On Consumers' Freedom of Choice: Lessons from the Cellular Market

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Do the many offers made available to consumers in the cellular market benefit them, or detract from their ability to achieve meaningful choice? When does offering more choice lead to worse results? Addressing these questions in the context of cellular contracts allows for a combined analysis relying on empirical studies in cognitive psychology together with economic analysis of competition in the cellular market. While the psychological literature sheds light on human limitations, the economics of contracts and competition show how firms in the cellular market may be using obfuscation to raise the cost of comparing among them, lessening competitive pressure and raising profits.

This paper sets out an exploration of complexity in contractual offerings, and how this complexity is both detrimental to consumers – and highly valued by them. The paper begins with a review of experimental and theoretical literature in psychology, delineating the effects of cognitive overload (caused by extraneous information and overly-large choice sets). Thereafter, evidence is presented to show that while choice-making suffers in these conditions, consumers highly value variety – even when it ultimately produces worse results, both subjectively and objectively. Thus I separate between two forces: the preference for choice, and the preference among choices. The former entices consumers to high-variety settings, which reduce their ability to satisfy the latter.

Implementing these general tendencies to cellular markets, economic analysis is used to show two effects of hyper-choice: strategic consumer confusion as to actual price, and reduction of competitive pressure. Each raises issues of regulatory concern, the first in the realm of consumer protection and the second in the realm of antitrust law, or competition policy. While some of the effects are relevant to all consumers, discrimination among them is made easier as well. Price discrimination is generally profitable for capable sellers, and two specific forms of discrimination among consumers stand out in this market: new vs. existing consumers and naïve vs. sophisticated consumers. The paper thus examines how contractual

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complexity might be used to differentiate among consumers, and who ends up paying the price.

After the theory, comes empirical verification. Empirical studies of cellular (and other) markets are reviewed, dealing with the effects of competition on available choices, and consumers' ability to choose optimally. Critical reading of these studies shows that the issues raised by theoretical analysis are well grounded in reality, but also provides an opportunity to observe the implicit assumptions common in the literature, equating variety with consumer welfare, while ignoring cognitive costs and the actual implementation of choice.

Lastly, potential regulatory responses are discussed. Is it true that the harm to consumer choice warrants state intervention? Levels of paternalism are raised, as well as the skewed incentives that might result from overly zealous regulation. The problem, by now well defined, does not necessarily lend itself to a clear-cut solution. Costs of intervention may be higher than its benefits.
I \hspace{1cm} \textbf{INTRODUCTION}

The cellular-phone market is an exciting and fascinating avenue for research. In it one finds high-speed technological innovation, changes in social norms regarding public vs. private space and behavior, issues of competition policy in concentrated industries, public health and environmental concerns, regulation of communication media, and consumer protection law regarding commercial relations between cellular providers and their customers. Add onto that the ever-increasing array of services provided via cell-phones, and the possibilities for research seem boundless indeed. Cellular firms operate both as vendors, selling products and services to their subscribers, and as facilitators, selling access to their consumers to content-providing firms. This latter aspect brings up issues best analyzed within the two-sided-market framework, further complicating competitive analysis. The market is obviously important in terms of size and social prevalence, but also allows a peek into issues arising in other industries, and the manner in which regulators and legislators seek to affect social changes that the cell-phone industry exemplifies. The issues to be analyzed here will thus affect not only legal and public policy in the cell-phone industry, but will serve as a basis for discussion of social, economic, and legal issues arising in other industries as well.

This paper focuses on the relationship between firm and customer, specifically on the complexity of contracts offered, and the ways this complexity might be harmful to consumers. In a nutshell, the question raised is whether expanded choice offered to consumers acts to their detriment, rather than benefiting them, and what special circumstances in the cellular industry might exacerbate this problem. Complexity in choice problems can arise in a multitude of ways, increasing choice while making comparison between alternatives more difficult. The mobile-phone market is a prime example, as consumers choose along multiple dimensions, including type of phone (each with differing attributes), type of contract (pre-paid vs. monthly bill, unlimited use vs. metered, 'bucket-of-minutes' vs. per-use, etc.), national vs. local coverage, and more. Even after initial choice, cellular usage usually varies over time, raising issues of following up and checking monthly bills, and the difficulties of understanding what seem to many to be exceedingly complicated pricing plans and their presentation in (purposefully?) obfuscated monthly bills.
Since the literature cited draws heavily from psychology on one hand and economics on the other, central themes will be introduced via experimental and empirical data. The use of examples will hopefully clarify the issues raised, and allow for looking beyond the anecdotal evidence to discern recurring issues evolving from human reasoning and the limitations thereof. The cellular market will serve both as a platform for implementation, important due to its size and centrality in current social life, and as a particular example of the wider debate – whether and how much government should intervene in the marketplace to protect consumers apparently unable to protect themselves. Beyond the general issues pertinent to other consumer markets as well, the cellular market is distinct in economic attributes exacerbating the issues. Specifically, the high level of concentration characteristic of telecommunications markets affects the competition between firms, in a manner directly affecting the provision of choice to consumers (and the latter's ability to bargain for it). Comparisons among firms' offerings which facilitates consumer choice between providers (rather than between contract terms), may be strategically constrained through obfuscation, further reducing competitive forces. Furthermore, contractual complexity may allow price discrimination between consumers in a manner more severe when long term relations between provider and consumer are expected (due to high switching costs), and subscription pricing prevalent in the cellular industry serves a role as well.

Consumers face a multitude of choices when choosing a cell-phone provider, or choosing a calling plan. They face a large variety of handsets, technical capabilities, and contract terms, seemingly giving them freedom of choice on many levels. The argument I examine, is to what extent this choice is fictitious, a façade of consumer autonomy covering a reality of confusion and the difficulty of comparing the different firms' offerings. From a legal perspective, the question is to what extent the multiplicity of terms raises issues of consumer protection and subversion of the competitive process. The question of regulatory intervention requires not only assessing consumers' ability to effectively choose among the many offers, but also a discussion of how regulators view consumers, and how much psychological realism we are willing to admit into the legislative and regulatory process.

In a broader context, I shall attempt to show that the different arguments raised in the cellular market are intertwined, and that cross-effects must be considered before intervention of any type can be justified. This paper focuses on the consumers' vantage point and the legal assumption of consumer capabilities as a necessary first step of regulation. Although the focus is individual in nature, assessing cognitive limitations and resulting market behavior,
the broader characteristics such as firm concentration are vital to the analysis, and strongly
affect the type of contracts consumers are offered. In other words, competition in the market
is formed by a combination of 'standard' economic attributes and psychological effects
consumers cannot escape. The result is that contractual complexity may corrupt the choice
process, in a manner allowing both consumer exploitation and lessening of competition.

This paper aims to elucidate the issues, fleshing them out both as a general
phenomenon and their specific implementation in the cellular context. The aim is not to
provide ultimate solutions, but to show the directions these might take – and the
insurmountable difficulties involved. Essentially, this paper aims to enrich our understanding
of what 'choice' really means, and the problematic nature of either trusting the market to
provide it, or relying on regulation to protect it.

II  CONTRACTUAL COMPLEXITY – WHEN IS THERE TOO MUCH
CHOICE?

Consumers' freedom of choice is usually seen as a good to be maximized, since
increasing variety allows the consumer to find an alternative closer to his most-preferred
choice, as well as facilitating expression of personal autonomy.\(^1\) Despite this, an argument
may be raised that increased variety need not benefit the consumer, and might be used by the
firm in order to confuse the consumer and point him towards the profit-maximizing options,
as well as creating a sense of choice and competition well beyond the reality faced.

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\(^1\) E.g. Deci, E. L. *The psychology of self-determination* (Lexington, MA: Heath, 1981); Deci, E.
L., & Ryan, R. M. *Intrinsic motivation and self determination in human behavior* (New York: Plenum
Press, 1985); Beattie, J., Baron, J., Hershey, J. C., & Spranca, M. D. "Psychological determinants of

While freedom of choice allows for self-determination and autonomy, here there can be too much
of a good thing. The consumers' ability to choose may be impeded by having too many alternatives, an
argument that will be at the center of our discussion below. See, e.g., Schwartz, B. "Self-
determination: The tyranny of freedom", *55 American Psychologist* 79–88 (2000); Schwartz, B.
The basic idea of complexity as an anti-consumer tactic is simple: given consumers with limited cognitive capability, their ability to know and understand the variety of calling plans is constrained. Thus, from a certain stage, adding an option does not add to choice - and may even detract from the decision-making process due to the cognitive load placed on the consumer. One may argue that the consumer is free to ignore extraneous options, or examine only the first $X$ alternatives he encounters ($X$ being a factor of his personal attention-span). Still, in reality the problem is more severe: the attempt to assess the multiple options we face hinders choice even among the smaller number of alternatives that we are capable of remembering and comparing to each other. Cognitive overload leads to mistaken decisions, and these can be anticipated, indeed planned, in a manner allowing firms to plan the types of alternatives offered, and the optimal order in which they are presented to the consumer. Furthermore, insofar as choice is valued as a good due to the decision-maker's ability to express autonomy through choice, exerting control over the process. In contrast, excess alternatives detract from the ability to handle the choice-situation, and thus autonomy suffers.

II.A Cognitive Overload – The Difficulty of Choosing

The Cellular market typically offers an extremely wide variety of handsets and calling plans among which the consumer may choose. Seemingly, variety means choice, and increasing consumers' choice enhances their welfare. Nonetheless, the question remains how good consumers are at choosing optimally when variety is large and uncertainty as to future effects prevails. Especially interesting is whether the rational model's prediction that increasing the number of alternatives increases welfare (due to ability to find 'a better fit'), holds when cognitive overload is taken into account.

If we assume that the human mind fulfills many purposes simultaneously, cognitive overload may be characterized as 'cost of thinking', a situation where brain resources are utilized extensively to understand a complex situation, at the expense of investing mental effort in other actions.\(^2\) In the context of consumer choice, this is not only the difficulty of

understanding a specific offer the consumer faces, but the resources necessary to find relevant alternatives, compare among them, and the need to classify offers as competing or belonging to different categories altogether. Cognitive overload may lead to mistakes in judgment, but also to a 'decision not to decide', deferring the need to deal with the question due to the difficulty of formulating a clear answer.\(^3\) As shown below, avoiding a difficult decision can take the form of delaying a purchase decision, but may also lead a consumer to make a quick decision while avoiding an in-depth comparison that is difficult to make. Such quick decisions typically rely on a preliminary and superficial assessment of affective (emotion-laden) characteristics, ignoring the more difficult comparison among cognitive ones.\(^4\)

A simple example may be found in an experiment conducted to test the relation between cognitive overload and self-control.\(^5\) A group of subjects were asked to remember a two-digit or seven-digit number, while deciding what type of food to choose – chocolate cake or fruit salad. Memorizing the numbers created a cognitive load, with the two-digit treatment signifying a relatively easy task compared to the seven-digit treatment. The choice between chocolate cake and fruit salad was an attempt at testing the subjects' willpower, under the assumption that beyond a basic heterogeneity of preferences regarding the alternatives (distributed randomly and supposedly identically in both groups), fruit salad is often chosen via a cognitive consideration of health and fitness, necessary to overcome the affective tendency towards chocolaty instantaneous gratification. The difference between the groups was significant and stark – among those memorizing two-digit numbers, 37% chose the chocolate cake, while their seven-digit counterparts chose cake 59% of the time.

A cute anecdote which exemplifies a general tendency accepted in the psychological literature – that high cognitive load 'steals away' mental resources from other issues simultaneously considered, and reduces the cognitive availability necessary for self-control.

http://ssrn.com/abstract=444840 Among other things, this study found an inverse relation between the number of options examined, and the tendency to stop the search and choose – even when the advantage gained by continuing the search remained the same.


The practical conclusion may be that when one would like to steer consumers towards a more affective and less controlled decision, creating conditions of cognitive overload is a good start.\textsuperscript{6} Going further, one may devise a decision-making process requiring the consumer to go through multiple stages, leaving the choice requiring the most self-control last, after the cognitive component tires.\textsuperscript{7} It should be stressed that complexity yielding such decision-making processes is not necessarily a planned anti-consumer tactic devised by firms seeking to exploit their customers. Often, as we shall see below, the large number of options is considered attractive by consumers, and they are actively seek the (seemingly) enhanced freedom of choice associated with them. There are even arguments that such choice proliferation is detrimental to the producers offering them, and profit-maximizing requires cutting down on options offered.\textsuperscript{8}

One of the interesting aspects of choice overload is that consumers are generally unaware that variety may work to their detriment, and may be unaware of the effects of cognitive overload – despite their actions. For example, a known tendency is to make a decision based on partial consideration of the reasons therefore, or even considering just a


The level of cognitive load does not have to be a direct result of the number of options considered. It also varies according to the structure of question posed, the consolidation of information into categories, and the distribution of possibilities. Thus, the same number of alternatives can lead to different levels of cognitive load. See, Nicholas H. Lurie, "Decision Making in Information-Rich Environments: The Role of Information Structure", 30 \textit{Journal of Consumer Research} 473(2004)

Another way of focusing information for consumers is to encourage them to create an 'ideal picture' of the product they seek. Consumers holding such a mental picture use it as a fulcrum upon which to compare the alternatives they face. In this manner they essentially compare categories rather than lists of attributes, allowing for consideration of a larger number of alternatives. See, Alexander Chernev, "Product Assortment and Individual Decision Processes", 85 \textit{Journal of Personality and Social Psychology} 151 (2003)


\textsuperscript{8}E.g., Huffman, C., & Kahn, B. E. "Variety for sale: Mass customization or mass confusion?", 74 \textit{Journal of Retailing} 491–513 (1998).
partial list of product characteristics, and 'tell ourselves' a reasonable story showing our decision as justified. It seems most of us are interested in the feeling that we chose correctly, and we are quite good at finding ad-hoc reasons to prove our wisdom. Furthermore, this preference is so strong, that systematic evidence is available to show that people are willing to distort existing information in order to better suit their preferences – despite the distortion fooling no one other than themselves.\(^9\) One interesting phenomenon is that decision-makers find the way to prefer options whose superiority is easier to explain, not based on product-attributes, but on the ease of answering the question why this option is to be preferred.\(^{10}\) Beyond that, in order to ease decision-making, there is a tendency to focus on easily-compared attributes and base decisions on them, while ignoring more important attributes that do not lend themselves so easily to creating a clear hierarchy among alternatives.\(^{11}\) All in all, this first glimpse paints a rather bleak picture of consumers' aptitude for utility maximization through product choice.

As far as decision tools go, i.e. the methodology used to make decisions in high-complexity environments, we would expect that even if the consumer lacks time or mental resources to make a full comparison among competing offers, the decision will be made based on those attributes considered the most important, even if their full effect is too difficult to assess. In other words, a rational consumer aware of his limited capacity of considering all relevant dimensions, would rate attributes based on their (subjective) importance, and consider as many of them as possible, weighted by importance and (inverse of) cognitive cost. In contrast to this admittedly optimistic expectation, reality shows that when complexity is high consumers tend to seek decision tools reducing the dimensionality of the problem, usually through heuristics limiting the number of attributes considered. The problem is that such heuristics typically rule out options strictly preferred (by the consumer himself) to those


\(^{10}\) E.g., Shafir, Eldar, Itamar Simonson, and Amos Tversky, “Reason-Based Choice” 49 Cognition 11–36 (1993)

remaining in the active choice set. Thus, we act in a way which effectively reduces our ability to find the best option, even according to our own subjective assessment.

An especially interesting example may be found in a study where consumers were given a list of products in response to their internet search. Some saw a list of 15 products to choose from, while others saw 50 such items. While supposedly those receiving a longer list are better off, this group chose on average worse products, after spending a longer time searching for them. A large variety does harm to the quality of choice due to difficulty in comparing the alternatives, thus making identification of the optimal choice harder. Beyond that, a well-documented tendency is to prefer the option framed as the default-choice. Status-quo bias is a well-known phenomenon which received much empirical and experimental corroboration, becoming a central part of behavioral economics and arguments in favor of 'soft paternalism'.

Empirical studies show that in a large variety of circumstances, individuals prefer to stick to the default option they were offered, probably in order to avoid examination of the different options and risking future remorse. This is true not only in economic applications, but also in such different contexts as maintaining current political structure, and even increasing support (or reducing resistance) to practices of torture carried

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out by U.S. officials on suspects of terrorism, when these were described as part of an ongoing practice rather than a new development.\textsuperscript{16}

The stress an individual encounters when facing a complex choice may lead to a preference not to decide at all, even when each of the alternatives is better than not deciding. An especially significant example in terms of economic implications is found in workplace retirement funds. In the U.S. this has turned into an especially fertile ground for research, as employees need to decide on an appropriate fund when they are hired (and sometimes periodically afterwards), and the implications of their choice will be felt only when they retire. Since the economic implications are large (retirement savings accumulated over a long period), this is an especially difficult choice to make. Often several competing funds are offered, differing in levels of risk and reward, and the difficulty of understanding them combines with an ability to defer the choice to an unknown future date. If the decision is difficult to make now, but there is ample time (theoretically) to return to it in the future, the temptation to defer deciding is large. If we add to this the fact that no change is expected in the complexity of the decision later on, the result is a dynamic reminiscent of 'tomorrow the diet starts', with a similar level of success.

A fascinating study examining the relation between the number of funds from which employees could choose, and their actual choice, showed a clear tendency to avoid choosing altogether (and thus implicitly choose none) as the number of alternatives increased.\textsuperscript{17} Since a picture is worth more than a thousand words, the results are shown as in the original.\textsuperscript{18}


\textsuperscript{18} For a fascinating discussion attempting to elucidate this common expression, see Jill H. Larkin and Herbert A. Simon, "Why a Diagram is (Sometimes) Worth Ten Thousand Words", 11 (1) Cognitive Science 65 (1987)
The general direction of the graph, decreasing from left to right, shows the reduction of participation among employees in any fund as their choice increased. It should be stressed that all funds offer matching contribution, meaning that employee deposits are matched by equal deposits made by their employer. This means that non-participation entails forgoing employer investment as well – leaving money on the table. Beyond the reduction of investment, another phenomenon was witnessed – reduction in the willingness to invest in equity funds, preferring less risky alternatives. Supposedly, there should be no relation between the number of funds offered and the employees’ risk-aversion, but it seems that in the background operates a dynamic of remorse-aversion. Employees confused by the array of choices were also afraid they will be unable to choose optimally among them, leading them to avoid decisions as well as avoid taking risks (both creating potential for future remorse).

Both tendencies led to direct monetary loss, as the more rewarding options were chosen less

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often. In simple words, complexity of choice harmed the quality of choices made, as well as willingness to make a choice at all.

II.B The Preference for Choice – and its Harm for the Chooser

Up to this point we examined contractual complexity in the sense of offering a too-large variety of options to consumers, harming their ability to optimally choose the best alternative (subjectively speaking). The emphasis was on the difficulty of comparing among alternatives differing in their structure, or cognitive overload shifting choice from being reason-based to affect-laden. The common factor so far has been on an instrumental objective – finding the most preferred alternative from the chooser's point of view. This section shifts the focus towards choice as a formative process – the advantage gained by the act of choosing itself, above and beyond the advantages of a 'correct' choice.

Most people share an intuitive judgment that the ability to choose is a good thing, and limitations thereof detract from welfare. Even when the choice is between 'insignificant' alternatives, meaning ones whose instrumental contribution is slight, it is often assumed that making the choice (rather than having the choice externally forced) is in an individual's interest. A noted exception is when choice is between negative alternatives, i.e. choosing between bad and worse. There, most people prefer having the choice made for them, perhaps because it is easier to accept bad news when it is forced than to accept it as something we

21 This is not merely the preference of security over profit, of the type explainable by standard risk-aversion. Here, the risk-premium is so large that additional explanations are necessary, usually drawn from the behavioral literature. See generally, Jeremy J Siegel and Richard H. Thaler, "Anomalies: The Equity Premium Puzzle," 11(1) Journal of Economic Perspectives 191-200 (1997)

22 See Deci, note 1 above.

23 Cordova, D. I., & Lepper, M. R., "Intrinsic motivation and the process of learning: Beneficial effects of contextualization, personalization, and choice", 88 Journal of Educational Psychology 715-730 (1996). This preference turns out to be so strong that it is enough to rearrange the alternatives in categories, to make them more attractive. The multiplicity of categories creates an illusion of increasing choice, even when the alternatives themselves remain unchanged. See, Cassie Mogilner, Tamar Rudnick, and Sheena S. Iyengar, "The Mere Categorization Effect: How the Presence of Categories Increases Choosers’ Perceptions of Assortment Variety and Outcome Satisfaction", 35 Journal of Consumer Research 202 (2008)
Although it is tempting to classify the status-quo bias under a preference for non-choice, it is important to distinguish between the cases – choosing the status-quo is not the same as avoiding choice altogether.

It may very well be that a person prefers both receiving a variety of alternatives to examine, and ending-up with the status-quo. Some would call this self-delusion, since in actuality such a preference does not entail true judgment, but acceptance of the default option because it is framed as such through the choice of another agent who set up the options in this way. Even if the default option is preferred not due to its content but merely because of its framing, the individual's preference for receiving an array of alternatives is not negated. The studies cited (and many more) show a common preference for both receiving a list of alternatives (preferably long) and choosing the one framed a-priori as the primary one, usually as the default option. This might sound strange (especially to those of us trained to assume the rationality of the decision-making process), yet it is prevalent nonetheless. The phenomenon of wanting to examine a variety of alternatives (preference for choice) is a common one, and distinct from the manner in which this variety serves the individual's final objective of choosing optimally among them (preference among choices). How much so, and when the preference for choice detracts from the preference among choices, are the questions this section aims at elucidating.

As before, let us begin with an experimental example. In order to examine the effect of variety on purchase decisions, a tasting-booth was placed in an upscale supermarket. On the counter several types of jams were placed in a manner inviting store patrons to pass by and taste to their heart's content, perhaps purchasing a jar of jam for home use (at a discount). The experiment was conducted in both large and small variety conditions. The large variety was created by placing 24 types of jams available for tasting, while only 6 jams were made available in the small variety condition. The number of customers stopping to taste, as well as the number of those subsequently purchasing, were noted. The results are simple and

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significant: when the tasting booth offered 24 choices, the number of shoppers stopping to
taste was 50% larger than when only 6 choices were available. Thus, a clear preference for choice was witnessed. On the other hand, the number of purchasers among those stopping to
taste was significantly smaller in the large-variety condition – only 3% of tasters actually purchased one of the 24 jams, while 30% of those tasting 6 jams made a purchase. The
difference is not only in the percentage of tasters purchasing, but in absolute numbers as well – sales dropped when variety increased despite drawing a larger crowd. More interested
customers, but fewer purchasers.

What can we learn from the experiment? Insofar as it exemplifies a general
phenomenon, we observe two effects. First, a large variety attracts a significantly larger
number of shoppers to stop and taste. Second, the large variety prevents a purchasing
decision, and action that is supposed to mirror the implementation of a preference formed
through tasting (or prior to it). This is not a case of consumers attracted merely for the tasting
without having a purchase objective, since in that case we would observe an increase in the
number of tasters without increasing the number of purchasers. That phenomenon may well exist, but is far from sufficient to explain the dramatic drop in number of purchases made.

In order to verify the generality of results, as well as discuss other implications, the same study examined variety effects in other contexts. For example, subjects were asked to choose among
different types of chocolate, and then asked for personal evaluations of the choice process and their
enjoyment of the chocolate. Choosing among many alternatives reduced eventual enjoyment of the chocolate. When examining students' choice whether to turn in an optional assignment, both
participation rate and quality of work submitted were reduced when choice variety was increased. Thus both result and process were detrimentally affected, based on both subjective and objective measures.

As to the results' generality, it should be noted that the preference for choice and the importance
of choice for personal autonomy and subjective welfare, varies across cultures. It is perhaps unsurprising that in Western cultures where individual values are stressed, choice seems much more important than in more communal cultures, where interdependence is as (or more) important than independence. See, Sheena S. Iyengar and Mark R. Lepper, “Rethinking the Value of Choice: A Cultural Perspective on Intrinsic Motivation,” 76 Journal of Personality and Social Psychology 349–66 (1999); Miriam Hernandez and Sheena S Iyengar, "What drives whom? A cultural perspective on human agency", 19(3) Social Cognition 269 (2001)

If the results were not so stark, they might be explained away by experimental design suffering from selection bias. Selection bias exists where the type of people approaching a large-variety tasting booth (24 flavors), is different from the type of people who approach a small-variety booth (6 flavors).
In the previous section we saw other examples of a large variety being detrimental to choice-making, due to cognitive-overload. The important distinction here is that consumers were attracted to the same thing which eventually blocked their ability to form a preference and purchase a jam, slightly reminiscent of the moth being drawn to approach the lamp, only to be burned by its proximity…

One must not overreach in interpreting the example. Just as increasing options does not necessarily benefit the chooser, it is not always detrimental either. In this case, a negative correlation was observed between the number of alternatives and the purchase decision, but it is important to note that only two conditions were compared. When we examine a larger array of 'menus', differing in the number of alternatives offered in each, a more complex dynamic is apparent. In the beginning, increasing options benefits choosers due to their ability to switch to a (subjectively) more-preferred alternative. As the size of the menu increases, cognitive overload rises, and the difficulty of making comparisons prevents purchasing decisions.28

Returning to our context of choice, the exceptionally large number of alternatives offered in the typical cellular contract requires focusing on the difficulty of choice in large-variety contexts. We should also note a possible objection that non-purchasing is different

Theoretically, the first might be acting out their preference for tasting in itself, not being interested in a subsequent purchase. It may also be that only people truly interested in home consumption approach a small-variety booth. In order to overcome any such effect, the experimenters varied the hours in which the booth operated in each version, and studied demographics of the people approaching the booth in the different treatments. These controls, together with the stark numerical difference observed, strengthen the conclusion that a general phenomenon was observed.


Some describe this as an advantage of increasing variety up to a satiation point, lack of advantage thereafter up to a regret point, and a disadvantage after that. See, Rémi Desmeules, "The Impact of Variety on Consumer Happiness: Marketing and the Tyranny of Freedom", 22 Academy of Marketing Science Review 1 (2002)

It is especially interesting to see that consumers interested in choice may perceive its offering by the firm as unfair. A preliminary experimental study reproduced the standard results of variety impeding choice, but showed that consumer perceived this as unfair only when prices were high. When prices were low, variety was still unhelpful, but did raise 'moral' objections on consumers' part. See, Maxwell, Sarah, "Hyperchoice and high prices: an unfair combination", 14(7) Journal of Product and Brand Management 448 (2005)
from loss of utility, and we have no way of knowing for sure that shoppers avoiding purchase suffered a loss. While we have no way of reading minds, the purchase decision expresses an assessment that the product is worth more than its price. A shopper, who tasted and bought a jam, is seen as increasing his utility compared to his previous, pre-purchase, situation. This follows directly from seeing him as implementing a preference to shift from one situation to another, presumably more-preferred. A large number of shoppers approaching the tasting booth show their interest in examining, tasting, and perhaps buying, the jams. The fact that they eventually did not buy, insofar as this was caused by the larger variety placed before them, shows that the number of options detracted from their ability to implement their preference between alternatives, thus the default option, of non-purchase, was seen as simpler than solving the complex optimization problem they faced (although most consumers probably did not describe their situation in these words). Where simple alternatives bypassing the difficulty of high-variety-choice are present, these could be easily superior to non-purchase. Simple alternatives thus become more enticing when surrounded by an array of choices, with the status-quo bias as one example of this dynamic.\textsuperscript{29} In the context of the market for cellular communication, as we shall see below, simplicity may be achieved through choice in options recommended by the firm, recognizable due to advertising, or a preference for simple tariffs over complex ones.

This phenomenon, of a preference for choice which harms the chooser, is far from unique to consumer contexts, and affects choosers long after the choice-making process itself.\textsuperscript{30} For example, job-seekers usually examine and compare a large number of alternatives prior to choosing (or finding) a permanent workplace. Apparently, here also one


\textsuperscript{30} A preference for choice even when this does not improve the alternative chosen is not only a human trait. For documentation of the same in animals, see, A. Charles Catania, "Freedom of Choice: A Behavioral Analysis", 14 \textit{The Psychology of Learning and Motivation} 97-145 (1980)
can search too much – not just in 'wasting' search costs, but also in harming the quality of choice eventually made, as assessed by choosers themselves.\textsuperscript{31}

In the job-search context a difference was found between the objective assessment of choice focused on easily-measured parameters (such as starting salary), and the subjective assessment made by the chooser reflecting on her choice and the process leading to it. While a search focusing on maximizing starting salary will achieve that purpose, and usually a larger menu of alternatives will be better, it turns out that those investing more time in the search tend to regret their choice more, and describe the search process more negatively than those limiting themselves to a smaller array of choices.\textsuperscript{32}

In simple words, the tendency to search long and hard harms the enjoyment of the result – not exactly the utility maximization that economists hold dear.\textsuperscript{33} Importantly,

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  \item \textsuperscript{32}For a general discussion of this phenomenon, see, Barry Schwartz, The Paradox of Choice: Why More is Less (New York: Ecco, 2004)
  \item \textsuperscript{33}Part of what explains this is the type of people choosing each process. Generally speaking, the tendency towards optimization (utility maximization) vs. satisficing (achieving a satisfactory result, not necessarily the best available one). Paradoxically, 'optimizers' reach lower levels of utility, both in subjectively self-assessed terms such as feelings, and in objectively measured correlations to psychological measures such as regret and depression. See, Barry Schwartz et al., "Maximizing Versus Satisficing: Happiness Is a Matter of Choice", 83(5) Journal of Personality and Social Psychology 1178–1197 (2002).
  \item It should be noted that this conclusion is contested. In another study, the measures used by Schwartz et al. were argued to be non-indicative of optimization, and an alternative measure was proposed which weakened the conclusion that optimizers are less happy with their choice. Still, even this alternative study found that optimizers were more prone to regret than satisficers. See, Dalia L. Diab, Michael A. Gillespie, and Scott Highhouse, "Are maximizers really unhappy? The measurement of maximizing tendency", 3(5) Judgment and Decision Making 364 (2008).
  \item It is interesting to remember that already in the 1950's, Herbert Simon suggested that psychological realism dictates that the economics profession should emphasize satisficer-oriented models rather than optimizer-oriented ones. See, Simon, Herbert A., Models of Man: Social and Rational (Oxford: John Wiley & Sons, 1957). Implementing the findings showing satisficers reach higher levels of utility, leads to a conclusion that optimizers, aiming at high utility levels, should adopt a strategy of satisficing as well, but one aimed at measurable attributes such as pay (in employment search), or price (in product search). Thus, true optimization is achieved by aiming for a known
\end{itemize}
subjective assessments of this type affect objective criteria as well – including for employers. Job satisfaction and salary satisfaction during employment were found to be closely related to employees' subjective assessment of the negotiation process prior to employment – and affect employee morale (which is related to their investment in quality of work), as well as their willingness to stay at the workplace rather than seek alternative employment (forcing the employer to find and train new employees).\textsuperscript{34}

The tendency to prefer a large variety despite its harming enjoyment of the alternative chosen may be explained as the result of a two-stage process: First, one chooses a menu of alternatives, thus employing the \textit{preference for choice}. Subsequently, one chooses among the alternatives on the menu chosen in the first stage, thus employing the \textit{preference among choices}. The second stage is subject to biases when the variety is too large, but this affects first-stage choice only insofar as these biases are salient while choosing among menus, and it seems humans are imperfect at such anticipation and find it difficult to bring themselves to employ protective measures.\textsuperscript{35} When the separation between stages is strong, meaning the consumer is focused on variety when choosing a menu (such as when choosing to approach the jam-tasting booth), her difficulties later on (in choosing among jams) are an insufficient incentive to plan ahead. This is especially true when the corrective response is limiting the supply of choices to which she exposes herself, or choosing a smaller menu in order to facilitate easier choice later on.\textsuperscript{36}


\textsuperscript{36} The tendency of consumers (and people generally) to focus on the stage in which they currently operate, and ignore or severely discount the importance of future steps they will need to take, is often overlooked by 'standard' economic models based on rational utility-maximization. An example can be found in Emir Kamenica, " Contextual Inference in Markets: On the Informational Content of Product Lines", 98(5) \textit{American Economic Review} 2127–2149 (2008), which builds a model explaining 'excess choice' on a fully rational (non-cognitively constrained) basis. There, results of the type reviewed above are explained by consumers receiving new information when they see the firm's choice of variety offered to its customers. On the other hand, it can be shown that in many cases a preference for choice
leads to mistakes unexplainable within the rational framework. For example, the preference for a lottery with a strictly lower probability of winning, just because more options were presented (one of which being the winning one). See, Bown, N.J., Read D., and Summers, B., "The Lure of Choice", 16 Journal of Behavioral Decision Making 297-308 (2003)
III IMPLEMENTATION TO THE CELLULAR MARKET

In the cellular context, what happens to the consumer once she approaches the point-of-sale (whether physically, or via telephone or internet) and stares at the multitude of available handsets, and plethora of alternative calling plans? The first impression is of much choice, and we may assume that confusion sets in immediately thereafter. Which is better? The choice of handsets may be said to be guided by subjective preference and is affect-laden (large or small handset? Black or red? How important is a five-megapixel camera relative to a three-megapixel one? Better a small and convenient handset or a good keyboard for email?).

Rather than assess the full array of dimensions along which consumers must classify their preferences and compare to market offerings, the focus here will be on the calling plans, independent of individual differences and tastes regarding handsets and their many attributes. Choice of calling plans is simpler to analyze, as consumers generally have a single (and common) optimization objective – minimizing expected payment to the cellular provider when using the phone in the future. With regard to this common objective, it may be possible to directly assess 'better' vs. 'worse' choices, allowing assessment of the choice process and the incentives underlying it.

In order to minimize costs, the consumer must anticipate future use of her phone, since most calling plans provide a menu combining fixed and marginal prices (monthly payments and per-minute/second price), or a mixed bundle of such menus accounting for multiple uses (text messages, internet use, etc.). What the consumer generally does not know in advance, is the total cost of the cellular contract – the full price in absolute terms. If she knew how much she would use the phone in the future, and when, she might be able to compute the ultimate prices of the different alternatives in order to find her optimal contract, given personal usage. Even if a service representative would be willing to compare plans for her, knowing future use is difficult.

Even a customer with usage history from another firm, or one changing (or 'upgrading') plans, is hard-pressed to predict whether future usage will be similar to past

37 An additional purpose can be added, for those consumers who are 'sophisticated' in behavioral parlance – choosing a calling plan affecting future use, whether as an instrumental goal to reduce consumption and thus payment, or for other reasons – involving health effects, social norms, or personal reasons. Some of these will be addressed below.
history, and one must take into account the effect of the calling plan itself on the incentives. For example, moving from a plan where price-per-minute is high, to one where it is low, is likely to increase phone usage. Buying a bundle of 'free minutes' incentivizes one to use them, or at least dissipates any monetary incentive to limit usage (until the upper bound is approached). Here the length of contract is extremely important, and is usually quite long. This is true either due to explicit commitments consumers accept in their contract (minimum terms), or due to consumers' viewing switching providers as an expensive endeavor (time and effort-wise). In order to visually show the difficulty of optimization of calling plan, observe the following graph:

The horizontal axis shows the number of monthly minutes, while the vertical axis shows monthly price. The four dotted lines show four alternative calling plans, beginning with a fixed per-minute price (the steepest line), through increasing fixed monthly payments reducing subsequent per-minute price. Moderate angles show a lower marginal (per-minute) price, while the higher vertical-axis origin shows a higher fixed monthly payment. Additionally, one alternative shows a step-function, i.e. a fixed monthly payment for a bundle of 'free' minutes, and a steep (high) price-per-minute thereafter. Simply put, the graph shows
five calling plans the consumer might choose from, and given a personal usage profile, he may choose the cost-minimizing one.

The assumption that the consumer chooses optimally means that he will always be on the inner envelope of available alternatives, here – on the bold blue line.\(^{38}\) For example, the squares indicate optimal plan choices given different levels of phone usage, while the red circles indicate sub-optimal choices that the consumer should avoid.\(^{39}\) Assuming consumers are able to understand the different plans and choose optimally requires they be able to draw such a graph based on the details garnered from firm presentations (or other source) and correctly predict future usage.

It is far from obvious that the standard consumer is able to carry out such an optimization exercise, especially when we take into account that in real-world situations the appropriate graph includes many more than five alternatives, and usage is usually unstable over time (while commitment to a given plan is). Importantly, the graph presented here includes only the simplest types of calling plans (minute-based), and excludes reduced prices to select numbers (friends and family) or during select times (night and weekends).

Beyond the difficulties comparing plans and predicting usage, the graph applies only to voice calls. If we want to add prices for text messages, a three-dimensional graph will be necessary, which shall include price per message as well as bundles of messages (similar to bundles of minutes here). Since real-world application includes internet usage, downloads, and more – the required graph is multi-dimensional. In the example above, the necessity of

\(^{38}\) Many studies make this assumption (usually implicitly) with no discussion of its appropriateness as a description of reality. As a theoretical model, this could be defended, but as a basis for legal and economic policy, it cannot. See, e.g., Busse, M., “Multimarket Contact and Price Coordination in the Cellular Telephone Industry,” 9 Journal of Economics and Management Strategy 287–320 (2000). On page 297, the author explains the underlying assumption for analysis: "Assuming that a customer chooses the plan that minimizes costs for his or her expected level of usage, the effective price schedule a customer faces is the lower envelope of a menu of two-part tariffs offered by the carrier". This is an especially strong assumption of optimization, whereby regardless of the number or types of calling plans, the consumers is always seen as able to find and achieve his optimal point. Graphically, the 'lower envelope' to which he refers is the bold blue line in our graph above. For further discussion and additional examples, see section V below.

\(^{39}\) If we count the available plans from the origin upwards, this means that as the consumer's monthly phone usage increases, he should switch from the first plan, to the third, then second, fourth, and fifth – switching each time his plan lies above another available alternative.
presenting a graph printable on paper requires two-dimensionality, but including other cell-phone attributes shows the optimization problem for \( N \) attributes requires \( N+1 \) dimensions. We see, therefore, that an assumption that the consumer optimizes when choosing a multi-dimensional calling plan, is a strong assumption indeed, and making such an assumption the basis for real-world policy recommendation (as some scholars do) is problematic to say the least.\(^{40}\)

### III.A Industry Concentration and the Supply of Alternatives in the Cellular Market

Based on the review of psychological evidence above, it seems that the cellular firms have a clear interest in keeping price complexity high – the fewer consumers are able to compare among firms, the weaker the competitive pressures the firms face, at least on the price-reduction dimension. Simply put, complexity acts as a mechanism to reduce price-competition, leaving other competitive dimensions intact. These dimensions include number and type of handsets offered, branding and advertising (creating customer goodwill or 'feeling good' when thinking of one firm compared to others), customer service, quality of reception, and more. Of course, complexity may be present in non-price dimensions as well.\(^{41}\)

Some of these attributes are at least as difficult to compare as final prices, since the consumer is hard-pressed to assess quality of service prior to his need to find a service center and stand in line there, or prior to experiencing the waiting time until the automatic call center directs his call, or assessing how many representatives he must speak to before his problem is resolved. Still, price is a very salient feature, and is prominent in most consumers' purchase decisions. Absent a clear parameter of firm comparison, every firm can advertise in order to create an impression of low prices (employing 'sales' and 'special offers'), as well as make non-price dimensions more prominent, aiming at product differentiation in order to achieve a

\(^{40}\) To this we shall return shortly, see section V below.

\(^{41}\) See, e.g., Paul A. Herbig and Hugh Kramer, "The Effect of Information Overload on the Innovation Choice Process: Innovation Overload", 11(2) *Journal of Consumer Marketing* 45-54 (1994), arguing that fast-paced innovation creates effects similar to those of cognitive overload. Since the cellular market is highly innovative, complexity appears in consumer decisions not only due to price obfuscation, but through the frequent technological changes in what a cellular phone actually is able to do, essentially changing the product in question.
superior position in the branding game. Lack of price-competition is not lack of competition. Still, price-competition has a direct and stark effect on firm profitability, and weakening it is a primary strategic business interest.

Some may argue that in a competitive market firms will find it in their interest to offer a simple price structure in order to signal to the consumer the advantages they offer. The basic argument is as follows: a firm seeking to differentiate itself and attract consumers might offer a simple price structure to signal that it offers value-for-money, a good deal. If consumers understand the signal in this way, and competition between firms evolves between the firms to situate themselves similarly to the first firm, a competitive solution arises where the firms offer their products on an identical, easy-to-understand, price structure, while firms obfuscating their prices are shunned by consumers. The idea is that competition may lead to price-simplicity where the driving force of the model is consumer preference for simple price structures. In other words, insofar as consumers prefer such contracts, firms have an incentive to offer them. Of course, one may question whether consumers understand such signals, as they may see complex structures as preferable to simple ones due their (theoretical) ability to optimize, or see the multitude of offerings as openings for active choice.

One should note, though, that this model is based on an assumption that consumers prefer simple price structures, as these signal quality of service or 'fairness' on part of the offering firm. If consumers are actually interested in being offered a large variety (a reasonable assumption according to the discussion in section IL.B. above), the firm loses its incentive to offer simple prices, and would prefer multiple calling plans and 'sales'. The question of price complexity or simplicity thus depends not on competition per se, but on consumer preferences. When the demand for choice is high, complexity will ensue, even when actual consumer optimization is thus thwarted.


Most cellular markets are highly concentrated, with usually as few as 3-4 firms serving nationwide customers. Such markets are characterized as 'oligopolistic' (few sellers), and operate differently than markets where many firms exert competitive pressure on each other. The most striking difference relevant here, is that in an oligopolistic market, one firm's action is observed directly and quickly by other firms, and they may respond accordingly. Thus, a cellular firm advertising a reduction in prices attracts consumers but simultaneously creates a strong incentive for its competitors to respond in kind, so as to avoid seeming more expensive. Contractual complexity of the sort present in the cellular market makes comparison between the firms' prices difficult, since there are many options and prices to compare. Since most price schedules are non-identical across firms, even knowing which firm is the cheapest is a non-trivial endeavor. Since most consumers are unable to precisely assess their future usage patterns, a simple comparison of current fees vs. alternative offers is impossible.

To illustrate, assume one of the firms offers a simple price schedule – such as a given unit price (per minute/second) which is unchanging over time and amount of use. The average consumer will not know if such an offer is better or worse for him than the complex bundle offered by a competing firm. If the consumer views simplicity a signal of quality (not necessarily a realistic assumption), other firms may follow suit and offer similar simple prices. Having done so, the consumer may now choose on basis of easily-compared prices, leading the firms to compete by lowering the price to marginal cost. Even ignoring issues of the high fixed costs associated with large-infrastructure industries, cellular firms in such a world would find themselves sharing the market at low prices. Assuming similarity in firm costs, this would simply create price-competition with low profit margins, with little change in market shares. Excellent for the consumers among us, but not so for the cellular firms.


Of course, there is nothing new here – this is what competition is all about. But since we are dealing with an oligopolistic market, the firms have a better alternative available. The first firm, knowing that moving towards price-competition will only cause others to do the same, will not plan on such a strategy to create much of a profit. Any advantage it gains over its competitors will be short-lived, and will eventually lead to maintaining current market shares - though with lower profits. In competitive markets, the multitude of competing firms creates a prisoners' dilemma among them. They are all better-off maintaining high prices, but each on its own prefers to be the only one deviating by offering discounts and attracting customers. With many firms, each has a small effect on the market as a whole, thus their incentive is to act unilaterally. This incentive grows when realizing that if they do not act quickly, another firm will do the same, but sooner.

The small number of large competitors in most cellular markets allows for 'solving' the prisoners' dilemma, as effect on the market is large, and long-term interaction creates indefinite repetition of the game. The firms are familiar with each other, and understand that their common interest in maintaining prices high dominates their any interim profits a first-mover might make. In the economic (and antitrust) literature this dynamic is known as 'oligopolistic coordination' or 'tacit collusion', but in most jurisdictions there is nothing illegal about it.

Oligopolistic coordination in cellular markets may manifest itself in two (intertwined) ways: the structure (and variety) of contracts offered, and the price in easy-to-compare options. Complex contractual structure adds to the difficulty of comparisons among firms, leaving the consumer befuddled as to which offer is best. Despite this, some of the prevalent offers are relatively simple, such as constant price-per-minute, or fixed price per bundle of

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45 A similar dynamic was observed between U.S. cellular firms, in a slightly more complex context. There, each geographically separated market allows competition between local firms, but since some of these are branches of national firms, multi-market contact exists between some but not all firms. The national firms can use strategies unavailable to the local ones, namely, responding in one market to actions initiated in another. See, Parker, P. M. and L. Röller, “Collusive Conduct in Duopolies: Multimarket Contact and Cross-Ownership in the Mobile Telephone Industry,” 28 RAND Journal of Economics 304–322 (1997); Busse, M., “Multimarket Contact and Price Coordination in the Cellular Telephone Industry”, 9 Journal of Economics and Management Strategy 287–320 (2000).

46 See, e.g., Herbert Hovenkamp, The antitrust enterprise: principle and execution (Harvard University Press, 2005), at 212
minutes. Of course, given the variety of cellular uses, prices per text message or internet usage complicate even the simplest of calling plans. Still, some offers are comparable and in these, simple price-competition abounds. Oligopolistic coordination prevent prices on these options from dropping too much (from the firms' point of view), as well as maintaining the multitude of more complex offers in the market.\textsuperscript{47} Had competitive pressures been higher, we might observe one of the firms striving to show its advantage over others by offering something along the lines of "any price schedule offered by my competitors will be matched at an $X\%$ discount". Such an offer would create price-dominance for the offering firm, branding it as the price leader. Obviously other, non-price, dimensions would still be up for grabs.\textsuperscript{48}

Despite the apparent allure of such an offer, it would create a downwards-spiral in prices that would probably harm the offering firm along with its competitors. While firm A offers a discount relative to firm B, the latter would lower prices so that firm A would have difficulty meeting them and maintaining profitability while offering the promised discount. Price-competition would increase, lowering firm profits across the board. Still, even when such dynamics are absent from the cellular market, this need not suggest that the market is not competitive, as competition on non-price dimensions is important as well, including handsets, service, branding, special offers and promotions, proprietary services, etc. The question whether a certain cellular market is competitive or not, does not lend itself to an easy answer. The different dimensions examined might lead to conflicting results, with non-price dimensions showing much more activity and vigor (especially apparent in advertising) than direct price-competition. The firms' interest in maintaining current price-ambiguity, raising

\textsuperscript{47} There are good reasons to think that complexity would not be competed away, even if the cellular market were perfectly competitive. If consumers value choice, and take variety as a proxy for it, firms compete to offer more calling plans, resulting in consumer confusion. If consumers are unaware of the resulting confusion, they have no reason to leave a firm offering them what they perceive to be a good – variety. This issue will be discussed in more detail below, see section IV.B.

\textsuperscript{48} Of course, our current focus is on price (for simplicity's sake), but branding and quality differentiation are no less important. There is no need to assume consumers are drawn to the cheapest firm, although this is a starting point for many.
switching costs and reducing consumer churn, is an important factor, though not the only one.\textsuperscript{49}

To summarize the discussion so far, contractual complexity allows the cellular providers to maintain conditions where comparisons among them are difficult, thus lowering the competitive pressure to lower prices and sacrifice profitability. The question if this calls for regulatory intervention is still an open one that we shall return to below. The main point so far is the recognition that the plethora of calling plans and methods of computing cellular prices makes difficult one of the most basic driving forces of healthy competition – comparison of prices by consumers. This complexity remains intact due to an interaction between cognitive limitations of human beings facing the choice between cellular providers and calling plans, and firms' interest in lowering competitive pressure – balancing their unilateral interest in attracting customers with their common interest in reducing visibility in the market. The consumers, on the other hand, do not contribute to the abolishment of complexity mainly because its base, the availability of multiple options to choose from, is considered a good they value highly. As we saw in the section regarding the preference for choice, the attractiveness of variety in the first stage dominates the difficulties stemming thereof in the second stage of actual comparison. In other words, it seems that consumers are interested in the complexity firms manufacture for them, even if they are eventually harmed by it – and often complain later on.

\textsuperscript{49} Other issues require discussion, such as the control cellular firms (those selling transmission) might exert on other markets, such as sale of handsets, accessories, or the content transmitted. There are reasons to doubt the necessity of these markets being catered to by the same firms. Some see this integration as harmful to potentially competitive markets, since the high concentration in the transmission market allows market power to be exerted in the accessories market, the content market, and others. See, Tim Wu, "Wireless Carterfone", 1 International Journal of Communication 389 (2007); Scott Wallsten, "Wireless Net Neutrality?" Progress & Freedom Foundation Progress Snapshot Paper No. 3.2 (February 13, 2007). Available at SSRN: http://ssrn.com/abstract=976749

On the other hand, others argue that the regulation existing in the cellular market is unnecessary, as competitive pressures suffice. See, Boliek, Babette, "Net Neutrality Regulation in the Mobile Telecommunications Market: A Cautionary Tale from the Era of Price Regulation" 3rd Annual Conference on Empirical Legal Studies Papers. Available at SSRN: http://ssrn.com/abstract=1129517
**IV  CONTRACTUAL COMPLEXITY AS A VEHICLE FOR DISCRIMINATION AMONG CONSUMERS**

Contractual complexity does not affect all consumers in the same way. Offering a variety of cellular contracts allows the cellular firm to tease apart classes of consumers according to their willingness to pay – and maximize profits from each class of consumers. A simple example will illustrate: let us focus on the willingness to pay (WTP) for 'bundles of minutes'. Assume that a minimum of 100 minutes per month is necessary for the ownership and operation of a standard cellular phone. Further assume that 100 consumers exist, differing in their WTP, such that consumers range from the least-eager buyer willing to pay at most $1, to the most-eager buyer willing to pay up to $100 for the same minimum bundle. Denote the consumers number 1 to number 100 respectively. All consumers view the first cellular minutes, those changing their status from non-users to cellular users, as the most important ones, and all would buy extra minutes only at a lower price. Thus we see consumers exhibiting 'diminishing marginal utility', a standard assumption in most applications.

In order to keep the example simple, assume the next hundred-minute bundle (moving from 100 to 200 minutes), is worth exactly half of the first bundle (moving from non-ownership to cellular-user status). The next bundle (moving from 200 to 300 minutes) is worth half of the second, and so on. Thus the model exhibits consumers identical in their diminishing marginal utility, but different in their underlying preferences for cellular use.

A profit-maximizing firm will choose a price balancing the income generated by high prices (from those willing to pay it), with the deterrent effect on consumption (of those forgoing cellular use, or reducing it, due to its cost). Assume for now that the marginal cost of providing an additional minute of calling time is relatively small, and does not constrain pricing at this point. If the firm charges $1 per minute, it will sell one hundred-minute bundle, to the highest valuing consumer (number 100), and none to other consumers (assuming only bundles are sold). If the firm reduces price to $0.80 per minute, it will sell twenty bundles, to

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50 Willingness to pay is obviously not a perfect measure of the product's importance, as ability to pay comes into play as well. Still, willingness to pay expresses the consumer's readiness to substitute away from other products, and devote his buying power to the cellular contract.
consumers 81-100. Reducing price further, to $0.40, will allow the sale of 60 bundles (consumers 41-100), as well as 20 additional bundles sold to consumers 81-100 (who value the second bundle at half the first, here $0.405 to $0.50 respectively). We could go on and on, but the basic rule seems clear – that of reduction in price allowing more bundles to be sold, albeit at a lower profit per bundle.

A profit-maximizing firm will take into account both influences of price-reductions (as well as covering costs, which we assumed were a non-binding constraint). The final price will be chosen accordingly, as well as by competitive pressure which will be assessed shortly. Consumers with a high valuation (willing to pay more for cellular minutes) directly benefit from the existence of those with low valuation, since in order to attract the latter, the firm reduces prices to the former as well.

This is where price discrimination, offering different prices to different types of customers, comes in. Up to now we've assumed that the firm offers a constant price-per-minute, but were it able to personalize prices, it would gladly charge high-valuation consumers more than it would charge low-valuation ones, with discounts going only to the latter - who need enticement to be drawn into the market. Since directly knowing another person's valuation is difficult (even our own is not always clear to us), a technique of allowing consumers to sort themselves is helpful here.\textsuperscript{51}

\textsuperscript{51} In economic parlance, this is referred to as 'second-degree price-discrimination', see, e.g., Jean Tirole, \textit{The Theory of Industrial Organization} (MIT Press, 1988), pgs. 142-144.

The term 'discrimination' should not be construed negatively, but as a descriptive term denoting consumers being charged according to their varying willingness to pay for the product, rather than a fixed, uniform, price. One of the common methods is the practice of retailers selling some products in two distinct types of packaging – small quantities and 'family-size' larger packages. The first cost less, but the per-unit price is higher. There, the purpose is attracting consumers interested in large quantities, but requiring a discount to consummate the purchase. The basic idea is that of diminishing marginal utility. All would pay a high per-unit price for the first package, but only 'families' would pay much at all for the second. The larger size is in essence a bundle of an expensive first package, together with a cheap second package – averaging a lower per-unit price than the smaller (first only) package.

Some argue that these pricing tactics can also be used to mask a deeper-rooted 'standard' discrimination, on the basis of race, gender, and other 'suspect categories'. Such results may occur even if the seller had no such intention, as when social groups have different characteristics – buying patterns, preference for credit vs. cash, access to financial instruments, etc. See, Jonah Gelbach, Jonathan Klick, and Lesley Wexler, “Passive Discrimination: When Does It Make Sense to Pay Too Little?”, 76 University of Chicago Law Review 797 (2009).
For example, the firm could offer two bundles of minutes: a basic package, those first hundred minutes, at $0.50 per minute, and a separate package of 200 minutes at $0.40 per minute. This will lead customers 61-100 to purchase the large package, while customers 51-60 will purchase the smaller one.52 This, compared with the fixed-price of $0.50, where customers 51-100 purchase one hundred minutes each; or compared with a fixed-price of $0.40 per minute where customers 41-80 purchase one hundred minutes each, and customers 81-100 purchase two hundred minutes each. It can easily be shown that the firm profits more from offering a contractual variety, i.e. a different price-per-minute in each bundle, than any fixed price it might possible choose.53 In this case, a fixed price of $0.50 per-minute will generate revenue of $2500, a fixed price of $0.40 will bring in $3200, and combining both offers ($0.50 in the hundred-minute bundle and $0.40 in the two-hundred-minute bundle) will raise revenue to $3700.54

While the numerical example is merely illustrative, it can be stated generally that when the firm increases contractual variety, it is able to attract additional consumers while

52 To see why, note that the consumer will purchase the utility-maximizing bundle, i.e. the one creating the largest difference between his valuation and the price charged. The one-hundred minute package is better than none at all to all consumers valuing the average minute it contains at higher than its $0.50 price, and those are consumers 51-100. The second package will be purchased only by consumers increasing their welfare even more. Buying the larger package reduces the price of the first hundred minutes as well (from $0.50 to $0.40 per minute). In order to calculate the threshold above which consumers will prefer the larger package, we compare consumer welfare (CS) obtained by the purchase of each package, with $x$ denoting the consumer's valuation per minute:

$$CS(II) > CS(I) \iff 100(x - 40) + 100\left(\frac{\sqrt{x} - 40}{2}\right) > 100(x - 50)$$

In the first package (on the right-hand-side) she obtains one hundred minutes, valued at $x$ and costing $0.50 each. In the second (left-hand side), one hundred minutes valued at $x$, and one hundred additional minutes, valued at $x/2$ (due to diminishing marginal utility) – all costing $0.40. Solving the inequality shows that the second package generates more consumer welfare only when $x$ is above 60, i.e. consumer number 61 and above will purchase the larger bundle of minutes.


54 From the firm's perspective, in the first case, it sells to 50 consumers, 100 minutes each, at $0.50 per minute. In the second case, it sells 60 consumers 100 minutes, with 20 of them purchasing 100 extra minutes, all at $0.40 per minute. In the third case, 40 consumers purchase the 200 minute-package at $0.40 per minute, while 10 consumers purchase 100 minutes at $0.50 per-minute.
limiting loss from those who would otherwise pay a higher price. One could continue elaborating the different types of contracts, and the choices a profit-maximizing firm might make, but that is not our main agenda. It is important, on the other hand, that up to this point consumers were differentiated only according to their willingness-to-pay for voice calls, and within a constrained framework at that. If we consider the much richer reality of consumers buying not only in hundred-minute bundles, as well as each defining a differently shaped marginal utility function, it becomes apparent that there exists a fertile ground for additional contracts to differentiate consumers further. Add their willingness-to-pay for text messages, video calls, media content, email and internet access – and it is easily seen that it is not only along the price dimension that contracts differ, but along many other dimensions as well – and each one allows further contractual variety.

The advantage the firm gains from differentiating its consumers is in its ability to demand a price closer to the consumer's subjective valuation, without offering its other customers the same price. Offering contractual variety will bring each consumer to seek out her own optimal offer, and in her choice she signals to the firm information about her subjective valuation – information the firm previously did not posses. The consumer's choice, then, is the method by which the firm gains the information necessary to offer a 'personalized price' which maximizes profit. The firm creates contractual variety knowing that consumers will differentiate themselves, thus allowing it to offer discounts to attract some consumers without lowering price to others.

Had we not considered cognitive load which limits consumers' ability to actually choose their optimal contract, and had no other cognitive biases entered in assessing the utility gained from each alternative, adding additional contracts could only help consumers. A study examining the utility of the firm from enlarging contractual variety showed that a relatively small number of alternatives were sufficient to extract most of the potentially possible profit. Given a cost of servicing the different contracts (even that of advertising and customer service) the firm would prefer to limit variety. Here, the ability to differentiate consumers is beneficial to the firm, but the main effect is not in sorting consumers optimally – but in using contractual variety to make more difficult the comparison among plans and firms, thus limiting optimal consumer choice-making and lessening competitive pressure. Beyond

55 See text at note 74 below.
that, there are two additional forms of differentiation – according to customer seniority and according to customer sophistication. We turn now to assess these.

From the cellular firms' point of view, there are good reasons to offer new customers low prices, while they are comparing offers from competitors and considering which network to subscribe to. There are equally good reasons to hope (and even expect) that existing customers will stay 'loyal' to the firm even at higher prices.\(^6\) Along the same lines, if there are customers who lose their bearings in the thicket of multiple offers, there is no reason to offer them the same price offered to those investing time and effort to optimize their choice of cellular contract. Such price discrimination allows higher profitability to firms engaging in it, an in a competitive market is commonly assumed to disappear. The characteristics of the cellular market allow discrimination to persist, and contractual complexity is an especially effective vessel by which to maintain this condition.

**IV.A Discrimination between new and existing customers**

The cellular market is characterized by consumers staying with their chosen firm for a relatively long time. There are several reasonable objective reasons for this phenomenon: switching costs are high, and though lower where mobile number portability has kicked in, there are still information and administrative costs of comparing among firms and making a transition. The effort involved begins not with the transition itself, but at the stage where the consumer **considers** a transition, and includes finding information about competitors, comparing the various offers, as well as the inconvenience of a remaining 'open question' regarding one's future cell-phone contract. The issue of cognitive cost raised above, is relevant here as well.\(^7\)

When a customer considers a transition among firms, he must invest cognitive effort in comparing alternatives, a cost spared only when choosing to 'stay put' and avoid

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\(^6\) 'Customer loyalty' is a common expression and important commercial goal for sellers. Still, it is important to bear in mind that 'loyalty' here is merely a factual description, of customers continuing their commercial dealings with the firm even when short-term gains are to be had from switching suppliers. Such loyalty could stem from emotional aspects and identification with the firm as a communal entity, but also from high switching costs (pecuniary or psychological) which consumers avoid by remaining with one firm over time.

\(^7\) See section 0 above.
deliberation. In this respect, staying with his present firm is the default option, and the status-quo bias is relevant here as well. All this, before the transition itself, which requires effort of the type many abhor – beginning with waiting for service representatives on automated phone systems, later on going through the necessary paperwork, and eventually following up on bank statements to ensure that the new payments include no more than what the service representative promised. The more complex the contract, and the larger the number of alternatives compared, the harder the task of choosing optimally and the more difficult it is to ensure that oral promises at the point of sale are reflected in the bill arriving much later. When each firm offers a different contractual framework, how is the consumer to know which offer is really the best for him? Contractual complexity can thus be viewed as a strategy to increase switching costs between firms, so that existing customers choose to stay put, and settle for the offers made at their existing firm.

Beyond that, the structure of most offers requires commitment to enjoy lower prices, either through minimum-term calling plans, or through purchasing the mobile phone itself in installments. Consumers in their 'commitment period' are not free to move to a firm making them a better offer, thus will usually not search out information regarding alternatives. It is important to note that switching costs in the cellular market are mostly contractual – they stem from the strategic choice of a firm to offer a long-term binding contract, and the customers' acceptance of such offers.

Long-term commitment in itself does not necessarily harm consumers. A rational consumer committing to remain with a firm for a specified time, will take into account the length of that period when signing the contract. Comparison among firms will be according to price as well as length of commitment required and the probability distribution of future changes in consumption. Such changes are important, and there are many good reasons to think that consumers tend to underestimate them, believing that the future will be similar to the present they know.\(^58\) In a fully rational model, the consumer will take into account that

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\(^58\) This is a well-documented trait most of us share and is relevant in a broad array of future-affecting decisions. Simply put, when we attempt prediction of our future preferences and choices (or make current choice relying on such prediction), we are overly influenced by our current state, and underestimate the change in our own preferences over time. For a review, see, Loewenstein, George, and David Schkade, “Wouldn’t It Be Nice? Predicting Future Feelings,” in Daniel Kahneman, Edward Diener, and Norbert Schwarz, eds., *Well-Being: The Foundations of Hedonic Psychology* (New York, NY:Russell Sage Foundation Press, 1999).
once he signs up with a firm, it will exploit his inability to switch away – but this dynamic is anticipated and compared across firms. Contractual complexity makes such comparisons difficult, thus also makes more difficult the balancing of present vs. future price, or understanding the way different alternatives play out along this dimension. Yet its effect goes further still.

Offering a large variety of calling plans allows for attracting new consumers without offering existing ones the same terms, and doing so in a way that makes the differences inconspicuous. Lacking the ability to easily compare offers, the salience of differences is low, thus new consumers may be enticed while minimizing outrage (or mere frustration) on the part of existing ones. Furthermore, when an existing customer becomes free of any obligation to stay on with the firm, and turns to compare offers, she may be offered a calling plan superior to her current one, so that the effort and inconvenience of transitioning to another firm are spared. The same result could be achieved through a simple discount, but the context of contractual complexity allows for the possibility that here, too, the customer will choose sub-optimally, leaving the firm with a higher profit than when prices are clear. Furthermore, using such calling plans allows for tailoring a solution optimal to the consumer's current consumption profile, but not necessarily so for future changes. In a highly dynamic environment such as the cellular market, optimality today does not ensure minimal price later on. When the consumer stays for long periods on the same calling plan (whether due to a contractual obligation, or due to high switching costs later on), the cellular firm can anticipate a rise in profitability with future changes in consumption.

For an implementation in an economic model and an assessment of the problematic case of choosing today to maximize future utility, see e.g. Loewenstein, G., O'Donoghue, T. & Rabin, M., "Projection bias in predicting future utility", 118 Quarterly Journal of Economics 1209-1248 (2003).

59 It can be shown that when consumers are rational, i.e. perfectly considering future utility in current decisions, switching costs themselves will not lead to higher prices, even when the firm can change prices later on. Initial price will be low, to attract consumers, and later prices high (when consumers are 'locked-in'), but average prices over the whole term of the contract will not be different from those in a no-switching-cost market. This is so due to the assumption of perfect rationality, of consumers correctly assessing future monopolistic pricing and averaging with current low prices. See, Paul D. Klemperer, "Competition when Consumers have Switching Costs: An Overview with Applications to Industrial Organization, Macroeconomics, and International Trade", 62 Review of Economic Studies 515-539 (1995)
Contractual complexity thus acts to raise switching costs, which allows for raising prices to existing customers, while hiding the existence of discrimination among consumers paying different prices for similar consumption.

**IV.B Discrimination between naïve and sophisticated consumers**

Consumers differ as to their ability to cope with contractual complexity. The standard view propounded above, is that of consumers examining several alternatives and choosing among them while under the influence of cognitive biases. This is true of most consumers, though they differ along two dimensions: the extent to which their decision-making is subject to these biases, and their awareness of these effects and their own susceptibility. Some simplify analysis by segmenting consumers into two groups: 'naïfs' whose decisions are affected strongly by biases of which they are unaware, and 'sophisticates' who are aware of their difficulties in choice-making, and are able to take actions to minimize these effects or employ strategies to lessen their susceptibility. One might say that the sophisticates are those able to navigate through contractual complexity, find the optimal alternative offered – or at least be aware of the difficulties facing them and prepare accordingly. For the sophisticated consumer, having many alternatives means enlarging their information and choice sets – which will eventually lead to a better alternative being chosen.

For example, a sophisticated consumer will know to ask about calling plans not suggested to her, arrange alternatives in a table or graph to facilitate comparison, or examine the different firms' offers based on her own consumption profile. Ideally, she will even take into account anticipated changes in future consumption, including the incentive her chosen calling plan will create to alter phone usage – as marginal cost per minute of calling time varies considerably across plans, and initial choice will drive behavior later on.

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61 The incentive effect of marginal price on future phone usage is an important factor, both for consumers basing current choice on expected future consumption, and for firms aiming at increasing phone usage and changing consumer habits. The objective measure of marginal price per extra minute used is highly relevant where we see 'buckets of minutes' effectively creating a zero marginal price (thus encouraging use), and may be further exacerbated if consumers exhibit a tendency to exploit opportunities to their fullest – a 'sucker' effect where non-use of free included minutes confers a
Naïve consumers, on the other hand, see the variety of calling plans as an advantage – even when it actually harms their ability to choose. They are unaware of cognitive load and do not prepare themselves upfront to handle it. For them, the opulence of alternatives complicates decision-making, and eventually they will find themselves choosing according to rules-of-thumb, heuristics unanticipated by them and therefore leading them to sub-optimal decisions. Importantly, these heuristics can be fully anticipated by the firm, and play a major role in devising the types of plans offered, as well as the method of presentation and order of presented alternatives. Simply put, the naïve consumers are the target-audience for contractual complexity, and they will pay higher prices than their sophisticated counterparts for the same consumption profile.

Between these two extremes lies a spectrum of differing levels of sophistication. Consumers vary in their awareness of cognitive biases generally and the specific effects of cognitive load, just as they vary in the amount of time and effort they are willing to invest in order to overcome their biases, or improve their ultimate choice by accounting for them.\footnote{These effects can be modeled by allowing naïveté to be a continuous parameter, as well as allowing for differing costs of time and effort, whether due to objective measures or subjective preferences (as some abhor paperwork and negotiation with service representatives more than others). See, Kfir Eliaz and Ran Spiegler, "Contracting with Diversely Naive Agents", 73 Review of Economic Studies 689–714 (2006).} For expositional clarity, we focus here on the extreme cases, though the general arguments apply more widely. Sophistication may be a personal attribute, varying across consumers, as well as a structural issue – where individuals differ from firms. Insofar as business customers purchase cellular plans in bulk (for employee work-related use), we should expect to see increased sophistication with size of purchase, as well as with experience gained by professional purchasers making a business decision. Still, it would be going too far to state this is merely a firm/individual distinction, as not all firms are alike, exactly as consumers vary.

The distinction between sophisticates and naïfs allows us to examine the effects of contractual complexity. At first glance, it seems clear that sophistication allows for finding optimal calling plans, and thus sophisticates will achieve lower final prices than naïfs. A psychic cost. The 'bucket of minutes' plans purportedly had a strong effect in increasing consumption in the U.S., see Thomas W. Hazlett, David Porter & Vernon Smith, "Radio Spectrum and the Disruptive Clarity of Coase", 10-18 George Mason Law and Economics Research Paper Series, at page 21. Available on SSRN at: http://ssrn.com/abstract_id=1583098
deeper look will show another effect intertwined with this one. Given naïve consumers which complexity will push toward sub-optimal choices, the firms in the market will profit from creating complexity, and the sophisticated consumers will benefit – as more alternatives allows them more room for optimization. A model developed for a similar context is that of add-on pricing, or the existence of shrouded attributes – those characteristics whose price is unanticipated by some of the consumers.\textsuperscript{63} When naïfs are expected to under-anticipate certain costs, firms will focus on them, and will raise prices even more to cover the low prices sophisticates are able to garner from the situation. Put simply, the sophisticates' success creates an externality on the naïfs. In the cellular context, this externality is apparent when the same opulence of alternatives confusing the naïfs, helps the sophisticates find their optimal personalized contract. For the latter, a fertile ground for market research and comparison, for the former – a high monthly bill.

While complexity in choice of calling plans is our focus here, it is important to note that the same effect is present in complex cellular bills. When consumers complain that they can't understand their monthly statement, they refer to the complexity of several different charges, some with discounts or 'cash back' promises, which confuses them. It takes a sophisticated consumer indeed to follow the varying amounts present in most cellular bills, and be willing to invest the time and energy in phoning their provider, waiting in queue, and getting charges dismissed. The more complex the contract, the more difficult it is to verify that prices charged are the same as those promised. The more the firm relies on specialized 'discounts', the more awareness necessary on part of the consumer - both in the planning stage, and later on when the actual bill arrives. Obviously, the multi-faceted nature of the cellular contract, including many attributes of which voice is just one, plays an increasingly large role here.

\textsuperscript{63} See Gabaix and Laibson at note 60 above. There, the emphasis was on attributes which the buyer imperfectly observes (or foresees), such as the price of ink when purchasing a printer. This price is theoretically predictable, and a sophisticated consumer will take it into account as part of each printer's price. The naïve consumer, though, will focus on the current expenditure of the printer's price alone. The result is competition among firms to offer cheap printers, profiting from future sale of ink cartridges. Even unconstrained competition in the printer market will not prevent this dynamic, and it can be shown that firm profits will be supra-competitive. The market imperfectly constrains pricing due to (naïve) consumers ignoring future costs. A firm attempting to sell more expensive printers with cheaper ink will find itself considered less attractive.
A related distinction is that between cellular contracts for personal use, compared with those for business use. A common assumption in behavioral models is that firms are better able to assess their situation and employ full rationality, while individuals are laden with biases which are difficult to overcome. Such a clear distinction may be helpful for expository purposes (just as the dichotomy between naïfs and sophisticates), though obviously more muddled in reality. Business customers are often offered different terms than individuals, stemming both from economies of scale (as businesses often purchase many units within the same deal) and from sophistication generated by professional buyers investing in market research. For our purposes, sophistication is the key issue, relating directly to the biases and cognitive load assessed here. Thus the business/individual distinction is to be treated as one example of the more general sophistication/naïveté divide (or, rather, spectrum) that will be further explored below.
V  EMPIRICAL VERIFICATION IN REAL MARKETS

Up to this point the focus was on the theoretical basis, both psychological and economic, for the problematic effects of complexity in the cellular contract. It is important to examine empirical work as well, both in the cellular market and in similar contexts, in order to verify the issues raised are problematic in practice, as well as in theory.

In Great Britain a study was conducted examining consumer choice among electricity companies and types of payment options. The result shows cognitive load to harm decision quality, even when the load stems solely from additional options. Most consumers failed to minimize costs by staying with their previous provider or payment plan (99% of those staying with the default option would have benefited from a change), though it would be wrong to infer from this a 'mistake' on their part. It may very well have been a choice to pay a material price to avoid the psychic effort involved in a change. The fact that a third of those who did transfer to a different firm did so in a sub-optimal way is more difficult to rationalize away. A cumulative analysis showed that only a quarter of the potential gains made possible to consumers through the entrance of a new provider made it to consumers' pockets – a difficult and disappointing result for believers in competition and the free market. Still, the most interesting result in that consumer mistakes rose with increasing competition, i.e. increasing alternatives harmed consumers. As anticipated by theory, complexity led to worse decisions.

In the U.S., the effect of increasing competition on the variety of cellular calling plans was examined directly. The American cellular market developed from licenses granted in small geographical markets to local monopolies or duopolies, through gradual licensing of additional competitors, varying across markets. This allowed for a side-by-side comparison of the effect of competition on separated markets. The important result for our context is that the number of offered calling plans increased significantly with increasing competitive pressure. As a new firm was licensed and entered the market, the incumbent firm responded

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not just by lowering prices, but began to offer new types of calling plans previously unavailable. This phenomenon is open to competing interpretations. It may be seen as an increase in consumer welfare, as each consumer can better personalize her contract – if we assume choice is made optimally. It may also be seen as an attempt to create a façade of competition, while softening the competitive pressure to reduce prices directly. Of course, there is no reason to think only one of these is correct. The factual finding is one – the interpretations, many.

What is interesting to note, is that the authors of the study do not pause to consider whether choice was conducted optimally, but immediately jump to the conclusion that increasing variety increased consumer welfare. They rely on an unstated assumption that consumers cannot be harmed by additional choice, and always optimize among available alternatives. This assumption comes up in other empirical examinations, almost always unstated and unexamined for veracity.66

In order to more deeply examine the claims of over-abundance of choice in the cellular market, Eugenio Miravete conducted a series of studies attempting a 'rationalization' of empirical findings, i.e. finding an explanation based on the rational choice model whereby consumers are optimizing choice by minimizing payment for cellular services. First, he examined consumer choice in fixed-line telephony, where a distinct change occurred in the types of plans offered.

Data was collected from a price experiment conducted by South Central Bell (SCB), the local telephone company in Louisville, Kentucky during 1986.67 Until that time, SCB sold phone access in one bundle, a monthly contract offering unlimited local calls. When the firm wanted to add other options, it was asked by the regulator to conduct a price experiment to test the effect on consumers. SCB added a pay-by-use option with a lower monthly fee but requiring a positive price for calls made – an attractive offer to 'light' users of the phone line.

66 See, Nicholas Economides, Katja Seim, and V. Brian Viard, "Quantifying the Benefits of Entry into Local Phone Service", New York University Law and Economics Working Papers No. 34 (October 16, 2007). Available at: http://lsr.nellco.org/nyu/lewp/papers/34. The same implicit assumption was made in Busse, note 38 above.

The question was whether consumers would choose their optimal contract, and especially – if they would correct initial mistakes over time. The same database led other researchers to conclude that consumers have a strong preference (some would say, too strong) for fixed-price options, where price is perfectly anticipated and does not differ by use. Contrary to previous claims in the literature, Miravete concluded that consumer mistakes in choosing calling plans are explained by a dynamic process of initial assessment, receiving data on actual use and payment, and correction of mistakes over time. This process fits with the assumption that consumers rationally minimize their phone bill. Their bias towards fixed-price options was explained by an over-estimation of their future phone usage, one that was corrected over time if proven wrong. The findings that consumers were slow to correct such mistakes, and showed a status-quo bias, were explained by their uncertainty regarding the future.

While it is interesting to discuss consumer mistakes and possible corrections later on, a study comparing two pricing options is far from appropriate to understand the current cellular situation, where the number of calling plans is large, and they include attributes

68 Since phone use varies over time, consumers will not always know which option is cheapest for them. Thus, the question is not merely initial choice among calling plans, but especially attention to changes and re-optimization – an ex post learning process of adapting to slowly unveiling information about their own phone use.


Many studies have shown a strong flat-rate bias in varying contexts. See, e.g., Lambrecht, Anja and Skiera, Bernd, "Paying Too Much and Being Happy About it: Existence, Causes and Consequences of Tariff-Choice Biases" 43 Journal of Marketing Research 212-223 (May 2006). There, a flat-rate-bias explains lower consumer churn as well, due to willingness to pay for psychological convenience.


making direct comparison very difficult. It may very well be that consumers are able to optimize among two clearly distinct alternatives, where the salience of differences is high due to a single pre-change price with no options suddenly being augmented by a relatively simple alternative.

In order to check whether a rich menu of pricing options allows the cellular firm to mislead consumer into choosing the wrong calling plan, Miravete chose to study what he called 'foggy pricing'. The basic idea is simple – if calling plans exist in order to confuse consumers, the cellular firms must be pointing them towards plans in which payment is higher. Consumers, obviously, are not interested in paying more than they have to for their cellular service, thus their choice was seen as a mistake if they clearly are paying too much. Since the study was empirical and based on real-world data, a clearly defined mistake must be identified to differentiate choice (and heterogeneity of tastes) from confusion. A price was termed 'foggy' if it was clearly dominated by others, i.e. could not be chosen but for a mistake in understanding the options. Dominated calling plans are those for which cheaper alternatives are available for any possible consumption profile during all (or at least most) hours of the day.

A 'foggy' price is supposedly not in the firm's interest, since if consumers choose optimally, or at least correct initial mistakes relatively quickly, such plans should not survive in the marketplace. Nevertheless, such plans were offered, and their number rose in direct proportion to the competitiveness in the relevant market. In other words, when a cellular firm obtained a local monopoly (a common starting point for most of U.S. cellular markets), almost no foggy options were offered. As local competition increased, firms rushed to offer

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72 Due to different structures of calling plans, one may be cheaper during specific times, while the consumer should still not choose it due to its being dominated at other times. The first definition of 'foggy prices', a fully-dominated tariff, is simple and binary – each calling plan is either 'foggy' or it is not. The second definition allows more flexibility as well as a measurement of range – the 'fogginess' is measured continuously according to the length of time in which it is dominated. This allows a full ranking of plans and measurement of the conditions leading to the amount of 'fogginess' in the prices offered.
more and more calling plans, with some of these being 'foggy'. This can be explained as competition causing cellular firms to focus on raising profitability through creating confusion and gaining from consumer mistakes, as the simple high-price strategy was no longer viable.

It should be stressed that the definition used by Miravete for 'foggy pricing' was especially strict and limiting. A dominated calling plan is one which can always be improved by switching, but if the aim was examining the consumer's point of view, it is more important to see to what extent the optimal plan was chosen – not just the worst one available. If creating complexity through an overly-rich menu of alternatives reduces the consumer's ability to choose correctly, that is enough to warrant critique – even if there was a worse yet option forgone. Furthermore, there is no reason to assume that a rational profit-maximizing firm would create such 'foggy' options. It is easier to create a network of prices which all have attributes making them better for different times or consumption profiles – although none is 'best'. If a large variety allows higher final prices, there is no need to create a 'worst' option. Variety which makes optimal choice by consumers difficult, allows the firm to profit from mistakes. If complexity makes comparison difficult, this is sufficient to raise profits and there is no reason for the firm to seek out dominated, or 'foggy', prices.

Finally, it is especially interesting to note that Miravete could not find a rational explanation for the variety of calling plans, one which does not rely on systematic mistakes by consumers or cognitive biases of the type we are dealing with here. The only study in which he directly examined the variety of pricing options (and not just the worst one), led him to conclude that there exist too many options – not for consumers, but for the firms themselves. His recommendation to cellular firms to reduce the number of options offered, due to their handling costs and lack of profitability, is interesting – especially since in practice

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73 Here it is interesting to remember the implicit assumption upon which Seim and Viard, note 65 above, based their work. In their study, variety was measured as a direct proxy for consumer welfare, with no attention to plan details. Thus, 'foggy prices' were measured as part of the consumers' benefit as well. The downside of making implicit assumptions about consumers valuing choice per se becomes apparent, even without the considerations of complexity and cognitive cost we deal with here.

the cellular market (among others) is heading in the opposite direction.75 Here too, the basic assumption of rational consumers, lacking biases or cognitive load, underlies the model – and here, too, the assumption was not made explicit nor its veracity discussed. With no room for variety as the source of confusion or difficulty in comparing among firms, no explanation was found for the existence of so many options.

It should be noted that in most of the studies cited above, a simple comparison was made of two states of the world: before competition entered, and after it did. The mere fact of de-regulation, together with the change in number of operators in the market, increases the salience of different alternatives. This leads consumers to be more aware of differences and be more able to attend to them. In most mature cellular markets today, market segmentation is relatively stable, thus salience should be expected to be lower due to the lack of a distinct change to draw consumer attention. Also, if a large part of variety's effect is in discriminating between naïve and sophisticated consumers, an empirical examination of cumulative effect suffers from a double bias. For sophisticates, we would expect their situation to improve with an increase in the number of alternatives, and for naifs – that it would become worse. Bundling all consumers together will only allow for finding an average effect, thus even if the effect is large on each group separately – this will disappear due to opposite signs. This does not mean that the data examined above shows such an effect, as this should be measured directly, but the conclusion such an effect is lacking requires substantiation not yet provided.

Recently, Bar-Gill and Stone found direct empirical verification of the issues studied here.76 Studying a dataset consisting of actual plan choice, usage, and payment, they compare possible explanations of what seem to be mistakes in consumer choice. Focusing on our issue of choice, complexity in calling plans, they compare 'rational’ explanations with those allowing for consumers' confusion, and show that the data are much better explained by the latter. While consumer learning occurs over time, this process is insufficient to overcome the

75 Also interesting is the dismay perhaps experienced by an economist offering a rational explanation for consumer choice (rejecting cognitive constraints), while witnessing the lack of such rationality as to firms' commercial dealings.

substantial welfare losses found. Of special interest is the fact that competition in the cellular market also does not dissipate firm profits from complexity, contrary to the assumptions implicit in the literature surveyed above. Their policy proposal, of informing consumers about their actual usage, is in line with the 'asymmetric paternalism' literature, bringing us to the next section – deliberating the appropriate normative response to issues of complexity and consumer mistakes.

VI GIVEN HARMFUL COMPLEXITY – SHOULD THERE BE A REGULATORY RESPONSE?

The picture painted so far is one of an overly-rich menu of cellular prices, causing consumer confusion and sub-optimal choice, as well as lower competitive pressure on firms whose offerings are difficult to compare. From a regulatory point of view, there is a consumer-protection problem, and an antitrust problem. Consumer protection – if strategic complexity causes consumers to choose incorrectly, or more generally – misleads them. Antitrust – if we focus not on the single consumer, but on competition in the market and its reliance on comparisons between firms being possible. Cellular markets are regulated in most jurisdictions, with specific regulators focusing on communications networks, as well as competition authorities and courts hearing cases bearing on these issues.

Regulatory and court intervention in contractual complexity is possible in two main ways: limiting the number of calling plans firms may offer, or creating a simple basis for comparison upon which all calling plans must be based. The second option intervenes less than the first in market processes and firms' freedom of action, and similar solutions were

77 Consumer learning may be fostered by allowing their quick response through changing calling plans. The lock-in effect of minimum-term contracts, as well as the psychic costs of studying and understanding the available alternatives, raises switching costs and thus reduces the incentive for learning ex ante. Note, of course, that the increase in plan complexity and available alternatives raises these learning (and thus switching) costs. Compare with Martin Gaynor and John Heinz, "Cell Phone Demand and Consumer Learning – An Empirical Analysis", NET Institute Working Paper 05-28 (2005), which found evidence of learning over time, but in a setting where switching was easy and early termination was costless.

78 Whether antitrust intervention is possible depends on whether explicit collusion exists, as well as our attitude towards the legality of oligopolistic coordination. See text at note 46 above.
proposed in other markets suffering from similar issues.\(^7^9\) Even without state intervention, one may hope that at least some of the detrimental effects of cognitively-constrained consumers would be prevented through market mechanisms – such as firms maintaining a positive image, having their offerings rated by independent consumer organizations, popular press, and the like.\(^8^0\) Still, the hope that market forces make direct intervention unnecessary seems overly optimistic, especially when dealing with an attribute consumers value – the ability to choose.

Mechanisms interfering with consumers’ choice, justified by the need to protect them from mistakes, are paternalistic in nature, and much has been said and written about the newly garnered support for paternalism from behavioral economics and the scientific literature it relies on. Since this strand originates mostly from economists educated to respect private choice and market forces, the argument surrounding the new paternalism is fierce, with many bringing up known limitations of such intervention.\(^8^1\) In order to overcome the individual-choice problem and avoid forcing those for whom protection is unnecessary, techniques of asymmetric paternalism were developed – ones which leave a 'safety valve' allowing some consumers to avoid regulation not in their best interest.\(^8^2\)

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cellular markets can be shown to be of this strand, such as limiting the length of commitment periods a firm may demand. Such limitations are based on an assumption that consumers cannot rationally take into account future price rises or consumption changes, stemming from the same type of cognitive limitation we deal with here. Similar arguments can be made regarding firms offering distinct cellular numbers, also an attribute raising switching costs which a rational consumer should take into account ex ante. Regulators in many jurisdictions have acted to enforce number portability, showing an unwillingness to rely on perfect consumer rationality and foresight. Regulation of contractual complexity in the cellular market can be similarly justified.

These effects can also be seen as a type of oligopolistic coordination among firms, remaining in the market due to its high concentration. Still, even if increasing the number of firms in order to enhance competitive pressure were possible, beneficial effects would be mitigated by the existence of naïve consumers valuing variety and ignoring cognitive costs and their effects. If consumers were rational utility-maximizers lacking any cognitive limitations or cost of thinking, obfuscation strategies would not work and competition would dissipate them. Of course, oligopolistic coordination can manifest itself directly in prices rather than complex behavioral tactics. In the present situation, however, the lower salience of behavioral tactics and complexity of contracts makes these more attractive from the firms' point of view. From the consumers' point of view, some would protest the sense of unfairness


The status-quo bias mentioned above is an excellent example. If diverging from the status quo is allowed, and most consumer decline to do so, it seems obvious that a regulatory agency would strive to make the default option the best for most consumers, or for most of those predicted not to invest the time and effort needed to make a conscious choice. Such regulation still allows consumers to choose differently, thus the constraint on individual liberty is minimal. On the other hand, there are reasons to doubt the efficacy of such 'have the cake and eat it too' tactics. See note 81 above.

83 The U.S. cellular market is served by four national providers (in addition to other local and niche players). This is characteristic of cellular markets worldwide, due to exceptionally high fixed costs in the industry. See, FCC Thirteenth Annual Report (2009), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-09-54A1.pdf.

84 This is due to the driving force behind these practices being consumer preference and lack of foresight, rather than mere firm coordination. Thus, a firm offering fewer plans might benefit consumers, but this would only be perceived as such by sophisticates. Naïfs would focus on the smaller variety, impeding their perceived choice. See section IV.B above.
experienced when going through a process of excitement from abundance, choosing from a large set, trying to find the optimal contract – and eventually getting a long and complicated bill making understanding and comparison difficult.

When considering regulatory intervention in contractual complexity, it is important to remember that the large variety is highly valued by consumers. Creating a common-ground for comparison still limits the freedom of firms unable to devise contracts at their will, as well as re-creating known problems with regulation, of needing to constantly adapt to a changing market – especially in a dynamic and innovative market such as the cellular one. Here, as elsewhere, there are no easy answers or magic solutions. Intervention helping on one dimension is likely to harm in others, or its cost (including the rigidity imposed on the business world) might turn out to be high. This paper focuses on pointing out the problem and understanding its sources. Devising solutions and dealing with their unavoidable drawbacks requires separate consideration.

One aspect raised above, the distinction between naïve and sophisticated consumers, requires additional thought. It is true that sophisticates, able to compare calling plans and form forward-looking incentives, could achieve lower prices. Regulatory intervention aimed at protecting those of us more naïve in their dealings with firms, also reduces the profit potential sophisticates see in learning the various offerings and alternatives. The sophistication we deal with here is not a static attribute, but a dynamic character trait which changes with time, investment of effort, and sometimes money. In may be said that the sophisticates work hard to find the best deal, and the fact that naïfs pay more is a result of their own laziness – not investing in understanding their commercial surroundings. Each description brings up different connotations, and it is important to remember the difference between describing a fact (the price difference between groups), and adding interpretations and personal opinions (who is to blame). The important point is that reducing the price difference also reduces the incentive to exert effort to find a better deal, thus regulatory

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85 See section IV.B above.

86 'Laziness' invokes a negative connotation, implying a consumer's obligation to take more care with commercial choices. It could also be argued that cognitive biases are over-emphasized, and it is consumer culture as a whole which should be critically assessed. See, Martha A Starr, "Saving, Spending, and Self-Control: Cognition versus Consumer Culture", 39 Review of Radical Political Economics 214 (2007). From this point of view, it is not better consumerism that should be fostered through law, but less of it.
intervention encourages consumer laziness. It amounts to a proclamation that consumers are unable to make their own choices, or to understand the alternatives offered – and doing the work for them. Demanding that firms arrange their offerings in a way that even naïfs can understand removes any need they might have to try and become more sophisticated.

Since we are all consumers, and are all human-beings tainted with cognitive limitations of some kind, this is not just a regulatory question, but a matter of accepting the fact that our ability to choose is limited, even if a rich menu is placed before us. The existing tendency to offer great variety and pull us in with 'sales' and 'discounts', is a direct result of our wanting the choice process itself, together with the excitement garnered from a new purchase. A consumer aware of his limitations will take them into account, whether in learning how to minimize payment for cellular services, or forgoing the effort altogether – consciously deciding to pay a little more while not wasting time on comparisons. If the purpose is maximizing utility, i.e. subjective welfare, it is far from clear which option is best. The state's attempt to save the consumer the cost of becoming more sophisticated might detract not just from a worthy incentive, but also harm the ability to satisfy one preference (wanting the process of choice) in order to foster another (choosing the best alternative). The tendency to see cognitive limitations as justifications for protective regulation, must account for the ancillary harm to the joy of choice-making, as well as the problematic incentive to avoid investment in sophistication. The solution is far from obvious.

It is precisely this point which motivated the choice of this specific market, cellular calling-plans, to be assessed in this paper. If asymmetric/libertarian/soft paternalism is an appropriate policy choice to deal with other cognitive biases, cognitive load and hyper-choice situations should be part of the program. This market is a central and important one in our society, at least with respect to the number of people affected. Still, this example more than others shows how intervention aimed at improving social and personal welfare, involves restricting choice in a manner that many may find objectionable. Understanding the mechanisms by which consumers choose, and firms' adaptation to them, is important, even if appropriate regulatory response is uncertain.

87 See note 33 above. In light of the utility attained by 'maximizers' vs. 'satisficers', discussion of appropriate state intervention might be best focused on education, such as encouraging enjoyment of the present and settling for 'good enough', rather than tweaking market mechanisms facilitating 'optimal' consumer choice.
VII  CONCLUSION

The cellular market allows for a fascinating test-case of several cognitive biases plaguing consumers, as well as marketing tactics of firms adapting to such consumers. Some biases have already received regulatory response aimed at protecting consumers, usually within a context of public debate stressing the freedom of choice. This paper adds to the menu of relevant biases the problem of cognitive overload and over-abundance of contractual choice in the cellular market. Given a difficulty in understanding and processing information, the consumer finds himself offered a too-large variety which harms his ability to choose optimally, so that freedom of choice becomes mostly illusory.

After reviewing the basic structure of cellular markets and the psychological literature regarding cognitive load, we studied the mechanisms through which providing overly abundant choice might benefit firms at the expense of consumers. Since, for most of us, the basic intuition is that variety of alternatives is an advantage to the consumer interested in choice, we have a heavy burden in arguing that contractual variety can be a curse as well as a blessing. Reviewing the literature and examining experimental evidence as well as real-world empirical studies, were aimed at substantiating the basic argument that freedom of choice in the cellular context is ill-served by increasing variety. Still, the basic tendency shared by most consumers is to prefer a rich menu of choices, even when the eventual enjoyment of the final choice suffers as a result. Thus, we saw that the preference for choice is no less real than the preference between alternatives, and examined a variety of contexts where these collide. Where this happens, the consumer will seek choice and suffer from sub-optimal results.

Implementation of psychological insights to the cellular market allows for a renewed look at prevalent marketing tactics, where harm to consumers appears in two ways – inability to make optimal choice, as well as a lessening of competitive pressure on firms. The first raises issues from consumer protection law and paternalistic regulation, while the second raises issues related to antitrust law and competition policy. The high concentration in most cellular markets allows for oligopolistic coordination, where marketing tactics based on cognitive limitations allows firms to charge high prices in a less salient way than most models assume.
In order to examine the economic implications of choice biases, we examined empirical studies, as well as differentiating between types of consumers. The empirical literature illuminated the biases affecting researchers, who are quick to make implicit assumptions regarding consumer rationality and thus assume an increase in consumer welfare without examining alternative explanations. The distinction between sophisticated and naïve consumers allowed us to understand the price discrimination mechanism and the importance of complexity – as well as raise hard questions as to the appropriateness of regulatory intervention. Eventually, as the consumers are interested in the large variety which harms their eventual choice, it is unclear that the state's role is to prevent them from acting out this preference, or reduce consumers' incentive to figure out the way the market operates and increase their own sophistication.

In the end, it is hard to say if regulation aimed at solving the information overload problem will do more good than harm. Still, posing the question seems important in order to delve further into the issues, as well as giving a richer context within which to discuss regulatory arrangements in other industries. It is this issue of contractual complexity which raises the issue of freedom of choice most clearly, and we see that easy answers are hard to come by. As we observe that choice is not necessarily better (or more 'free') given many alternatives, it is difficult to argue how the purpose of increasing consumer autonomy is best served. Education as to the array of cognitive biases afflicting consumers may be helpful in overcoming them (though less than one would hope), but it serves a deeper purpose. It allows for increasing the type of sophistication addressed above, but even more, it allows for a deeper understanding of our choice mechanisms. Even without a clear regulatory response, knowing ourselves and critically examining our own actions allows for attaining true freedom of choice – accepting reality and enjoying our own part in it, while understanding our limitations and being willing to pay their price.