An Empirical Assessment of Competition Law in Pakistan's Cement and Fertilizer Industries

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Abstract

The Competition Act of 2010 marked a transition from anti-monopoly to competition law in Pakistan. Unlike previous legislation, the Act was the first legislation applicable to government undertakings, but a more pressing question is whether it applied to military enterprises. Using difference-in-differences estimation, this study finds that the Act has had no effect on the cement industry and military-owned fertilizer firms; however, it has resulted in lower revenues and costs for government-owned fertilizer firms. Where the legislation is not working is where cartels and duopolies are able to circumvent the legal process.

*I would like to thank Gharad Bryan for his valuable feedback.

1 Introduction

1.1 Antitrust Policy in Pakistan

1.1.1 From Anti-Monopoly to Competition Law

The Monopolies and Restrictive Trade Practices Ordinance (MRTPO) represented Pakistan's first piece of antitrust legislation, implemented by the Monopoly Control Authority (MCA). Though it remained unchallenged for over three decades, the MRTPO was eventually replaced by the Competition Ordinance of 2007 following the establishment of the Competition Commission of Pakistan (CCP). According to CCP (n.d.), the MRTPO was "inadequate to address competition issues effectively." The Competition Ordinance of 2007 was a temporary piece of legislation, with subsequent Ordinances enacted in 2009 and 2010, before a lasting solution was achieved with the Competition Act of 2010.

The stated purpose of the Competition Act is "to provide for free competition in all spheres of commercial and economic activity, to enhance economic efficiency, and to protect consumers from anti-competitive behavior" (Government of Pakistan, 2010). According to Wilson (2010), "[t]he [Competition Act] reflects a marked shift from the objective of the MRTPO, which was enacted with a view to prevent undue concentration of economic power in the hands of a few." This is significant since undertakings owned by the government were previously exempt from the application of the MRTPO (see Government of Pakistan, 1970 and Wilson, 2018).

1.1.2 Competition Commission of Pakistan

The Competition Commission of Pakistan is an independent body established to administer the Competition Act. The CCP was established with the purpose of prohibiting

abuse of dominance, anti-competitive agreements, and deceptive market practices. The Commission also reviews mergers and acquisitions that could significantly reduce competition (CCP, n.d.). Since the establishment of the CCP in 2007, the body has issued 150 orders and cleared more than 500 mergers and acquisitions.

According to Wilson (2010), "[i]f one is to gauge the performance of the [CCP] from the number of cases it has decided, the Commission has been sprinting along like the hare in Aesop's fable."

1.1.3 Anti-Competitive Behavior in the Cement and Fertilizer Industries

The cement industry in Pakistan has a long history of collusion. Prior to the established of the CCP, their activities were scrutinized by the MCA. In 2008, shortly after the passing of the first Competition Ordinance, the CCP imposed a penalty of over PKR 6 billion (USD 71 million) on the All Pakistan Cement Manufacturers Association (APCMA) and its member undertakings after finding them guilty of fixing quotas from 2003 and 2005 (CCP, 2009). The cartel, however, obtained a stay order from the court, preventing the CCP from recovering the penalty (I. Khan, 2020). In an inquiry launched in 2020, the CCP again found evidence of the APCMA fixing prices (CCP, 2020).

Similarly, the fertilizer industry has also been found guilty of anti-competitive behavior. In 2011, the CCP launched an investigation against the industry following an increase in the price of urea. They found the urea fertilizer market to be a duopoly, with the two individually dominant parties guilty of raising prices to anti-competitive levels (CCP, 2013). Among the dominant parties was the Fauji Fertilizer Company (FFC), a military-owned firm. Ironically, the FFC had previously been found to have unreasonable monopoly power, at which time the company asserted that they did "not have the

power to set non-competitive prices in the urea/DAP fertilizer markets" (CCP, 2008). Simultaneously, the FFC has admitted its dominant market position by disclosing that its associated undertaking is the only DAP fertilizer manufacturer in Pakistan (FFBL, 2022b; CCP, 2008).

1.2 The Military Economy

In *Military Inc.: Inside Pakistan's Military Economy*, Siddiqa describes the military as one of Pakistan's most dominant economic institutions. Siddiqa's work is arguably the most rigorous existing study on the military's internal economy, which the author values in the order of billions of US dollars. While the author's assessment of the issue has been instrumental in raising awareness, their findings are largely qualitative. The author acknowledges this gap in the literature, remarking that "[p]erhaps the deficiency of organized data has not encouraged economists to analyse the genre of military capital" (Siddiqa, 2007).

1.2.1 The Fauji Foundation

Formally, the military conducts business under the Fauji Foundation (FF). The Fauji Foundation was founded in 1954 under the Charitable Endowments Act of 1890 as a charitable trust for the welfare of ex-servicemen. Today the Foundation operates across more than 18 industries, with 80% of income going towards welfare initiatives (FFBL, 2022a). However, despite their private sector status, the Foundation has incurred a reputation of draining state resources to fund its activities. More generally, Auditor-General of Pakistan (2019) valued the defense services' loss to state at PKR 24,611 million (USD 0.6 million).

This reliance on the national treasury creates some ambiguity as to whether the Foundation operates within the public or private sector. According to Siddiqa (2007), the armed forces are exempt from "the procedures and norms of accountability prescribed for a government institution, or even a military project or programme financed by the public sector." The Foundation thus appears to be publicly funded but privately profitable.

Of the Foundation's numerous entities, the only ones listed on the stock exchange are their cement and fertilizer companies. Consequently, unlike most military enterprises whose performance remains obscure, there exists a wealth of information on these publicly traded firms. This study thus focuses on cement and fertilizer companies listed on the Pakistan Stock Exchange. This relates well to a literature gap identified by Siddiqa (2007): "there ha[s] never even been a consistent effort to extrapolate the data that is available, such as the annual financial reports of some of the companies."

1.3 Motivation

To date, the effects of military – and, more generally, government enterprise – on civilian welfare in Pakistan remain unknown. Without causal identification, we are unable to estimate their impact in the market and prompt equivalent policy action if anticompetitive activity is present. Hence, this study exploits the fact that antitrust policy did not apply to government-owned enterprises until 2007 to estimate such causal impacts.

The primary question of interest being explored in this study is as follows: to what extent has more comprehensive antitrust law affected the performance of government- and military-owned firms in Pakistan? To answer this, I use a difference-in-differences (DID) estimation strategy, comparing the financial performance of government- and military-owned firms before and after 2007 to that of civilian owned firms. Given the unique

dynamics of the cement and fertilizer market, I conduct industry-specific analyses.

This study finds that the Competition Act has had no effect on the cement industry and military-owned fertilizer firms; however, it has resulted in lower revenues and costs for government-owned fertilizer firms. The zero effects in the cement industry are unsurprising given its history of collusion. Similarly, the zero effects on military majority-owned fertilizer firms were expected considering their abuse of dominance. Thus, less dominant government-owned firms have fallen victim to this duopolistic market structure.

These findings speak to the strengths and weaknesses of competition law in Pakistan. Although the intended effects of the Competition Act are apparent among government-owned fertilizer firms, cartels and duopolies remain unpunished for their violations. Hence, such anti-competitive forces need to be handled with less leniency for the benefit of the greater economy.

The remainder of the paper is organized as follows: Section 2 provides an overview of relevant literature, Section 3 describes the data, Section 4 specifies the empirical strategy, Section 5 details the results and discussion, Section 6 discusses potential limitations, and Section 7 presents the conclusion and implications of this study.

2 Literature Review

To date, there has been virtually no economic analysis on the impact of the Competition Ordinances and Act in Pakistan. The vast majority of literature assessing competition law in developing countries focuses on evaluations of competition authority enforcement decisions (i.e. mergers and acquisitions). Given that state-owned enterprises were not excluded from competition law until 2007, this provides a unique opportunity to assess market competition.

2.1 Military Expenditure and the Economy

Most of the literature on military spending and the economy involves macroeconomic time-series analysis rather than applied microeconometrics. The consensus in the literature is that increases in the defence budget translates to decreases in average quality of life. Studies have found that military spending has a negative effect on economic growth (Khilji, Mahmood, & Siddiqui, 1997), positive effect on income inequality (Raza, Shahbaz, & Paramati, 2017; Sharif & Afshan, 2018), and interferes with human capital investment (Murshed & Saleh, 2013). A working paper by the State Bank of Pakistan, however, finds that although defence expenditure cannot be used as a macroeconomic stabilization tool, it does not hurt long-run economic growth (M.-u.-H. Khan, 2004).

2.2 Antitrust Evaluation in Developed Countries

A study on the impact of antitrust decisions of the imposed by the Taiwan Fair Trade Commission finds that administrative fines decrease firms' profit margins and increase operating costs (Chang, 2017). The author also uses difference-in-differences estimation to infer the effect of receiving a fine ruling on firm performance. They find that these effects are more pronounced for medium and large enterprises relative to small ones. This implies that impacts of antitrust enforcement can be evidenced in financial performance indicators.

In a study of 22 industries across 12 OECD countries, Buccirossi, Ciari, Duso, Spagnolo, and Vitale (2013) find that competition policy increases total factor productivity by 12.8 to 22.2 percentage points. These results provide support for the gross benefits induced by competition policy on a country's long-term economic performance. Hence, although Chang (2017) suggests that antitrust enforcement can reduce a firms' short-term

financial performance, these losses may be offset by the country-wide welfare gain enabled by increased competition. This is expressed eloquently in Buccirossi et al. (2013), who stated that "[t]he aim of competition policy is to ensure that firms refrain from undertaking behaviors that reduce social welfare by impairing competition."

2.3 Antitrust Evaluation in Developing Countries

Studies on the efficacy of competition law in India find that country's 2002 Competition Act has been "instrumental in bringing a fairly large part of the public sector under the purview of the Act, with a promising trend towards widening it even further" (Bhattacharjea, De, & Gouri, 2019).

Economic analyses of similar legislation have been conducted on the Competition Act of India. However, here the literature also remains limited. According to Nair (2012), the Act marked "a clear distinction from the erstwhile MRTP Act by shifting the focus from dominant firms to firms who are abusing their dominant positions." To identify industries with monopoly power, the author exploits the variation which resulted from competition law reform starting in 1992. Using this method, they find that, within the selected industries, there are only a "handful" of dominant firms, of which the majority are "cost efficient in their operations."

2.4 The New Difference-in-Differences

In recent years, there have been significant developments in the DID literature. This literature tackles various nuances related to the usage of DID models, including issues of heterogenous treatment effects, continuous treatment effects, and multiple time periods. In the context of this study, the implications of these developments need to be taken into

consideration.

De Chaisemartin and D'Haultfoeuille (2020) propose a solution to using two-way fixed effects estimators (TWFE) with heterogenous treatment effects. Specifically, they propose a new estimator DID_M that estimates the average treatment effect across all observations whose treatment changes from $t-1$ to t. This estimator is relevant to this study, as the effect of antitrust policy likely varies across firms and time. See also De Chaisemartin and D'Haultfoeuille (2018) and De Chaisemartin, D'Haultfœuille, and Guyonvarch (2019).

Callaway and Sant'Anna (2021) provides a framework for estimating treatment effects in DID setups with multiple time periods. The authors achieve this by estimating

$$ATT(g,t) = E[Y_t(g) – Y_t(0) | G_g = 1],$$

where g denotes the period the unit is first treated and G_g is an indicator for whether the unit is first treated in period g. This allows us to better understand "how treatment effect dynamics vary across groups $[G]$." While this is an interesting extension to the existing DID framework, it is not directly applicable to my study as the timing of the policy was uniform across firms.

Callaway, Goodman-Bacon, and Sant'Anna (2021) analyzes DID setups with continuous treatment. According to the authors, continuous treatment variables can provide richer information, help support causal interpretations, and point to potential mechanisms. In setups with multiple time periods and treatment "intensities," the TWFE estimator is composed of "the path of outcomes for units treated at the same time but with different doses." Mechanically, this is accomplished through the average causal response parameter:

$$ACR(g,t,d) = \frac{\partial E[Y_t – Y_{g-1} | G=g, D=d]}{\partial d},$$

where d represents the dose and $ACR(d)$ the "overall average causal response of a small change in dose." This is especially relevant to this study where intensities of government- and military- ownership vary substantially by firm.

3 Data

3.1 The Pakistan Stock Exchange

The Pakistan Stock Exchange (PSX) was established in January 2016 following the merger of the nation's three leading stock exchanges. Currently, there are more than 500 companies from over 35 industries listed on the PSX with a market capitalization of over 7 trillion PKR (PSX, n.d.). As of September 2021, the PSX is classified as a frontier market by MSCI Inc. (MSCI, 2021).

Companies listed on the PSX represent the biggest players in an industry, as well as those with the largest amount of publicly available data. Given that the military's cement and fertilizer companies are publicly traded, this study focuses on firms within these sectors listed on the PSX.[1]

Using company annual reports, I created a panel dataset comprising financial performance and shareholding metrics. In terms of financial performance, I focus on (i) revenues, to understand gains and losses resulting from the Competition Act, and (ii) costs, to explore claims on FF's cost inefficiencies. Collecting data on major shareholders, such as NBP and FF, allows me to estimate the effect of government and military ownership on a firm's financial performance. Given the time-consuming nature of manually extracting metrics from annual reports, the only control variable included is years

[1]The list of sampled firms can be found here: https://dps.psx.com.pk/sector-summary.

of business operation, or "age." This dataset contains 360 observations, including 24 distinct (19 cement and 5 fertilizer) firms over 15 years: 2003 to 2017. Given that the first Competition Ordinance was introduced in 2007, this provides a comprehensive view of industry trends before and after the reform.

3.2 Sector Production

The National Fertilizer Development Centre (NFDC) provides data on firm-year fertilizer production.[2] Given that there are only 5 publicly listed fertilizer firms, this production data assists in better understanding the dynamics of the industry.

3.3 Descriptive Statistics

3.3.1 Cement

In the context of this paper, military-owned firms refer to those where shareholders include the Fauji Foundation (FF); government-owned firms refer to those where shareholders include the National Bank of Pakistan (NBP); and civilian-owned firms refer to those where shareholders do not include the FF or NBP.

Government-owned firms were the first entrants to Pakistan's cement industry. Most firms in the cement industry are government-owned firms, with average shareholding of 3 percent. These firms generate the highest revenues and profits in the market. Military-owned firms, on the other hand, are the most recent entrants to the cement industry. Despite having the highest costs, military-owned firms have higher average profit margins that government-owned firms. The market shares of military and government owned firms are roughly equal overtime. Civilian-owned firms have relatively lower revenues

[2]This data can be found here: http://www.nfdc.gov.pk/Web-Page%20Updating/domprod.htm.

and profits. See Table 1.

3.3.2 Fertilizer

Government- and civilian-owned firms were the first entrants to Pakistan's fertilizer industry. Despite their late entry, the military owns two of the dominant players in the market. Military-owned firms are the most profitable, with the highest average revenues and costs. These firms also have the largest market share. Government-owned firms, on the other hand, have the lowest average market shares and profit margins. Although civilian-owned firms have the lowest average revenues and profits in the market, they have the highest profit margins. See Table 2.

4 Methodology

4.1 Empirical Strategy

This study uses difference-in-differences (DID) estimation to determine the impact of antitrust reform on the performance of government- and military-owned enterprises. DID estimation accomplishes this by comparing the differences in outcomes of state-owned enterprises before and after reform to those of civilian-owned enterprises. Given that government-owned enterprises were not subject to antitrust policy until the Competition Ordinance of 2007, they can be considered "treated" by the reform. Civilian-owned enterprises would hence be considered the comparison group.

The main assumption of this empirical strategy (the parallel trends assumption) is as follows: in the absence of antitrust reform, the treated and comparison groups would exhibit similar trends in firm performance on average. For the reforms to have had an

effect, we would expect to see a deviation in the treated groups trends following 2007. Although there is no way to statistically verify the parallel trends assumption, we can get a sense of this by visually comparing the trends of these two groups. See Figures 1 – 10.

$$Y_{ft} = \alpha_f + \beta_t + \delta D_{ft} + \gamma Age_{ft} + \epsilon_{ft}$$

Y_{ft} represents the outcome variables of interest: revenues, costs, and output. These variables are log transformed for ease of interpretation. D_{ft} is an indicator variable for whether the firm is a government- or military-owned enterprise in the post-period, the years following 2007. δ is the corresponding DID estimator, the main coefficient of interest that captures the causal effect of antitrust reform first legislated by the Competition Ordinance of 2007. α_f and β_t denote firm and year fixed effects respectively. Age_{ft} controls for the years of firm operation. ϵ_{ft} represents the error term that will be clustered at the firm level to control for correlation between observations that likely occurs overtime.

To better understand the industry-specific effects of the Competition Act, I have run separate regressions for the cement and fertilizer industries.

5 Results and Discussion

5.1 Results

The main findings of this study are as follows: in the cement industry, the Competition Act has had no identifiable effect; in the fertilizer industry, the policy has decreased revenues and costs of government-owned firms and has had no effect on military-owned firms.

5.1.1 Cement

Table 3 observes that the Competition Act has had no detectable effect on revenues or costs of government- or military-owned firms. However, Table 3 does find that for every year the firm operates, revenues increase by 13.5 to 14 percent and costs increase by 14.1 to 14.8 percent. This suggests a first-mover advantage in terms of revenue gains; however, these firms also struggle to achieve cost efficiencies and stay in the market.

In the cement industry, military majority-owned firms have an average 0.1% NBP shareholding. This allows the use of the specifications defined in Table 3, Columns 5 and 6, where I estimate the effect of antitrust policy on military majority-owned firms, holding constant their NBP shares.

5.1.2 Fertilizer

Table 4 finds that improved antitrust policy decreases the revenue and costs of government-owned firms. In the fertilizer industry, military majority-owned firms have an average 0.5% NBP shareholding. This enables the specifications outlined in Table 4, Columns 5 and 6.

Columns 1 and 5 indicates that for every 1 percentage point increase in NBP shareholding, average revenues decrease by 225 and 248 percent. These large and statistically significant effects are likely driven by Agritech Limited (AGL), the smallest player in the industry with the largest NBP shareholding of any fertilizer firm.[3] From 2008 to 2017, AGL has experienced a 32 percent decrease in revenue while its competitors experienced substantial growth, making it the leading driver behind the negative effect of the

[3]From 2003 to 2017, NBP had a 12 percent stake in AGL and less than 1 percent shareholding in all other major fertilizer firms on average.

Competition Act on government-owned fertilizer revenue.

Table 4, Columns 2 and 6 illustrates similar effects on costs, implying a 163 to 196 percent decrease in costs for every 1 percentage point increase in NBP shareholding. AGL, again, is the likely culprit being the only firm to experience constant or decreasing costs. These decreasing revenue and cost effects seem exclusive to AGL, the firm that happens to have the greatest NBP shareholding. This suggests that the intended purpose of bringing government undertakings under the purview of antitrust policy has been achieved in the fertilizer industry.

Conversely, Table 4 suggests that the Competition Act had no effect on military-owned firms revenues and costs. The zero effect on revenues and costs is surprising considering the substantial decreases experienced by firms with NBP shareholding. This finding supports an initial hypothesis that the Fauji Foundation's entities cannot be considered government undertakings as they seem to circumvent legal provisions. Instead, they have remained unaffected by the Competition Act and have benefitted from its regulation of government-owned firms.

Similar to findings in Table 3, first-movers in the fertilizer industry experience higher revenues and costs. Specifically, for every year the firm operates, revenue increases by 10.4 to 12.4 percent and cost increases by 10 to 12 percent.

Additionally, Table 5 finds that the Competition Act had no effect on government- or military-owned firm production. However, Table 5 observes that AGL had smaller output increases relative to other firms in the industry. This may explain in part the revenue and cost decreases observed in Table 4. Similarly, Table 5, Column 2 illustrates that relatively high output increases experienced by FFC and FFBL, the military majority-owned enterprises. These large gains help clarify the zero effects on revenue observed in

4. Here, years of firm operation has no detectable effect on production.

5.2 Discussion

The lack of change in the cement industry is somewhat surprising considering the substantial growth in the sector in the post-period.[4] Given the zero effects found in Table 3, it is likely that the growth of production in government- and military-owned firms did not differ significantly from that of civilian-owned firms. However, further analysis is needed to understand the impact of antitrust policy on sector output in the cement industry – due to time constraints, this will be explored in later drafts of this paper.

Combining the findings featured in Table 4 with production data, we get a better sense of the dynamics within the fertilizer industry. In the pre-period, AGL experienced 19 percent growth in output, but in the post-period this declined to -87 percent. FFC and FFBL, on the other hand, experienced a 16 percent output decrease in the pre-period followed by substantially smaller declines of 3 percent in the post-period (see Figure 11). These observations help explain the government-owned revenue decline (driven by AGL) and military-owned revenue stagnation (driven by FFC and FFBL) as displayed in Table 4.

[4] From 2007 to 2017, total production in the cement sector increased by around 67 percent (APCMA, n.d.).

6 Limitations

6.1 Data Availability

As stated in Section 3, I have included limited control variables to the specifications due to the time-consuming nature of extracting data from annual reports.

Given that data on most firms is only available at the year level, the sample size is relatively small in this study. In future drafts of this paper, an effort will be made to obtain data at the quarterly level to improve statistical power. As such, the existing sample size is somewhat concerning, especially when we estimate industry-specific effects.

6.2 External Validity

Considering the specificity of the sample, that is Pakistan's cement and fertilizer industries, the results of this paper are likely not generalizable. In other words, this study lacks external validity. That does not mean to say that the approach of this study is not replicable. Using publicly available data and creative methodology this study has made a robust attempt at answering a difficult question. A similar approach used to assess a vastly different natural experiment can prove to be informative.

7 Conclusion, Implications, and Further Research

7.1 Conclusion

The motivation of this study was to assess the impact of more comprehensive antitrust law on the performance of government- and military-owned firms. Using DID estimation, I find that the Competition Act has had no effect on the cement industry and military-

owned fertilizer firms; however, it has resulted in lower revenues and costs for government-owned fertilizer firms.

Given the history of collusion in the cement industry, it is not surprising that the Competition Act has had no effect on the revenues or costs of government- or military-owned firms. Considering their repeat offenses abusing dominance, the zero effects on military majority-owned firms in the fertilizer industry are also expected. Less dominant government-owned firms, on the other hand, have fallen victim to this duopolistic market structure, elucidating the decreased revenues and costs resulting from the Competition Act.

7.2 Implications and Further Research

These findings are significant as they speak to the strengths and weaknesses of competition law in Pakistan. Within the fertilizer industry, the intended effects of the Competition Act are apparent among government-owned firms. Cartels and duopolies, however, seem to have circumvented the legal process and come out on top. Hence, such anti-competitive forces need to be handled with less leniency for the benefit of the greater economy. This is not only the responsibility of the CCP, but also the high courts of Pakistan.

The intersection of development economics and industrial organizations remains largely unexplored. However, studies like this one demonstrate that a combination of publicly available data and creative methodology can go a long way towards bridging the literature gap.

Figures and Tables

Table 1: Cement Industry 2003-2017

	Military	Public	Civilian
Year Founded	1992	1978	1984
Firm Performance (PKR million)			
Revenue	10387	10523	4387
Cost	6141	5833	2592
Profit	4246	4689	1781
Industry Performance (%)			
Market Share	7	7	3
Profit Margin	43	23	24
Shareholding (%)			
Military	50	0	0
Public	0	3	0
Observations	15	161	109

Table 2: Fertilizer Industry 2003-2017

	Military	Public	Civilian
Year Founded	1986	1961	1961
Firm Performance (PKR million)			
Revenue	43689	32455	15445
Cost	29409	20045	9712
Profit	14280	12410	5733
Industry Performance (%)			
Market Share	30	14	13
Profit Margin	32	25	34
Shareholding (%)			
Military	56	0	0
Public	0	15	0
Observations	30	12	33

Figure 1: Cement — Government vs. Non-Government Revenue

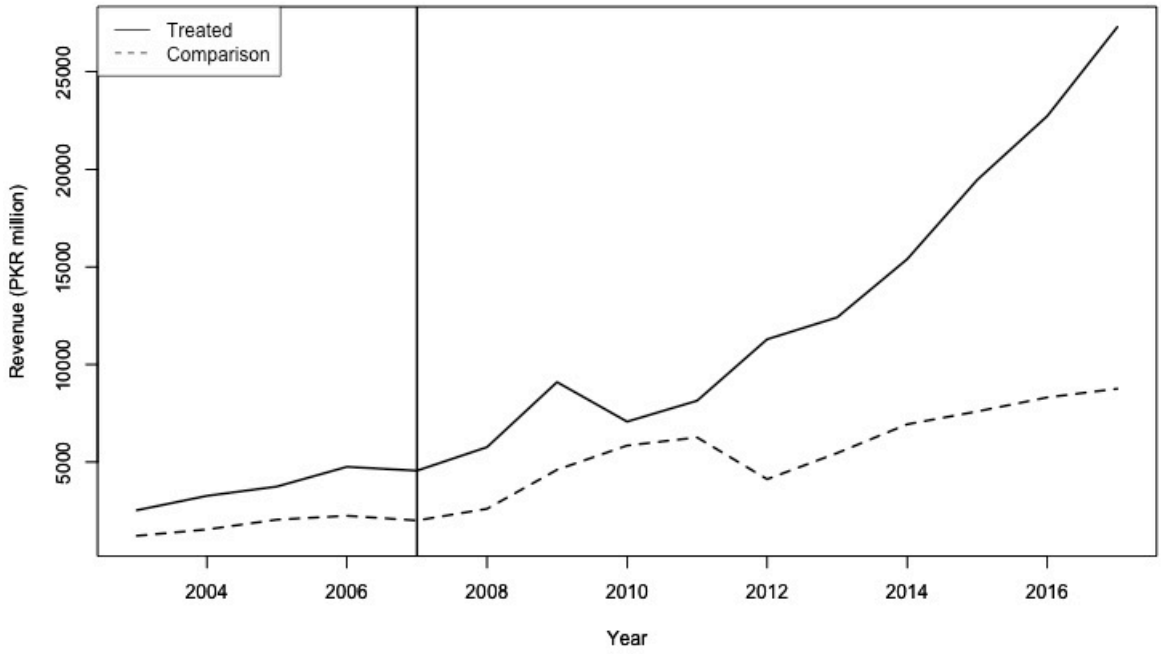

Figure 2: Cement — Government vs. Non-Government Cost

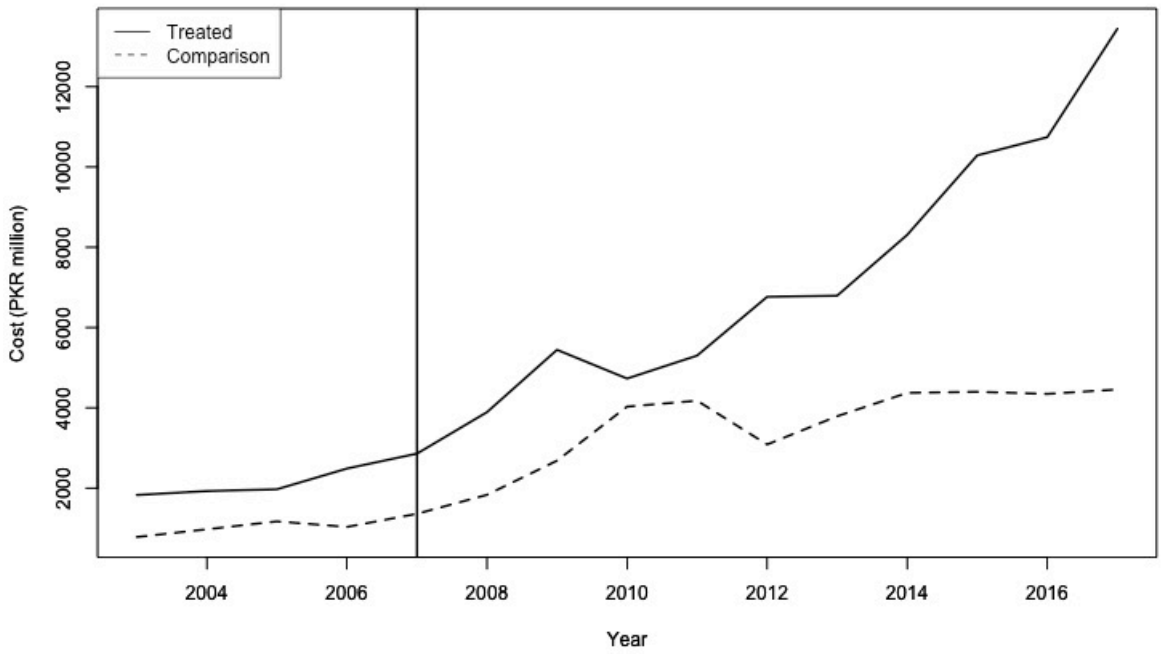

Figure 3: Cement — Military vs. Non-Military Revenue

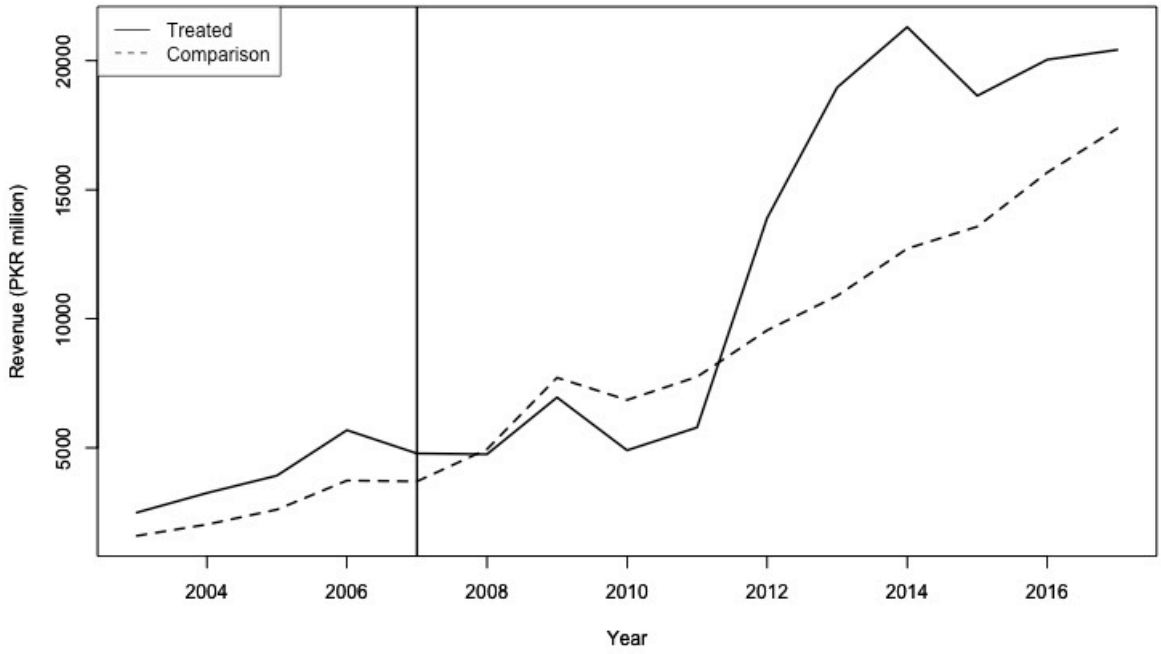

Figure 4: Cement — Military vs. Non-Military Cost

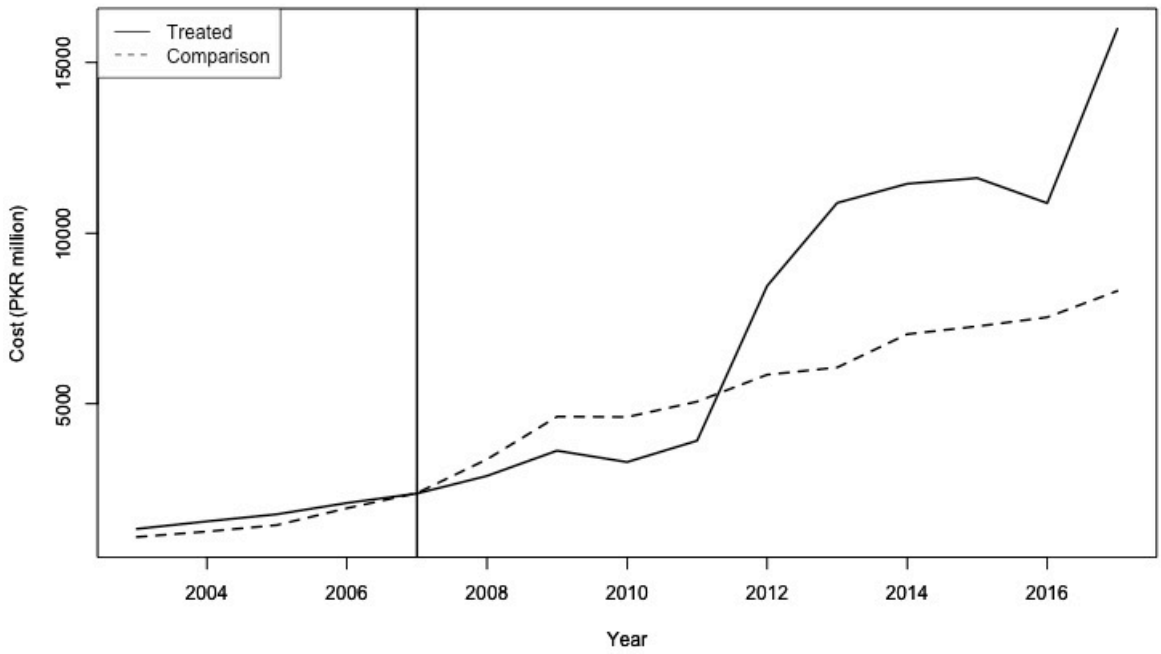

Figure 5: Fertilizer — Government vs. Non-Government Revenue

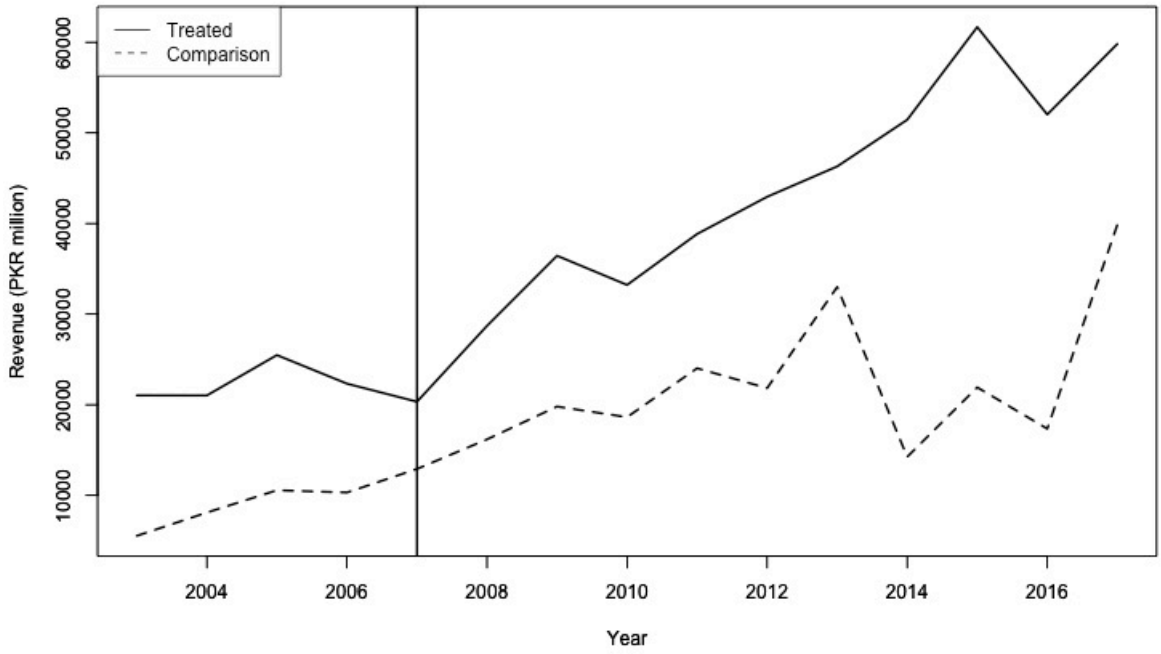

Figure 6: Fertilizer — Government vs. Non-Government Cost

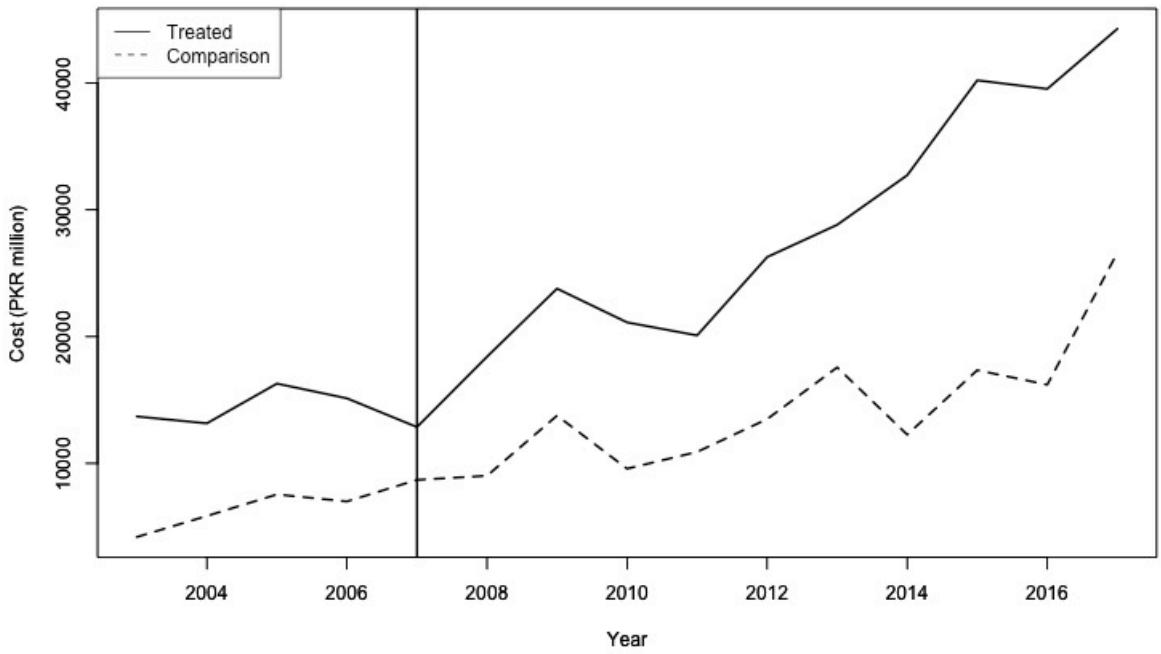

Figure 7: Fertilizer — Government vs. Non-Government Output

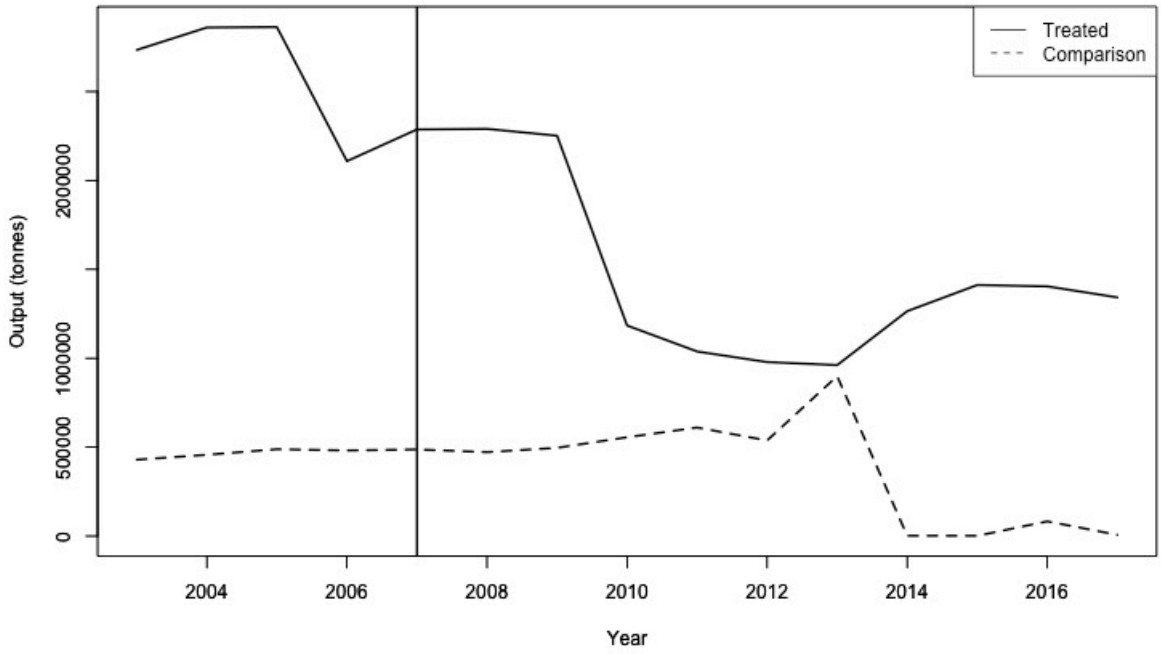

Figure 8: Fertilizer — Military vs. Non-Military Revenue

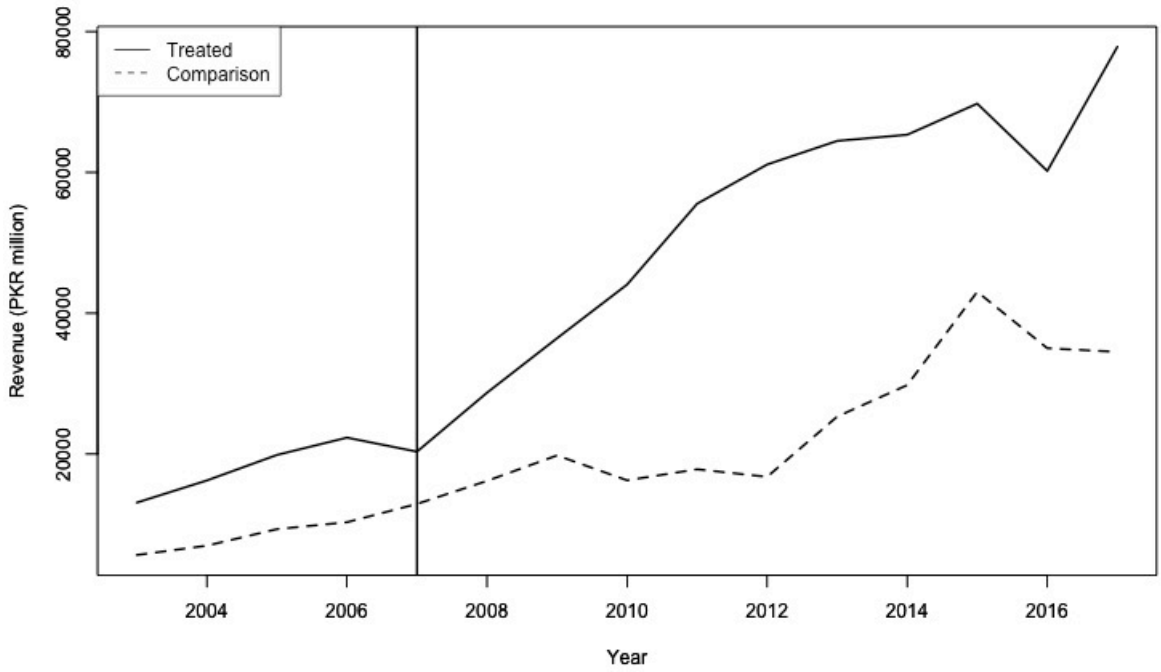

Figure 9: Fertilizer — Military vs. Non-Military Cost

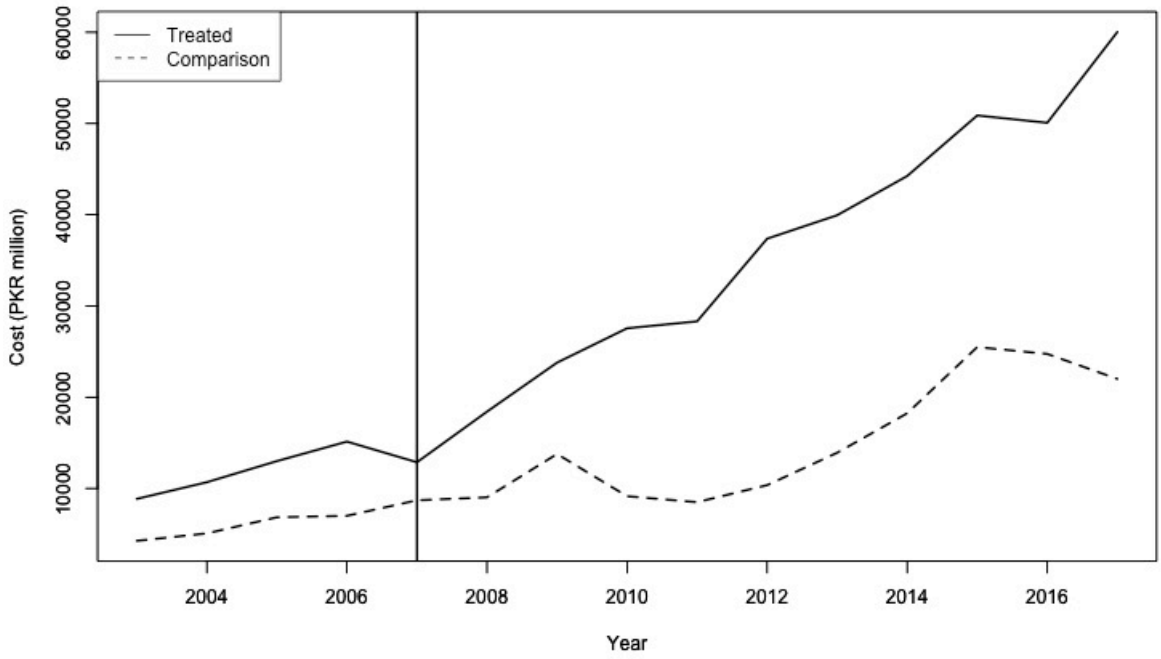

Figure 10: Fertilizer — Military vs. Non-Military Output

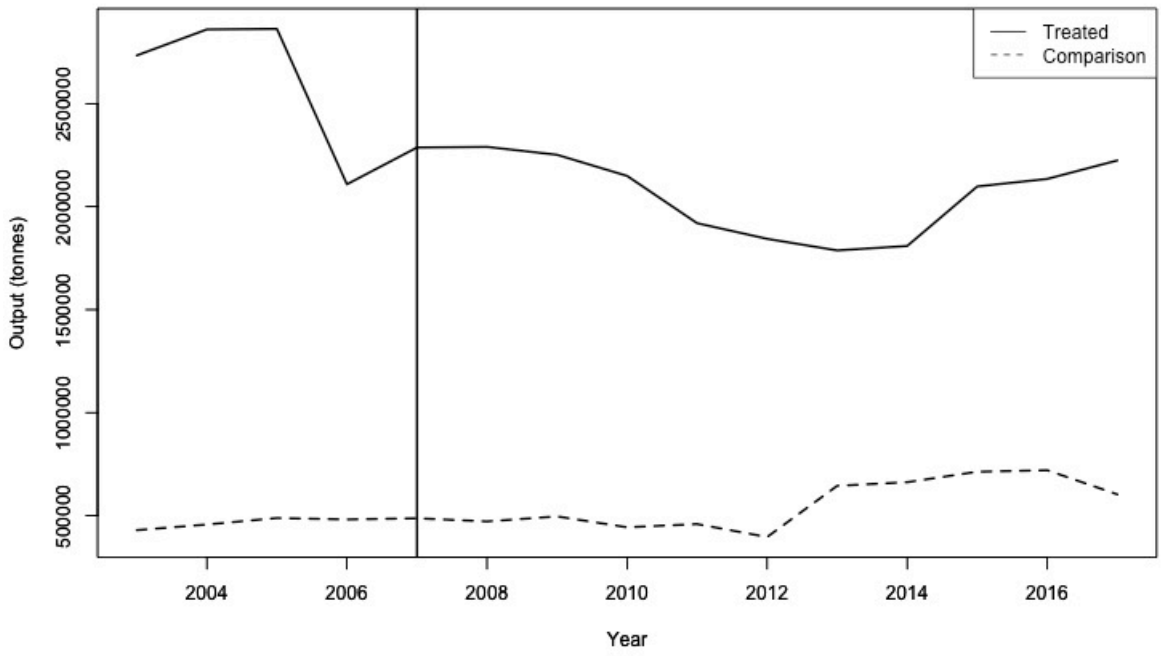

Figure 11: Fertilizer — Domestic Production

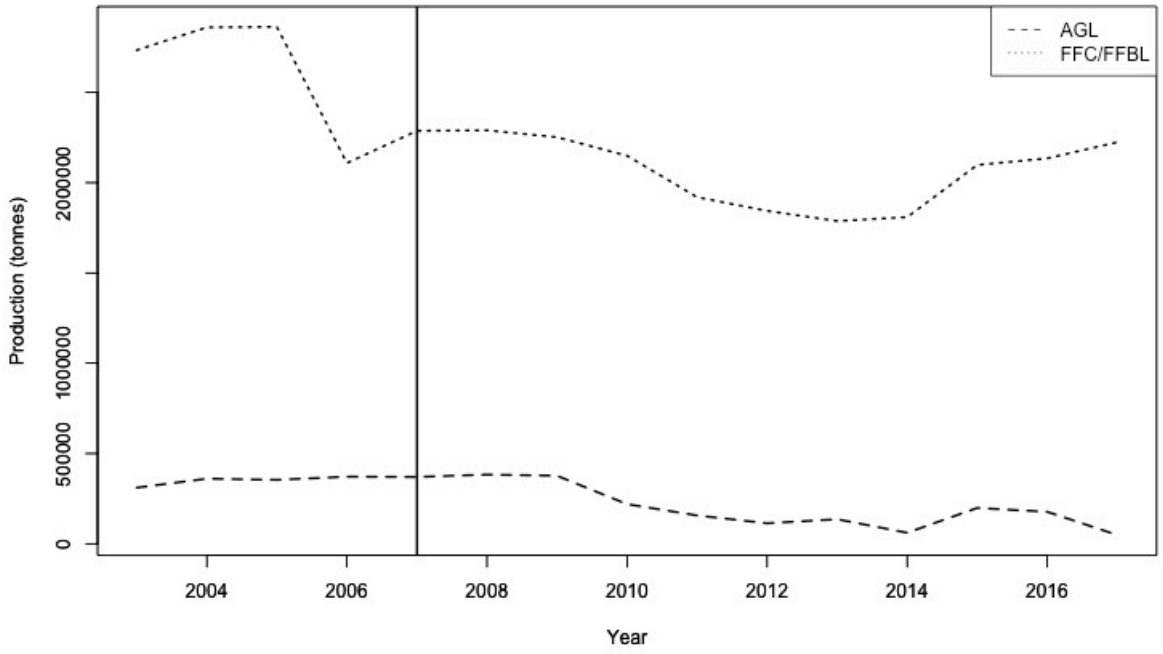

Table 3: Cement — Effects of Competition Act on Revenue and Cost

	(1) Revenue	(2) Cost	(3) Revenue	(4) Cost	(5) Revenue	(6) Cost
NBP Shares x Post	-8.693	-10.95			-8.586	-10.81
	(8.783)	(8.433)			(8.738)	(8.393)
FF Shares x Post			0.788	1.002	0.599	0.764
			(0.941)	(0.987)	(0.834)	(0.883)
Age	0.140**	0.148**	0.135**	0.141*	0.139**	0.146**
	(0.0386)	(0.0442)	(0.0439)	(0.0491)	(0.0406)	(0.0463)
Constant	4.590**	3.775*	4.827**	4.073*	4.633**	3.829*
	(1.173)	(1.376)	(1.359)	(1.541)	(1.234)	(1.440)
N	285	285	285	285	285	285

Standard errors in parentheses and clustered at firm level.

Dependent variables log transformed. Firm and year fixed effects output suppressed.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4: Fertilizer — Effects of Competition Act on Revenue and Cost

	(1) Revenue	(2) Cost	(3) Revenue	(4) Cost	(5) Revenue	(6) Cost
NBP Shares x Post	-2.479*	-1.962*			-2.254	-1.633*
	(0.762)	(0.460)			(0.867)	(0.453)
FF Shares x Post			0.641	0.779	0.426	0.623
			(0.313)	(0.407)	(0.445)	(0.531)
Age	0.124**	0.120**	0.104*	0.1000**	0.116**	0.109**
	(0.0214)	(0.0232)	(0.0238)	(0.0167)	(0.0172)	(0.0183)
Firms						
AGL	-0.438*	-0.341*	-0.759***	-0.600***	-0.473*	-0.392**
	(0.106)	(0.0783)	(0.0238)	(0.0167)	(0.118)	(0.0713)
EFERT	1.907***	1.890***	1.767***	1.748***	1.853***	1.811***
	(0.150)	(0.163)	(0.167)	(0.117)	(0.121)	(0.129)
FFBL	5.239**	5.265**	4.248**	4.204**	4.775**	4.586**
	(0.748)	(0.813)	(0.847)	(0.588)	(0.627)	(0.736)
FFC	3.857***	3.745**	3.258**	3.103***	3.576***	3.333**
	(0.429)	(0.466)	(0.486)	(0.339)	(0.366)	(0.432)
Constant	2.650	2.459	3.706*	3.532*	3.067*	3.069*
	(1.120)	(1.204)	(1.193)	(0.799)	(0.867)	(0.893)
N	75	75	75	75	75	75

Standard errors in parentheses and clustered at firm level.

Dependent variables log transformed. Year fixed effects output suppressed.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5: Fertilizer — Effects of Competition Act on Sector Output

	(1) Output	(2) Output	(3) Output
NBP Shares x Post	1.678		1.666
	(7.031)		(7.143)
FF Shares x Post		0.234	0.111
		(0.608)	(0.657)
Age	-0.122	-0.0949	-0.117
	(0.197)	(0.118)	(0.214)
Firms			
AGL	2.177	2.409***	2.184
	(1.052)	(0.118)	(1.078)
EFERT	3.442	3.633*	3.481
	(1.386)	(0.824)	(1.499)
FFC/FFBL	240.8	188.3	230.2
	(381.8)	(227.6)	(413.2)
Constant	16.05	14.75	15.80
	(10.03)	(6.089)	(10.74)
N	60	60	60

Standard errors in parentheses and clustered at firm level.

Dependent variables log transformed. Year fixed effects output suppressed.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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