An Experiment on the Motivation and the Effects of Socially Responsible Market Behavior[1]

Running Title: Altruism as a market strategy

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Abstract

We report data from an experiment designed to investigate whether firms' concerns for socially beneficial objectives is the result of strictly economic motivation or, alternatively, whether the non selfish hypothesis survives after strictly economic motivations have been accounted for. We confirm this conjecture showing that, even when firms use altruistic donations as a profit oriented differentiation strategy, some of their investment is not recovered from their market activities maintaining at least a part of their pro-social behavior within the purely altruistic domain.

Keywords: market altruism, experiment, corporate social responsibility, pricing.

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INTRODUCTION

Since Friedman's (1970) statement that a responsible firm's concern should be to maximize its stakeholders' returns, many corporate activities directed towards pro-social objectives have been explained as ultimately profit seeking strategies. There is a growing literature on corporate social responsibility (CSR) in which a firm's socially beneficial decisions are envisaged as apparently altruistic strategies aimed at differentiating a firm from its rivals, in order to relax competition and raise the prices in the market. This idea has been recently formalized by García-Gallego and Georgantzís (2009). In this paper, we use the term *CSR differentiation*, to refer to differentiation achieved as the result of a firm's pro-social behavior.

Consistent with economic theories of the firm, McWilliams and Siegel (2001) suggest that the economic case is not to reject CSR activities entirely, but to find an optimum level of CSR investments that can even surpass merely obeying the law in profitability. Husted and Salazar (2006) extend these arguments to say that a strategic approach to CSR may help firms to improve profitability and enhance social performance at the same time. They describe the context in which it may be possible to maximize social profit so that both society and firms benefit. Distinguishing among strategic CSR, altruistic CSR, and even coerced CSR, McWilliams, Siegel, and Wright (2006) describe a variety of perspectives on corporate social responsibility, which they use to develop a framework for consideration of the strategic implications of CSR. Baron (2001) defines strategic CSR as the use of CSR to attract socially responsible consumers, in the sense that firms provide a public good in conjunction with their business strategy.

As far as product differentiation is concerned, we can divide papers on strategic CSR into three different groups. The first group considers ethical consumption as a source of vertical[1] product differentiation assuming that all the consumers prefer buying the product with a CSR characteristic than the product without such a characteristic. The vertical differentiation represents the CSR aspects of the production process that are perceived as a quality improvement of the final product by socially conscious

consumers. The second group refers to horizontal[2] product differentiation assuming that only some consumers prefer a particular product, but the preference is based on taste, rather than quality. The third group[3] is a mix of the two former groups, assuming that consumers' population is split into two different exogenously given groups of consumers with different preferences: the group of standard consumers and the group of potentially ethical consumers.

Our paper relates to the aforementioned first group where product variants differ in their quality and consumers differ in their willingness to pay for quality, following the pioneering work of Mussa and Rosen (1978), Gabszewicz and Thisse (1979), and Shaked and Sutton[4] (1982, 1983). Unlike Crampes and Hollander (1995) we model the cost of quality as an increase in firm's fixed cost, constraining its subsequent actions, and hence the actions of its competitors. This insight applies to the regulatory arena as well as Lutz et al. (2000) show when they find that corporate leaders may strategically commit to modest environmental improvements that constrain regulators' ability to set tough standards.

The question of whether firms can use CSR to achieve a sustainable competitive advantage is an important question. A paper by Reinhardt (1998) finds that a firm engaging in a CSR-based strategy can only generate an abnormal return if it can prevent competitors from imitating its strategy. In competitive markets this is unlikely, since CSR is highly transparent. Other theoretical studies (Dutta et al., 1995; Hoppe and Lehmann-Grube, 2001) show that any early mover advantages that might be gained by offering higher quality products are eroded when competitive strategies are observable.

While some oligopoly models predict that firms producing a higher quality product earn 'abnormal' returns, these findings hinge on the assumption that costs are constant and independent of quality. Furthermore, some economic models of CSR (Baron, 2001; Fedderson and Gilligan, 2001) identify an important countervailing force on the ability of companies to engage in strategic CSR in oligopolistic industries: activists who target leading firms. This countervailing force makes it

difficult for oligopolistic firms to achieve a competitive advantage through the strategic use of CSR.

Our work relates with research on CSR emerged from public economics' arena. In this field, Baron (2007) considers the formation of firms that can engage in costly CSR and shows that social entrepreneurs and not shareholders bear the cost, unless the corporate social responsibility is a surprise. A social entrepreneur is willing to bear the cost either because doing so expands the opportunity sets of citizens in consumption-social giving space or because there is an entrepreneurial warm glow from the firm's social responsibility. A social entrepreneur carries strategic CSR beyond profit and market value maximization. Baron (2008) presents a theory of CSR in the form of the private provision of public goods and private redistribution by a firm. In this paper the firm privately provides the public good in response to the preferences of its consumers, shareholders, and mangers, and if shareholders had altruistic preferences for the beneficiaries of the social expenditures more would be provided subject to any crowding out by government expenditures. In a most recent paper Baron (2009) considers motivation underlying corporate social responsibility in a setting in which firms compete directly in a market.

Following the framework when a firm links the provision of a public good to the sale of their (private) products, Bagnoli and Watts (2003) study the feasibility of CSR by private firms with "warm-glow" (in Andreoni's (1989, 1990) sense) preferences for public goods. They conclude that, when firms explicitly link the provision of a public good to the sales of the private good they offer, the provision of the public good is inversely related to the competitiveness of the market. Specifically related to our framework, they find that if the provision of the public good is not explicitly linked to the sales of the private good and if there is free entry, too little of the public good is privately provided. The reason is that even if firms enter until profits are zero, they are only able to capture the participation benefits that accrue to consumers but not the common benefits of having a positive quantity of the public good available. Kotchen (2006) develops a general model of private provision of a public good that includes the option to consume an impure public good. This paper shows that, if a green market is not sufficiently large or environmental quality is not a gross

complement for private consumption, introducing a green market may actually discourage private provision of an environmental public good and diminish social welfare. Besley and Ghatak (2007) find that firms that use CSR will produce public goods at exactly the same level as predicted by the standard voluntary contribution equilibrium in which the public good is underprovided with respect to the corresponding socially optimal level.

Although other similar economic explanations of corporate altruism and solidarity have been proposed, like political and fiscal favoritism, or simply giving in to pressure by green lobbies, we focus here on the product differentiation hypothesis. While theory can easily assume or rule out one or another motivation of economic behavior, real world data cannot help us identify the sources of pro-social behavior in the market. For example, if a pro-social investment by a firm is a necessary condition for it to survive in a market, apart from the increase in prices due to differentiation and, thus, relaxed competition, a further price increase may be caused by the decrease in the number of firms and their enhanced ability to collude. Yet, the social losses due to higher prices should be compared to the social gains from firms' pro-social investment, in order for the overall effect to be assessed. Furthermore, whether the real intention of firms investing in pro-social goals is purely profit driven or, alternatively, whether some purely altruistic motivation coexists with the objective of profit maximization would be impossible to know. Real world data are informative on observable market magnitudes, but not on unobservable motivators or the level of these magnitudes, should a different motivation be in place.

Laboratory data can help us disentangle strictly economic and non economic motivations provided that the appropriate design is used in order to produce and test the set of the corresponding desirable hypotheses. The experiment whose results are reported here confirms the differentiation hypothesis. Interestingly, after this profit seeking motivation is accounted for, the hypothesis of some unprofitable and, thus, purely altruistic behavior cannot be rejected.

Our paper relates with two experimental papers. First, taking eco-labeling as an example of CSR, Cason and Gangadharan (2002) study sellers' incentives to offer products of differing environmental quality. The authors conclude that the regulator can improve environmental performance by providing the option of certified green labeling in a posted offer market with 5 sellers and 6 buyers that lasts for 20 periods. When offered the possibility of selling products certified by a third party at a fixed cost, unknown to buyers, most sellers pay for the certification and endogenously decide to deliver environmentally friendly products, while cheap talk or reputation building are ineffective in increasing market efficiency significantly. In our setting the moral hazard problem of false labeling is directly solved because every certification is guaranteed. A key difference with our framework is that the environmentally superior product has a higher unit cost and benefits only the buyer of that product whereas we consider that every consumer, buying or not the ecological varieties, benefits from the cleaner production process followed by an ecological producer. Second, Rode et al. (2008) study ethical differentiation of products in triopolistic experimental markets where producers set prices for the exogenously determined varieties they sell. The high quality producer's costs were higher than the others. In two treatments, the additional costs were attributed to compliance with ethical guidelines. In the third, no justification was provided. Many consumers reduced their experimental gains by purchasing the ethically differentiated products at higher prices. The extra cost of producing a superior unit was effectively donated to an NGO fighting child labor, having thus a potentially different valuation for every experiment participant, while in our framework the contribution to the social fund is equally shared among all consumers.

Our main finding can be summarized as follows. Firms recognize the ability of socially responsible behavior to improve their image in the product market, leading to higher prices and profits. However, they end up investing more to the social objective than they can recover from the resulting differentiation among them. In other words, this is the first paper to illustrate the possibility of pure *ex post* altruism by originally profit-maximizing firms.

FRAMEWORK AND EXPERIMENTAL DESIGN

We consider nine firms selling a homogeneous product whose unit production cost is 100 ExCUs (Experimental Currency Units). The product is sold in a market of nine consumers each one willing to spend up to 200 ExCUs per period to purchase a unit of the good from a seller of his or her choice. Presumably, in the baseline treatment, which is implemented as a standard homogeneous Bertrand market, all consumers should prefer the cheapest among all sellers in order to maximize the difference between 200 ExCUs and the purchase price, that is, their period surplus. In the control treatments, firms make a sunk cost-type of contribution to a "public fund" equally shared by all consumers independently of whether each one of them has bought a unit from this particular seller or not. Despite the lack of direct relation between a buyers' purchase and the decision of a firm to raise the public good, consumers may feel that a contributing seller merits some further support, accepting to pay a higher price in order to buy the good from this particular seller who has, thus, achieved some advantage due to CSR differentiation from non-contributing sellers.

Nine sessions with two independent markets in each one of them were run, with a total of 324 participants. Using standard procedures, subjects were recruited among voluntary undergraduate students from different economics and business-related courses at the University Jaume I (UJI), Spain. Before a session started, subjects were randomly distributed into two separate rooms, one for consumer-subjects and a one for firm-subjects. Inside each room, an experimentalist gave to each subject an identification number, read the corresponding written instructions and answered any remaining questions[5]. At the end of each session, subjects were privately paid in cash, converting cumulative firm profits and consumer surplus into Euros by an exchange rate of 1€=420ExCUs. To compensate for possible negative profits, firm-subjects received an extra fixed amount of 15€ each. A typical CSR-involving session lasted 150 minutes approximately, while the baseline session lasted 90 minutes. Average buyer-subject earnings were 30€, whereas seller-subjects earned on average slightly below 15€. Specific software, based on PHP programming, was created for this experiment. All sessions were carried out at the Laboratori

d'Economia Experimental (LEE at UJI, Castellón-Spain). Five treatments were implemented, respectively denoted as T0, T1, T2, T3 and T4. The main characteristics of each treatment are described in Table 1.

Table 1. Main Characteristics of the Experimental Design

Treatment	CSR Investment	Information	Contribution productivity	Sessions	Markets	Subjects
T0	NO	PH	--	1	1-2	36
T1	YES	NH	Low	2	3-6	72
T2	YES	NH	High	2	7-10	72
T3	YES	PH	High	2	11-14	72
T4	YES	CH	High	2	15-18	72
				TOTAL	18	324

CH: Complete History (selling prices and investment levels). NH: No History. PH: Selling Prices History only.

In the baseline treatment T0, firms simultaneously decide each period the selling price for the product. Once the 9 firms have set prices, this information appears on the computer screens of all consumers. Each buyer then decides from which firm to buy a unit of the product. After the consumers' decisions are made, a new period starts in which each firm receives information concerning prices charged by all firms in the market, the demand for each firm, as well as period and cumulative profits. As the session goes on, this information is stored in a complete history, so that the subjects can always make use of it in their decision-making process. Similarly, consumers have a complete history on the purchase prices paid in each period by each consumer, to which firm they bought the good from, and accumulated earnings.

In treatments T1-T4, before setting prices, firms have to choose the level of their investment in the production of the public good. This variable has 5 possible levels, numbered 0 through 4, so that level 0 means no contribution, and level 4 involves maximum contribution to the public good. In T1, firms' investment to the public good

is less efficient in terms of public good production. Therefore, whereas the costs of the five levels of contribution were fixed for all treatments and given, respectively, by 0, 8, 16, 24 and 32, the corresponding contributions to the public good were 0, 20, 40, 90 and 150 for T1 and 0, 30, 60, 140, 230 for T2, T3 and T4. The fact that a firm produces a certain quantity of the public good has implications not only for firms but also for consumers. For firms, a higher level of contribution implies a higher fixed cost. For consumers, a higher quantity of the public good implies a higher payoff, no matter what their purchasing decisions are, given that they share the public good equally among them. This share of the public fund is added to each subject earnings in each period.

Each market lasts for 42 periods. The time structure of the experiment for treatments T1-T4 is as follows. First, firms contribute to the public good. Then, they compete in prices and, finally, consumers choose which firm to buy from. While firms decide the selling price in each period, the level of investment is a strategy which can be changed only in periods 1, 7, 13, 19, 25, 31 and 37. This feature in our design represents the fact that, in the real world, deciding on prices is more frequent than deciding on investments. Once all firms have made their decisions, each consumer receives information on the price and the investment level chosen by each firm, as well as its share of the public fund. With this information, consumers decide which firm to purchase the product from. Once consumers decide, a new period starts in which each firm receives information on price and investment levels set by all firms, the number of units and the corresponding benefits for each firm.

In T1 and T2, each firm knows all information concerning the transactions made in the previous period. In T3, firms have a complete history on prices, demand and firm profits for each period in the past. In T4, the aforementioned complete history incorporates the investment levels chosen by each seller.

A comparison between T1 and T2 allows us to analyze how firms respond to changes in the productivity of firms' investment in terms of public good production. Moreover, comparing T2 and T3 allows us to analyze how firms respond to

qualitative changes in the information on past prices. Finally, the comparison between T3 and T4 makes it possible to study how firms respond to qualitative changes in the information concerning investment levels in the past. Before proceeding with a detailed discussion of the results, it is worth mentioning that treatment effects have been rather modest, if any. Therefore, we focus on the discussion of the general patterns observed in our data.

RESULTS

We discuss the results obtained from our experiments in two different ways. First, we refer to figures 1-9 as a means of obtaining an intuitive picture of the main findings and the patterns underlying the behaviour of our subjects. In some cases, we provide further support to our findings, reporting the results of non parametric tests. Second, we present the estimates of two models describing the behaviour of the demand and the supply sides of our experimental markets. In order to exclude possible end game behaviour, data are reported and statistically analyzed for the first 37 periods.

Figures 1 and 2 show that, in the baseline Bertrand markets, firms have posted prices which have remained relatively close to the competitive price 100, while, at the same time, a significant amount of heterogeneity is observed, both in the absence (markets 1 and 2) and in the presence of contribution strategies (markets 3-18). In fact, in several markets, there have been systematic efforts to maintain higher than competitive prices, especially in the presence of CSR strategy available to the firms. On the contrary, some markets have remained almost perfectly competitive, including cases of markets with a CSR strategy available to the firms, like for example market 13. However, figure 1 also shows that clearing prices (those at which consumers actually buy the product) have presented far less heterogeneous patterns, remaining much closer to the competitive level of 100 monetary units. This is more clearly reflected on average market clearing prices aggregated by treatment, presented in

figure 3. Generally speaking, we observe tight convergence of clearing prices to the competitive level in all treatments implemented.

However, when we take all periods into account, we find that the aforementioned pictures of convergence to the perfectly competitive price should not be mistakenly interpreted to imply that the availability of a CSR strategy to firms leaves posted and clearing prices unaffected. On the contrary, when comparing prices obtained from the baseline treatment, T0 with those obtained in the other treatments (T1-T4), we find that both posted (M-W test, p= 0.0014) and clearing prices (M-W test, p= 0.0000) are significantly higher in the presence of CSR strategies, rather than in the absence of them. Therefore we can formally state the first result of our experiments:

RESULT 1 (CONFIRMATION OF THE *CSR DIFFERENTIATION* HYPOTHESIS): *The availability of a CSR strategy to firms, leads to higher posted and market clearing prices than the absence of such strategies.*

Next, we refer to figures 4, 5 and 6. On them, we observe the evolution of firms' contributions to the public fund as the result of their "altruistic" investments. Note a striking similarity to the usual temporal pattern of contributions obtained in standard public good experimental games. Specifically, contributions start relatively low and they rise during the early periods of the session, while they decrease over the remaining periods of the session. Like in the case of clearing prices, which have been lower than posted ones, "clearing" contributions have been systematically higher than posted ones. Therefore, consumers have systematically preferred cheaper sellers and sellers who have contributed more to the public fund. However, this result is formally established and further refined in the analysis of the demand side behaviour, presented towards the end of this session.

The most interesting pattern obtained from this experiment is reflected on figure 7. While the baseline treatment has yielded the perfectly competitive outcome, driving firms' profits down to zero, markets with CSR strategies available to the firms have been clearly unprofitable. This can be established in a very straightforward way by

simply checking on the aforementioned figures in which all markets from 3 to 18 and treatments T1, T2, T3, T4 have yielded negative profits to the sellers. We have also formally compared profits in T0 to profits in the CSR treatments (T1-T4) and found that, in the latter, firms have earned significantly lower profits (M-W test, p=0.0000).

We formally state next the second result of our experiments:

RESULT 2 (CONFIRMATION OF THE *EX POST PURE ALTRUISM* HYPOTHESIS): *When firms use a CSR Differentiation Strategy, their gains from relaxing price competition do not compensate their investments to the public good.*

In the remaining paragraphs of this session we focus on individual behavior as reflected on figures 8 and 9 and the estimates of two econometric models capturing demand and supply side behavior.

Figures 8 and 9 represent pricing (dots) and purchasing (marked with an "x") decisions on a bi-dimensional price-contribution space. Overall, we see that persistent dispersion exists in both sellers' and consumers' strategies. Firms tend to invest positive amounts to the public good, posting at the same time higher than competitive prices. Towards the end of the experiment (especially, period 36), firms tend to set close to competitive prices, even when they have invested maximal amounts to the public good. Consumers also tend to become more homogeneous in their behavior, choosing sellers who are contributing more to the public good. In few words, sellers seem to recognize their ability to sustain higher prices when using CSR differentiation and consumers tend to increasingly enjoy firms' altruism at lower and lower prices.

Both patterns are now presented in a more formal way. First, we analyze firm *i*'s pricing decision (logarithm of p_i) in period *t* as a function of other firms' (*j*) logarithm of average price in the previous period, *t-1*, as well as own and rival average contributions (C_i, C_j, respectively) through the estimation of the following model:

$$(1) \qquad lp_{it} = \alpha + \delta \cdot t + \beta_0 \cdot lp_{it-1} + \beta_1 \cdot lp_{jt-1} + \sum_{k=1}^{4} \gamma_k \cdot C_{it} \cdot Treat_k + \sum_{k=1}^{4} \mu_k \cdot C_{jt} \cdot Treat_k + u_{it}$$

where $Treat_k$, $k \in \{1,2,3,4\}$ is a treatment specific dummy. The estimates are presented in Table 2.

Table 2. Estimation of model (1)

Variable	Coefficient	Std. Error	p>|t|
cons.	.0789	.0136	.000
T	-.0007	.0003	.027
lp_{it-1}	.3856	.0471	.000
lp_{jt-1}	.0656	.0352	.065
$C_{it}Treat_1$	.0071	.0024	.003
$C_{it}Treat_2$	.0147	.0071	.041
$C_{it}Treat_3$	.0146	.0071	.042
$C_{it}Treat_4$	.0106	.0042	.013
$C_{jt}Treat_1$	-.0089	.0046	.056
$C_{jt}Treat_2$	-.0193	.0087	.028
$C_{jt}Treat_3$	-.0029	.0051	.578
$C_{jt}Treat_4$	-.0118	.0062	.058
$R^2 = 0.3692$		**F(11,143) = 31.37**	**Prob > F=0.000**

The results of this estimation indicate the existence of several intuitively expected patterns. Specifically, a firm reacts by raising its price as a response to its rival's higher prices in the previous period. The firm sets a higher price, the higher is its contribution to the public fund and the lower is its rival's contributions. Thus, a firm's

price is higher, if it perceives its situation as advantageous in the "altruism" market, either through a higher own or a lower rival contribution. Furthermore, the firm is more likely to have a higher price, if the firm or its rivals had set a high price in the previous period. The negative sign of the period variable (T) captures the monotonically declining trend of prices over the experiment, which contrasts with the inverse U-shaped of initially ascending and then descending contribution levels. Finally, as expected, the only case in which rival contributions are insignificant in a firm's pricing decision is T3, in which there is no historic information on rival contributions.

Next, we estimate a demand model of the form:

(2) $$D_{it} = \alpha - \beta_1 \cdot (p_{it} - p_{jt}) + \beta_2 \cdot (C_{it} - C_{jt}) + u_i$$

in which firm *i*'s demand in period *t* is explained as a function of the difference between the firm's own price and the average of other's prices in the same period, as well as the firm's own contribution and other firms' average contribution.

The results are presented in Table 3.

Table 3. Estimation of model (2)

Parameter	T0	T1	T2	T3	T4
constant	1	1	1	1	1
β_1	-.0267	-.0304	-.0361	-.0321	-.0254
β_2	-	.0123	.0123	.0086	.0107
R^2	.0684	.1827	.2796	.2505	.1803

All estimated parameters are significant at 5% (p=0.000).

The estimates obtained confirm the intuitively expected pattern that a firm's price has a negative effect on its own demand and a positive effect on the demand of its rivals, whereas contributions have exactly the opposite effects. In fact, we can quantify the average price-to-contribution substitution coefficient, in consumers' preferences as the amount they are willing to spend on a higher price in order to maintain the same demand, provided that a firm contributes more to the public fund. According to our estimates, the coefficient is 1/3, implying that a firm will maintain approximately the same demand if it contributes 3 extra ExCUs to the public good, while it increases its price by 1 ExCU. As a control of robustness of our results, it is worth observing that, in all treatments, a firm setting the same price and the same contribution as the corresponding averages fixed by its rivals will on average have a unit demand. This is the natural consequence of the fact that, in each period, there are 9 firms and 9 consumers, each one selling and buying, respectively, one unit of the product. Alternative specifications of the pricing (1) and the demand (2) models above have been estimated[6] to control for dynamic patterns due to reputation effects and serial correlation of individual contributing behavior across subsequent periods. The inferior performance of these models and the lack of significance of the corresponding extra variables examined, show that a firm's cumulative contribution to the public good cannot improve the demand model (2). Furthermore, individual contributions are not serially correlated, indicating that a firm's CSR strategy in one period does not dependent on its strategy in previous periods.

We summarize our findings concerning the motivators of individual behavior in the following result:

RESULT 3: *Consumers appreciate contributing sellers and are willing to pay significantly higher prices to the most responsible among them, whereas the latter recognize the advantage of altruistic behavior in the market, setting higher prices.*

Despite result 3, we have seen that *ex post*, firms have ended up competing too much among them and the final outcome has not compensated their CSR

Differentiation investments with higher profits, rendering their contributions to *ex post* purely altruistic.

CONCLUSIONS

We have conducted a laboratory experiment aimed at studying the causes and effects of firms' altruism in an oligopolistic market. Briefly, our results confirm two apparently contradictory but intuitively appealing facts. First, we confirm the hypothesis of CSR differentiation. That is, firms use altruistic investments as a means of differentiating themselves from their rivals in the market. Subsequently, they try to recover their investments through higher prices resulting from relaxed competition achieved thanks to the aforementioned differentiation among them. Second, despite the levels of product differentiation achieved as a result of such strategic –as opposed to purely altruistic– investments, this action is rapidly imitated and firms end up competing too much among them, yielding negative net profits. Thus, their originally profit seeking "altruism" leads them to a behaviour which can be seen *ex post* as purely altruistic, because their contribution to a socially beneficial objective is not compensated by increased price levels attained through CSR differentiation.

Regarding our finding of *ex post* purely altruistic but unprofitable CSR, some final comments are in order. It could be argued that, in the long run, unprofitable CSR strategies would drive firms out of the market, leading to the survival of their non-CSR competitors. However, given that in our framework firms are obliged to stay in the market, we must be cautious when attempting any evolutionary and long-run interpretations of our results. Having this in mind, note that in our experiments, sellers committing to lower levels of CSR would have no better chances of survival than their most CSR-driven competitors, because, although they assume lower fixed costs, the economies of scale achieved by their limited sales are also insufficient to yield them positive profits. Furthermore, it is rather straightforward to see why, in the real world, firms do not abandon a market immediately after they have earned

negative profits in it. In fact, several marketing strategies imply initial losses with respect to a new product or a new campaign for image, aimed at recovering the costs sunk to it in the future. From a behavioural point of view, seminal laboratory work by Kahneman (1988), Kahneman and Lovallo (1993) and a paper by Camerer and Lovallo (1999), more related to our work, have shown that people hold overconfident beliefs concerning the profitability of entry into a market with limited entry slots. This implies a prediction of “late” exit following a history of negative profits, which suggests that our results are compatible and even complementary with a more general dynamic framework in which entry and exit decisions are endogenous. We leave this exercise for a future extension of our work.

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FIGURES

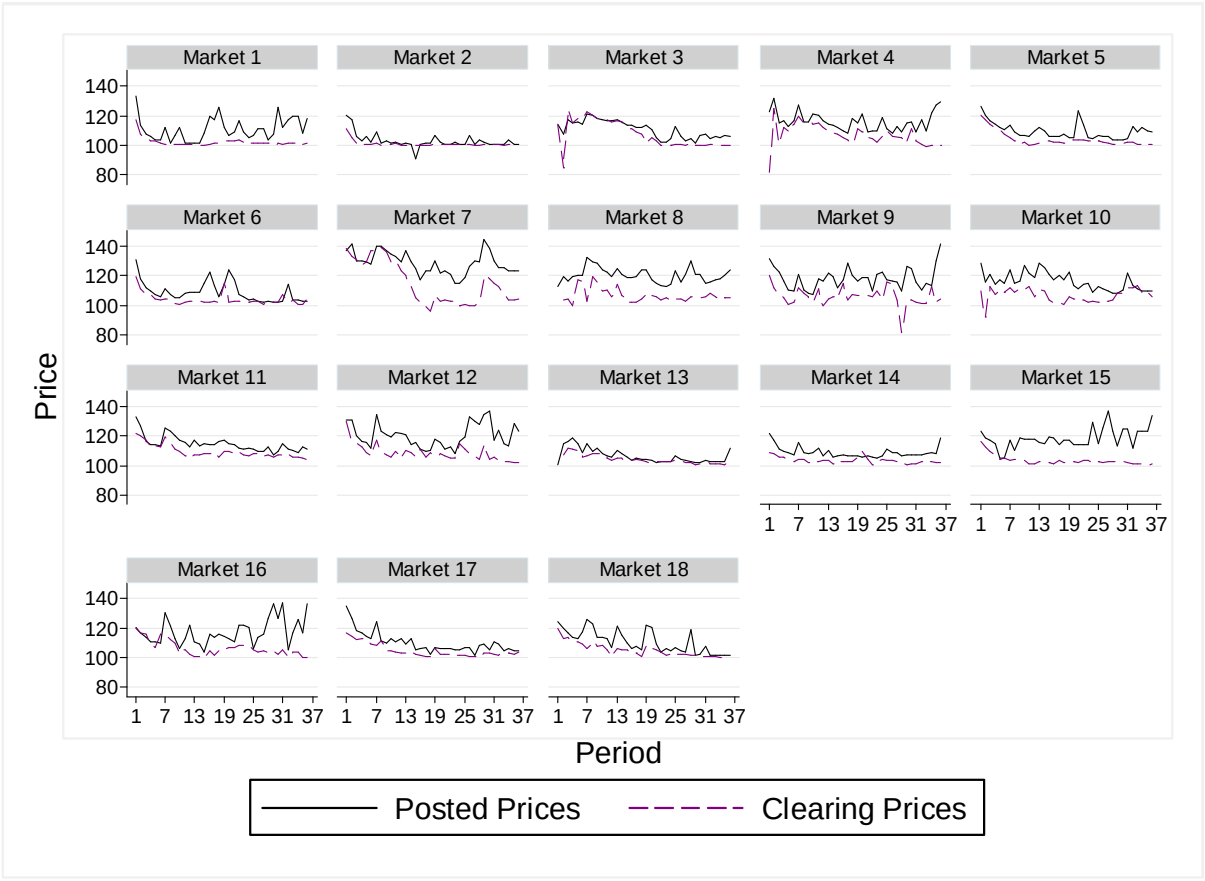

Figure 1. Evolution of average posted vs clearing prices over time

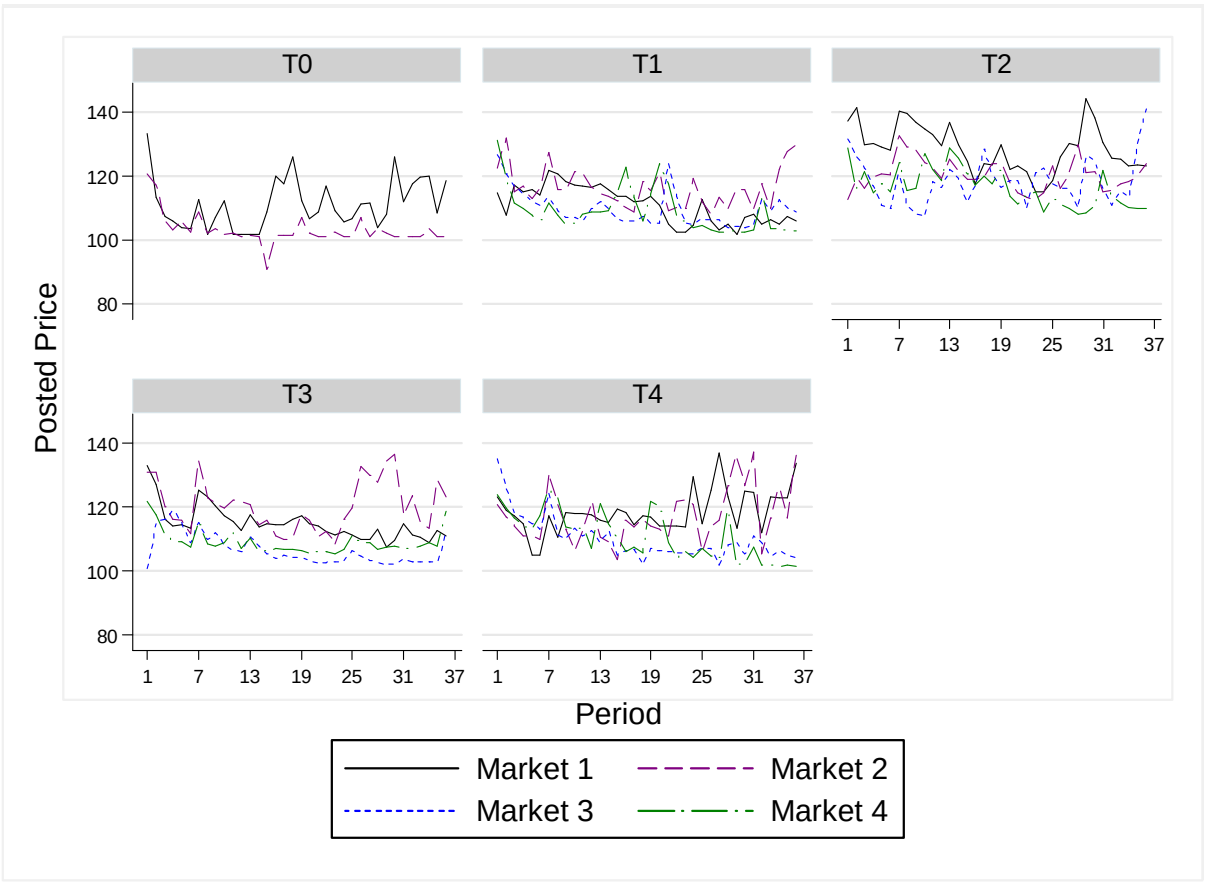

Figure 2. Evolution of average posted prices over time: Treatment aggregates

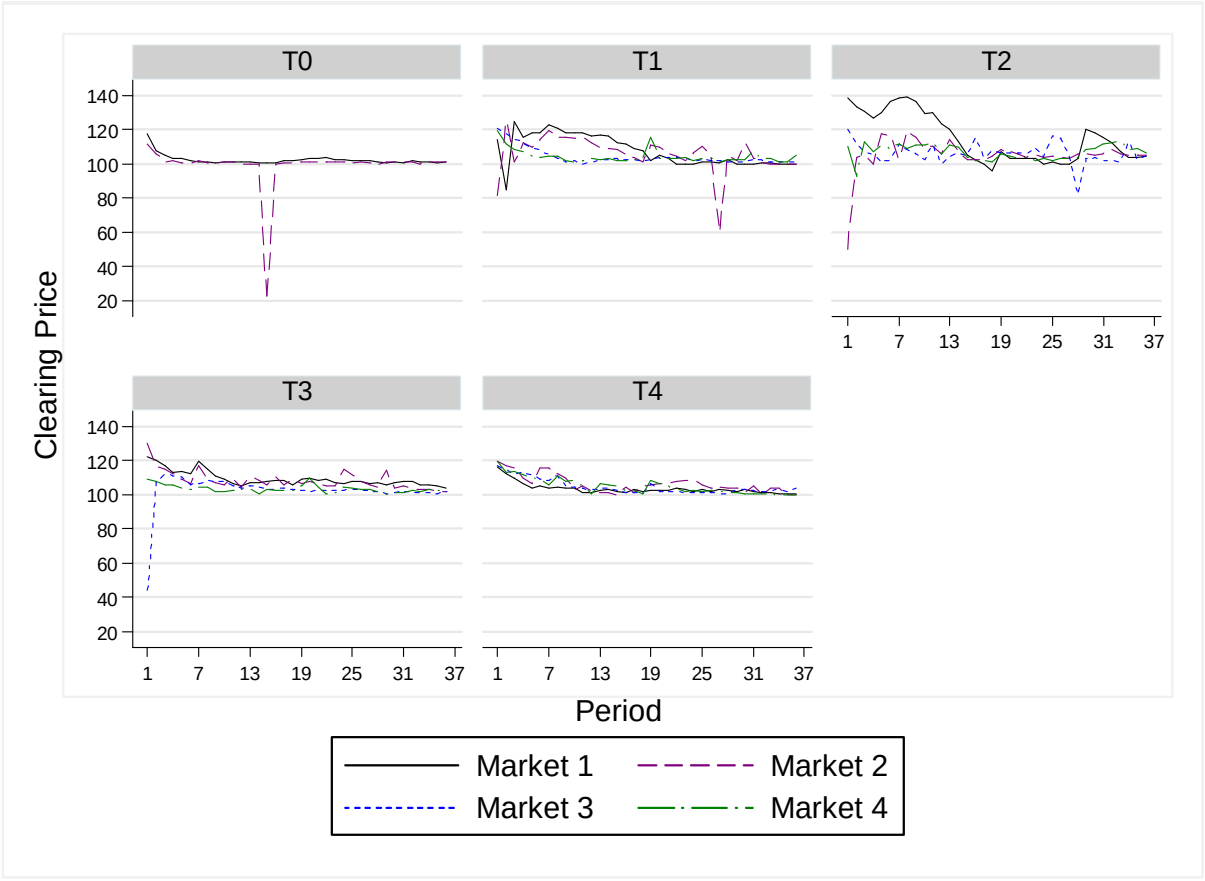

Figure 3. Evolution of average clearing prices over time: Treatment aggregates

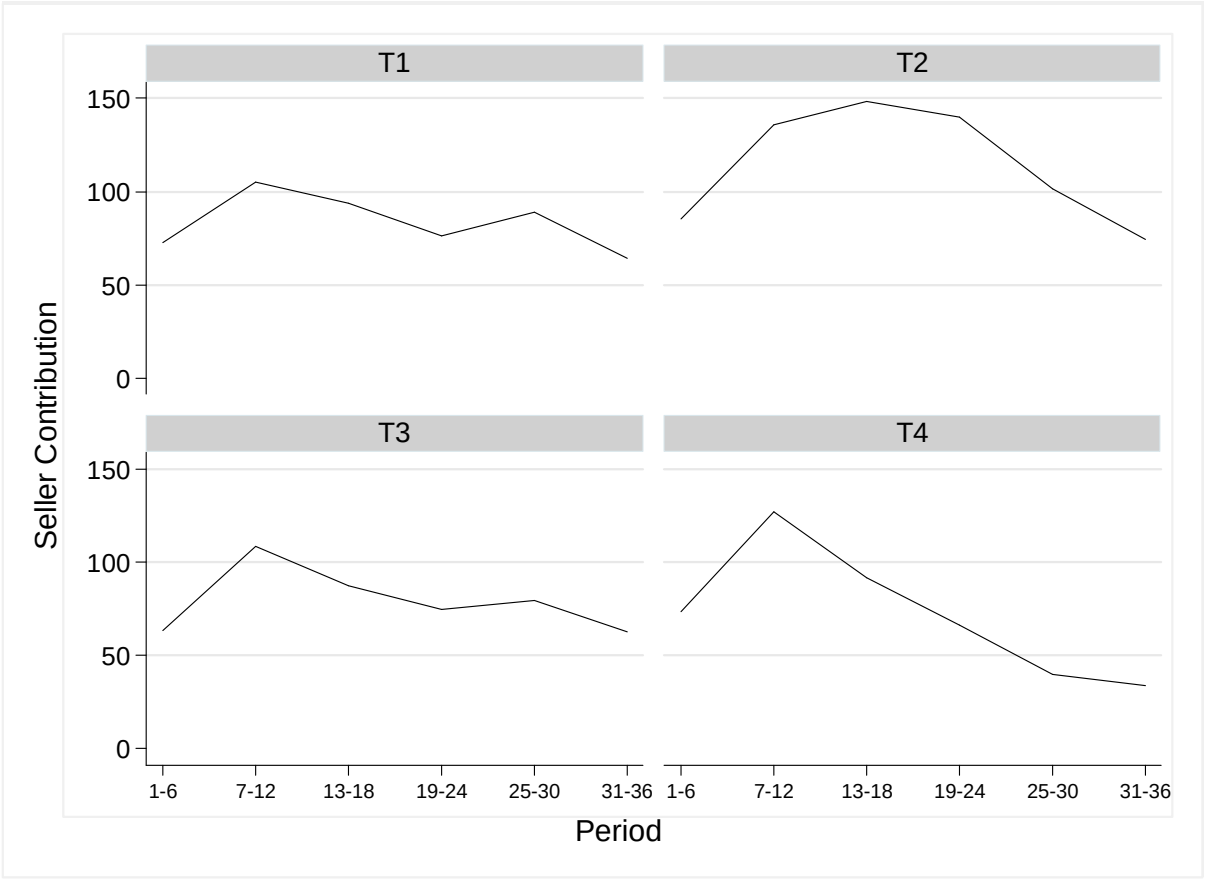

Figure 4. Evolution of seller contributions over time: Treatment aggregates

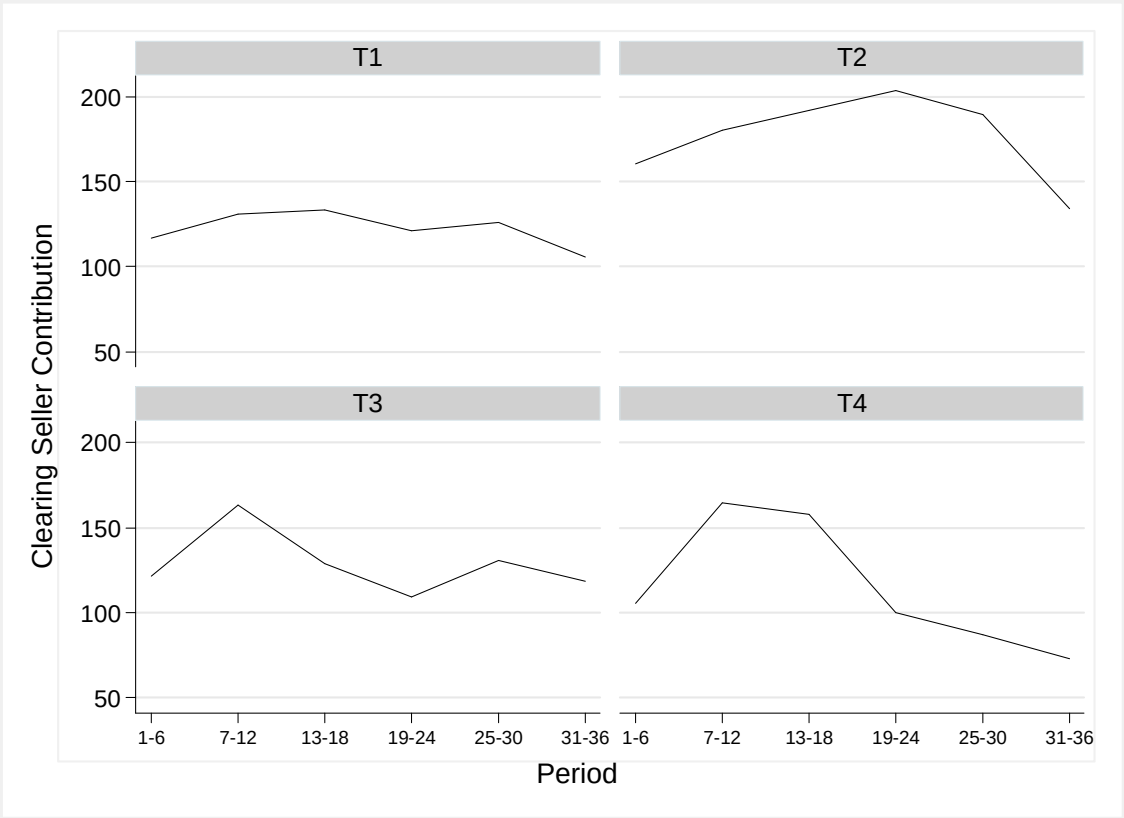

Figure 5. Evolution of average “clearing contribution” over time: Treatment aggregates

Figure 6. Evolution of average posted vs clearing contributions over time per market

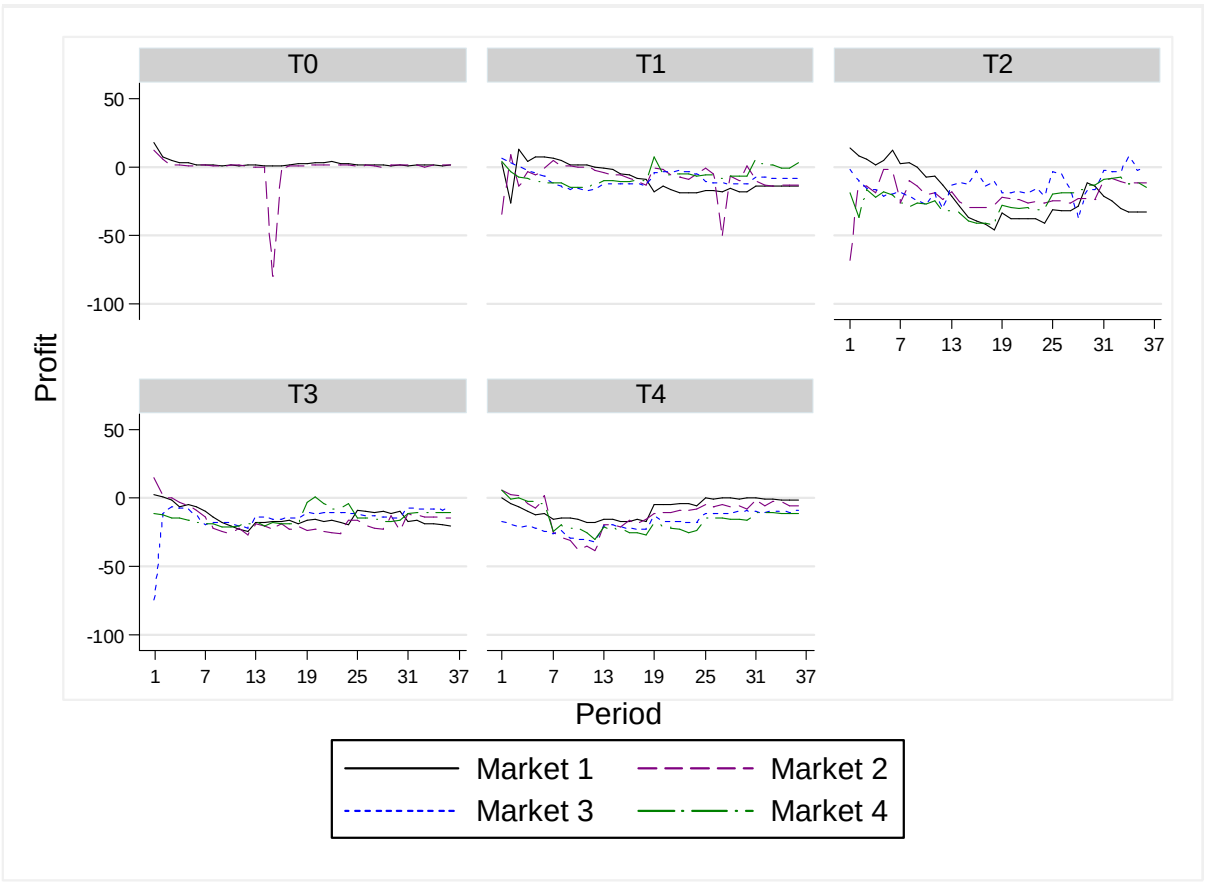

Figure 7. Evolution of average profit over time: Treatment aggregates

Figure 8. Initial (period 1) posted prices (dots) and purchasing decisions (marked with “x”) per market

Figure 9. Period 36 posted prices (dots) and purchasing decisions (marked with "x") per market

ACKNOWLEDGEMENTS

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END NOTES

[1] See Amacher et al. (2004), Uchida (2007), Calveras et al. (2007), Mitrokostas and Petrakis (2008), Baron (2009), Bottega and De Freitas (2009), Casadesus-Masanell et al (2009), Toolsema (2009) and Garcia Gallego and Georgantzis (2009).

[2] See Becchetti and Solferino (2003) and Conrad (2005).

[3] See Davies (2005) where the size of groups of consumers is exogenously given and Fanelli (2008) where is not.

[4] Arora and Gangopadhyay (1995) apply this model to voluntary over-compliance of firms with established government standards. In their model the market gets segmented by income levels and firms with different levels of environmental-friendliness are able to charge different prices and achieve a positive profit.

[5] For space reasons, instructions will be available to the reader upon request from the authors.

[6] Estimation results obtained for these specifications are available upon request from the authors.