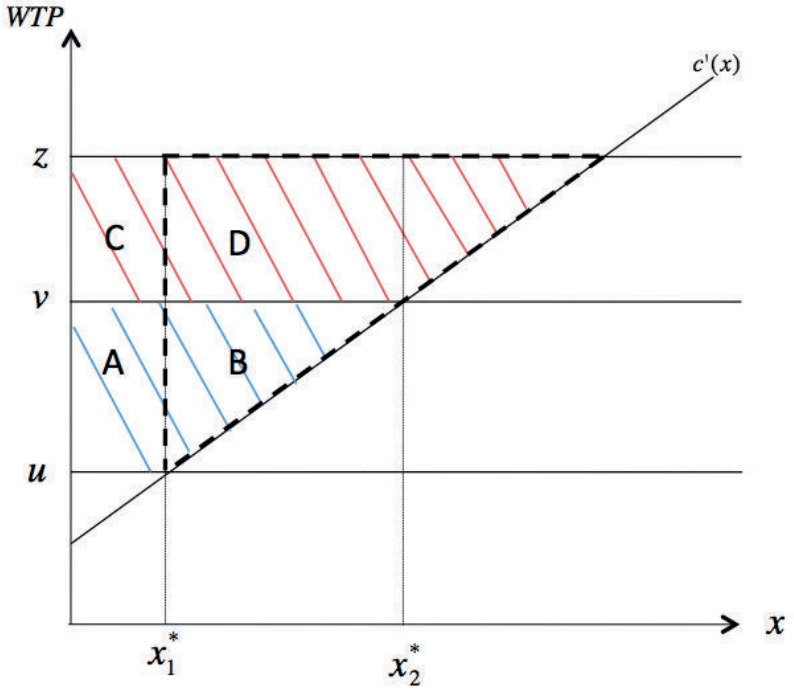

Figure 3.2: Surplus of naive consumers in the absence of regulation, with increasing WTP for the contract set (S, S)

For naive agents at period t_1 quantities are equal to x_1^* such as $c'(x_1^*) = u$ and naive consumers pay u per unit. The total price is equal to $u(x_1^*)$. Since naive agents have a WTP per unit equal to $v > u$, they enjoy a positive surplus, which is represented by the rectangle A in figure 3.2. At period t_2, the naive agents' WTP per unit increases to z, while the per unit price is equal to v. Quantities at period t_2 are equal to x_2^* such as $c'(x_2^*) = v$ and naive consumers pay a total price to $v(x_2^*)$. Once again, naive consumers enjoy a positive surplus which is represented by the rectangle C in figure 3.2. Hence, consumer naivete has a positive effect on consumer surplus in the presence of increasing preferences.

In order to assess the overall effect of naivete on the market, one should also consider the social surplus. In this regards, consumer naivete has an ambiguous effect. Projection bias leads not only to lower prices, but also to smaller quantities: WTP underestimation leads to a market outcome where quantities are smaller than what they would have been without projection bias. Naivete therefore generates a deadweight loss.

Proposition 2: *In the absence of market regulation and with increasing WTP, consumer naivete leads to a deadweight loss on the market.*

In order to assess the deadweight loss generated by consumer naivete, let us compare quantities consumed by both agent types when WTP is increasing. Recall that naive as well as sophisticated consumers buy the contract set (S, S) but prices and quantities differ (see page 214).

- Sophisticated consumers pay a total price $P_{1_s}^S = v(x_1^*)$ and $P_{2_s}^S = z(x_2^*)$ and quantities exchanged on the market are equal to x_1^* at period t_1 and x_2^* at period t_2 such as $v = c'(x_1^*)$ and $z = c'(x_2^*)$.
- Naive consumers pay a total price $P_{1_n}^S = u(x_1^*)$ and $P_{2_n}^S = v(x_2^*)$ and quantities exchanged on the market are equal to x_1^* at period t_1 and x_2^* at period t_2 such as $u = c'(x_1^*)$ and $v = c'(x_2^*)$.

We assumed that the cost function was increasing and convex, which entails that $c'(x)$ is also increasing. It follows that at both periods quantities consumed by naive agents are lower than those consumed by their sophisticated counterparts. This drop in consumption constitutes a social cost. At period t_1, the deadweight loss due to naivete is represented by the rectangle B in graph 3.2. At period t_2, trapezium D captures the deadweight loss.

To conclude, in the case of increasing WTP, naive consumers are better off than sophisticated ones. The firm captures the entire surplus of sophisticated consumers, while naivete prevents it from doing so and therefore protects naive agents from a price increase. Consequently, if one focuses on consumer welfare, market regulation to protect naive consumers seems unnecessary. However, in the case of increasing WTP, naivete also triggers a decrease in consumption. This deadweight loss represents a social cost. Hence, if WTP is increasing, there is a conflict between consumer protection and the maximization of the social surplus. In practical terms, a public policy aimed at debiasing naive agents would decrease consumer welfare, while increasing the total surplus. This conclusion shows that there might be conflicts between several objectives pursued by consumer policy. Any assessment on whether consumer education is efficient should first rest on a clarification of the aims of consumer policy.

3.5 The effect of consumer bias in the presence of regulation regarding contract duration

In some instances, firms are obliged to offer short-term contracts. For example on the French cell-phone market firms offering contracts longer then 12 months are required to offer the same services for a maximum period of 12 months.[11] In what follows, we take into account this legal obligation by considering that firms offer the two types of contracts at both periods. Three contract sets are available to consumers: (L, L), (L, S) et (S, S). Moreover, as firms are required to offer equivalent services between the different contract sets, it is further assumed that $x^L = x^S$ at each consumption period. Since the long-term contract remains unchanged throughout the game, this entails $x_1^S = x_2^S$. For simplification purposes, since quantities are equal at both periods, we denote them x rather than x_1 and x_2. Recall that represents the amount of early termination fees (ETF) consumers have to pay if they terminate a long-term contract early, as explained on page 207.

3.5.1 Solving the firm's maximization problem

Th o ntrat set (L, L). If the monopoly guides consumers towards the contract set (L, L) a series of constraints must be verified. The two participation constraints (PC_1) and (PC_{2_L}) which define the set $_1$ described above (page 210) need to be fulfilled for consumers to engage in a long-term contract at period t_0. Moreover, several incentive constraints guarantee that the consumer will not deviate towards a different contract set, neither at period t_0, nor at period t_1. Recall that the price of the long term contract does not change throughout the game, such as $P_1^L = P_2^L = P^L$.

[11] This obligation stems from European Directive 2009/136/EC of 25 November 2009.

The monopoly solves the following program:[12]

$$\begin{aligned}
&\text{maximize} \quad 2[P^L \quad c(x^L)] \\
&\text{subject to} \\
&w_0^1(x) \quad P^L \quad 0 && (PC_1) \\
&w_0^2(x) \quad P^L \quad 0 && (PC_{2_L}) \\
&w_1^2(x) \quad P^L(1 \quad) && (PC_{3_L}) \\
&x^S = x^L && (IC)
\end{aligned}$$

$$\begin{array}{llllll}
w_0^1(x^L) + w_0^2(x^L) & 2P^L & w_0^1(x^L) & P^L + w_0^2(x^S) & P_2^S & P^L \\
w_0^1(x^L) + w_0^2(x^L) & 2P^L & w_0^1(x^L) & P^L & P^L & \\
w_0^1(x^L) + w_0^2(x^L) & 2P^L & w_0^1(x^S) & P_1^S + w_0^2(x^S) & P_2^S & \\
w_0^1(x^L) + w_0^2(x^L) & 2P^L & w_0^1(x^S) & P_1^S & & \\
w_0^1(x^L) + w_0^2(x^L) & 2P^L & w_0^2(x^S) & P_2^S & & \\
w_0^1(x^L) + w_0^2(x^L) & 2P^L & 0 & & & \\
w_1^2(x^L) & P^L & w_1^2(x^S) & P^L & P_2^S &
\end{array}$$

The previous conditions hold with $P_1^S = P_2^S = +$ and we find that the program is equivalent to:

$$\begin{aligned}
&\max \quad = 2\left[\min\left[w_0^1(x), w_0^2(x), \frac{w_1^2(x)}{1}\right] \quad c(x)\right] \\
&\text{subject to} \\
&P_1^S = + \\
&P_2^S = +
\end{aligned}$$

Th o ntrat set (S,S). For the contract set (S,S), the monopoly solves: $\max \quad = [P_1^S + P_2^S \quad 2c(x)]$

[12] As we write the firm's program, we denote x^S and x^L quantities o ered respectively in the short-tem and the long-term contract so that the reader can understand where each constraint comes from. As we solve the model, since $x^L = x^S$ as explained page 217, we simplify the notation to x.

$$\text{maximize} \quad [P^S_{1_n} + P^S_{2_n} \quad 2c(x^S)]$$

$$\text{subject to}$$

$$w^1_0(x) \quad P^S_1 \quad 0 \qquad (PC_1)$$

$$w^2_0(x) \quad P^S_2 \quad 0 \qquad (PC_{2_S})$$

$$w^2_1(x) \quad P^S_2 \quad 0 \qquad (PC_{2_S})$$

$$x^S = x^L \qquad (IC)$$

$$w^1_0(x^S) + w^2_0(x^S) \quad P^S_1 \quad P^S_2 \quad w^1_0(x^L) + w^2_0(x^L) \quad 2P^L$$

$$w^1_0(x^S) + w^2_0(x^S) \quad P^S_1 \quad P^S_2 \quad w^1_0(x^L) \quad P^L \quad P^L$$

$$w^1_0(x^S) + w^2_0(x^S) \quad P^S_1 \quad P^S_2 \quad w^1_0(x^L) \quad P^L \quad P^L + w^2_0(x^S) \quad P^S_2$$

$$w^1_0(x^S) + w^2_0(x^S) \quad P^S_1 \quad P^S_2 \quad w^1_0(x^S) \quad P^S_1$$

$$w^1_0(x^S) + w^2_0(x^S) \quad P^S_1 \quad P^S_2 \quad w^2_0(x^S) \quad P^S_2$$

$$w^1_0(x^S) + w^2_0(x^S) \quad P^S_1 \quad P^S_2 \quad 0$$

$$w^2_1(x^S) \quad P^S_2 \quad 0$$

The previous conditions hold with $P^L = +$ and we find that the program is equivalent to:

$$\max \quad = [w^1_0(x) + \min[w^2_0(x), w^2_1(x)] \quad 2c(x)]$$

$$\text{subject to}$$

$$x^L = x^S$$

$$P^L = +$$

Th o ntrat set (L, S)**.** For the contract set (L, S), the monopoly solves: max $=$ $(1 + \ )P^L_n + P^S_{2_n} \quad 2c(x)$.

$$\text{maximize} \quad (1+\ )P^L + P_2^S \quad 2c(x)$$

$$\text{subject to}$$

$$w_0^1(x) \quad P^L \quad 0 \qquad (PC_1)$$

$$w_0^2(x) \quad P^L \quad 0 \qquad (PC_{2_L})$$

$$w_1^2(x) \quad P^L \quad P_2^S \quad P^L \qquad (PC_{3_{(L,S)}})$$

$$x^S = x^L \qquad (IC)$$

$$w_0^1(x^L) + w_0^2(x^S) \quad (1+\ )P^L \quad P_2^S \quad w_0^1(x^L) + w_0^2(x^L) \quad 2P^L$$

$$w_0^1(x^L) + w_0^2(x^S) \quad (1+\ )P^L \quad P_2^S \quad w_0^1(x^L) \quad P^L \quad P^L$$

$$w_0^1(x^L) + w_0^2(x^S) \quad (1+\ )P^L \quad P_2^S \quad w_0^1(x^S) + w_0^2(x^S) \quad P_1^S \quad P_2^S$$

$$w_0^1(x^L) + w_0^2(x^S) \quad (1+\ )P^L \quad P_2^S \quad w_0^1(x^S) \quad P_1^S$$

$$w_0^1(x^L) + w_0^2(x^S) \quad (1+\ )P^L \quad P_2^S \quad w_0^2(x^S) \quad P_2^S$$

$$w_0^1(x^L) + w_0^2(x^S) \quad (1+\ )P^L \quad P_2^S \quad 0$$

$$w_1^2(x^S) \quad P^L \quad P_2^S \quad w_1^2(x^L) \quad P^L$$

The previous conditions hold with $P_1^S = +\quad$ and we find that the program is equivalent to:

$$\max \quad = (1+\ ) \min \left[w_0^1(x), w_0^2(x), \frac{w_0^1(x)}{1+\ } \right] + \min[w_1^2(x), (1 \qquad)P^L, w_0^2(x)] \quad 2c(x)$$

subject to

$$x^L = x^S$$

$$P_1^S = +$$

3.5.2 Main results

We derive from the maximization programs described above the monopoly's optimal strategy depending on the consumer type. Whether the firm is facing naive or sophisticated agents, its strategy always depends on WTP variations in time.

3.5.2.1 Dec easing WTP

As mentioned in section 3.4.3.1 in the absence of regulation and with decreasing WTP, consumer bias generates a drop in social welfare. The present section aims at assessing whether regulating the amount of ETF helps mitigate the negative consequences of consumer bias.

S ph sticated o s umers. If the monopoly is facing a market composed of only sophisticated agents who exhibit a decreasing WTP, the most profitable contract set is (S, S). At equilibrium, quantities offered at period t_1 and t_2 are

$$x^* = x_1^* = x_2^* = \arg\max \left[\frac{v(x) + z(x)}{2} \quad c(x) \right].$$

Prices charged by the firm at periods t_1 and t_2 are respectively equal to $P_{1_s} = v(x^*)$ and $P_{2_s} = z(x^*)$.

Naive o s umers. If the monopoly is facing a market composed of only naive agents who exhibit a decreasing WTP, the most profitable contract set depends on the value of . Let us denote $_1 = \frac{u-v}{u+v}$ and $_2 = \frac{u-v}{u}$. [13]

- If $_1$, two contract sets are equivalent and most profitable for the firm : (S, S) and (L, S). At equilibrium quantities offered at period t_1 and t_2 are

$$x^* = x_1^* = x_2^* = \arg\max \left[\frac{u(x) + v(x)}{2} \quad c(x) \right].$$

  Let us focus on the contract set (S, S). Prices charged by the firm at periods t_1 and t_2 are respectively equal to $P_{1_n}^S = u(x^*)$ and $P_{2_n}^S = v(x^*)$.[14] Prices and quantities are above the socially optimal level.

[13] Recall that functions u, v and z are assumed to be linear (see above system (3.1) page 203). This assumption ensure that $_1$ and $_2$ each have a unique value.

[14] For the contract set (L, S), prices are equal to $P^L = \frac{u(x)}{1+}$ and $P_2^S = v(x)$. Quantities are equivalent to the ones o ered in the contract set (S, S).

- If $(\ _1,\ _2)$, the most profitable contract is (L, L) and quantities are equal to

$$x^* = x_1^* = x_2^* = \arg\max \frac{v(x)}{1} \quad c(x).$$

The total price is equal to $P_n^L = \frac{v(x^*)}{1-\theta}$. Prices and quantities are above the socially optimal level.

- If $\ _2$ the most profitable contract is (L, L) and quantities are equal to

$$x^* = x_1^* = x_2^* = \arg\max u(x) \quad c(x).$$

The total price is equal to $P_n^L = u(x^*)$. Prices and quantities are above the socially optimal level.

Proposition 3: *Regulating the amount of ETF is an e cient policy only when consumer are naive and have decreasing WTP. In this instance, restricting the amount of ETF helps mitigate the negative consequences of consumer naivete.*

Aa lysis. First note that the ETF level does not affect the market equilibrium in presence of sophisticated agent. Therefore, regulating ETF is only relevant for naive consumers in presence of decreasing WTP. Moreover, regardless of the value of , naive consumers always pay more than sophisticated ones. However, the scope of their loss depends on the value of .

- Regardless of the value of , sophisticated consumers are offered the contract set (S, S) and are charged prices $P_{1_s}^S = v(x^*)$ and $P_{2_s}^S = z(x^*)$, which are equal to their WTP at both periods. However, quantities bought by sophisticated consumers do not correspond to the optimal quantity which would maximize social surplus. At period t_1, agents consume less than what they would be willing to buy at the price $P_{1_s}^S$. There is a deadweight loss in t_1. Conversely, at period t_2, sophisticated agents consumers buy more than the optimal quantity. Hence, regulating contract duration generates a market inefficiency when agents have decreasing WTP.

  This inefficiency results from the way we modeled regulation concerning contract

duration. Recall that we assumed $x^L = x^S$ at both consumption periods. This constraint, which represents the legal requirements that service providers should offer a short-term contract at *"non-disqualifying conditions"*, results in a market inefficiency when one considers separately periods t_1 and t_2: there is a deadweight loss at period t_1 and an overconsumption at period t_2. On the whole, market regulation is neutral since the two inefficiencies at periods t_1 and t_2 compensate for each other.

- In the case of naive consumers, the market outcome depends on the value of .
  - If $_1$, then naive consumers are offered the contract set (S, S). They are willing to pay at periods t_1 and t_2 respectively v and z per unit. However they are charged prices $P^S_{1_n} = u(x^*)$ and $P^S_{2_n} = v(x^*)$, which are above their WTP. Hence, naive consumer undergo a net disutility.
  - Let us now turn to the case $_1$ $_2$. As explained above, the firm offers the long-term contract to naive agents and charges a price $P^L_n = \frac{v(x^*)}{1-\theta}$ at both periods.

    Naive consumers are willing to pay v and z respectively at periods t_1 and t_2. Since $\frac{v(x^*)}{1-\theta} > v(x^*) > z(x^*)$, agents endure a net disutility.
  - Finally, when $_2$, naive consumers buy the long-term contract and pay $u(x^*)$ at both periods.

    The disutility borne by naive consumers is equal to the difference between the price and their WTP.

To sum up, naivete clearly has a detrimental effect on consumer welfare when WTP is decreasing. Because naive consumers overestimate their future willingness to pay, then have a net disutility. However, the scope of this disutility depends on the value of , the amount of ETF: consumer disutility increases with . To account for this mechanism, recall that is the amount consumers have to pay to terminate a contract early. Hence, an increase in means consumers are captive. As the captivity increases, the disutility endured by naive consumers also increases. The net disutility of the naive consumer is minimum for $_1$. Consequently, the regulator would have to know the present and future preferences of the consumer, as well as the cost function of the firm, in order to

infer the threshold $_1$. Moreover, the condition $x^S = x^L$ on both period of consumption does not allow sophisticated to consume the socially optimal level at each period, while on average the optimum is reached.

3.5.2.2 Inc easing WTP

S ph stia ted c nsm ers. If the monopoly is facing a market composed of only sophisticated agents with increasing WTP, the most profitable contract set is (S, S). At equilibrium, quantities offered at period t_1 and t_2 are

$$x^* = x_1^* = x_2^* = \arg\max \left[\frac{v(x) + z(x)}{2} \quad c(x) \right].$$

Prices charged by the firm at periods t_1 and t_2 are respectively equal to $P_{1_s}^S = v(x^*)$ and $P_{2_s}^S = z(x^*)$.

Just as in the case of decreasing preferences, the regulatory constraint $x^S = x^L$ results in a market inefficiency if one considers separately both periods t_1 and t_2. Quite logically, the situation is reversed, compared to the case of decreasing preferences: at period t_1, quantities are above the social optimum, and at period t_2, quantities are below the social optimum. Overall, the ex-post social optimum is reached.

Naive c nsm ers. If the monopoly is facing a market composed of only naive agents with increasing WTP, the most profitable contract sets are (L, L) and (S, S). The firm is indifferent between the two contract sets. At equilibrium, quantities offered at periods t_1 and t_2 are

$$x^* = x_1^* = x_2^* = \arg\max[u(x) \quad c(x)].$$

Prices charged by the firm at periods t_1 and t_2 are such as $P_{1_n} = P_{2_n} = u(x^*)$. Prices and quantities are below the ex-post social optimum.

It is worth noting that when WTP is increasing, regulating the amount of ETF has no impact on the market. The intuition is as follows: if preferences are increasing, consumers who engage in a long-term contract will not terminate it early. Hence, ETF does not affect

consumer behavior.

Analysis. If agents have increasing WTP, naive consumers always pay less than sophisticated ones. The intuition behind this phenomenon is that naive consumers do not anticipate the increase in their future WTP. Hence, naivete protects consumers from a price increase.

At periods t_1 and t_2, naive agents are willing to pay respectively v and z per unit. The actual per unit price charged by the firm is u. Hence consumers enjoy a positive net surplus. Conversely, the monopoly entirely captures the surplus of sophisticated agents. Indeed, the latter anticipate from the outset that their WTP will increase which allows the firm to fixe prices accordingly.

Naivete also affects quantities exchanged on the market. Quantities aimed at naive consumers are equal to $\arg\max[u(x) \quad c(x)]$ at both periods. Naive agents would be willing to consume $\arg\max[v(x) \quad c(x)]$ and $\arg\max[z(x) \quad c(x)]$ respectively at periods t_1 and t_2. Hence in the presence of increasing preferences and naive consumers, quantities exchanged on the market generate a deadweight loss. The intuition behind this phenomenon is quite easy to grasp: naive agents underestimate their future WTP, such as the actual price charged by the firm is lower than the price aimed at sophisticated agents. Therefore, quantities are also lower than the ones bought by sophisticated agents.

To sum up, naivete results in a net increase in consumer welfare but it also has a net social cost. The conclusions summarized in propositions 1 and 2 above remain valid when the market is regulated. Once again, the global effect of consumer bias on welfare is ambiguous and depends on the criteria one considers. This observation raises the issue of defining a welfare criteria according to which policy recommendations should be evaluated. This brings us to the more general question of legal policy implications which can be drawn from our model.

3.6 Legal policy implications

The previous paragraphs raise interesting questions regarding legal policies designed to protect consumers against their own biases. Regardless of whether ETF are regulated or not, naivete results in a drop in consumer welfare when WTP is decreasing. Naive consumers overestimate their future WTP and therefore undergo a negative surplus at a later stage of the game. In this event, debiasing clearly has a positive impact on consumer welfare. Revealing the agents' true WTP guarantees that they will not be exploited by the monopoly. Hence, debiasing naive agents enhances consumer welfare. Whether consumer education is socially desirable depends on the cost of debiasing, on who this costs weighs upon, and on how the social planner values consumer and producer welfare.

Assessing whether consumer education is socially desirable in the presence of increasing WTP is even more tricky. When WTP is increasing, naive consumers are better off than sophisticated agents. Naivete protects consumers from a price increase, and allows them to have a positive surplus. However, naivete also generates a deadweight loss insofar as quantities exchanged on the market are lower than what they would have been in the absence of biases. The overall effect of consumer naivete on welfare is therefore ambiguous: consumer bias enhances the situation of consumers to the detriment of social welfare. In this context, assessing whether consumer education should be implemented crucially depends on the welfare criteria one considers. There is a divergence between the objectives of consumer welfare, on one hand, and social welfare, on the other hand.

The paper also sheds new light on ETF regulation by showing that regulating the amount of ETF is only relevant when consumers have decreasing WTP. Conversely, ETF regulation has strictly no effect on the market outcome when consumers have increasing WTP. Yet, setting a maximum level of early termination fees is a widespread practice, which is thought to protect consumers and increase competition. Our model challenges the common assumption according to which ETF regulation enhances social welfare, insofar as the effect of such regulation depends on WTP variations. One should also take into account the cost of regulation and implementation in order to assess the overall effect on welfare.

3.7 Concluding remarks

Our primary goal was to study the joint effect of projection bias and ETF regulation on the market outcome. In this perspective, we build on the model proposed by [108] and extend it to three periods. We come to compelling conclusions regarding the effect of naivete on welfare. We first show that naive consumers are not always worse off than sophisticated ones. Naivete indeed protects consumers from a price increase: when WTP is increasing, naive consumers do not anticipate their future WTP and are therefore preserved from a price increase. However, naivete also triggers a deadweight-loss, insofar as consumption is lesser than in the absence of projection bias. Hence, the overall effect of naivete on welfare is ambiguous when WTP is increasing. The previous conclusions lead to interesting implications concerning consumer debiasing. We argue that debiasing always has a positive impact on social welfare when WTP is decreasing. In the case of increasing WTP, one can't assess outright whether educating consumers would have a positive impact on social welfare. The answer depends on the extent to which projection bias increases consumer surplus, on one hand, and decreases social welfare, on the other hand. The issue becomes even more complicated if the social planner weighs differently the various components of social welfare.

Our second important result lies in the fact that ETF regulation is not a relevant policy when consumers have increasing WTP. This observation raises serious questions about the efficiency of wide-spread policies which consist in regulating the amount of ETF. We argue that some new paths and new means of regulation should be explored. This issue is also a promising direction for future research.

Finally, it is worth noting that in our model consumer WTP is monotonic: over the three periods, WTP is either increasing or decreasing. It should be quite stimulating to study non-monotonic functions in further research.

Conclusion

Main contributions of the thesis.

The thesis is at the crossroad of several fields of research. It first contributes to the literature on cognitive biases, with a focus on consumer bias. I explore the effects of consumer misperception on the market outcome. I show that, depending on the market characteristics and on the nature of the bias, consumer misperception has various effects on the market equilibrium. The thesis also contributes to the literature on consumer debiasing and soft paternalism. In each chapter, I investigate relevant policies which could help constrain the negative consequences of consumer misperception.

Ch p er 1. In the first chapter, I explore the consequences of quality overestimation on the market outcome. I study a duopoly with substitute commodities in order to determine when firms have incentives to educate their rival's customers to attract them. I focus on the two polar cases: the *"consumer exploitative"* market outcome, whereby firms cater to consumer misperception, on one hand ; and the educated consumer outcome whereby both firms completely debias their rival's customers, on the other hand. The main contribution of the chapter is that a greater substitutability between the two commodities does not necessarily increase the firms' incentives to debias consumers.

A far as policy recommendations are concerned, I start by refuting the libertarian view according to which the market provides efficient responses to consumer bias. Whether one thinks of the right to withdraw or of the market for reputation, such mechanisms do not withstand the presence of consumer bias. Therefore, when firms do not spontaneously engage in consumer education, it can be welfare enhancing to foster debiasing. I explore two main paths the regulator could follow to stimulate consumer debiasing: legal duties to inform and comparative advertising, if implemented properly, can both increase consumer education.

Ch p er 2. The second chapter focuses on consumers who form inaccurate anticipations about their future utility. Both over- and under-estimation of future utility are studied. I determine if and when firms have incentives to debias consumers by revealing the true

utility provided either by their own good, by their rival's product, or both. The first main contribution of the chapter consists in showing that, in the case of symmetric debiasing, what matters is not so much the intensity of consumer bias but rather the asymmetry in the structure of the misperceptions. Consequently, it could well be that agents are strongly biased concerning both goods but that neither firm has incentives to educate them because the misperceptions compensate for each other. This result brings a novel contribution to the literature on consumer misperception.

The second interesting contribution of the chapter relates to policy implications. I argue that misperception of utility can be due to price misperception on one hand, or to erroneous beliefs about one's own needs or capacities to use a product, on the other hand. Hence, two main paths for regulation are conceivable, depending on the origin of the bias. If consumers misperceive prices, regulating price-formats to facilitate price comparison is a relevant policy. If consumers form false beliefs about their use of a product, informing agents about their own needs is a suitable policy. I study several examples of current or proposed regulation in both categories.

Chapter 3. Finally, the last chapter of the thesis focuses on a monopoly with consumers who exhibit a projection bias. In this chapter I focus on contracts which imply a commitment over a given period of time (typically one or two years). Consumers can choose either a short- or a long-term contract. In order to investigate the effect of naivete on the market outcome, I compare prices and quantities aimed at sophisticated agents with the ones intended to naive agents. I come to the conclusion that even in a monopolistic context, naivete can be welfare enhancing if consumers have increasing willingness to pay. If the market were more competitive, one expects naivete to have an even greater positive impact on consumer welfare. It seems worth to fathom deeper in this direction in order to assess the effect of projection bias in a competitive market.

By and large, the three chapters converge to show that consumer policy should take into consideration cognitive biases. Designing consumer law while overlooking the ubiquitous biases agents exhibit leads to inefficient and potentially dangerous policies. The main

example thereof is the numerous duties to inform which can result in information overload. Consequently, the three chapters of the thesis discuss and illustrate how consumer policy can acknowledge the key role of cognitive biases. The thesis also emphasizes that no general rule can be determined as to whether and how to debias consumers. The appropriate policy depends on numerous market characteristics and on the nature of the bias. Any policy recommendation based on consumer misperception should be context dependent, which leaves several paths open for future research.

Paths for future research.

Extending the results to more competitive frameworks. One important limitation of the thesis is that it focuses on a duopoly (chapters 1 and 2) or a monopoly (chapter 3). Whether the results would hold in a more competitive framework is not straightforward. Since few markets actually correspond to a duopolistic model, it would be enlightening to study the effects of consumer biases in an oligopoly with at least three firms, and in the perfect competion framework. Several mechanisms might take place. First, one could expect that when competition increases, the likelihood of consumer education increases, insofar as debiasing is a means to attract new customers. A second effect might work in the opposite direction: when competition increases, firms make smaller profits and consequently have weaker incentives to educate consumers (the positive aftermaths of debiasing is smaller). Hence, it could be that competition actually weakens the firms' incentives to educate. In this line of thought, Spiegler (2010) [147] explains that in some circumstances when firms determine both prices and quality, increasing the number of competitors strictly reduces consumer welfare (page 108).

However, no general conclusion can be drawn about the effects of increased competition on consumer welfare under the bounded rationality assumption. Increasing the number of firms can have either positive or negative consequences on welfare, as Spiegler (2010 [147], page 186) emphasizes and this issue remains open for future research.

The case of professionals who exhibit cognitive biases. In the thesis I focused on consumer contracts, that is to say contracts signed by a consumer and by a professional party. In some instances, contractual relations between professional parties are similar to consumer contracts. Think for instance of a franchisee or a licensee who is about to sign into a distribution agreement. Just like a consumer, he will be offered a standard form contract which he is in no position to negotiate. Here also, the drafter of the contract has a significant advantage. Acknowledging that such contracts of adhesion are often imbalanced and that there is a strong information asymmetry, Commercial Law provides for an information disclosure requirement, inspired by consumer law.[15] Such legal interventions rest on the assumption that agents are rational and are able to process all the relevant information. Just as in the case of consumer contracts, this assumption deserves to be discussed. As Armstrong & Huck [5] explain, firms are not shielded from cognitive biases.

Similar processes as the ones mentioned in the thesis about consumer contracts can occur in distribution agreement. Just like the professional party can divert the consumers' attention by offering a small gift or selling the good in a bundle, the head of the network can make some secondary clauses particularly salient in order to distract his contractor's attention. For example clauses according to which the franchisee or the licensee will pay lower entrance fees if he opens a second retail outlet rely on an optimism bias: franchise candidates tend to overestimate the occurrence probability of the favorable outcome and consequently give too much importance to the clause in the decision making process. Such distraction strategies typically lead agents to overlook important clauses of the contract because they become less salient.

In this context, just like in consumer law, the professional does not lack information but is subject to cognitive bias. Should the regulator intervene to prevent erroneous decision making ? On one hand, one could argue that professionals should be able to protect their own interest. The libertarian arguments about the negative aftermaths of regulation on learning and decision making seem particularly relevant in the case of commercial relations. On the other hand, one could also consider that in distribution contracts the stakes are

[15] In France, this duty to inform is provided for at article L.330-3 of the Commercial Code.

high and justify a legal protection.

Considering commercial relations between professionals breaths new life into the debate about the relevance and the legitimacy of a legal protection against cognitive biases.

Exploring the interactions between biases. Each chapter of the thesis focuses on one specific type of bias in a given market structure. While this method allows us to draw clear and simple conclusions about the effect of biases on the market, it does have one drawback: by studying separately three biases, we do not take into consideration the possible interactions between different types of errors. Yet, it is conceivable that some consequences of cognitive bias could be compensated for by another bias. In this thread, Jolls & Sunstein (2006) [84] argue that in some instances a legal intervention to constrain the effects of cognitive biases can be counterproductive. *"Simply put, some errors can counteract others. In such cases efforts either to insulate legal outcomes from the effects of the first aspect of bounded rationality (...) or to engage in debiasing through law in response to this aspect of bounded rationality might actually make things worse rather than better"*(page 54). Because of the methodology which is used in the thesis, such interactions are not taken into consideration. Modeling the simultaneous effects of two or more biases on the market seems to be a promising, although challenging, path for future research.

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Bibliography

[1] George kA erlof. The Market for ffLemonsffi Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics*, 84(3):488–500, 1970.

[2] R CEP. Observatoire des march s des communications lectroniques en france. Les Actes de l'ARCEP, Autorit de R gulation des Communications El ctroniques et des Postes, 2015.

[3] Dan rA iely. *Predictably Irrational*. New York: Harper Collins, 2009.

[4] Dan rA iely and George Loewenstein. The Heat of the Moment: The Effect of Sexual rA ousal on Sexual Decision Making. *Journal of Behavioral Decision Making*, 19:87–98, 2006.

[5] Mark rA mstrong and Steffen Huck. Behavioral Economics as Applied to Firms: A Primer. *Competition Policy International*, 6(1):3–45, 2010.

[6] Adi Ayal. Harmful Freedom of Choice: Lessons from the Cellphone Market. *Law and Contemporary Problems*, 74:91–132, Spring 2011.

[7] Douglas G. Baird. The Boilerplate Puzzle. In Omri Ben-Shahar, editor, *Boilerplate, The Foundation of Market Contracts*. Cambridge University Press, 2007.

[8] Oren Bar-Gill. The Behavioral Economics of Consumer Contracts. *Minnesota Law Review*, 92(3):749–802, 2008.

[9] Oren Bar-Gill. Competition and Consumer Protection: a Behavioral Economics Account. Law Economics Research Paper Series, Working-Paper n °11-42, December 2011.

[10] Oren Bar-Gill and Omri Ben-Shahar. Exit from Contract. *Journal of Legal Analysis*, 6(1):151–183, July 2014.

[11] Oren Bar-Gill and Oliver Board. Product Use Information and the Limits of Voluntary Disclosure. *American Law and Economics Review*, 14(1), 2014.

[12] Oren Bar-Gill and Franco Ferrari. Informing Consumers about Themselves. *Erasmus Law Review*, 3(2):93–119, 2010.

[13] Oren Bar-Gill and Rebecca Stone. Mobile Misperception. *Harvard Journal of Law and Technology*, 23(1):51–118, June 2009.

[14] Francesca Barigozzi and Martin Peitz. Comparative Advertising and Competition Policy. In Jay Pil Choi, editor, *Recent Development in Antitrust, Theory and Evidence*, pages 215–264. MIT Press, 2007.

[15] Michael Barr, Sendhil Mullainathan, and Eldar Shafir. Behaviorally Informed Regulation. In Eldar Shafir, editor, *The Behavioral Foundations of Public Policy*, pages 440–461. Princeton University Press, 2013.

[16] Lucian Bebchuk and Richard Posner. One-Sided Contracts in Competitive Consumer Markets. In Omri Ben-Shahar, editor, *Boilerplate, The Foundation of Market Contracts*, pages 3–11. Cambridge University Press, 2007.

[17] David Bell. Regret in Decision Making under Uncertainty. *Operations Research*, 30(5):961–981, September 1982.

[18] David Bell. Disappointment in Decision Making under Uncertainty. *Operations Research*, 33(1):1–27, 1985.

[19] Paul Belleflamme and Martin Peitz. *Industrial Organization: Markets and Strategies*. Cambridge University Press, 1st edition, 2010.

[20] Paul Belleflamme and Martin Peitz. *Industrial Organization: Markets and Strategies*. Cambridge University Press, 2nd edition, 2015.

[21] Omri Ben-Shahar, editor. *Boilerplate, The Foundation of Market Contracts*. Cambridge University Press, 2007.

[22] Omri Ben-Shahar and Eric Posner. The Right to Withdraw in Contract Law. *The Journal of Legal Studies*, 40(1):115–148, 2011.

[23] Omri Ben-Shahar and Carl Schneider. *More Than You Wanted to Know: The Failure of Mandated Disclosure*. Princeton University Press, April 2014.

[24] Omri Ben-Shahar and James J. White. Boilerplate and Economic Power in Auto-Manufacturing. In Omri Ben-Shahar, editor, *Boilerplate, The Foundation of Market Contracts*. Cambridge University Press, 2007.

[25] Douglas Bernheim and Antonio Rangel. Beyond Revealed Preferences: Choice-Theoretic Foundations for Behavioral Welfare Economics. *The Quarterly Journal of Economics*, 124(1):51–104, 2009.

[26] Sushil Bikhchandani, David Hirshleifer, and Ivo Welch. The Blind Leading the Blind: Social Influence, Fads, and Informational Cascades. *Journal of Political Economy*, 100(5):992–1026, 1992.

[27] Michelle E. Boardman. Contra Proferentem: The Allure of Ambiguous Boilerplate. In Omri Ben-Shahar, editor, *Boilerplate, The Foundation of Market Contracts*. Cambridge U iversity Press, 2007.

[28] Kathryn Braun. Postexperience Advertising Effects on Consumer Memory. *Journal of Consumer Research*, 24(4):319–334, 1999.

[29] Meghan Busse, Devin Pope, Jaren Pope, and Jorge Silva-Risso. The Psychological Effect of Weather on Car Purchases. *The Quarterly Journal of Economics*, 130(1):371–414, 2015.

[30] Jean Calais-Auloy and H nri Temple. *Le Droit de la Consommation*. Dalloz, 10th edition, 2010.

[31] Colin Camerer, Samuel Issacharoff, George Loewenstein, Ted O'Donoghue, and Matthew Rabin. Regulation for Conservatives: Behavioral Economics and the Case for fA ymmetric Paternalismffi *University of Pennsylvannia Law Review*, 3(151):1211–1254, 2003.

[32] Jean Carbonnier. *Droit et Passion du Droit sous la Ve République*. Flammarion, 1996.

[33] Michael Conlin, Ted O'Donoghue, and Timothy Vogelsang. Projection Bias in Catalog Orders. *American Economic Review*, 97(4):1217–1249, 2007.

[34] Robin Cubitt and Robert Sugden. On Money Pumps. *Games and Economic Behavior*, 37:121–160, 2001.

[35] Michael Darby and Edi Karni. Free Competition and the Optimal Amount of Fraud. *Journal of Law and Economics*, 16(1):67–88, 1973.

[36] Claude Lucas de Leyssac and Gilbert Parl ani. *Droit du Marché*. Presse Universitaire de France, 2002.

[37] Bruno Deffains and Samuel Ferey. L' conomie du droit entre r volution cognitive et tournant r aliste. *Revue française d'économie*, 27(4):45–80, 2012.

[38] Bruno Deffains and Samuel Ferey. Les fonctions cognitives du droit dans la pens e de Cass Sunstein. *Revue économique*, 65(2):263–278, 2014.

[39] John Deighton. The Interaction of Advertising and Evidence. *Journal of Consumer Research*, 11(3):763–770, December 1984.

[40] Stefano Della-Vigna and Ulrike Malmendier. Paying Not to Go to the Gym. *American Economic Review*, 96(3):694–719, 2006.

[41] Stefano DellaVigna. Psychology and Economics: Evidence from the Field. *Journal of Economic Literature*, 47(2):315–372, 2009.

[42] Stefano DellaVigna and Ulrike Malmendier. Contract Design and Self-Control: Theory and Evidence. *Quarterly Journal of Economics*, 119(2):353–402, 2004.

[43] Dominique Demougin. Class Actions From an Economic Point of View. In *Droit Et Economie du Procès Civil*, pages 81–104. L.G.D.J, 2009.

[44] David Deroussin. *Histoire du Droit des Obligations*. Economica, 2007.

[45] Avinash Dixit. A Model of Duopoly Suggesting a Theory of Entry Barriers. *The Bell Journal of Economics*, 10(1):20–32, 1979.

[46] Avinash Dixit and Victor Norman. Advertising and Welfare. *The Bell Journal of Economics*, 9(1):1–17, 1978.

[47] Charlotte Duke, Steffen Huck, and Brian Wallace. The Impact of Price Framing on Consumer Decision Making. Technical Report OFT1226, Office of Fair Trading, May 2010.

[48] Gerald Dworkin. Paternalism. *The Monist*, 56(1):64–84, 1972.

[49] Kfir Eliaz and Ran Spiegler. Contracting with Diversely Naive Agents. *Review of Economic Studies*, 73(3):689–714, 2006.

[50] Glenn Ellison. Bounded Rationality in Industrial Organization. In Blundell, Newey, and Persson, editors, *Advances in economics and econometrics: theory and applications*, volume 2 of *Ninth World Congress*, pages 142–219. Cambridge University Press, 2006.

[51] Jon Elster. *Nuts and Blots for the Social Science*. Cambridge University Press, July 1989.

[52] Jon Elster. Rationality and The Emotion. *The Economic Journal*, 106(438):1386–1397, September 1996.

[53] Richard Epstein. Behavioral Economics: Human Errors and Market Corrections. *University of Chicago Law Review*, 73(1):111;132, 2006.

[54] Michael Faure and Hanneke Luth. Behavioral Economics in Unfair Contract Terms Cautions and Considerations. *Journal of Consumer Policy*, 34(3):337–358, 2011.

[55] Samuel Ferey. Paternalisme lib ral et pluralit du moi. *Revue économique*, 62(4):737–750, 2011.

[56] Peter Fishburn. N ntransitive Measurable Utility. *Journal of Mathematical Psychology*, 26(1):31–67, 1982.

[57] Franklin Fisher and John McGowan. Advertising and Welfare: Comment. *The Bell Journal of Economics*, 10(2):126–127, 1979.

[58] Bruno Frey and A ois Stutzer. Economic Consequences of Mispredicting Utility. Technical Report 3, German Social-Economic Panel Study, 2013.

[59] James Friedman. Advertising and Oligopolistic Equilibrium. *The Bell Journal of Economics*, 14(2):464–473, 1983.

[60] Xavier Gabaix and David Laibson. Shrouded Attributes, Consumer Myopia, and Information Suppresion in Competitive Markets. *The Quarterly Journal of Economics*, 121(2):505–540, 2006.

[61] Xavier Gabaix, Augustin Landier, and David Thesmar. Consumer Protection: Bounded Rationality and Regulation. Technical report, Conseil d'Analyse Economique, report n °101, September 2012.

[62] Jaskold Gabszewicz and Jean-Fran ois Thisse. Price Competition, Quality and Income Disparities. *Journal of Economic Theory*, 20(3):340–359, 1979.

[63] Alexia Gaudeul and Robert Sugden. Spurious Complexity and Common Standards in Markets for Consumer Goods. *Economica*, 79(314):209–225, April 2012.

[64] Daniel Gilbert, Michael Gill, and Timothy Wilson. The Future is Now: Temporal Correction in Affective Forecasting. *Organizational Behavior and Human Decision Processes*, 88(1):430;444, May 2002.

[65] Clayton P. Gillette. Preapproved Boilerplate. In *Boilerplate, The Foundation of Market Contracts*. Cambridge University Press, 2007.

[66] David Gilo and Ariel Porat. The Hidden Roles of Boilerplate and Standard-form Contracts: Strategic Imposition of Transaction Costs, Segmentation of Consumers and A ticompetitive Effects. *Michigan Law Review*, 104:983–1032, March 2006.

[67] David Gilo and Ariel Porat. The Unconventional Uses of Transaction Costs. In Omri Ben-Shahar, editor, *Boilerplate, The Foundation of Market Contracts*. Cambridge U iversity Press, 2007.

[68] Edward Glaeser. Paternalism and Psychology. *University of Chicago Law Review*, 73(1):133–156, 2006.

[69] Martha Goyder and Steve Brooker. Warning: Too Much Information Can Harm. Final report, Better Regulation Executive and National Consumer Council, 2007.

[70] Michael Grubb. Selling to Overconfident Consumers. *American economic review*, 99(5):1770–1807, 2009.

[71] F.A Hayek. The Use of Knowledge in Society. *The American Economic Review*, 35(3):519–530, September 1945.

[72] Robert A Hillman. Online Boilerplate: Would Mandatory Web Site Disclosure of e-standard Terms Backfire? In Omri Ben-Shahar, editor, *Boilerplate, The Foundation of Market Contracts*. Cambridge university Press, 2007.

[73] Robert A Hillman and Jeffrey Rachlinski. Standard-Form Contracting in the Electronic Age. *New York University of Law Review*, 77(2):429–495, May 2002.

[74] Jack Hirshleifer. On the Emotions as Guarantors of Threats and Promises. UCLA Department of Economics Working Paper 337, August 1984.

[75] Stephen Hoch and Young-Wan Ha. Consumer Learning: Advertising and the Ambiguity of Product Experience. *Journal of Consumer Research*, 13:221–233, September 1986.

[76] Sven Hoppner. The Unintended Consequence of Doorstep Consumer Protection: Surpirse, Reciprocation and Consistency. *The European Journal of Law and Economics*, 38(2):247–276, 2014.

[77] Tanjim Hossain and John Morgan. ...Plus Shipping and Handling: Revenue (Non) Equivalence in Field Experiments on eBay. *Advances in Economic Analysis Policy*, 6(2):1–27, 2006.

[78] Harold Hotelling. Stability in Competition. *The Economic Journal*, 39(153):41–57, March 1929.

[79] Steffen Huck and Jean-Robert Tyran. Reciprocity, Social Ties, and Competition in Markets for Experience Goods. *Journal of Socio-Economics*, 36(2):191–203, 2007.

[80] Steffen Huck and Jidong Zhou. Consumer Behavioral Biases in Competition: A Survey. Final Report OFT1324, Office of Fair Trading, September 2011.

[81] Samuel Issacharoff. Disclosure, agents and consumer protection. *Journal of Institutional and Theoretical Economics*, 167(1):56–76, 2010.

[82] Irving Janis and Leon Mann. *Decision Making: A Psychological Analysis of Conflict, Choice, and Commitment*. The Free Press, 1979.

[83] Jason Scott Johnston. Cooperative Negotiations in the Shadow of Boilerplate. In Omri Ben-Shahar, editor, *Boilerplate, The Foundation of Market Contracts*. Cambridge University Press, 2007.

[84] Christine Jolls and Cass Sunstein. Debiasing Through Law. Harvard Law School John M. Olin Center for Law, Economics and Business Discussion Paper Series. Paper 495, September 2004.

[85] Christine Jolls and Cass Sunstein. Debiasing Through Law. *Journal of Legal Studies*, 35(1):199–242, 2006.

[86] Christine Jolls, Cass Sunstein, and Richard Thaler. A Behavioral Approach to Law and Economics. *Stanford Law Review*, 50(5):1471–1550, 1998.

[87] Louis Josserand. La protection des faibles par le droit. In *Legal Essays in Tribute to Orrin Kip McMurray*. Berkeley, California, 1935.

[88] Barbara E. Kahn, Mary Frances Luce, and Stephen E. Nowlis. Debiasing Insights from Process Tests. *Journal of Consumer Research*, 33:131–138, June 2006.

[89] Danial Kahneman, Ed Diener, and Norbert Schwarz, editors. *Well-Being: The Foundations of Hedonic Psychology*. Russel Sage Foundation Press, 1999.

[90] Danial Kahneman and Jackie Snell. Predicting a Changing Taste: Do People Know What They Will Like? *Journal of Behavioral Decision Making*, 5:187–200, 1992.

[91] Danial Kahneman and Amos Tversky. Judgment under Uncertainty: Heuristics and Biases. *Science*, 185(4157):1124–1131, 1974.

[92] Daniel Kahneman. *Thinking Fast and Slow*. Farrar, Staus and Giroux, April 2011.

[93] Emir Kamenica, Sendhil Mullainathan, and Richard Thaler. Helping Consumers know Themselves. *American Economic Review*, 101(3):417–422, 2011.

[94] Heiko Karle and Martin Peitz. Competition Under Consumer Loss Aversion. University of Mannheim Working Paper Series, December 2012.

[95] Friedrich Kessler. Contracts of Adhesion, Some Thoughts About Freedom of Contract. Faculty Scholarship Series. Paper 2731, 1943.

[96] Jonathan Klick and Gregory Mitchell. Government Regulation of Irrationality: Moral and Cognitive Hazards. *Minnesota Law Review*, 90(6):1620–1663, 2006.

[97] Russell Korobkin. Bounded Rationality, Standard Form Contracts, and Unconscionability. *The University of Chicago Law Review*, 70(4):1203–1295, 2003.

[98] Russell Korobkin and Thomas Ulen. Law and Behavioral Science: Removing the Rationality sA sumption from Law and Economics. *California Law Review*, 88(4):1051–1144, 2000.

[99] Botond K szegi. Behavioral Contract Theory. *Journal of Economic Literature*, 52(4):1075–1118, 2014.

[100] Timur Kuran and Cass Sunstein. Availability Cascades and Risk Regulation. *Stanford Law Review*, 51(4):683–768, 1999.

[101] David Laibson. Golden Eggs and Hyperbolic Discounting. *Quarterly Journal of Economics*, 112(2):443–477, 1997.

[102] Janet Landman. *Regret: the Persistence of the Possible*. Oxford University Press, 1993.

[103] George Loewenstein. Out of Control: Visceral Influences on Behavior. *Organizational Behavior and Human Decision Processes*, 65(3):272–292, 1996.

[104] George Loewenstein and Daniel Adler. A bias in the Prediction of Tastes. *The Economic Journal*, 105:929–937, July 1995.

[105] George Loewenstein and Shane Frederick. Predicting Reactions to Environmental Change. In Max Bazerman, David Messick, Ann Tenbrunzel, and Kimberly Wade-Benzoni, editors, *Environment, Ethics and Behavior*, pages 52–72. San Fransisco: New Lexington Press, 1997.

[106] George Loewenstein, Daniel Nagin, and Raymond Paternoster. The Effect of Sexual Arousal on Expectations of Sexual Forcefulness. *Journal of Research in Crime and Delinquency*, 32, 1997.

[107] George Loewenstein and Ted O'Donoghue. We Can Do This the Easy Way or the aH rd Way: eN gative Emotions, Self-Regulation, and the Law. *The University of Chicago Law Review*, 73(1):183–206, 2006.

[108] George Loewenstein, Ted O'Donoghue, and Matthew Rabin. Projection Bias in Predicting Future tU ility. *The Quarterly Journal of Economics*, 4(118):1209–1248, 0N vember 2003.

[109] George Loewenstein and David Schkade. Wouldn't it Be Nice: Predicting Future Feelings. In Danial Kahneman and Edward Diener, editors, *Well-Being: The Foundations of Hedonic Psychology*. Russel Sage Foundation Press, 1999.

[110] Graham Loomes and Robert Sugden. An alternative Theory of Rational Choice hU der Uncertainty. *The Economic Journal*, 92(368):805–824, 1982.

[111] Joana Sousa Louren o, Emanuele Ciriolo, Sara Rafael Almeida, and Xavier Troussard. Behavioural Insights Applied to Policy. European Report EUR 277726 EN, Joint Research Center, 2016.

[112] James March. Bounded Rationality, Ambiguity, and the Engineering of Choice. *The Bell Journal of Economics*, 9(2):587–608, 1978.

[113] Florencia Marotta-Wurgler. ffUnfairffiDispute Resolution Clauses: Much Ado about Nothing. In Omri Ben-Shahar, editor, *Boilerplate, The Foundation of Market Contracts*. Cambridge Iv iversity Press, 2007.

[114] Kenneth May. Intransitivity, Utility, and the Aggregation of Preferences Patterns. *Econometrica*, 22(1):1–13, 1954.

[115] Massimo Motta. *Competition Policy: Theory and Practice*. Cambridge University Press, 2004.

[116] Javad Nasiry and Ioana Popescu. Advance Selling when Consumers Regret. *Management Science*, 58(6):1160–1177, 2012.

[117] Phillip Nelson. Information and Consumer Behavior. *Journal of Political Economy*, 78(2):311–329, 1970.

[118] Office of Fair Trading. Switching Costs. Part One: Economic Models and Policy Implications. Economic Discussion Paper 5, Office of Fair Trading, London UK, 2003.

[119] Office of Fair Trading. What does behavioural economics mean for competition policy. Technical Report OFT1224, Office of Fair Trading, March 2010.

[120] Gerhard O. Orosel and Klaus G. Zauner. Vertical Product Differentiation when Quality is unobservable to Customers. Working Paper, July 2005.

[121] John Quiggin. Regret Theory with General Choice Sets. *Journal of Risk and Uncertainty*, 8(2):153–165, 1994.

[122] Matthew Rabin. A Perspective in Psychology and Economics. *European Economic Review*, 46(4):657–685, 2002.

[123] Jeffrey Rachlinski. The Uncertain Psychological Case for Paternalism. *Northwestern University Law review*, 97(3):1165–1225, 2003.

[124] Todd. D. Rakoff. *Boilerplate, The Foundation of Market Contracts*, chapter The Law and Sociology of Boilerplate. Cambridge University Press, 2007.

[125] Daniel Read and George Loewenstein. Diversification bias: Explaining the Discrepency in Variety-Seeking Between Combined and Separated Choices. *Journal of Experimental Psychology: Applied*, 1(1):34–49, 1995.

[126] Daniel Read and Barbara van Leeuwen. Predicting Hunger: The Effects of Appetite and Delay on Choice. *Organizational Behavior and Human Decision Processes*, 76(2):189–205, 1998.

[127] Amanda Reeves and Maurice Stucke. Behavioral Antitrust. *Indiana Law Review*, 86(4):1528; 1586, 2011.

[128] Ilana Ritov and Jonathan Baron. Outcome Knowledge, Regret, and Omission Bias. *Organizational Behavior and Human Decision Processes*, 64(2):119–127, November 1995.

[129] Mario Rizzo and Douglas Glen Whitman. Paternalist slopes. New York University of Law and Economics Research Paper No. 07-08, February 2007.

[130] Mario Rizzo and Douglas Glen Whitman. Little Brother is Watching You: New Paternalism on the Slippery Slopes. *Arizona Law Review*, 51(3):685–739, 2009.

[131] Mario Rizzo and Douglas Glen Whitman. The Knowledge Problem of New Paternalism. *Brigham Young University Law Review*, 4:904–968, 2009.

[132] Gilles Saint-Paul. *The Tyranny of Utility: Behavioral Social Science and the Rise of Paternalism*. Princeton University Press, July 2011.

[133] Paul Samuelson. A Note on the Pure Theory of Consumer's Behaviour. *Economica*, 5(17):61–71, February 1938.

[134] Paul Samuelson. Consumption Theory in Terms of Revealed Preferences. *Economica*, 15(60):243–253, 1948.

[135] Frederic Schick. Dutch Bookies and Money Pumps. *Journal of Philosophy*, 82(2):112–119, 1986.

[136] David Schkade and Daniel Kahneman. Does Living in California Make People Happier? A Focusing Illusion in Judgements of Life Satisfaction. *Psychological Science*, 9(5):340–346, 1998.

[137] Carl Shapiro. Advertising and Welfare: Comment. *The Bell Journal of Economics*, 11(2):749–752, 1980.

[138] Oz Shy. *Industrial Organization*. Massachusetts Institute of Technology, 1996.

[139] Herbert Simon. A Behavioral Model of Rational Choice. *The Quarterly Journal of Economics*, 69(1):99–118, February 1955.

[140] Itamar Simonson. The Effect of Purchase Quantity and Timing on Variety-Seeking Behavior. *Journal of Marketing Research*, 27(2):150–162, 1990.

[141] Itamar Simonson. The Influence of Anticipating Regret and Responsibility on Purchase Decisions. *Journal of Consumer Research*, 19(1):105–118, 1992.

[142] Nirvikar Singh and Xavier Vives. Quantity Competition in a Differentiated Duopoly. *The RAND Journal of Economics*, 15(4):546–554, 1984.

[143] Henry E. Smith. Modularity in Contracts: Boilerplate and Information Flow. In Omri Ben-Shahar, editor, *Boilerplate, The Foundation of Market Contracts*. Cambridge University Press, 2007.

[144] Social and Behavioral Sciences Team. Social and Behavioral Sciences Team Annual Report. Technical report, Social and Behavioral Sciences Team, 2015.

[145] Hugo Sonnenschein. The Dual of Duopoly is Complementary Monopoly: or, Two of Cournot's Theories are One. *Journal of Political Economy*, 76(2):316–318, 1968.

[146] Ran Spiegler. The Markets for Quacks. *The Review of Economic Studies*, 73(4):1113–1131, 2006.

[147] Ran Spiegler. *Bounded Rationality in Industrial Organization*. Oxford University Press, 2011.

[148] Ran Spiegler and Michele Piccione. Price Competition Under Limited Comparability. *The Quarterly Journal of Economics*, 127(1):97–135, 2012.

[149] Robert Sugden. Regret, Recrimination and Rationality. *Theory and Decision*, 19(1):77–99, 1985.

[150] Robert Sugden. The Opportunity Criterion: Consumer Sovereignty without the Assumption of Coherent Preferences. *The American Economic Review*, 94(4):1014–1033, September 2004.

[151] Robert Sugden. Why Incoherent Preferences Do Not Justify Paternalism. *Constitutional Political Economy*, 19(3):226–248, 2008.

[152] Cass Sunstein. If Misfearing Is the Problem, Is Cost-Benefit Analysis the Solution. In Eldar Shafir, editor, *The Behavioral Foundations of Public Policy*, pages 230–242. Princeton University Press, 2013.

[153] Cass Sunstein and Richard Thaler. Libertarian Paternalism. *American Economic Review*, 2(93):175–179, 2003.

[154] Cass Sunstein and Richard Thaler. Libertarian Paternalism Is Not an Oxymoron. *The University of Chicago Law Review*, 70(4):1159–1202, 2003.

[155] Henri Temple. Le droit de la consommation est-il subversif ? In *Mélanges Calais-Auloy*, page 1068. Dalloz, 2004.

[156] Fran ois Terr , Philippe Simler, and Yves Lequette. *Droit Civil, Les Obligations*. Dalloz, 9th edition, 2005.

[157] Richard Thaler. Toward a Positive Theory of Consumer Choice. *Journal of Economic Behavior and Organization*, 1(1):39–60, 1980.

[158] Richard Thaler and Cass Sunstein. *Nudge: La méthode douce pour inspirer la bonne décision*. Vuibert, 2008.

[159] Amos Tversky and Danial Kahneman. Rational Choice and the Framing of Decisions. *The Journal of Business*, 59(4):S251–S278, 1986.

[160] Orit Tykocinski and Thane Pittman. The Consequences of Doing Nothing: Inaction Inertia as Avoidance of A ticipated Counterfactual Regret. *Journal of Personality and Social Psychology*, 75(3):607–616, 1998.

[161] Peter U el and George Loewenstein. The Role of Decision Analysis in Informed Consent: Choosing Between Intuition and Systematicity. *Social Science and Medecine*, 44(5):647–656, 1997.

[162] Ren van Bavel, Benedikt Hermann, Gabrielle Esposito, and Antonios Proestakis. Applying Behavioural Sciences to EU Policy-making. JRC scientific and technical report, Joint Research Center, European Commission, 2013.

[163] Joshua Wright and Douglas Ginsburg. Behavioral Economics: Its Origins, Fatal Flaws and Implications for Liberty. *Northwestern Law Review*, 106(3):12–63, 2012.

[164] Marcel Zeelenberg. The U e of Crying Over Spilled Milk: a Note on the Rationality and Functionnality of Regret. *Philosophical Psychology*, 1(3):325–340, 1999.

[165] Marcel Zeelenberg, Jane Beattie, Joop van der Pligt, and Nanne de Vries. Consequences of Regret Aversion: Effects of Excepted Feedback on Risky Decision Making. *Organizational Behavior and Human Decision Processes*, 65(2):148–158, February 1996.

[166] Marcel Zeelenberg and Jeffrey Inman. Regret in Repeat Purchase versus Switching Decision: The Attenuating Role of Decision Justifiability. *Journal of Consumer Research*, 29(1):116–128, June 2002.

[167] Marcel Zeelenberg, Wilco van Dijk, Antony Manstead, and Joop van der Pligt. On Bad Decisions and Disconfirmed Expentancies: The Psychology of Regret and Disappointment. *Cognition and Emotion*, 14(4):521–541, 2000.

[168] Jidong Zhou. Advertising, Misperceived Preferences, and Product Design. Working Paper, 2008.

Résumé : Les consommateurs disposent d'une rationalité limitée et sont sujets à divers biais cognitifs. La thèse étudie les conséquences des biais de rationalité sur le comportement des consommateurs ainsi que les implications sur la politique de consommation. Chacun des trois chapitres de la thèse est consacré à un biais particulier (surestimation de la qualité, erreurs d'anticipation de l'utilité, biais de projection) dans un contexte concurrentiel déterminé. Les deux premiers chapitres sont bâtis sur des modèles de duopole standards auxquels sont intégrés des biais de rationalité : le premier est un duopole avec différenciation horizontale inspiré de Dixit (1979), tandis que le second envisage un modèle de différenciation verticale adapté de Gabszewicz & Thisse (1979). Le troisième chapitre étend à trois périodes la modélisation du biais de projection proposée par Loewenstein et al. (2003). J'aboutis à la conclusions que, si les biais cognitifs conduisent dans certains cas à des choix sous-optimaux (chapitres 1 et 2), les consommateurs naïfs peuvent également être avantagés par rapport aux agents sophistiqués (chapitre 3). Ce constat plaide en faveur d'une intervention circonstanciée et mesurée sur le marché. Enfin, des recommandations de politiques économiques sont formulées: je prône une approche renouvelée du droit de la consommation, qui ne serait plus fondé principalement sur l'information du consommateur mais davantage sur des mesures de redressement cognitif. De exemples de mesures concrètes sont discutés tout au long de la thèse.

Descripteurs : Economie du droit comportementale - Biais de rationalité - Protection des consommateurs - Contrat d'adhésion.

Abstract : Consumers have bounded rationality and exhibit cognitive biases. The thesis studies the consequences of such biases on consumer choice and implications on consumer policy. Each chapter of the thesis investigates one specific bias (quality bias, utility misperception and projection bias) in a given market structure. The first two chapters focus on standard duopoly models, in which cognitive biases are incorporated: I build a horizontally differentiated duopoly based on Dixit (1979) in chapter 1, and a vertically differentiated duopoly inspired by Gabszewicz & Thisse (1979) in chapter 2. As for the third chapter, it extends to three periods, in a monopolistic framework, the projection bias model proposed by Loewenstein et al. (2003). I come to the conclusion that, while cognitive biases sometimes lead to suboptimal consumption decisions (chapters 1 and 2), naive consumers can be better off than their sophisticated counterparts (chapter 3). This observation pleads in favor of a non-systematic and context dependant legal intervention to counter cognitive errors. I argue in favor of a new approach of consumer policy, that would focus less on information disclosures in favor of debiasing schemes. Examples of such debiasing policies are discussed throughout the thesis.

Keywords: Behavioral Law and Economics - Consumer bias - Consumer policy - Standard form contracts.