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Working Paper

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ESRI Working Paper, No. 598

Provided in Cooperation with:
The Economic and Social Research Institute (ESRI), Dublin

Suggested Citation: McGowan, Féidhlim (2018) : The roaming regulation and the case for applying behavioural industrial organisation to EU competition policy, ESRI Working Paper, No. 598, The Economic and Social Research Institute (ESRI), Dublin

This Version is available at:
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Working Paper No. 598

September 2018

The roaming regulation and the case for applying behavioural industrial organisation to EU competition policy

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Abstract: *Behavioural Industrial Organisation (BIO) incorporates psychological insights into traditional models of market interactions between firms and consumers. These models often have high predictive power relative to models based on the classical paradigm of the 'rational' consumer in markets where the good has multiple features and at least a subset of consumers display biases such as inattention, overconfidence and self-control problems (present bias). This paper uses the Roaming Regulation as a case study to demonstrate the value of BIO to competition policy makers in such markets. To motivate the appropriateness of BIO models to roaming, the phenomenon of 'bill-shock' is first shown to be plausibly caused or exacerbated by these biases. The paper discusses how insights from BIO models can inform an understanding of 'demand substitution', and by deduction how policymakers conceive of market power. Finally, a counterfactual examination of two key junctures in the Roaming Regulation policy cycle highlights how the application of BIO is conducive to the formation of evidence-based policy.*

Acknowledgements: *I am grateful to Pete Lunn and Seán Lyons for guidance on structure and relevant content, and to members of the Behavioural Research Unit for instructive feedback. Thanks also to ESRI seminar audience members for helpful suggestions. All errors and omissions are my own.*

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Section 1: Introduction

Roaming is the term given in mobile telephony markets to the provision of continuity of service outside the area of the home network provider. In 2007, the EU introduced a Regulation to cap roaming charges. This measure was ostensibly temporary. Its purpose was to protect consumers from excessive prices and incurring large, unexpected bills - a phenomenon known as 'bill shock' (Horrigan and Satterwhite, 2010; Xavier, 2011) - while allowing competition in the provision of roaming services to develop.[1] However, the anticipated developments in competition did not materialise: prices stayed at, or just below, the price caps. As a result, the provisions were renewed and eventually roaming charges were abolished entirely on June 17th, 2017.

This policy response was unusually strong. Less drastic interventions more in keeping with the predominant 'information paradigm' of EU consumer law (Micklitz, 2008) were available. Justifying the approach, the legislation described the characteristics of the roaming market as 'unique' and the measures taken as 'exceptional'.[2] Some took a dim view of this justification: "The underlying problem has yet to be formulated in the language of competition law economics [. . .] The delay is inexcusable, given the difficulty in bypassing such economic analysis" (Sutherland, 2008). Others questioned whether the Roaming Regulation was "a regulatory fallacy" and suggested it was "no substitute for functioning competition" (Knieps and

[1] European Commission, 2006
[2] Recital 13, Regulation (EC) No 717/2007.

Zenhausern, 2014). That such critiques were made is not particularly surprising given the policy was not a response to a classic market failure of asymmetric information, market power, or externalities.

The application of behavioural research to internal market regulation has received much attention in recent years from within the EU Commission (e.g. van Bavel et al. 2013) and the academic community (e.g. Faure and Luth, 2011; Burgess 2012; Franck and Purnhagen 2014; Purnhagen 2015; Sibony and Alemanno 2015). Van Boom (2011) applied behavioural research to analyse issues of price intransparency with the EU consumer law framework. In a similar vein, Trzaskowki (2011) discussed whether the 'average consumer test' used by the Court of Justice of the European Union (CJEU) is flexible enough to incorporate insights from decision-making research to arrive at a more evidence-based normative standard. Behavioural insights have been used sporadically, and perhaps implicitly, in EU competition cases. The well-documented stickiness of default options (e.g. Johnson & Goldstein, 2003; Madrian & Shea, 2001) was a factor in the CJEU ruling that compelled Microsoft to offer users an active choice of internet browser (Case T-201/04).[3] In a recent labelling case, the average consumer benchmark in the Food Information Regulation interpreted by the CJEU in line with findings from behavioural science rather than case law (Purnhagen and Schebesta, 2016, p. 595). Empirical research has begun to test suppositions of the CJEU in relation to the abilities of the 'average consumer'. In the Mars case[4], it was alleged that the company had engaged in misleading advertising when they displayed an oversized indication of the extra volume on the package The CJEU ruled that a 'reasonable observant and circumspect' average consumer would not be misled. An experimental

[3] Research on defaults similarly informed the decision to ban pre-ticked boxes in the EU Consumer Rights Directive (Directive 2011/83/EU).
[4] Verein gegen Unwesen in Handel und Gewerbe Köln e.V. v Mars GmbH (C-470/93) [1995] E.C.R. I-1923.

test later provided evidence that consumers were prone to 'anchor' on the visual size of the display and hence overestimate the extra volume on offer (Purnhagen and van Herpen, 2017).

Less attention has been afforded to the potential benefits of applying behavioural industrial organisation (hereafter BIO) within the internal market.[5] BIO maintains the rigour and mathematical tractability of classic industrial organisation while incorporating departures from rational behaviour, such as loss aversion or limited attention. In many markets BIO models offer greater predictive power of market outcomes, and explain phenomena that are anomalies under the standard model. For instance, they explain that current accounts have high overdraft fees because a subset of consumers ignore this feature completely, so it is optimal to set a high price. (Armstrong and Vickers, 2012). Mobile phone consumers underestimate the variance of their usage - firms respond by charging a price that is increasing in minutes of calling (Grubb, 2009). Brown et al. (2012) find films that open without reviews earn more at the box office than reviewed movies of similar (invariably very low) quality. The absence of a review would be a clear signal of low quality to a rational consumer. Firms increase demand by taking advantage of consumers' failure to reason strategically.

This paper applies behavioural research to the roaming regulation. Two contributions are made to the nascent literature. The first is to argue against the roaming market being 'unique'. Though the supply-side dynamic between the wholesale and retail roaming markets was certainly unusual (Infante and Vallejo, 2012), the demand side had characteristics common to many markets, such as credit cards. These commonalities will be highlighted. Specifically, the case will be made that three well-documented behavioural biases – namely inattention, overconfidence and present bias

[5] Papers that examine implications of behavioural economics in general on competition policy include Bennett et al. (2010) and Stucke (2010)

(self-control problems) – contributed to the inelastic demand for roaming services and were plausible causal factors in ‘bill shock’. It is posited that the Roaming Regulation should be considered a ‘behaviourally aligned’ intervention, defined by an EU Commission taxonomy as “initiatives that, at least a posteriori, can be found to be aligned to behavioural evidence” (Lourenco et al., 2016).

The second contribution and main purpose of this paper is to use the Roaming Regulation as a case study to illustrate the potential benefits of applying BIO models to competition policy issues. Contrary to predictions under the standard model, BIO models show that more sellers in a market does not necessarily benefit consumers, and that regulations to enhance consumer protection may also boost competition. An analysis of two problems that arose during the lifecycle of the Roaming Regulation will demonstrate the potential usefulness of BIO models to policymakers. Critiques of the Roaming Regulation, and proposed alternative measures, will also be analysed within this framework.

The paper proceeds as follows. Section 2 provides context by outlining regulatory developments in the roaming market. Section 3 briefly describes some of the behavioural biases telecommunications consumers display that plausibly contributed to bill shock. Section 4 compares the standard model of competition with BIO models that incorporate behavioural biases. How firm actions designed to exploit consumer biases affects demand substitutability, and by deduction market power, is then discussed. Two key junctures in the policy lifespan of the Roaming Regulation are analysed in Section 5 to demonstrate the potential benefits of BIO models. The case is made that had the EU Commission related their empirical findings on the malfunctioning of roaming markets to the appropriate BIO model, it wold have simplified the

subsequent task of defending the Roaming Regulation as an appropriate and proportionate policy measure. Section 6 briefly discusses policy implications and concludes.

It is important to note at the outset that this paper is agnostic on whether the Roaming Regulation in its current form is the optimal policy intervention to address bill-shock. That judgement requires a welfare analysis beyond the scope of this paper.[6] However, a firm view is taken on the need to consider behavioural evidence to reach an informed decision about what such an intervention would look like.

Section 2: A Brief History of Roaming Charges

This section is intended to provide necessary context for the following sections rather than provide a comprehensive overview of the evolution of regulation in roaming markets. For a more detailed discussion see Infante and Vallejo (2012). The roaming market, in simplified terms, worked as follows: Domestic operators paid a wholesale charge to foreign operators for providing continuity of service. The domestic provider then charged its customers for using roaming services. This was the retail charge. The dynamics of this market are unusual. A firm lowering its price at the wholesale level would not necessarily lead to an increase in demand: "The demand for wholesale international roaming services stems from the demand on the retail level, and is therefore linked to the travel pattern of the customers at the retail level". [7] Additionally, choice of wholesale partner was often not based on price but on reciprocation.

[6] Though it is not the focus of this paper, it should be noted that fears of a large 'waterbed' effect (Genakos and Valletti, 2011) following price caps on roaming services have not (yet) materialised (BEREC, 2010, cited in Falch and Tadayoni, 2014), suggesting that high prices were not a reflection of high costs but rather a lack of competition. This is reminiscent of the consumer savings accruing after the CARD Act (Agarwal, 2015), where a waterbed effect was predicted by opponents to the legislation but not subsequently observed.

[7] European Regulators Group (2005) ERG COMMON POSITION ON THE COORDINATED ANALYSIS OF THE MARKETS FOR WHOLESALE INTERNATIONAL ROAMING, Paragraph 59.

International roaming charges were first brought to the attention of the EU Commission in 1996 by mobile operators concerned that arrangements at the wholesale level between Mobile Network Operators were in violation of EU competition rules. Exemptions were granted subject to the introduction of non-discriminatory wholesale pricing.[8] A sector inquiry covering national and international roaming services was ordered in 1999 following complaints about persistently high prices.[9] This led to the Commission opening proceedings alleging abuse of a dominant position by some mobile operators in the United Kingdom and Germany, but the case was later closed without penalties being imposed. International roaming was later recognized as an issue for potential *ex-ante* regulation at the time of the adoption of the 2002 regulatory package for electronic communications,[10] where companies were found to be dominant in the relevant market.

The first Roaming Regulation (Roaming I) was enacted in 2007[11] due to the perceived inadequacy of the 2002 regulatory tools to tackle the problem of high roaming charges. It introduced wholesale and retail caps (called Eurotariffs) for incoming and outgoing calls. To increase price transparency, it was mandated that customers receive a free text message when travelling with information about roaming charges. A review in 2009 led to Roaming II. Price caps were lowered for voice calls to reduce the gap between wholesale and retail prices. Additionally, SMS prices (retail and wholesale) and data services (wholesale only) were

[8] European Commission XXVIth report on Competiton Policy. Brussels: EC (1996)
[9] DG COMP, 2000. Accessed online 2nd May 2017. Available at http://ec.europa.eu/competition/sectors/telecommunications/archive/inquiries/roaming/working_document_on_initial_results.pdf
[10] through the identification of the wholesale national market for international roaming on public mobile networks in the Commission's Recommendation of 11 February 2003 on Relevant Product and Service Markets within the electronic communications sector.
[11] Council Regulation (EC) No 717/2007 on roaming on public mobile telephone networks within the Community and amending Directive 2002/21/EC L-171/32

regulated. A consumer protection measure against bill shock was introduced too: on reaching a predefined limit (€50 excl. VAT by default), the operator was obliged to notify the customer, at which point they could decide whether to continue spending money on data services.

The Roaming Regulation was recast once more in 2012[12] as competition had failed to bring about the envisaged benefits, especially for data services (BEREC, 2012). Referring to data provided by the national regulatory authorities, Recital 22 of the 2012 Regulation stated that: "retail and wholesale roaming prices are still much higher than domestic prices and continue to cluster at or close to the limits set by Regulation (EC) No 717/2007, with only limited competition below these limits". Price caps were lowered accordingly. It also introduced the concept of roaming unbundling, which separated the sale of roaming services from the rest of the retail package. Article 4 (2) asserted that "Roaming customers shall have the right to switch roaming provider at any time. Where a roaming customer chooses to switch roaming provider, the switch shall be carried out without undue delay". Article 4 (4) outlined the responsibility of domestic providers to inform customers about switching roaming provider. It was envisaged that the technical provisions for unbundling would take time to implement. This never occurred however, because in September 2013, Commissioner Neelie Kroes announced plans to introduce "Roam Like at Home (RLAH)" whereby operators charge the same price for roaming services within the EEA as for domestic mobile services. This was supported immediately by the European Parliament, but implementation was delayed by concerns over a painful transition for the telecoms industry by the Council of the European Union (Spruytte et al., 2017). In November 2015 the legislation was finalised and in June 2017 RLAH came into effect.

[12] REGULATION (EU) No 531/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 June 2012 on roaming on public mobile communications networks within the Union (recast)

Section 3: Behavioural Biases in Telecoms Markets

Telecoms consumers often display behavioural biases such as inattention, overconfidence and time inconsistent preferences (see Lunn, 2013 for a detailed discussion). The express political motivation of the Roaming Regulation was to eradicate 'bill shock'. This section outlines how these phenomena - especially in combination - plausibly increase the likelihood of experiencing bill shock. Parallels are drawn throughout to similar markets where these biases have been documented.

3.1 Inattention

That humans are boundedly rational decision makers means decisions must be arrived at by a process other than full optimisation (Simon, 1955). When faced with 'too-much information', individuals struggle to evaluate choices accurately (Jacoby 1984; Bettman, Luce, & Payne, 1998; Schwartz, 2004; Scheibehenne et al., 2010). A wealth of evidence suggests that individuals simplify the task for themselves and 'satisfice' by focusing on a subset of the information and using heuristics or rules of thumb (Iyengar, Huberman and Jiang, 2004) to find an option that is "good enough". Although this may be a sound strategy with no adverse consequences (Gigerenzer and Todd, 1999), in some circumstances satisficing results in inattention to information that matters.[13]

Inattention is evident in a wide range of domains proposed and has been proposed as one of the unifying themes of behavioural economics (Gaibaix, 2017). For example, left digit bias when evaluating the mileage of second hand cars (Lacetera, Pope, and Sydnor, 2012) and inattention to future weather conditions when buying a car (Busse et al., 2015); inattention in loan choice to

[13] Inattention can occur without information overload but the opposite is rarely the case.

features not made salient (Lunn et al., 2016); inattention to shipping costs on eBay (Brown, Hossain and Morgan, 2010); and retail investors are often inattentive to fee information that has a larger bearing on expected returns than past performance information that is often attended to instead (Wilcox, 2003; Husser and Wirth, 2014).

Inattention to hidden fees on credit cards is perhaps the most well-researched example for consumer products that, like mobile phones, involve standard contract terms. Consumers who take out new credit cards incur higher rates of fees than existing customers, with one study estimating that fee expenditure in the U.S. market fell by 75% over the first three years of an account (Agarwal et al., 2008). Initial inattention that is corrected by incurring fees is the simplest explanation for this finding, although the exact mechanism cannot be stated with certainty, [14] The U.S CARD Act banned or placed limits on many of the fees that consumers were inattentive to. A comparison of borrowing costs before and after its introduction found no evidence of waterbed effects and estimated consumer savings at $12Bn per year (Agarwal et al., 2015).

A standard mobile phone contract is highly complex (Bar-Gill and Stone, 2009). It has at least six important attributes[15] apart from terms and conditions related to roaming. Survey evidence (Eurobarometer, 2006) suggested that consumers were inattentive to roaming charges in their 'satisficing' between service providers. Survey by national regulators (ComReg, 2005) and the

[14] Gathergood et al. (2018) show that learning effects are it is wholly due to consumers switching to automatic payments – thereby avoiding the need to remember to repay altogether.

[15] the price of own network calls and texts, other network calls and texts, the data allowance and the penalty charges for exceeding the allowance, the number of free calls and texts, and the price of off-peak rates (e.g. free weekend calls etc.) A bill pay customer would have to estimate the probability of exceeding multiple allowances for different types of calls and texts.

European Commission (2006) recorded low levels of knowledge on roaming charges too (less than one third said they knew their roaming charges). These estimates were self-reported and hence likely constitute an upper bound on the true proportion. Inattention to roaming charges leaves one exposed to a higher probability of bill shock, especially when individuals are unlikely to be Bayesian thinkers who are suspicious of what might be in the fine print (e.g. see Jin, Luca, and Martin, 2017).

3.2 Overconfidence

Two types of overconfidence are relevant to the incidence of bill shock. The first is over optimism about one's abilities or likely outcomes relative to the general population (Dunning, 2004). This tendency blunts the effectiveness of information disclosure about the average likelihood of an event occurring in changing individual behaviour. Bar-Gill and Ferrari (2010) discuss how attribute disclosures are rarely helpful to consumers who mispredict usage. They argue that "product-use" disclosures, such as the average roaming charges incurred, would be better, especially if it was given at the individual (or perhaps peer group) level to counteract the 'better-than-average' effect.

The second form of overconfidence relates to the range of potential outcomes individuals consider possible. Subjective confidence intervals are often constructed too narrowly, thus underestimating the probability of outcomes far from their expected mean. This is called miscalibration. Firms exploit this miscalibration by convex price curves for usage (Grubb, 2009). Both types of overconfidence have been recorded in market settings (Dellavigna, 2009) for credit cards and gym memberships. Research in telecommunications has shown that miscalibration

causes individuals to systematically choose the wrong calling plans, meaning high charges for exceeding usage allowances are often incurred (Grubb, 2009; Grubb and Osborne, 2015).

Overconfidence may be robust to correction through experience and feedback due to attribution bias, namely the tendency to ascribe negative outcomes to external circumstances and positive outcomes to one's own ability. Alternatively, behaviour change may occur but then be followed by a steady regression to prior habits. For example, learning to avoid additional fees in credit card markets is often temporary (Agarwal et al., 2008) unless consumers switch to automatic payments (Gathergood et al., 2017). Overconfidence and miscalibration are plausible explanations for 'bill shock' in roaming charges. And attribution bias may explain why 'bill shock' did not stimulate switching behaviour – ascribing the high bill to unavoidable external circumstances would dampen down the subjective probability of a repeat occurrence and thus the incentive to switch.

3.3 Present Bias (Self-Control Problems)

Hyperbolic discounting – the empirical finding that present consumption is valued disproportionately highly relative to the future consumption - means people often display time-inconsistent preferences (Malhotra, Loewenstein and O'Donoghue, 2002). Beliefs about future self-control are often overly optimistic; the present self envisages an ascetic future self, but when the future arrives, it is the voluptuary present self making the decisions. As a result, relative to prior beliefs about usage, consumers may overconsume services which provide instant gratification at a future cost (DellaVigna and Malmendier, 2006; Meier and Sprenger, 2010).

Ausubel (1991) in an influential paper first argued that consistently high profits in the credit card industry waere caused by consumers expecting not to borrow on their cards, but then doing so.

It has been noted that the potential scale of the self-control problem is particularly acute in telecommunications, given the broad range of social and entertainment platforms, such as Facebook and Reddit, and addictive activities, such as gambling and viewing pornography, the device allows access to (Lunn, 2013). Present bias potentially amplifies the potential consumer detriment of high roaming charges due to the "buy now, pay later" nature of roaming services. Taken in conjunction with inattention to roaming charges and/or overconfidence about avoiding incurring these charges, present biased consumers may be more likely to experience bill shock.[16]

Section 4: The Standard Model of Competition vs. BIO Models

In the standard model of competition, firms are profit maximising and individuals are rational agents who maximise utility. BIO models maintain the profit-maximising assumption on the firm side but incorporate behavioural biases on the consumer side, such as self-control problems, loss aversion, inattention, overconfidence and confusion (see Grubb (2015) for reviews of this literature). The analytical core becomes the interaction between individual psychology and market competition (Barr et al., 2008). Firms have the choice to attenuate consumer biases or exploit them. The nature of the product often determines which choice the seller makes. Barr et al. (2008) illustrate this point using the example of exponential growth bias, the tendency to underestimate the effects of compound interest (Stango and Zinman, 2009). A company selling savings accounts will aim to rid consumers of this bias; a credit card company will not.

[16] An extreme example is the British man who incurred a bill of £31,500 mobile phone after downloading an episode of his favourite TV show (Prison Break) while on holidays in Portugal. After a legal challenge the bill was reduced to £229

Not all consumers are alike however. Some may be 'sophisticated' in the sense that they behave like the archetype 'rational agent' of neoclassical economics. Others may be 'biased' and display some of the behavioural tendencies outlined in Section 3. Competition works best when even a subset of consumers being sophisticated means all consumers receive a better deal. This often occurs in markets for simple goods that have only have one or two features, e.g. taste in the case of an apple, or perhaps the betting odds in a bookmaker. In these markets, the circumspection of even a few sophisticated consumers ensures a better deal must be offered to all, including the biased ones. This is called a search externality.[17] But if the product has multiple attributes, some of which may be non-salient, the situation is different. Goods or services that contain standard contract terms fall into this category. Here an opportunity arises for the producer to divide consumers and prosper (Morwitz et al., 1998; Greenleaf et al., 2015).

When some consumers are sophisticated but others inattentive to add-on fees[18], BIO models show that the optimal firm response is to place a high mark-up on the hidden, or 'shrouded' component of the product and set the base price for the visible product below marginal cost (Gabaix and Laibson, 2006; Heidhues et al., 2016). Sophisticated consumers find a way to avoid this hidden cost. For instance, going to a hotel, they will take public transport rather than incur the parking charges at the destination, which they expect to be high. To avoid roaming charges, they may buy a SIM card in the visited country. The biased consumers, in contrast, naively choose whichever product has the lowest visible price and subsequently incur the hidden add-on charges. In this situation, sophisticated consumers may be cross-subsidized by biased consumers.

[17] Kay (2004) uses the analogy of the queues at a shopping market to explain the intuition. All shoppers need not actively search for the shortest queue. As long as a few do so, the queues will be of roughly equal length and all will benefit.

[18] Inattention to add on fees may be due to naïve overconfidence in avoiding these fees (Bubb and Kaufman, 2013) or simply not noticing them in the fine print (Brown et al., 2010)

Instead of heterogeneity leading to a positive search externality, what transpires is a negative 'rip-off externality' (Armstrong, 2015).

In addition to distributional effects, hidden fees interacts with consumer heterogeneity to create distortions in the efficiency of the market. Naïve consumers who are inattentive to roaming charges will incur more charges than they would under full information. To take advantage of this naivety, companies set these prices high. For those who are attentive to roaming charges, Heidheus and Koszegi (2018) note: "faced with these high roaming fees when abroad, consumers have an incentive to reduce their amount of calling, generating an inefficiency" (pg 19). This pattern of usage is reflected in the survey reports that many people incurred bill shock and others did not use their phones on holiday at all. Others expend socially wasteful effort in finding ways to avoid add-on costs, such as buying a foreign SIMs in their destination.

Within the standard model, when evidence of poor consumer outcomes arises, the regulatory response is often to promote greater competition within the market place. The example of an 'honest firm' entering a market in Gaibaix and Laibson (2006) is instructive in this regard. They demonstrate that an honest strategy is a losing one, because debiased consumers prefer to avail of the lower base price offered by the dishonest firm and avoid the hidden fees. Therefore increasing the number of competitors in the market may do little but intensify efforts to exploit the biased consumers' inattention to shrouded attributes. Other BIO models (Spiegler, 2006; Gabaix et al., 2016) also find that more sellers does not necessarily improve outcomes for consumers. Carlin (2009) derives a model whereby firms make both a pricing decision and a complexity decision, which determines how easy it is to compare prices (a combination of low price and low complexity would be a strategy to attract new customers). As the number of firms

increases, so too does the probability of choosing the high complexity option. Similar theoretical results are reported by Chioveanu and Zhou (2013).

Of direct relevance to the Roaming Regulation is how standard and BIO models predict price caps impact on welfare. A strong argument under the standard framework is that price caps are welfare reducing (Fershtman and Fishman, 1994; Armstrong et al., 2009). In these models, consumers observe the price of a single firm, but can pay a search cost to become informed about the prices of other firms. The introduction of a price cap reduces price dispersion and therefore reduces consumers' incentive to become informed. If consumers are not inclined to search for alternatives, competitive pressure on firms lessens. The decrease in competition leads to an increase in the average price consumers pay. Through this mechanism, a well-intentioned consumer protection measure may backfire and reduce welfare. The opposite is the case in the BIO model of Heidheus, Johnen and Koszegi (2018). In this model consumers have limited attention. This means there is a trade-off between fully understanding the offer of one firm and comparing offers between firms. Regulating the additional price or secondary feature of a product increases welfare through two channels. First, it limits consumer harm by hidden features. Second, it frees consumers to devote more attention to comparing products rather than trying to understand the minutiae of a single product to avoid price gouging. Regulation has a liberating effect on consumers and hence enhances competition, and there may be positive externalities for competition in other markets too. The authors note that the results are not licence to endorse indiscriminate regulation; pro-competitive effects must be balanced against classical concerns regarding regulation.

4.2 Behavioural Components of Demand Substitutability

Within the acquis of EU competition law, the three competitive constraints are demand substitutability, supply substitutability, and potential competition (Commission Notice on Definition of the Relevant Market, 97/C-372/03) Of these, the former is the most important: "demand substitution constitutes the most immediate and effective disciplinary force on the suppliers of a given product" (para 13). There are two sides to effective demand substitution. The availability of substitutes is the first. Leaving aside the difficulties delineating markets,[19] it is usually relatively straightforward to ascertain whether substitutes are available. The other side of the coin is that - conditional on substitutes existing - consumers must be able to spot the best deal. In the classical model this is assumed to be the case. But empirical evidence shows such discernment cannot be taken for granted. In the field, consumers often fail to choose the best price for homogenous goods (Grubb, 2015), switch to more expensive options (Wilson and Price, 2010) or choose strictly dominated options (Bhargava et al., 2017). When product features such as complexity or hidden fees interact with consumer dispositions such as inattention, the result is often to weaken the degree of demand substitutability.

Effective demand substitutability is important in its own right, but within EU competition its absence has a greater significance – it is a codified signal of a firm in a dominant position. The Commission Notice on Enforcement priorities notes that firms in a dominant position are free to act independently rather than having their choices constrained by genuine competitive pressure: "This notion of independence is related to the degree of competitive constraint exerted on the undertaking in question. Dominance entails that these competitive constraints are not sufficiently

[19] For example, are bananas and apples substitutes? See Chiquita Bananas. - Case 27/76.

effective and hence that the undertaking in question enjoys substantial market power over a period of time" (para 10). It follows that absent or weak demand substitutability leads to dominance being more likely. The Commission notes that dominance is rare below a market share of 40 % in the relevant market, but that exceptional cases based on the market structure may occur. (para 14). As noted in the previous section, within the BIO literature it is understood that firms may benefit from intentional obfuscation under certain circumstances. If this stymies consumers' ability to compare offers and choose the best deal, genuine competition may be illusory. Bar-Gill (2009) makes this point in relation to the subprime mortgage market. The complex fee structure made direct comparisons extremely difficult – thus, the market seemed competitive by normal metrics of concentration but lenders in essence operated local monopolies.

Strict quantitative measures such as the SSNIP (small but significant non-transitory increase in prices) test allow for an objective view of the degree of market dominance to be ascertained. That the definition of dominance is predicated on demand substitutability, which in turn depends on consumer capabilities to spot the best deal, raises the question of whether quantitative tests to measure this aspect of the market should be used in a more systematic way. Experimental tests, both online and in the laboratory, are growing in popularity amongst regulators as a way to measure consumer capability to judge product quality. They offer a way to cleanly identify the factors that lead to poor decision making, and a way to pre-test the effectiveness of potential interventions (Lunn and Robertson, 2018). For example, Bhargava et al. (2017) found that consumers did not understand the trade-off between premium and excess in health insurance; dominated options were often chosen as a result. Simple worked examples greatly reduced the incidence of mistaken choices. Lunn and Bohacek (2017) pre-tested a regulatory intervention for

an ‘Estimated Annual Bill’ on electricity offers and found its presence greatly reduced the incidence of mistakes and reduced the attractiveness of arguably misleading ‘discount offers’. Financial consumer protection bodies within financial regulation are increasingly turning to experimental tests to inform judgments of where intervention is necessary too (for example, see FCA, 2016). Where there are clear indicators of poor consumer outcomes without evidence of a classic market failure, systematic experimental tests of consumer capability may inform judgments of whether intervention is necessary, and if so what form it should take.

Section 5: A BIO Perspective on the Roaming Regulation

The previous section underscored the importance of consumer capability in determining firm behaviour within BIO models and how this may inform perspectives on market power. To demonstrate the potential benefits of incorporating BIO into the policy cycle more generally, two obstacles that arose in the process of tackling high roaming charges are described in this section. In each case, it will be demonstrated that the predictions of BIO models, had they been readily available and consulted, would have made the validity of the Roaming Regulation as a market intervention more readily apparent.

5.1: A Policy Implementation Problem

International roaming was recognised as an issue for potential *ex-ante* regulation at the time of the adoption of the 2002 regulatory package for electronic communications,[20] a toolkit to ensure effective competition in telecommunications. In 2005 the issue of high roaming charges at the retail level was raised.[21] This was the precursor for the introduction of the Roaming Regulation

[20] Through the identification of the wholesale national market for international roaming on public mobile networks in the Commission's Recommendation of 11 February 2003 on Relevant Product and Service Markets within the electronic communications sector.
[21] European Regulators Group (2005)

in 2007. High wholesale charges, high retail mark-ups, a failure to pass on wholesale savings to retail customers, and a lack of clear information on the part of consumers about roaming charges were all proposed as partial explanations for these high retail charges. Missing from this list was ‘dominance on a retail market', as there were clearly a high number of competitors. This was a puzzle under the standard framework. Determined to proceed - if not through the 2002 measures then around them – it was asserted that “the retail and wholesale roaming markets exhibit unique characteristics which justify exceptional measures going beyond the mechanisms otherwise available under the 2002 regulatory framework.”[22]

However, as outlined in Section 4, BIO models predict high prices being robust to the presence of many competitors when consumers display biases such as inattention and overconfidence and the product has multiple attributes. In a counterfactual scenario where BIO models were consulted during the formulation of a regulatory toolkit, legislators would have had a stronger case to preserve discretion over the circumstances in which ex-ante regulation was justified. For a policymaker concerned that market dynamics are eroding consumer surplus, market dominance may be a sufficient condition for regulatory intervention, but BIO models show it may not be a necessary one.

5.2: A Policy Enforcement Problem

The Roaming Regulation was opposed by mobile phone operators, who felt the EU Commission was going on a politically-motivated solo run with little concern for whether the precise criteria for legislative action at the EU level were met (Sutherland, 2008). Some legal academics agreed

[22] Recital 13, REGULATION (EC) No 717/2007 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 June 2007 on roaming on public mobile telephone networks within the Community and amending Directive 2002/21/EC

that the EU had gone beyond its competence in capping retail roaming services (Brenncke, 2008). A court case was taken in Britain by four large mobile operators to challenge the validity of the Roaming Regulation. The claimants challenged the validity of the Roaming Regulation on three grounds, namely that its legal basis was inadequate, it was disproportionate and it breached the principle of subsidiarity. The second claim is direct relevance to the central premise of this paper. The case was referred to the European Court of Justice for a preliminary ruling.[23] An analysis of the ECJ's verdict highlights a potentially troubling juxtaposition: a clear empirical need for a Roaming Regulation and no apparent theoretical basis for one.

The principle of proportionality essentially means that measures implemented through Community law provisions must be appropriate for attaining the legitimate objectives pursued and must not go beyond what is necessary to achieve them.[24] Community legislature is allowed broad discretion in its choice of measure[25] but this choice must nonetheless be based on objective criteria.[26] The claimants argued that the chosen measure went beyond what was necessary. Paragraph 61 of the verdict summarises this position:

> "It is argued that said measure goes beyond what is necessary to achieve the objective pursued, given the competitive nature of retail markets. A less intrusive and more proportionate approach would have been to regulate wholesale charges only, while allowing competition in retail markets to bring retail markets down in the normal way, according to the rules of supply and demand".

[23] Case C-58/08, Vodafone Ltd and Others v. Secretary of State for Business, Enterprise and Regulatory Reform, Judgment of the Court of Justice (Grand Chamber) of 8 June 2010
[24] ibid, para 51
[25] ibid, para 52
[26] Ibid, para 53

The claimant's argument is to maintain the status quo. Justifying the departure from it, the judgment refers to the poor pass through rate of wholesale charge reductions to the retail level "owing to the absence of incentives for that to happen" [27] and "no competitive pressure on operators to pass on that reduction"[28]. The supporting evidence for this assertion is observational in nature: "experience has shown that a reduction in wholesale charges did not necessarily lead to a reduction in retail charges".[29] Taken in isolation, this is not a particularly compelling argument on which to base regulation - many explanations, for instance changes in technology, could be forwarded for why the future will be unlike the past.

Generally, empirical observations carry more weight when they cohere with predictions from a theoretical model that captures the essential features of the system in question. Many of the BIO models outlined above predict that prices will not be reduced by market forces when the product is complex and consumers have behavioural biases. Notably, the verdict alludes to an interaction between the nature of the product and behavioural factors in justifying the need for controls on retail prices:

> "competition at retail level took place mainly in terms of the complete retail package and, for the majority of consumers, roaming was only a small part of that package and accordingly not a critical consideration when they choose or change their provider".[30]

The meaning of the term "not a critical consideration" in this context is ambiguous. It could mean that roaming charges were noticed but underweighted in the decision of which package to choose. If this is the case, the implication might be that incurring high roaming charges is

[27] Ibid, para 62
[28] Ibid, para 63
[29] Ibid, para 63
[30] Ibid, para 64

evidence of overconfidence. If instead ‘not a critical consideration’ is a euphemism for ‘went unnoticed’ then inattention is the cognitive bias at the root of the bill shock problem. Consumers may of course be heterogeneous in the bias they display which leads them to underweight roaming charges in the decision process. The policy implication may depend on which bias is most prevalent. However, without incorporating a model of competition that accounts for these biases, it is difficult to draw any policy implications without appearing to act in a somewhat ad-hoc fashion. This was the criticism levelled at the EU Commission from the beginning.

An analysis of the verdict supports the claim that the roaming regulation should be considered a behaviourally aligned intervention. The evidence cited to defend its validity has behavioural foundations in two regards. First, the observed lack of incentives to pass on savings to consumers, despite numerous competitors in the market, supports the predictions of BIO models but is an anomaly within the confines of the standard model. Second, the suggestion that the root of the roaming charges problem was the complexity of the retail product is evidence of a consumer bias. The verdict does not elaborate on how firms may have responded to this bias. Taking the predictions of BIO models in conjunction with widely observed ‘bill shock’, it is plausible that they exploited it. It can also be argued that the verdict highlights the benefits of incorporating BIO models into the policymaking process more generally. There is evident tension between the orthodoxy that the normal process of supply and demand should improve consumer welfare and the empirical evidence that it did not and would not.

5.3: Proposed Alternatives to Roaming

Mobile number portability (MNP) enables mobile telephone users to retain their mobile telephone numbers when changing from one mobile network carrier to another. It enhances competition by reducing switching costs (Klemperer, 1995) though its positive welfare effects are not unanimously accepted (Buehler & Haucap, 2004). Carrier portability is a similar concept - it means that customers would have the right to switch mobile phone providers at any time. It is very similar to the unbundling initiative in the 2012 recasting of the Roaming Regulation and has been proposed as a solution to roaming charges as it would address the crux of the issue:

"As soon as consumers are free to choose any contract for mobile communications originating or received in the visited country, they are no longer forced into contractual relations with the home carrier or alternative roaming providers." (Knieps and Zenhausern, 2014, pg 76).

Considered to be a necessary and sufficient measure to bring about genuine competition in roaming markets, and made feasible by technological advances such as 'soft SIMs' that require no hardware, carrier portability requires consumers to have SIM unlocked handsets. At present SIM-lock phones are popular. They enable providers to offer subsidised handsets, which is a widespread practice in many countries (Díaz-Pinés 2010) as a tool for gaining and retaining market share (OECD, 2013). Attempts to ban this bundling have failed.[31] Consumer choice is proposed as the means of resolving the tension between what carrier portability requires and what the market may offer:

"Consumers interested in changing carriers in guest countries should have the possibility to do so, whereas consumers interested in subsidised mobile handsets with low

[31]In Belgium a law prohibiting the bundling of a network service contract with a mobile handset has even been ruled illegal by the European Court of Justice as violating the Unfair Commercial Practices Directive 2005/29/EC.

demand for communications in foreign countries may keep with SIM-locked mobile handsets." (Knieps and Zenhausern, 2014, pg 77).

Evidently, the success of carrier portability is predicated on consumers having well-calibrated beliefs about their future roaming usage, having a constant discount rate (otherwise preferences may be time-inconsistent), and having the capability to integrate future probabilistic roaming costs into the decision. The considerable complexity of this decision makes it the sort that only *homo economicus* could grapple with successfully. While carrier portability may have an important role in the future of roaming, placing the burden of responsibility for its success on the average consumer may not be prudent given the behavioural evidence that demonstrates the limits of this approach.

Section 6: Discussion and Conclusion

"It is competition, and not competitors, that should be protected. Ultimately, the aim is to avoid consumer harm." (Kroes, 2008).

The task of delineating competition policy issues from issues of consumer protection issues is not straightforward. The above quote from the former EU Competition Commissioner shows that the two are inextricably linked. The BIO models reviewed in this paper show that when a product has multiple features – some of which are hidden – a firm's profit maximising strategy may entail exploitation of a biased group of consumers to the benefit of another group. The EU guidelines on how firms with market power should act to avoid falling foul of EU competition

rules[32] states that "Conduct which is directly exploitative of consumers, for example charging excessively high prices or certain behaviour that undermines the efforts to achieve an integrated internal market, is also liable to infringe Article 82".[33] Does a strategy of shrouding or deliberate price obfuscation run the risk of infringing this provision if only a subset of consumers is exploited? Are such strategies in keeping with the spirit of the law, that firms "do not exclude their competitors by other means than competing on the merits of the products or services they provide"?[34] These are open questions of considerable import to the functioning of a genuine internal market. To move towards a more nuanced and realistic understanding of what constitutes market power (i.e. a dominant position) and how such a position might be abused, this paper has called for the inclusion of BIO models in competition policy.

How might the policy cycle of the Roaming Regulation have looked had BIO models been (i) available at the time and (ii) utilised? At the outset, when determining whether there individual or joint dominance was present in the market, policymakers may have investigated whether exceptions to the market share criterion applied. This might have taken the form of experimental tests to determine the capability of consumers to identify the best value product. Being able to do so, and thus exert demand substitution as a competitive constraint, is a prerequisite for effective competition. Such tests may have also shed light on which bias was the primary driver of the 'bill-shock' that consumers experienced before the introduction of the Roaming Regulation. Alternative interventions, such as roaming being free up to a certain usage limit and opt-in thereafter, or a flat fee for roaming, may have presented themselves as more suitable alternatives as a result of this testing, though naturally this is only conjecture. The essential point is that BIO

[32] EU Commission Enforcement Priorities on Abuse of a Dominant Position
[33] Ibid, para 7
[34] Ibid, para 6

models could have plausibly motivated policymakers to investigate the causes of the observed problem on the consumer side in a more systematic manner. And whichever intervention was deemed most appropriate, reference to BIO models would have helped rebut the assertion by opponents to any intervention in retail markets that forces of supply and demand would improve outcomes for consumers in the usual way.

This paper first highlighted the behavioural components in the problem of bill-shock that are common to many markets, to counteract the perception of the Roaming Regulation as an exceptional case. Inattention, overconfidence and self-control problems emerge in many markets, such as credit cards. On these grounds it was posited that the Roaming Regulation is 'behaviourally aligned'. Such classification may allow advocates of consumer protection measures going beyond the information paradigm in other markets to use it as a reference case where appropriate. The alternative is it being cordoned off as an exceptional measure passed through sheer force of political will.

When consumers do not act like but rather display biases such as inattention, overconfidence and self-control problems, and firms sell a product with multiple features, the presence of multiple sellers does not ensure genuine competition with upward pressure on quality and downward pressure on prices. This is the main message of BIO models. The central importance of 'demand substitution' within EU competition law means there is a case for targeted laboratory testing of consumer capabilities to compare products. A counterfactual examination of two junctures in the Roaming Regulation illustrated that the standard model of competition is not always the most suitable for determining whether a policy intervention is necessary.

A valid concern on the introduction of the Roaming Regulation was that the underlying problem had not been formulated in the language of competition economics (Sutherland, 2008). This

paper has argued that standard competition economics did not have the vocabulary to fully articulate the problem. Partly for this reason, the rationale to justify the Roaming Regulation used inductive logic to an extent that is not in keeping with the deductive norms of competition policy. The introduction of BIO models may provide a way to analyse and resolve such matters in a deductively sound manner, and more generally, prove conducive to the formation of evidence-based policy.

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	596	VAT revenue elasticities: an analytical approach *Jean Acheson, Yota Deli, Edgar L. W. Morgenroth, Derek Lambert and Martin Murphy*
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