

Why do Inefficient Policies Persist? Evidence from Energy Markets in Brazil

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Overview

Policymakers often rely on price freezes, including on energy commodities, as a strategy for keeping prices of salient goods artificially low and redistribute income. In the context of Brazil, in 2005, Lula's administration announced that it would freeze the domestic wholesale prices of electricity, diesel, gasoline, and cooking fuels. Notably, and despite several attempts to phase it out, the wholesale gasoline price freeze has persisted and remains in effect to date. Importantly, our knowledge of the economic and political determinants of the persistence of inefficient policies is somewhat limited. This issue is, however, of first order importance to the design of climate policy, since the inability to phase out price freezes of carbon intense commodities can compromise and delay global climate mitigation goals.

In this paper, we provide new insights that inform the persistence of inefficient policies. Taking advantage of an unexpected announcement to end a gasoline price freeze (and align domestic with international prices) in Brazil in 2013, we present empirical estimates of the costs of gasoline price freezes in an event-study design. Brazil provides the ideal setting for such a study, given that the government has substantial control over Petrobras, a semi-public multinational corporation and the largest petroleum company in Brazil. As such, the government is able to pass the costs of the price freeze to shareholders of Petrobras, and use the price freeze as a non-salient instrument to redistribute income in the economy, and secure the political coalition needed to win elections. We provide evidence that relatively less costly instruments, such as targeted transfers, would have made no single income groups worse off. However, a policy reform that would phase out the price freeze is unlikely to ever occur. Taken together, our insights are consistent with the idea that higher income individuals (who make up the bulk of Petrobras shareholders) underestimate the true costs of the price freeze, but could resist a relatively more salient redistributive instrument, despite its overall lower costs.

Methods

We have three goals. First, we econometrically estimate Petrobras' event-day abnormal stock return, by isolating the shift in investor expectations of firm value. This value serves as a sufficient statistic of the cost of the price freeze. Second, we embed this sufficient statistic in a welfare consistent model to measure the economic costs of the price freeze. Third, we use the welfare model to compare the costs and distributional impacts of the price freeze with alternative instruments, and provide new insights that can explain the persistence of the price freeze. It is well known that recovering causal estimates of an abnormal return due to an unexpected event comes with the non-trivial empirical challenge of correctly predicting the expected return that a stock would have had absent of the announcement. To address this challenge, we compare and contrast two major different approaches: First, inspired by the finance literature we estimate a capital asset pricing model (CAPM) that implicitly addresses the empirical challenge by relying on a theoretical relationship between stock returns and those of a market index. Second, we take advantage of the synthetic control methods as well as machine learning techniques –ridge regression, and

elastic net—that can potentially relax the theoretical assumption of the CAMP model, and instead generate a data-driven ‘synthetic’ counterfactual series of expected returns of Petrobras’ shares calculated based on a set of all world peer firms, that also includes the classical marked index, Fama-French factors, BRL/USD exchange rate and wholesale crude oil spot price.

Petrobras shares are publicly traded on the Sao Paulo (BOVESPA) and New York (NYSE) Stock Exchanges; thus, we use data from these two exchanges in our analysis. Data on daily share prices, trades, and number of shares traded in the NYSE and BOVESPA exchanges during the period of September 12th, 2012, to March 3rd, 2014, are obtained from Economica, a financial data provider that collects data for the United States, Brazilian and other Latin American markets. For the NYSE, we collect data for all Brazilian firms traded on the exchange, as well as firms belonging to any of four sectors relevant to Petrobras using the 4-digit NAICS codes 2111, 2131, 3241 and 4247.

Results

Our central estimates of the event day abnormal returns range from 6.098 to 6.807 percent for nonvoting shares and 8.084 to 8.828 percent for voting shares, suggesting a remarkable pattern of consistent estimates across the two approaches taken to recover counterfactuals for the expected returns absent of the event. The resulting total (upper bound) effect ranges between 7.265 to 7.994 percent of total firm value, corresponding to between R\$17.181 and R\$18.907 billion Brazilian Reais (2013). Using only the nonvoting shares’ abnormal returns to calculate the lower bound effect, the change in firm value ranges between R\$14.421 to R\$16.100 billion Reais. This range highlights the economic significance of model accuracy, which could affect the estimated change in firm value by over \$1.5 billion Reais.

We then present the welfare effects of the price free, and the distributional impacts of the price freeze compared against alternative policies, respectively. Taken together, these results provide suggestive evidence that financial markets were quite sensitive to the potential additional risks Petrobras faced when securing fuel contracts - risks due to the volatility of oil prices and exchange rates -, increasing the distortionary costs of the program. It also implies that, as a mechanism for transferring wealth to individuals, this is a rather inefficient and costly program. We also show that other less costly but more salient instruments, such as targeted transfers would not leave any income group worse off.

Conclusions

Taken together, these results provide suggestive evidence that financial markets were quite sensitive to the potential additional risks Petrobras faced when securing fuel contracts - risks due to the volatility of oil prices and exchange rates -, increasing the distortionary costs of the program. It also implies that, as a mechanism for transferring wealth to individuals, this is a rather inefficient and costly program. We also show that other less costly but more salient instruments, such as targeted transfers would not leave any income group worse off. Taken together these results point to a potential plausible explanation for the persistence of the price freeze. To the extent that higher income individuals, who are the shareholders of Petrobras, underestimate the true costs of the price freeze due to its low salience, they may oppose policy reforms that would have actually benefit them. With this information in hand, politicians maintain the price freeze as a strategy for forming their winning election coalition and the inefficient policy persists.