How Governments Do Price Discrimination? Evidence from a Large Scale Nationalization *

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Abstract

To understand the influence of interest groups and redistributive motives in state-owned enterprises, we study the nationalization of YPF, Argentina's leading gasoline company. Descriptive analysis reveals a triple impact of nationalization. First, it led to lower prices, benefiting consumers on average. Second, it reverts *economic price discrimination*, by smoothing the correlation between markups and price elasticities. Third, it creates *political price discrimination* by charging lower prices in provinces that had political connections with the firm. Motivated by these findings, we develop and estimate a model of supply and demand of gasoline and recover the objective function of the State-Owned Enterprise (SOE), allowing for heterogeneity in how the SOE internalizes different groups of consumers and firms. Our estimates of the objective function reveal redistributive motives behind the nationalization. In comparison to a benevolent planner that internalizes the welfare of all consumers equally, the government chooses prices as if it only cares about low-income consumers in provinces that have political ties with the firm and middle-income consumers in all provinces. We then use the model to evaluate the firm's response to policy alternatives, including privatization and rules that aim to limit SOEs' discretion in doing pricing, such as uniform pricing mandates. We find that rules are effective in limiting the influence of politics in SOEs' decision-making but are associated with high social costs: they mitigate half of the welfare gains generated by the nationalization and increase tax-payers costs by 10%. These findings shed light on the complexities of public provision, emphasizing the importance of politics and interest groups in shaping SOEs' actions and the role of SOEs as instruments for redistribution.

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1 Introduction

State-owned Enterprises (SOEs) are widespread in both developed and developing countries. They account for 10% of the world's GDP (5% of OECD's GDP) and have doubled their presence among the world's largest corporations in the past decade [IMF, 2020]. The creation of SOEs is usually justified by the existence of market failures.[1] However, the efficacy of SOEs to correct market failures has been debated among economists. One of the primary arguments against SOEs is their lack of incentives to innovate and boost efficiency.[2] Early empirical studies supported this view [La Porta et al., 2002, La Porta and Lopez-de Silanes, 1999] but recent studies have indicated that public provision can indeed be cost-effective [Atal et al., 2021, Jiménez-Hernández and Seira, 2021, Neilson et al., 2020].

Setting aside efficiency concerns, this paper focus on another argument against SOEs, rooted in the politics of government decision-making [Stigler, 1971, Laffont and Tirole, 1991]. SOEs can become tools for political patronage or be influenced by interest groups, thereby diverting their actions away from public interest. These political interventions can manifest in various ways. For example, politicians may leverage SOEs for patronage, hoping for electoral gains, or external parties like competitors or suppliers might lobby for favorable terms, escalating the firm's deficit and, by extension, the taxpayers' burden. In essence, the government's commitment to enhancing overall welfare remains uncertain, and even if SOE's actions do improve welfare, equitable distribution of benefits is not assured.

While anecdotal evidence suggests the role of interest groups and redistributive motives in SOEs, little empirical evidence supports these claims. Our understanding of how interest groups shape governments' decisions is limited and there are no quantitative methods to assess they affect welfare and distributional outcomes. To fill this gap, we study the nationalization of YPF, the leading gasoline company in Argentina. We examine YPF's pricing strategy after the nationalization and compare it with the pricing strategy of a profit-maximizing firm. We estimate the firm's objective function, which reflects the firm's heterogenous preferences for various groups of consumers and firms, and quantify the impact of the nationalization on consumers and other market participants.

We collected a panel of monthly gasoline sales for all gasoline stations in Argentina. Our data includes prices and sales for each gasoline station before and after the nationalization. We also observed the station's brand and exact location. We combine this data with census block data (that reveals how households are distributed across the space) and expenditure

[1] For instance, in markets where profit-maximizing firms exert market power, SOEs may enhance consumer and total welfare by selling products at lower prices [Merrill and Schneider, 1966]

[2] While SOEs might be established to address market failures, they can inadvertently reduce societal welfare by crowding out private providers capable of more cost-effective production [Krueger, 1990].

survey data (which allows us to track consumption patterns of households with different demographic groups).

Our descriptive analysis reveals three key findings about the nationalization of YPF. First, gasoline prices decreased by 5%, and sales increased by 4% in the year following nationalization, with nearly 90% of this surge attributed to a rise in YPF's regular gasoline sales. Second, YPF implemented larger price cuts for products that have less elastic demand and are likely to have higher markups. Evidence for this claim includes: regular gasoline prices fell relatively more in high-income areas within a province; the prices of premium gasoline decreased more than those of regular gasoline; and markets where YPF held a dominant market share before nationalization experienced larger price drops. Third, YPF changed the relative prices of gasoline products across regions and provinces. In particular, gasoline became more affordable in provinces that cooperated with the federal government during the expropriation process and were allowed to retain 25% of YPF's stocks after the nationalization (henceforth referred to as *shareholder provinces* or *provinces with political ties*).

Collectively, these findings underline a core trade-off inherent in public provision. On the one hand, the firm takes measures benefiting consumers and boosting efficiency. After nationalization, the firm exercises reduced market power, resulting in lower prices and an expanded market. It also lessens the practice of setting higher prices for consumers willing to pay more, aiming for a closer alignment between prices and costs. We refer to this as the firm exerting less *economic price discrimination.* On the other hand, the firm imposes varied prices based on consumers' political ties. In our study, this arises from the differential influence of consumer representatives (e.g., governors) on the firm's decision-making process. We refer to this as *political price discrimination.*

Based on the main descriptive facts, we formulate and estimate a model of gasoline supply and demand under market power. On the demand side, consumers purchase gasoline. On the supply side, firms offer gasoline at different geographic locations. After the nationalization, all firms but the SOE maximize profits. However, the SOE maximizes a welfare function with unobserved weights on consumer surplus of different consumer groups (one per group of consumers based on their income and the province in which she lives) and rival firms' profits. This function encompasses both the profit maximization case, the total surplus maximization case, and an array of intermediate cases in which the SOE has preferences for some groups of consumers and firms over others, reflecting how various interest groups influence state intervention.

In differentiated product markets, where firms have market power, prices fluctuate for several reasons. While our descriptive findings provide suggestive evidence of a change in the objective function of the firm, alternative explanations exist.[3] Disentangling between demand-side explanations, cost-side factors, and changes in objective functions presents an identification challenge. However, the nationalization provides a unique variation to disentangle these forces. We can observe market operations pre-nationalization, when all firms (including YPF) aimed for profit, and contrast that with post-nationalization behavior. It also allows us to compare zones that are more exposed to nationalization since YPF is prevalent in those areas, with other zones less exposed to nationalization.

Our identification strategy resembles the one in Miller and Weinberg [2017], but adapted to the context of the nationalization of a firm (instead of a merger); designed to estimate the objective function of a State-Owned Enterprise (instead of estimating coordinated effects after a merger); and allowing for heterogeneity in the way in which the firm internalize consumer surplus of different groups of consumers and profits of different firms. Pre-nationalization data and the profit-maximizing conduct assumption allow us to recover marginal costs for all firms in the pre-nationalization period and for all firms but YPF in the post-period. Using this information, we identify YPF's costs in the post-nationalization period. Finally, the difference between observed and counterfactual markups that a profit-maximizing firm would have charged and how these differences change across product and geographic zones allow us to identify YPF's objective function.

The objective function estimation reveals that not all consumers are weighted equally. We found higher internalization of middle-income consumers in all provinces- who benefit from lower economic price discrimination- and relatively higher internalization of consumers in provinces with political ties with the firm -who benefit from political price discrimination. The objective function estimation also reveals that YPF does not internalize the effect of its pricing on rivals' profits.

Using our model, we find that, compared to a profit-maximizing firm, the SOEs charge lower prices on average, increasing gasoline sales and overall welfare. As previously documented in the literature, equilibrium effects play an essential role [Atal et al., 2021, Jiménez-Hernández and Seira, 2021, Neilson et al., 2020]. YPF's rivals also reduced prices, especially in lower quality products, making the impact on sales even larger. Consistent with descriptive evidence, the nationalization charges similar markups in both high and low-income zones and for premium and regular gasoline, exerting less economic price discrimination than a

[3] To begin with, prices may change in response to shifts in consumer's willingness to pay for products, which can involve changes in the number of consumers, alterations in consumer valuation, or variations in the number or quality of alternatives. Cost changes can also influence prices. Typically, firms pass on increased costs to their prices. Lastly, prices may be affected by changes in a firm's objectives or conduct. For instance, when a firm is expropriated, it might shift its focus from pure profit maximization to considering factors such as environmental externalities and voter reaction.

profit-maximizing firm. However, the nationalization also led to higher price discrimination based on political factors. In particular, the nationalization led to lower pricing in shareholder provinces, which are politically connected with the firm. This pricing has significant distributional implications.

At the time of writing this paper, a heated debate surrounds YPF. The leading presidential candidate and several party members propose the privatization of YPF, arguing that YPF is being used *to do partisan politics* and that the state cannot manage firms efficiently. Also, representatives from both major political parties in Congress advocate enacting price regulations for YPF by law to curtail regional pricing disparities. We use our model to study optimal policy design. Specifically, we explore the consequences of imposing rules that limit SOEs' discretion in price-setting, echoing existing regulations in various countries IMF [2020]. To evaluate the effects of the proposed policies, we solve YPF's pricing problem considering YPF's preferences - denoted by our estimates of its objective function - yet restricting YPF's choice set by the price rule. We study the effects of two regulatory approaches. The first regulatory approach, *uniform pricing*, involves setting equal prices for identical products at every gasoline station. The second regulatory approach, referred to as *uniform markup*, requires YPF to apply identical unit markups for each product type nationwide. We compare these policies to the current status quo of nationalization under discretion and the proposed privatization.

Our analysis reveals that none of these policies dominates the others in all dimensions. Trade-offs exist concerning taxpayer costs, efficacy in curbing political price discrimination, impact on total consumer surplus, and overall welfare implications. Although favored from the taxpayer's standpoint (as it bolsters YPF revenues), privatization does not emerge as the top policy for consumer surplus and welfare. When comparing nationalization under discretion vs. nationalization under uniform pricing, we find that the latter is better in limiting political price discrimination but incurs higher taxpayer costs and lower overall efficiency. Finally, uniform markup emerges as more efficient than the uniform pricing policy due to the SOE's propensity to adopt lower average markups and the enhanced alignment of prices with costs. Yet, it exacerbates political price discrimination.

Contribution To the best of our knowledge, this is the first study that examines the influence of interest groups on state-owned enterprises in an empirical application. In doing so, with both teoretical and empirical literature on interest groups [Stigler, 1971, Peltzman, 1976, Dal Bó, 2006, Kang and Silveira, 2021] and the literature on public vs. private provision [Krueger, 1990, Laffont and Tirole, 1991, Shleifer, 1998, La Porta and Lopez-de Silanes, 1999]. The paper also adds to a large literature that compares public and private provision in empirical industrial organization [Illanes and Moshary, 2020, Seim and Waldfogel, 2013, Atal et al., 2021]. Within this literature, the paper is closely related to recent studies, such as Jiménez-Hernández and Seira [2021] and Neilson et al. [2020], which explore the effects of public provision in oligopoly markets. We make two different contributions to this literature. First, we provide a framework for understanding pricing and place emphasis on estimating the role of politics in shaping the welfare and distributional outcomes of public provision. Furthermore, our study is the first to examine the effects of firm expropriation on pricing and market outcomes using microdata and modern empirical methods.

This paper showcases the use of modern empirical IO tools to recover preferences underlying government decision-making. By doing this, we contribute to early attempts to recover preferences underlying government decision-making [Timmins, 2002, Kang and Silveira, 2021], and to a whole literature on conduct testing and estimation in empirical IO [Porter, 1983, Bresnahan, 1987, Nevo, 2001, Miller and Weinberg, 2017, Backus et al., 2021, Duarte et al., 2020]. To our knowledge, this is the first paper allowing for heterogeneity in the way in which different groups of consumers and firms are internalized (based on demographic and political characteristics), and discussing how those parameters are identified. This is also the first paper estimating the objective function of a state-owned enterprise. This approach provides insights into the influence of interest groups on governmental decisions and evaluates institutional responses to regulations aimed at curbing such influences.

Finally, the paper is connected to the literature on price discrimination. While other authors have pointed out that firms can charge different prices based on non-economic attributes [Ayres and Siegelman, 1995, List, 2004, Goldsmith-Pinkham and Shue, 2023, Moshary et al., 2023], we are the first to document that a state-owned enterprise can charge different prices based on political attributes and, on the other hand, can exert less price discrimination based on economic attributes.

Paper Organization The rest of the paper is organized as follows. Section 2 describes our data and the retail gasoline market before the nationalization. In section 3, we present descriptive evidence on the effects of the nationalization on pricing and market outcomes. In section 4, we introduce our model of demand and supply of gasoline. In section 5, we discuss how the primitives of that model are identified; we describe how we estimate the model and present the results. In section 6, we evaluate the effects of the nationalization by comparing it to what a profit-maximizing firm would have done. This exercise is also helpful in understanding the effects of privatization. In section 7, we discuss the effects of alternatives to privatization. We conclude in section 8.

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