Large Shareholders and Sticky Prices: Evidence from a Corporate Governance Reform*

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Abstract

New Keynesian models often assume firms bear real resource costs to change product prices to maximize value for the firm as a whole. If, however, firms' large shareholders bear disproportionally high costs but enjoy few benefits, they will veto proposals in support of any price changes and, as a result, prices will be sticky. We test this hypothesis using matched administrative customs and firm data that allows us to compare pricing strategies of the same product to the same destination. Our difference-in-differences framework exploits a mandatory corporate governance reform in China that differentially stimulates large shareholders' incentive to care about firm value. Following the reform, firms actively adjust producer-currency prices to stabilize buyer prices in response to real-exchange-rate fluctuations, and the effects are stronger when large shareholders' incentives are more stimulated. The results are mainly driven by product-destination markets in which flexible pricing strategies are costlier to implement, by firms that are more in need of external finance, and by SOEs that are more affected by the reform. We conclude that the separation of ownership and control constitutes an important source of price stickiness.

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1 Introduction

A central tenet of New Keynesian macroeconomics is that firms pay real resource costs to change product prices, but only if an increase in profits exceeds adjustment costs (Akerlof and Yellen, 1985; Mankiw, 1985; Golosov and Lucas, 2007). This textbook theory assumes a professional manager resets prices on behalf of all shareholders, who unanimously support a pricing strategy if it maximizes value for the firm as a whole. Although this assumption holds for Berle-Means corporations that are widely held by small shareholders, it might not apply to firms dominated by large shareholders. In countries outside the US, many large shareholders have the power over firms in excess of control rights (La Porta et al., 1999; Claessens et al., 2000, 2002). Large shareholders often have exclusive access to technologies and resources to take costly actions to intervene with firms' product pricing.[1] Examples of these costly actions include, but are not limited to, monitoring CEOs to improve managerial efficiencies (Shleifer and Vishny, 1986, 1997; Burkart et al., 1997), building individualized customer relationships (Krugman, 1986; Froot and Klemperer, 1989; Drozd and Nosal, 2012), and financially aiding firms at the sacrifice of own investment opportunities (Johnson et al., 2000; Djankov et al., 2008). If, however, large shareholders pay disproportionally high costs but enjoy few benefits from taking these actions, they will veto proposals that support any price changes, and managers are likely to refuse to reset prices even if doing so is in the interest of minority investors.

In this paper, we document that in countries with less investor protection, the

[1] Anecdotes about shareholders engaging with firms' product pricing have become ubiquitous. In the US, institutional investors often communicate their preferred pricing strategies. As described by a Bloomberg news article dated on May 11, 2016, fund representatives exhorted drug industry executives and lobbyists to do a better job defending their pricing. In East Asia, large shareholders are often influential in product pricing. As reported by China's Security Daily dated on August 10, 2019, controlling shareholders of Kweichow Moutai Co., Ltd., the most famous liquor company in China, attempted to stabilize prices either through separating sales divisions from the listed firm or through related party transactions. In another example, China's local governments often act as large shareholders of state-owned enterprises (SOE). Local governments provide consulting, legal services, and financial support to local listed firms to help them set export prices properly to avoid anti-dumping investigations. See "China Tire: A Perfect Win over Anti-dumping Lawsuits" (China Daily, May 8, 2007).

separation of ownership and control influences price stickiness via a micro channel, namely, exporters' price adjustment to real-exchange-rate movements. Our key empirical finding is that fewer conflicts of interest causes exporters to price to market more — they reduce producer-currency prices more when real domestic currency appreciates, and increase prices more when it depreciates. Pricing-to-market, in essence, is the exporters' price discrimination across destination markets and aims to offset relative price shifts in the buyer currencies associated with exchange-rate fluctuations. Firms price to market because foreign customers dislike both positive and negative changes in destination-currency prices, an effect Anderson and Simester (2010) label "customer antagonization".[2]

An empirical test for the effect of large shareholders on product pricing faces two major challenges. The first challenge relates to measurement: The econometrician needs to observe a large and representative sample of goods for the same product going to the same destination. Only in such an empirical environment is a cross-firm comparison of price changes to exchange-rate movements meaningful. The second challenge is to isolate a quasi-exogenous source of variation in the extent to which large shareholders have more incentives to adopt flexible pricing strategies in the above homogeneous context.

To tackle the first challenge, we match micro data from the Customs Administration of China with publicly listed firms. The customs data provide information for each bilateral transaction at the monthly frequency, including values (in US dollars), quantities, product descriptions, trade categories, and destination countries. As documented by Manova and Zhang (2012), one prominent feature of the data is that export prices vary considerably across Chinese producers selling a given good in a given country, highlighting the extent of firm heterogeneity. Export prices also vary considerably across trade partners within a given exporter. Combined with financial data from publicly listed firms,

[2]Blinder et al. (1997) find more than 50% of managers say customer antagonization is an important reason for rigid output prices.

the customs dataset allows us to conduct a within-firm and within-product-destination comparison of the effects of large shareholders on export pricing.

To tackle the second challenge — obtaining an exogenous shock to the incentive of large shareholders to differentially affect firms — we exploit a mandatory corporate governance reform in China that aligned incentives of large shareholders with those of minority investors but did not change price-adjustment costs. In April 30, 2005, the state implemented the share-split structure reform, mandating that all public firms convert their non-tradable shares into tradable ones within "a relatively short time."[3]

The major purpose of the reform was to improve corporate governance by providing large shareholders with incentives to care about share prices. Prior to the reform, large shareholders such as governments and legal or natural persons were not allowed to sell their shares in open market transactions. As a result, they had fewer incentives to be concerned about share prices. Following the reform, the ability to liquidate their shares on the stock exchange and thereby realize the gains of stock price appreciation has given the large shareholders incentives to care about share prices, thus increasing their incentives to take costly actions to maximize value for the firm as a whole.

Two competing forces might confound our results. First, non-tradable shareholders might temporally use a helping hand to increase share values in response to trading frenzy (Xiong and Yu, 2011; Cai et al., 2017). Second, the takeover market might become more active after previously non-tradable shares become tradable. One important mechanism, however, mitigates these concerns. Because the reform schedule mandated a lock-up period of two to three years for holders of previously non-tradable shares, short-termist behavior or the threat of takeover was unlikely to drive the change in corporate outcomes around the reform.

Note our empirical strategy does not rely on a simple comparison of export-pricing strategies before and after the reform, which would raise the concern of unobservables

[3]See "China determined to complete stock market reform in short time" (*People's Daily*, June 28, 2005).

affected by the reform, which in turn would affect our outcomes of interest. Rather, our strategy integrates a difference-in-differences design in which we compare pricing strategies before and after the reform across firms in the extent of large shareholders' reform-led incentive alignment. Our cross-firm variation is based on the number of non-tradable shares (as a percentage of total shares) previously held by the largest shareholders prior to the reform.[4] Because the non-tradable ownership structure is pre-determined by the IPO process, the ownership barely changes over the years preceding the reform.

A key assumption of the difference-in-differences framework is that the timing of the reform was exogenous to firms' product pricing. We have two reasons to believe this assumption is reasonable. First, the reform was mandatory. China's Securities Regulatory Commission (CSRC) required all firms to finish reforms between August 2005 and the end of 2006. Firms, especially SOEs, which account for 70% of our sample firms, had limited flexibility in timing the reform, because of interventions from local governments [5] and bureaucracies of the State-Owned Assets Supervision and Administration Commission (SASAC).[6] Second, because the supply of previously non-tradable shares would cause prices of tradable shares to plummet, the success of the reform crucially depended on how non-tradable shareholders compensated for tradable shareholders. The actual timing of the reform depended on the negotiation process between the two groups of shareholders concerning compensation. Non-tradable shareholders need time to communicate with mutual funds and to obtain the necessary votes during the shareholder meeting. These factors affected the reform timing but are exogenous to an exporter's destination-specific pass-through of real exchange rates onto foreign consumers.

[4]In our main analysis, we use the non-tradable ownership before deducting shares that are compensated to tradable shareholders. The reason is that the negotiation outcome for stock compensation might be endogenous to tradable shareholders' expectation about corporate outcomes during the post-reform period. Our results, however, are virtually the same if we use non-tradable ownership after adjusting for share compensations. The two variables have a high correlation of 0.95.

[5]See "Shandong province plans to complete the reform by three batches within six months" (*China Securities Journal*, November 25, 2005).

[6]See "The centralization of Shenzhen SASAC, 18 local public firms are finally approved to take the share-split structure return" (*National Business Daily*, July 20, 2005).

As articulated by Cameron and Triverdi (2008, 2010) and Solon et al. (2015), we weigh regressions using the size of listed firms for several reasons. First, our sample is not a random sample of all exporters in China. Weights are necessary to adjust the sample to represent the entire population of exporters. Second, our main dependent variable is the unit value of exports, not actual prices. Because aggregate trade flows are typically determined by large firms, we weigh regressions by firm size to identify the macro effects of this heterogeneity. Consistent with the reform shaping large firms' product pricing, we also show the reform has mainly addressed the agency problem of large shareholders in large firms. Third, weighted regressions can correct for heteroskedastic error terms.

We first confirm the notion that large shareholders holding more non-tradable shares during the pre-reform period were more incentivized to take firm-value-maximizing actions after the reform (Chen et al., 2012; Liao et al., 2014). Following the reform, listed firms are less expropriated, experience more forced CEO turnovers (conditioning on poor firm performance), and make more capital investments without losing total factor productivity (TFP). Moreover, we find a much stronger effect of the reform on SOEs, consistent with this unique corporate sector in China consuming more shareholder wealth and imposing heavier burdens on economic life during the pre-reform period (Shleifer, 1998; Kornai et al., 2003). For a variety of political reasons, including employment rate and social stability, state-owned large shareholders (e.g., central/local governments) tend to transfer resources from units with better investment opportunities to those with worse opportunities; by contrast, private businesses allocate capital more efficiently exactly because of the high costs of external financing (Ljungqvist et al., 2015). Following the reform, SOEs still have a social objective, but because of the realization of capital gains, they are more incentivized to increase firm value.

Because the customs data end in December 2006, our results should be interpreted with caution. On July 21, 2005, China switched from a fixed to a managed floating-exchange-rate regime, and RMB started to appreciate against the US dollar during the

post-share-split-structure-reform period. The pricing-to-market strategy during the post-period therefore mostly refers to firms cutting producer-currency prices in response to RMB appreciation to avoid losing export volumes.[7]

We carry out the difference-in-differences analysis on the customs-firm matched sample spanning the period of 2000–2006.[8] The sample unit is at the firm-product-destination-year-month level. We estimate regressions with a full set of firm-year-month, destination-year-month, and product-destination dummies. Time-varying unobservables at the firm level, such as productivity, size, and performance, imply large differences in marginal costs and markups. These characteristics, however, can be fully absorbed by firm-year-month fixed effects. Absorbing any systematic variation across destination times allows us to exclude the role of time-varying export demand. Absorbing any systematic variation across product destinations allows us to exclude the role of other time-invariant characteristics at the product-destination level in explaining the differential pricing strategies.

Our data and empirical approach allow us to obtain point estimates of the impact of the share-split structure reform on price elasticities for goods exported by firms whose owners' incentives to care about firm value were differentially stimulated.[9] Because aggregate trade flows are determined by large firms, we weight regressions by firm size to identify the macro effects of this heterogeneity.[10] Unconditionally, we first document a negative elasticity of the producer-currency export price to real-exchange-rate changes, suggesting firms in our sample period priced to market. The estimated elasticity is about

[7]An appreciation of domestic currency might increase the value of exporters' domestic assets, which in turn affects pricing-to-market (Chaney, 2016). However, our difference-in-differences framework fully addresses this concern.

[8]Our results are robust to different specifications of the sample period.

[9]The (real) exchange rate in our paper is defined as the price of the home currency [renminbi (RMB) in China] in units of the foreign currency. A decrease in the exchange rate implies a depreciation of the domestic currency or an appreciation of the destination-market currency. An increase in the exchange rate implies the opposite.

[10]Our main results hold when we equally weigh observations.

-0.14. The number implies a one-unit increase in the real exchange rate leads to a 0.14-unit decrease in export price (in RMB), and vice versa.

Our difference-in-differences estimations yield the following empirical results. The elasticity of export price to exchange-rate changes becomes significantly more negative during the post-reform period and especially for firms heavily owned by non-tradable shareholders. We illustrate the magnitude using the most conservative estimates. Following a 10% real-exchange-rate appreciation, firms, evaluated at the mean, cut producer-currency prices by 1.3% before the reform and 4.6% after. A one-standard-deviation increase in non-tradable ownership leads the firms to cut the price by an extra 1.6%. Estimates from our weighted regressions suggest larger firms absorb more exchange-rate variations in their markups and that the reform has a larger impact on larger firms' product pricing. Our main findings are strikingly robust to alterative weighting schemes and to different sample periods.

The identifying assumption underlying the difference-in-differences framework is that any divergence in the trends of exchange-rate pass-through after the reform is due to the reform itself, and not to other possible concurrent shocks such as foreign demand, monetary policy, or the changing distribution of active exporters. To assess the plausibility of the required identifying assumptions, we show that before the reform, the trends of exchange-rate pass-through of exporters whose large shareholders have more and fewer reform-induced incentives are parallel.

Next, we test whether firms facing exchange-rate appreciations price to market to avoid losing export revenues. The elasticity of the value of exports to changes in the real exchange rate is the sum of price elasticity and volume elasticity (Berman et al., 2012). Following the reform, the elasticity of volume to real exchange-rate changes becomes less negative, and even more positive, in firms with non-tradable ownership concentration. Evaluated at the mean, firm volume is insensitive to exchange-rate changes, which is consistent with lower producer-currency prices offsetting potential losses in

volume. Furthermore, a one-standard-deviation increase in non-tradable shares leads firms to save volume by 4.1% in response to a 10% real-exchange-rate appreciation. Our most conservative estimates suggest the net effects of the reform on export value is 2.5% (4.1% -1.6%). We therefore conclude the pricing-to-market strategy creates value for shareholders in 2005-2006 at least. The results are consistent with firms taking more value-maximizing actions after the reform.

In a further step, we perform the cross-sectional analysis to lend further support to our hypothesis. If costly actions are indeed necessary to implement flexible pricing strategies, and large shareholders with concentrated non-tradable ownership underinvest in these actions, we should observe the effects of reform on product pricing to be more pronounced in product-destination markets where pricing-to-market is costly. Distant, competitive, and newly established markets potentially satisfy the selection criterion. Compared with other markets, actions such as monitoring CEOs, gathering information, and stabilizing customer bases in the presence of switching costs are more costly in these selected markets (Froot and Klemperer, 1989; Drozd and Nosal, 2012). Consistent with our conjecture, the effects of reform on price elasticities are unambiguously stronger in the above markets. Our main findings from the difference-in-differences framework become monotonically weaker as we move from the most distant, most competitive, and newest markets to the least distant, least competitive, and oldest markets.

We also document that following the reform, liquidity-constrained firms with concentrated non-tradable ownership price to market more. Prior literature documents that financial constraint constitutes an importance source of exchange-rate pass-through (Strasser, 2013; Gopinath, 2013; Foley and Manova, 2015; Antràs and Foley, 2015; Shi et al., 2019). Large shareholders reallocate capital within business groups to provide financing at the sacrifice of own investment opportunities; they provide collateral or loan guarantees but bear default risks if the borrower cannot honor debt contracts. Our main findings are driven by exporters that are relatively more in need of external finance. The

effects of the reform on price elasticities monotonically increase the extent to which firms depend on external financing (Rajan and Zingales, 1998).

A. Related Literature

This paper is linked to several strands of literature. The first strand is the literature on the connection between price stickiness, the core of New Keynesian economics, and financial markets. Weber (2015) examines the asset-pricing implications of nominal rigidities and finds firms that adjust product prices earn an equity premium of 4% per year. Gorodnichenko and Weber (2016) show that after monetary-policy announcements, the conditional volatility of stock market returns, as well as company operating income, increases more for firms that cannot freely adjust prices. D'Acunto et al. (2018) find flexible-price firms have a higher long-term financial-leverage ratio than inflexible-price firms. Xie (2019) documents that output-price rigidities impose non-negligible capital-market consequences through affecting firms' persistence of operating income. The literature treats price stickiness as a highly persistent firm characteristic.

Our study explores the causal effect of governance on product pricing. We show the separation of ownership and control constitutes an important source of price stickiness in emerging countries. In this regard, our study is related to D'Acunto et al. (2018). The authors argue that agency problems such as misreporting profits are potentially more severe for firms with rigid prices when bank monitoring is costly, and a positive shock to monitoring technology mitigates credit constraints that sticky-price firms face.

The second strand is the literature on the interaction between corporate finance and firms' pricing strategy. Chevalier (1995a,b), Phillips (1995), Chevalier and Scharfstein (1996), and Pichler et al. (2008), among others, find output prices increase following an increase in firm leverage. Chevalier and Scharfstein (1996) and Dasgupta and Titman (1998) lay out theoretical frameworks for understanding the above stylized facts. Gilchrist et al. (2017) find liquidity-constrained firms increased prices in 2008, while

their unconstrained counterparts cut prices. The authors develop a tractable general equilibrium model to rationalize their findings. The central mechanism behind these studies is that liquidity-constrained firms boost short-run profits to cut their investments in product market shares. The empirical results speak to the managerial myopia arising from financial distress, during which shareholders heavily discount future cash flows. Our paper differs from this strand of literature by emphasizing the agency cost of large shareholders in determining firms' pricing strategy.

2 Hypothesis Development

2.1 Large Shareholders and Share-Split Structure Reform

Our central idea follows the principle that large shareholders, with their control in excess of cash flow rights, might represent their own interests that do not coincide with the interests of other investors, employees, and managers in the firm (Shleifer and Vishny, 1997). Moreover, in many countries with weak institutions of corporate governance, controlling shareholders are de facto decision-makers in the firm, and whether they exert costly efforts to maximize firm value depends on the tradeoff between incentive and entrenchment effects of ownership concentration (La Porta et al., 2002; Claessens et al., 2002).

Before 2005, conflicts of interest among shareholders manifested in a unique form in China. Although tradable and non-tradable shares have the same cash-flow and voting rights, controlling shareholders are not able to sell their shares in open market transactions, which is why they care less about firm value. The split-share reform, by mandatorily converting non-tradable shares into tradable ones, effectively mitigated the conflict of interests between controlling shareholders (holders of previously non-tradable shares) and minority investors (holders of tradable shares). The ability to sell their shares on exchanges and thereby realize capital gains gives controlling shareholders the incentive to exert costly efforts to maximize firm value.

Based on these considerations, we formulate the first hypothesis we bring to the data:

Hypothesis 1: *Following the share-split reform, large shareholders with more pre-existing non-tradable ownership take more actions to maximize firm value than large shareholders with less non-tradable ownership.*

2.2 Large Shareholders and Product Pricing

To implement flexible pricing strategies, large shareholders bear disproportionally higher personal costs than minority shareholders. When they cannot fully realize capital gains resulting from price changes, large shareholders might veto proposals in the support of any price adjustments, even if such a proposal, if carried out, maximizes firm value.

The following question is central to our hypothesis: To implement flexible pricing, what costs are exclusively borne by large shareholders while the benefit accrues to all shareholders of the same company? Before we address this question, we first clarify that any expenses that the firm can reimburse are borne by all shareholders and can be internalized, and large shareholders will have the same incentive as minority shareholders to either veto or support a pricing strategy.

The literature documents that physical costs (menu costs), the absence of long-lasting customer relationships, incomplete information, managerial inattention, and poor financial conditions are channels via which product repricing is constrained. We do not intend to discuss all possible channels or to identify the specific channel at work, because doing so would require us to take a stance on the micro foundation of price stickiness at the firm level, which is still an open question in macroeconomics. Rather, we list these channels to make one point: Except for the physical costs, which can be internalized, large shareholders pay disproportionally higher personal costs to alleviate

the above constraints.[11] Paying these costs is equivalent to providing public goods to benefit all shareholders.

The argument is in line with the notion that small shareholders do not have a big enough stake in the firm to absorb these costs (Shleifer and Vishny, 1986, 1997; Burkart et al., 1997). Large shareholders, by contrast, have exclusive access to technologies to engage with costly activities. Examples of these activities include monitoring CEOs, establishing supplier-customer relationships, and extending financing to firms in distress. If large shareholders are also de faco decision-makers, they suffer disutility from collecting information and making decisions.

To better illustrate the idea, we use several examples in the context of export pricing. First, managerial costs, such as paying attention, gathering information, making decisions, and communicating, constitute an important source of price stickiness (Zbaracki et al., 2004; Mackowiak and Wiederholt, 2009; Ellison et al., 2015). Managers, however, often enjoy quiet lives (Bertrand and Mullainathan, 2003). Large shareholders, by taking a big stake in the firm, monitor management performance, which is costly (Shleifer and Vishny, 1986; Burkart et al., 1997). Closely monitored CEOs work more efficiently and pay more attention to changing environments, which in turn leads product prices to be more flexible.

Second, to implement pricing-to-market strategies, determined by the long-lasting customer relationship, exporters often explicitly build up a highly individualized consumer base (Krugman, 1986; Drozd and Nosal, 2012). Large shareholders, if they are de faco decision-makers, suffer disutility from establishing consumer bases in the destination market. The process of marketing to and bargaining with foreign customers is costly and time consuming. To achieve the same goal, large shareholders could pay monitoring costs to force the CEO to do so.

[11]The physical cost of adjustment, including any monetary expenses paid by all shareholders in proportion to their ownership, can be internalized. If adjustment cost only contains this component, controlling shareholders will have the exact same incentive as minority shareholders to adopt, or to abandon, price flexibilities.

Third, financial constraint constitutes an important source of exchange-rate pass-through (Strasser, 2013; Gopinath, 2013; Chaney, 2016; Shi et al., 2019). Large shareholders could facilitate the firm's borrowing by providing collaterals or loan guarantees, and bearing any risks if the borrower defaults (D'Acunto et al., 2019). Alternatively, owners of business groups could transfer capital from other group members to support the firm in distress (Johnson et al., 2000; Djankov et al., 2008; Jiang et al., 2010); by doing so, they forgo own investment opportunities. Ample evidences suggests large shareholders will only do so if they have enough interests in the firm (La Porta et al., 2002; Claessens et al., 2002). In the Appendix, we develop a simple model that is consistent with the third channel: financial constraints increases firms' marginal costs, which in turn hinders pricing-to-market.

Because the share-split structure reform is orthogonal to the aforementioned costs of adjustments, large shareholders holding more non-tradable shares are more willing to take costly actions (e.g., monitoring, financing, and marketing) during the post-reform period, which causes exporters to price to market more. We therefore aim to test the following second hypothesis in the data.

Hypothesis 2: *Following the share-split reform, firms whose large shareholders hold more non-tradable shares price to market more than firms whose large shareholders hold less.*

3 Institutional Background

In this section, we introduce institutional backgrounds relevant to our empirical setting. In section 3.1, we discuss the background for the split-share structure reform. In section 3.2, we discuss China's exchange-rate regime.

3.1 Split-Share Structure Reform

The opening of the Shanghai Stock Exchange and the Shenzhen Stock Exchange in the early 1990s facilitated the privatization of SOEs. To retain the government's control over the economy, policymakers created a unique ownership structure by splitting total initial public-offering shares into those that are not allowed to be traded, including state and legal shares, and A or B shares that can be freely traded by both domestic and foreign investors.

Under this ownership structure, controlling shareholders' incentives are at odds with those of the minority shareholders, because large shareholders cannot gain security benefits by selling their shares on the stock market. Moreover, such a structure puts public investors in a position inferior to controllers in making investment and dividend policies.

To address the prevailing governance problems, the Chinese government implemented the split-share structure reform. The idea of introducing the reform was, as early as February 2, 2004, addressed in the Several Opinions of the State Council on Promoting the Reform, Liberalization, and Stable Development of the Capital Market (known as the Nine Provisions of the State Council). On April 30, 2005, the CSRC instituted a plan entitled "Directive on Problems in Trying to Solve the Split-Share Structure of Listed Companies." The plan mandated that non-tradable shares be freely tradable. The reform was initiated under regulators' strong determination. After launching two batches of pilot companies within two months, Shang Fulin, chairman of China's Securities Regulatory Commission (CSRC), conveyed through a *People's Daily* news article that China would compete the reform within "a relatively short time."[12] Failing the reform would subject firms to delisting risks.

Four listed companies served as a pilot project, and 42 large corporations were subsequently chosen to undertake the reform. After the two pilot programs, the CSRC

[12]See "China determined to complete stock market reform in short time" (*People's Daily*, June 28, 2005).

submitted the formal plan to the State Council of People's Republic of China, rolling out the reform. According to a *People's Daily* article dated on August 16, 2005, the CSRC warned that it "cannot exclude the possibility that firms that fail to reform will be subject to delisting." The CSRC set the end of 2006 as the target deadline. By July 18, 2007, 84.3% of the 1,250 firms listed on the Shanghai Stock Exchange and the Shenzhen Stock Exchanges had undertaken the reform.

The reform plan mandated a one-year lock-up period for holders of formerly non-tradable stocks. After the expiration of the lock-up period, the holders of non-tradable A shares who held more than 5% of outstanding shares were allowed to sell no more than 5% in the first 12 months and no more than 10% in the first 24 months.

In Figure A.2, we show the timeline of the reform by following Li et al. (2011). We illustrate the general case in Panel A and a case study of Shanghai Baoshan Iron & Steel. We refer to the "post-reform period" as the period after the announcement of the start of the reform.

The reform took place in batches. For firms in the same batch, the announcement of the start of the reform took place on the same day. For each batch, the list of focal firms was publicly announced through the *China Securities Journal*. Individual firms had less flexibility in choosing the timing of reform for several reasons. First, local government coordinated the timing among firms from the same province. Second, SOEs had to apply to the SASAC for approval.

3.2 China's Exchange-Rate Regimes

Before July 2005, China followed a fixed-exchange-rate regime with the RMB pegged to the US dollar. On July 21, 2005, the State Administration of Foreign Exchange launched a movement from a fixed to a managed floating-exchange-rate regime. Under the new regime, based on market supply and demand, exchange rates of RMB against USD were set with reference to a basket of foreign currencies.

Figure A.1 plots the time series of monthly nominal and real exchange rates of RMB against USD from January 2001 through December 2006. Before July 2005, nominal exchange rates between RMB and USD did not change. Nominal rates started to fluctuate only after the regime shift. Real exchange rates, however, had fluctuated over the entire sample period. The increasing trend after July 2005 implies an appreciation of RMB.

4 Data

We use three datasets: the Chinese customs data for Chinese exporters and importers; data on intragroup credit (i.e., related-party transactions), ownership information, and financial data collected from the China Stock Market and Accounting Research (CSMAR) database; and country-level macro data collected from DataStream.

4.1 Customs Data

One of our major data sources is information on Chinese firms that entered into bilateral trade relations with the rest of the world from 2000 to 2006. The data are collected and made available by the Chinese Customs Office. For each monthly transaction, the data report the USD-denominated free-on-board values of firm exports and imports by product and trade partner for 243 destination or source countries and more than 7,500 different products in the 6-digit Harmonized System. The dataset also provides information about the quantities traded in one of 13 different units of measurement (e.g., kilograms, square meters, etc.). In addition, the dataset provides contact information for the firms, types of enterprises, and customs regimes.

To match the customs data with public firms, we manually match the firm names in the administrative customs data with the names of public firms and their subsidiaries in the CSMAR database. During the 2000-2006 period, among the 277,595 distinct names for exporting or importing firms that appear in the customs dataset, we identify 247 publicly

listed firms that export directly or through 764 exporting subsidiaries. The number of export-related firms is about 50% of the total number of firms listed on Shanghai and Shenzhen Stock Exchanges during our sample period.

4.2 Intragroup Trade Credit

To track the direction and amount of intragroup financing provided by public firms to related parties, we rely on highly disaggregated related-party transaction data. Chinese public companies have been required to disclose related-party transactions since 1997. Most firms report in a special footnote to their financial statements the identity of their related parties, the relation with these parties (e.g., percentage of shares held), and the types and amounts of related-party transactions.

The advantage of China's mandatory disclosure of related-party transactions is that public firms must break out any transactions involving related parties at a highly granular level. Although the borrowing and lending activities among related parties occur on a daily basis, Chinese public firms are required to report financing provided to each related party at an annual frequency. As a result, we observe the outstanding balance of intragroup receivables between a public firm and each of its related parties.

4.3 Non-tradable Shares and Financial Data

We use the share-split structure-reform database from CSMAR, which provides detailed characteristics for firms embarking on the reform agenda, to obtain the non-tradable shares held by individual large shareholders six months before the reform announcement. We calculate non-tradable ownership as the number of non-tradable shares divided by the total number of shares.

We also collect financial and stock price data from the CSMAR: total assets, total liabilities, net income, monthly and daily stock prices, total tradable shares outstanding, distress identification (coded as "ST" firms), and cross-listing information.

5 Share-Split Structure Reform and Large Shareholders

In this section, we demonstrate that the share-split structure reform stimulates large shareholders' incentive to maximize firm value, which manifested in multiple dimensions.

5.1 Regression Specification

Our sample firms are public firms that export either directly or through their subsidiaries. We use the following difference-in-differences regression framework.

$$Outcome_{i,t} = \alpha + \beta \times Nontrade\%_i \times Post_{i,t} + \gamma \times X_{i,t} + \theta_i + \theta_t + v_{i,t}, \tag{1}$$

where $Nontrade\%_i$ is the number of non-tradable shares (as a percentage of total shares) held by the three largest shareholders six months prior to the announcement of the reform. $Nontrade\%_i$ is time invariant and fully absorbed by firm fixed effects in equation 1. $X_{i,t}$ is a vector of characteristics for public firm i. These observables are the size of public firms (total assets), the long-term debt ratio, cash holdings, an "ST" dummy indicating whether the firm is in distress, and a "BH" dummy indicating whether the firm is cross-listed in the B- or H-share market. We control for year fixed effects (θ_t) to rule out the role of time trends. We also control for firm fixed effects (θ_i) to control for time-invariant unobservables. We cluster standard errors at the industry level.

We employ several corporate outcomes to test whether holders of previously non-tradable shares take value-maximizing actions. The first outcome is inter-corporate loans, measured as "net other receivables" (scaled by firm assets) collected from the related- party transaction database. Net other receivables are the difference between the outstanding balance of "other receivables" and "other payables." Consistent with ample anecdotes, Jiang et al. (2010) show controlling shareholders used intercorporate loans to

siphon billions of RMB from hundreds of Chinese listed companies during the 1996 – 2006 period.[13]

The second peculiar form of intragroup financing is "camouflaged" by the ordinary-course-of-business transactions. It is calculated from the related-party transaction database as the sum of the differences between accounts receivable and payable, between notes receivable and payable, between accounts prepaid and advances, and between profits receivable and payable. Ljungqvist et al. (2015) find SOEs misallocate capital using this type of intragroup financing to maximize social objectives.

The third is cash dividends scaled by sales. Contrary to conventional wisdom, anecdotes and academics have reported that prior to the reform, non-tradable shareholders exploited the dividend policy to retrieve cash from the firm as a way to liquidate their shares. Lee and Xiao (2004) argue cash dividends had been a vehicle for tunneling in SOEs.[14] Chen et al. (2003) use the case Foshan Electrical and Lighting Co. Ltd (stock code: 000541) to confirm the phenomenon of "tunneling dividends."

The fourth is the likelihood of forced CEO turnover for reasons other than tenure expiration, retirement, personal health, and job transfer. If the concentration of non-tradable ownership is associated with the tolerance of slack and inefficiency during the pre-reform period, we will observe more frequent forced CEO turnover in such firms after the reform, especially when firm performance is poor. In Table A.1, we form two subsamples stratified by whether the annualized stock return or the return on total assets (ROA) over the previous year is high or low.

The fifth is capital expenditure scaled by assets. Because the reform is exogenous to firms' investment opportunities, any increase in capital investments during the post-reform period speaks to bad governance during the pre-reform period: the entrenchment

[13]According to Jiang et al. (2010), these loans are found in the balance sheets of a majority of Chinese firms and collectively represent a large portion of their assets and market values.

[14]The authors show SOEs have a high propensity to pay cash dividends but a low propensity to subscribe rights offerings, and SOEs often increase cash dividend payments soon after rights offerings.

of non-tradable shareholders, the capital misallocation within the business group, and firm financial constraints.

The last is the TFP. We use it to measure efficiencies and to infer whether firms overinvestment or underinvest in capitals following the reform.

5.2 Empirical Findings

Table 1 presents descriptive statistics for characteristics of export-related firms on the sample period of 2000 – 2009.[15] By manually matching the customs data with CSMAR, we include firms in the sample if they either export directly or through subsidiaries. Seventy percent of our sample firms are SOEs. Figure 1 presents the distribution of export-related firms over reform months. The figure shows the share-split structure reform was concentrated between late 2005 and early 2006.

In Figure 3, we first show the non-tradable ownership barely changes in the years leading up to the reform. The pattern is consistent with the exogenous determination of the ownership structure for Chinese public firms during the IPO process, and the trading restrictions on non-tradable shareholders before and after the reform effectively precluding adjustments to changes in the economic environment (Chen et al., 2012).[16]

Table 2 presents the estimation results. Following the reform, firms with more concentrated non-tradable ownership provide less financing to related parties, pay out less in cash dividends, experience more frequent forced CEO turnovers, and invest more in capital. To attest to the heterogeneous effects of the reform on SOEs versus non-SOEs, we also perform the analysis on two subsamples stratified by firms' SOE status.

Our findings are consistent with the reform affecting SOEs and non-SOEs through different channels (Chen et al., 2012). First, both SOEs and non-SOEs refrain from using inter-corporate loans to finance related parties. Second, SOEs decrease

[15] We include three years before and three years after the reform to carry out the difference-in-differences design. Our results are not materially altered if we specify other sample periods.

[16] After the non-tradable shares are converted into tradable ones, non-tradable shareholders were still subject to lock-up period and trading restrictions on the selling of non-tradable shares.

intragroup financing disguised by ordinary-course-of-business transactions, whereas non-SOEs increase such financing slightly more. Third, only SOEs decrease cash dividends, despite an increase in the payout ratio. Fourth, SOEs experience significantly higher forced CEO turnovers. In Table A.1, we further show frequent turnovers are mainly driven by firms with poor stock market and accounting performances. Fifth, SOEs invest more in capital expenditures, whereas non-SOEs cut capital investment. Sixth, although SOEs do not experience changes in TFPs, non-SOEs experience sizeable increases in TFPs. Our findings are consistent with SOE owners misallocating more resources to maximize social objectives (Shleifer, 1998; Kornai et al., 2003; Allen et al., 2005).[17] By contrast, large shareholders of non-SOEs decrease overinvestment and improve efficiencies.

To illustrate economic magnitude, we first hold the non-tradable ownership at the mean. Following the reform, SOEs cut other receivables and normal credit by 2.3% and 1.7% of total assets, respectively, implying a 4% savings in corporate assets. Meanwhile, firms cut cash dividends by 2.1% of sales revenues. Firms also experience a 14-percentage-point increase in CEO turnover — approximately 72% of a standard deviation. In addition, firms also increase capital expenditures by 5.3% of assets without losing TFPs. We next compare outcomes before and after the reform across firms by increasing a one standard deviation of *Nontrade%* from the mean. In the post-reform period, a one-standard-deviation increase in *Nontrade%* leads SOEs to cut other net receivables by 0.6% of assets, to cut normal receivables by 0.4% of assets, to experience a 7.7-percentage-point increase in CEO turnover, and to increase capital investment by 0.8% of total assets without losing TFPs.

In Figure 4, we select several outcomes for SOEs to assess whether the trends in tunneling and CEO turnover are parallel across firms in years before the announcement of reform.

[17]Ljungqvist et al. (2015) find that although private groups allocate more capital to units with better investment opportunities, state groups do the opposite. Zhu (2018) finds resource allocation within a business group of SOEs internalizes the government's political goal of maintaining social stability at a cost to shareholder value.

6 Large Shareholders and Pricing-to-Market

Section 6.1 presents descriptive statistics on the customs-firm matched sample. Section 6.2 discusses the difference-in-differences framework. Section 6.3 reports the main findings. Section 6.4 reports results from robustness checks. Section 6.5 assesses the pre-tend assumption. Sections 6.6, 6.7, and 6.8 perform several cross-sectional analyses.

6.1 Descriptive Statistics

Table 3 presents descriptive statistics for the customs-firm data matched sample from January 2000 through December 2006. In Panel A, we report summary statistics for export-related metrics at the firm-product-destination-year-month level. In Panel B, we report summary statistics at the level of exporters. Our sample contains 1,011 exporters, among which 247 are publicly listed firms and 764 are exporting subsidiaries owned by public firms. The average exporter exports 94 different products to 14 destinations, enters into 243 narrowly defined markets at the destination-product level, and is hit by 218 different exchange-rate shocks that vary both across destinations and over time. In Panel C, we compare export-related metrics between public firms and their exporting subsidiaries.

Panel A of Table 4 presents descriptive statistics across trade categories. Panel B of Table 4 presents statistics for the top 10 products based on export values. Figure 2 describes the spatial distribution of export value. The unit in the map is destination/country. The darker a country, the higher the US dollar amount of value the country purchased from our sample firms.

6.2 Regression Framework

Our baseline specification is based on the framework laid out by (Knetter, 1989, 1993), in which a single exporter maximizes profit in producer-currency units, and import demand depends on the local currency price in the destination market.

We propose a difference-in-differences framework to compare price elasticities (e(p)), measured at the firm-product-destination-year-month level, before and after a listed firm announced the reform and across firms whose largest shareholders are differentially incentivized to care about share values. The double differences we aim to assess are therefore as follows:

$$[e(p_{H,\text{after}}) - e(p_{H,\text{before}})] - [e(p_{L,\text{after}}) - e(p_{L,\text{before}})]. \tag{2}$$

To implement this empirical strategy, we outlay the regression model using the following specification, where our coefficient of interest is β_2:

$$\begin{aligned} ln(p_{i,p,d,s}) = \alpha + \beta_1 \cdot ln(RER_{s,d}) + \beta_2 \cdot ln(RER_{s,d}) \times Post_{i,t} \times Nontrade\%_i + \\ \beta_3 \cdot ln(RER_{s,d}) \times Post_{i,t} + \beta_4 \cdot ln(RER_{s,d}) \times Nontrade\%_i \\ + \beta_5 \cdot Nontrade\%_i \times Post_{i,t} + \beta_6 \cdot Post_{i,t} + \beta_7 \cdot Nontrade\%_i \\ + \gamma \times Z + \epsilon_{i,p,d,s}. \end{aligned} \tag{3}$$

$ln(p_{i,p,d,s})$ is the logarithm of the RMB price of good p exported by firm i to destination d as of year-month s. The Chinese Customs Office reports the f.o.b. value of exports in USD. We convert the currency for value per unit into RMB.[18]

The right side of equation 3 contains several sets of variables. The first set includes our main independent variables of interest: the logarithm of the real exchange rate ($ln(RER_{s,d})$), a dummy indicating whether a firm i has passed the reform as of year-month s ($Post_{i,s}$), the amount of non-tradable shares the three largest shareholders hold six

[18] See Manova and Zhang (2012) for similar discussions.

months prior to the reform ($Nontrade_{i,t}$), and several interactions between the three variables.

The real exchange rate of destination country d as of year-month s is defined as

$$RER_{s,d} = ER_{s,d} \times CPI_s / CPI_{s,d}. \tag{4}$$

$ER_{s,d}$ is the nominal exchange rate defined as the price of the domestic currency (RMB) in terms of the foreign currency of country d as of month s.[19] Therefore, an increase in $ER_{s,d}$ implies an appreciation of the RMB. CPI_s and $CPI_{s,d}$ represent the monthly consumer price index of China and that of the corresponding destination country d, respectively.

Z is a full set of firm-year-month, destination-year-month, and product-destination dummies. Firm-year-month (Firm×Time) fixed effects absorb time-varying unobservables at the firm level. Destination-year-month (Dest×Time) fixed effects absorb time-varying demand from the destination country. Product-destination (Prod×Dest) fixed effects absorb time-invariant characteristics, such as the marginal cost and distribution cost, at the product-destination level. We cluster standard errors at the product-destination levels. Our results are robust to the clustering of standard errors at the firm, destination, or both product-destination and year-month levels.

The majority of public firms export through subsidiaries so that we include these exports. One concern is that large shareholders might have neither direct influence nor enough interest to intervene with pricing strategies made by subsidiaries. Our data, however, suggest the opposite. Listed firms own an average of 90% of exporting subsidiaries, whose day-to-day operations are likely directed by the parent company. In addition, financial statements of subsidiaries and listed parents are consolidated.

[19] For example, $ER_{s,\text{US}}$ was 0.125 in 2006; that is, one Chinese RMB was worth 0.125 USD in 2006.

6.3 Baseline Results

Table 5 reports the difference-in-differences estimates of the effect of reform on the elasticity of export price to real-exchange-rate fluctuations. We weigh observations using the public firm's lagged total assets. In column (1), we verify the phenomenon of pricing-to-market without differentiating the reform-led incentive alignment. Following a one-unit appreciation (depreciation) of the exchange rate, an exporter cuts (raises) the export price (in RMB) by 0.14 units, implying a price elasticity of -0.14. The interaction term of *ln(ERE)* $\times$ *Post* is zero, suggesting firms, on average, do not price to market more after the reform.

In columns (2)-(4), we compare price elasticities before and after the reform across firms by varying the percentage of shares owned by the largest non-tradable shareholders six months prior to the reform announcement. The three-way interaction *ln(ERE)* $\times$ *Post* $\times$ *Nontrade%* is strongly negative. Evaluated at the mean, a firm cuts (raises) export prices by 0.16 units in response to a one-unit appreciation (depreciation) of the exchange rate before the reform; the firm cuts (raises) export prices by 0.164 units after the reform, confirming the notion that the reform, on average, does not change the extent to which firms price to market. Note that firms with concentrated ownership price to market more, as evidenced by the negative interaction term *ln(ERE)* $\times$ *Nontrade%*. The results, however, do not contradict our prediction in the sense that ownership concentration is endogenously determined, which in turn reveals a firm's fundamental (Leland and Pyle, 1977).

Following the reform, however, a one-standard-deviation increase in *Nontrade%* is associated with an extra 0.016-unit adjustment of the producer-currency price — approximately 11.4% of the unconditional price elasticity (0.016/0.14=11.4%). In column (3), we further exploit variations within destination-year-month. The size of the coefficient for the triple interaction increases to -0.134. In terms of economic magnitude, a one-standard-deviation increase in *Nontrade%* is associated with an extra 0.018-unit

(0.134 × 0.134) price adjustment — about 13% of the unconditional price elasticity. In column (4), we further exploit variations within firm-year-month. We show the estimated magnitude of the three-way interaction becomes -0.186, and a one-standard-deviation increase in *Nontrade%* is associated with a 17.8% increase in elasticity.

In columns (5)-(8), we compare price elasticities before and after the reform between treated and control subsamples stratified by whether the top three non-tradable shareholders own more than 50% of the (treated) shares or not (control). We again document a sizable effect of the reform on the difference in price elasticities across the two groups during the post-period. Following a one-unit exchange-rate appreciation (depreciation), firms in the control group adjust prices by 0.121 units, whereas firms in the treated group adjust by 0.138 units. After the reform, treated firms adjust prices by an extra 0.034 units in response to a one-unit change in the real exchange rate — approximately 24% of the unconditional elasticity as reported in column (1). The economic size of the estimated coefficients again increases with the extent to which we restrict our regression specifications. In column (7), treated firms adjust prices by an extra 0.054 units, which is about 38.5% of the unconditional elasticity.

We next evaluate whether the effect of reform on the elasticity of export value is consistent with exporters pricing to market to stabilize producer-currency profits. However, we cannot evaluate the value sensitivity by isolating price from volume. The heterogeneous pricing-to-market logically generates heterogeneous reactions of export volumes to a real depreciation of the exchange rate. The higher the price elasticity to exchange-rate movements, the lower the export volume elasticity to the same exchange-rate movement. The net effect is the sum of price and volume elasticities (Berman et al., 2012).

In Table 6, we report estimates for the volume elasticity to real exchange rates. In line with testable predictions (to be presented in Section A.1), for all specifications, the elasticity of the volume to a real-exchange-rate change increases with *Nontrade%*.

After the reform, a one-standard-deviation increase in *Nontrade%* increases the volume elasticity by 0.040, and the economic magnitude barely changes as the regression specification becomes more restrictive. In columns (4)-(6), treated firms experience a 0.065 increase in volume elasticity during the post-reform period.

Note that China's share-split reform is accompanied by its exchange-rate reform. Starting in August 2005, RMB gradually appreciated against the US dollar. Pricing-to-market during the post-reform period mainly refers to the phenomenon in which exporters cut producer-currency prices in response to real exchange-rate appreciations to avoid a loss of revenues. Indeed, we show the sum of price and volume elasticities is modestly positive, consistent with large shareholders' preference during the post-reform period.

6.4 Robustness

In Table 6.4, we show our results are robust to a broad array of checks. For simplicity, we only report two coefficients that are relevant to the difference-in-differences framework: the triple interaction and the $Post \times Nontrade$.

In Panel A, we perform equal-weighted regressions. Results stay statistically significant, but the size of the estimated effects becomes smaller relative to the baseline analysis, suggesting large firms are important.

Our dependent variable is the unit value of exports at the level of firm-product-destination-year-month level (sample unit). The number of bilateral transactions for product p to destination d undertaken by firm i in year-month s varies across sample units. In Panel B, we therefore weigh observations by the square root of the number of bilateral transactions in each sample unit.[20]

In Panels C and D, we weigh observations using two alternative measures for firm

[20]Our main left-hand side variable is not calculated as the mean of unit values across bilateral transactions within a sample unit. Rather, our main dependent variable is the sum of export revenues across bilateral transactions within a sample unit scaled by the sum of quantities across these transactions. To this extent, weighting observations by the square root of the number of transactions in each sample unit does not yield efficient and consistent standard errors.

size, that is, public firms' sales revenues and total market capitalization, both of which are lagged by one year. The size of the estimated effects is close to that in the baseline analysis.

In Panel E, we restrict our sample period to 2004–2006 to allow most firms to have one year before and one year after the reform. In other words, we compare pricing strategies during the post-reform period with the strategies immediately before the reform. Our results are essentially the same.

In Panel F, we include only destination countries that are OECD members. Most OECD members are high-income economies and are regarded as developed countries, which enjoy the most economic freedom. In addition, exports to these countries account for 70% of our sample. If anything, large shareholders should care more about these markets. As Panel E shows, the main findings essentially come from exports to the OECD countries.

The supply of previously non-tradable shares would cause prices of tradable shares to plummet. To pass the reform, non-tradable shareholders normally compensate tradable shareholders with gift shares. In our main analysis, we use the pre-existing non-tradable ownership before the adjustment for compensation. The reason is that the negotiation outcome could be endogenous to tradable shareholders' expectation about corporate outcomes during the post-reform period.

In Panel G, we take into consideration the fact that after the reform, the stock compensation granted to tradeable shareholders effectively reduces non-tradable shareholders' ownership, and the ownership before the reform might not well represent these large shareholders' incentive during the post-reform period. Ownerships before and after the reform are highly correlated at 0.95. We show in Panel F that our main findings are not materially altered.

6.5 Parallel-Trends Assumption

A necessary condition for identification is the *parallel-trends* assumption, which states that the evolution of exchange-rate pass-through of treated and controlled exporters would have followed common trends before and after the share-split structure reform, had the reform not happened. The potential outcome absent the reform is unobservable, and hence we cannot test this assumption directly. However, we can assess the extent to which the trends of pass-through across the two groups are parallel before the reform. If we are convinced that the pre-trends are parallel, our identifying assumption would be that any divergence in the trends after the reform is due to the reform itself, and not to other possible concurrent shocks. Under this identifying assumption, the evolution of pass-through of controlled firms represents a valid counterfactual to the evolution of pass-through of treated firms had they not been exposed to the reform.

Figure 5 proposes a visual assessment for whether the trends in exchange-rate pass-through are parallel across treated and controlled exporters in the months before the announcement of reform. In the 12-month window prior to and after the event, we estimate the following linear specification. We divide the 24-month period into 12 bins, with each bin spanning two months. We estimate the regression on each bin and plot the estimated coefficients ($\hat{\beta}_2$) and the 90% confidence intervals.

$$ln(p_{i,p,d,s}) = \alpha + \beta_1 \cdot ln(RER_{s,d}) + \beta_2 \cdot ln(RER_{s,d}) \times Nontrade\%_i + \kappa \times Z + \epsilon_{i,p,d,s}. \quad (5)$$

We fail to reject the null hypothesis that the estimated $\hat{\beta}_2$ are equal prior to the reform. All the estimated coefficients within the two years before the reform are insignificantly different from zero, which decreases the likelihood that pre-trends drive our result.

6.6 Adjustment Costs

We test whether treated firms more actively adjust producer-currency prices during the post-period in product-destination markets in which flexible pricing strategies are costlier to implement. We use three simple and intuitive measures to proxy for real resource costs. More specifically, we construct subsamples stratified by whether a narrowly defined market is distant, competitive, or young. To implement pricing-to-market strategies, exporters in these markets bear more costs to gather information, to build up customer relationships, and to overcome switching costs. If large shareholders indeed bear a disproportionally higher portion of these costs, our main findings should mainly apply to these product-destination markets.

Table 8 shows how our main findings vary across product-destination markets. In Panel A, we present regression results by varying the travel distance (in 1,000 miles) from the listed firm to the capital city of the destination country. For each sample unit, we unfortunately do not have information about the location of the destination country. Our measurement, however, does not necessarily bias our estimations. The distance measure here describes the cost a decision-maker incurs to pay attention to the local markets, to investigate the changing local environment, and to collect relevant information. If large shareholders are decision-makers, they suffer from disutility from collecting information and building customer bases in these markets. If, however, managers take these actions on behalf of all shareholders, large shareholders pay monitoring costs.

We form four subsamples based on whether the travel distance falls into the following four intervals: (0, 1k], (1k, 3k], (3k, 5k], and (5k, +]. As Panel A shows, the magnitude of the triple interaction monotonically declines as we move from the farthest to the closest destination-product markets. Our results are also insensitive to alternative cutoffs to define the intervals.

In Panel B, we estimate the heterogeneous pricing-to-market conditioning on the Herfindahl-Hirschman Index (HHI) of each destination-product market. We calculate

the HHI index using the value of exports for the entire population of Chinese exporters included in the customs data. We then form four subsamples based on whether the value of HHI falls into the following four intervals: (0, 0.1], (0.1, 0.25], (0.25, 0.5], and (0.5, 1]. The competitiveness of the destination-product market monotonically declines with the degree of market concentration (HHI). One limitation of the measure is that it only provides information on the competition among Chinese exporters selling the same product to the same destination, not the competition among exporters from different countries.

As columns (1)-(4) in Panel B show, the size of the triple interaction monotonically decreases with the level of market concentration. In the most competitive market (e.g., HHI is less than 10%), a one-standard-deviation increase in Nontrade% is associated with a 0.041 (-0.309 $\times$ 0.134) increase in the magnitude of price elasticity during the post-reform period. In the least competitive market, however, price elasticities barely change across firms and over time. Columns (5)-(8) of Table 8 reveal the same pattern.

In Panel C, we test whether the heterogeneous pricing-to-market varies across the time elapsed since the firm exported a product to a destination for the first time. We form subsamples stratified by the time distances between the first month in which product p was exported to destination d by firm i and the current year-month s in which the export of the same product to the same destination is observed. Four subsamples are stratified based on whether the export history is shorter than one year, greater than one year but shorter than two years, greater than two years but shorter than four years, and greater than four years.

As Panel C of columns (1)-(4) indicates, the size of the three-way interaction monotonically decreases with the length of product history, suggesting firms owned by larger non-tradable shareholders price younger products to market more than before. We confirm our findings in columns (5)-(8) by comparing price elasticities before and after the reform across the treated and control groups.

In sum, the results in Table 8 strongly support the hypothesis that the sensitivity of export prices to real- exchange-rate changes is mostly changed in markets where the firm has to take costlier actions to implement the pricing-to-market strategies.

6.7 Financial Dependence

Chor and Manova (2012) and Manova (2013) highlight that industries that are heavily dependent on external financing disproportionally benefit from financial reforms. In a similar vein, we attempt to uncover systematic patterns across firms that differentially rely on external financing. Following the share-split structure reform, large shareholders refrain from tunneling resources out of listed firms to finance other firms. The purpose of doing so is not necessarily to improve price flexibility.[21] However, the fact that firms price to market more could be an unintended consequence of the reform.

To measure firms' reliance on external financing, we use the fraction of capital expenditure not financed by operating cash flows (*EXFIN*). Using data on all publicly traded firms in Compustat North America, Rajan and Zingales (1998) construct industry-level *EXFIN* to proxy for the degree of financial dependence of the same industry in countries outside the US.

For several reasons, we use the financial data of our sample firms to construct firm-level *EXFIN*. First, a US industry's *EXFIN* might not be a good proxy for the long-term need for external finance of the same Chinese industry. The reason is that governmental policies play an important role in allocating financial resources across firms domiciled in China. Second, the Chinese SEC uses an industry classification system that is different from either the Standard Industrial Classification (SIC) or the North American Industry Classification System (NAICS). Any concordances between the two classification systems contain non-negligible measurement errors. Third, many industries cover only several

[21] Lin et al. (2011) find the shadow value of external funds is significantly higher for companies with a wider insider control-ownership divergence, suggesting that companies whose corporate insiders have larger excess control rights are more financially constrained.

newly listed firms, making matching the Rajan-Zingales measure to firms listed in China difficult.

Table 9 presents the estimation results. In each year, we rank firms based on their *EXFIN* in the previous year. We then form four subsamples stratified by the four quintiles of the distribution of the value of *EXFIN*. Firms in the fourth and first quantiles are the most and least financially constrained. Following the reform, firms owned more by non-tradable shareholders price to market more if they are more in need of external finance.

6.8 SOEs vs. Non-SOEs

In this subsection, we compare the effects of share-split structure reform on pricing-to-market between SOEs and non-SOEs. Our results in Table 2 indicate the reform mainly stimulates the incentive of SOE large shareholders to take costly actions to improve firm value.

Table 10 reports the difference-in-differences estimates from the weighted regressions on the two subsamples stratified by exporters' SOE status. In line with the results in Table 2, we confirm our main findings are driven by SOE firms.

We find even non-SOEs did not price to market in our sample period. Although understanding the heterogeneous responses of firms with different ownership types is beyond the scope of this paper, the finding that SOEs and non-SOEs differ in the extent of pricing-to-market is interesting. Assuming constant and additive distribution costs of exports that are paid in local currency, Berman et al. (2012) show the markup increases in productivity. A depreciation reduces demand elasticity and increases firms' markup, but more so for more productive firms. In line with the above mechanism, our untabulated statistics show SOEs have higher productivity and markups.

We also reexamine the results in Table 9 and 8 by excluding non-SOEs. We confirm our findings in the cross-sectional analysis also driven by SOEs.

7 Conclusion

In this paper, we exploit an ownership-structure reform that constitutes an exogenous shock differentially stimulating large shareholders' incentives to take costly actions to maximize the value of listed firms. We examine whether exporters tend to stabilize producer-currency export prices in response to exchange-rate changes. Our difference-in-differences estimation results show that compared with otherwise similar exporters, those with large shareholders better aligned in incentive more actively adjust RMB export prices in response to exchange-rate movements in the destination currency. Our results suggest the conflict of interest among shareholders is an important source of price stickiness in emerging markets.

Our proposed mechanism, if verified, also applies to the typical agency problem for a Berle-Means modern corporation in which a professional manager is unaccountable to shareholders (Jensen and Meckling, 1977). As long as they bear personal costs to adjust product prices, managers might not have sufficient incentive to implement flexible pricing strategies. Indeed, managerial inefficiencies and inattention constitute an important source of friction that hinders product repricing (Zbaracki et al., 2004). In countries like the US, corporations are widely held by small investors, and managers are less monitored in the absence of large shareholders. To further evaluate the importance of this issue, an examination of the impact of external governance on price stickiness would be interesting. For example, would price adjustments become less frequent when managers are insulated from takeovers? Examining this issue is important to understand the real effect of monetary policy on the real economy and how such an effect varies across managerial characteristics, across publicly and privately owned firms, across geographical regions, and across historical episodes.

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Figure 1: **Distribution of Export-Related Firms over Reform Months**

This chart plots the distribution of export-related firms over calender months in which they made reform annoucements.

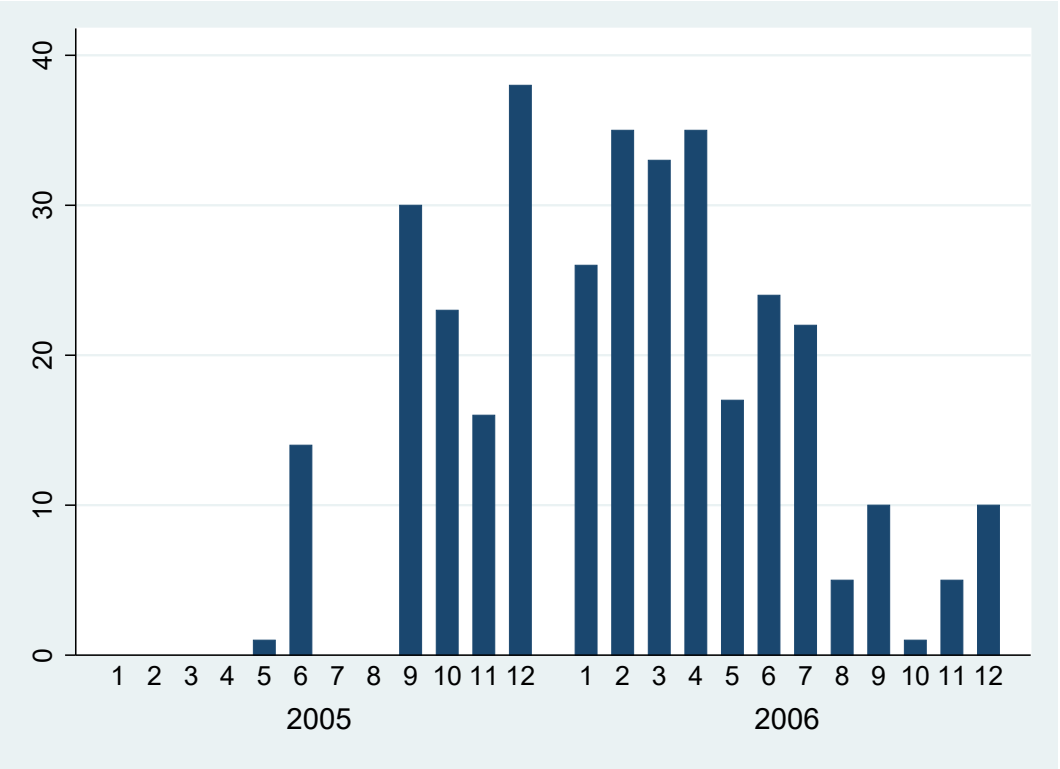


Figure 2: **Distribution of Export Value across Destinations**

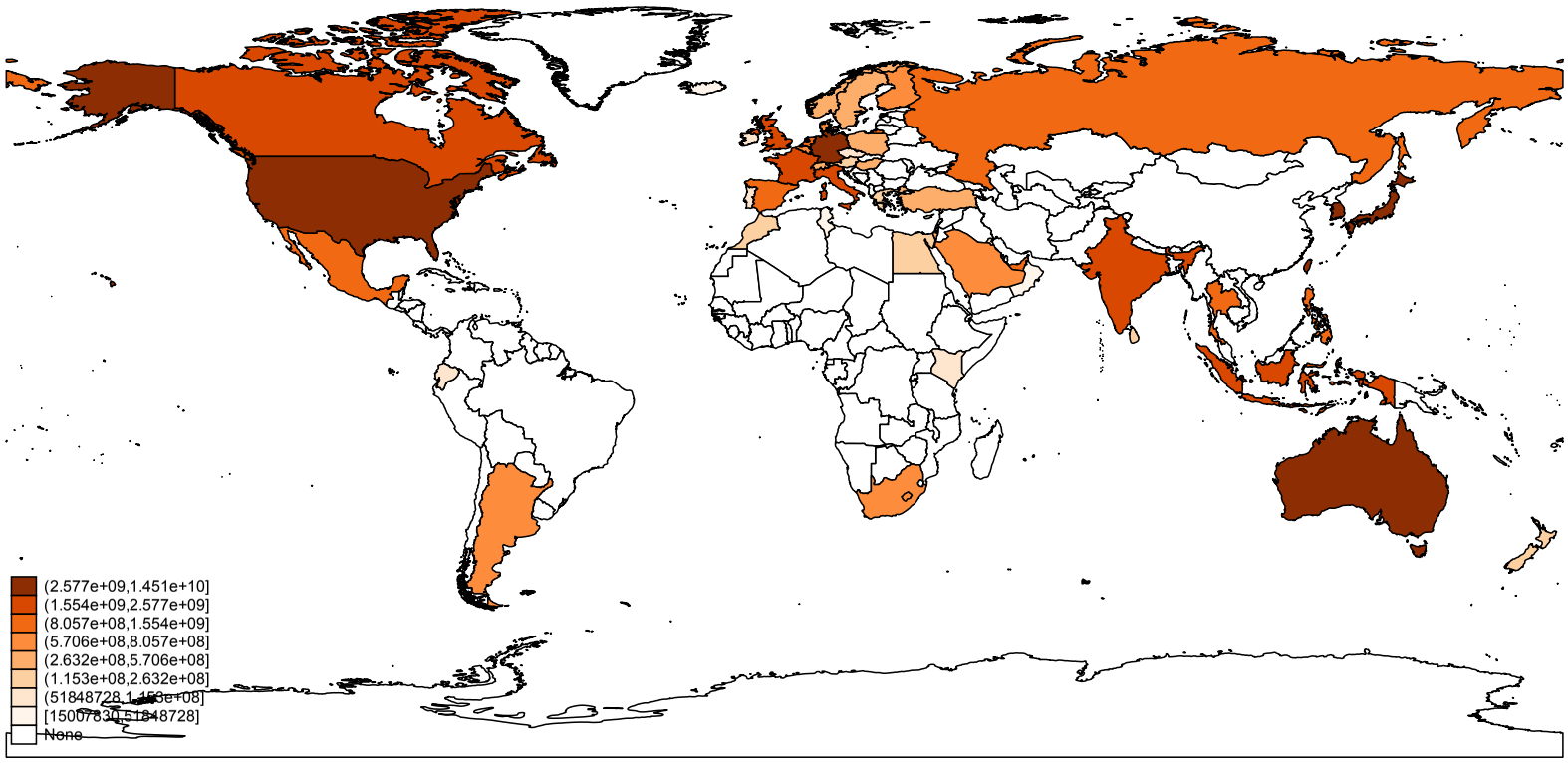


Figure 3: **Non-tradable Ownership around the Share-Split Structure Reform**

The chart plots the mean of non-tradable ownership and the 90% confidence intervals over the window of [-5, +5] years relative to the year in which firms announce the reform.

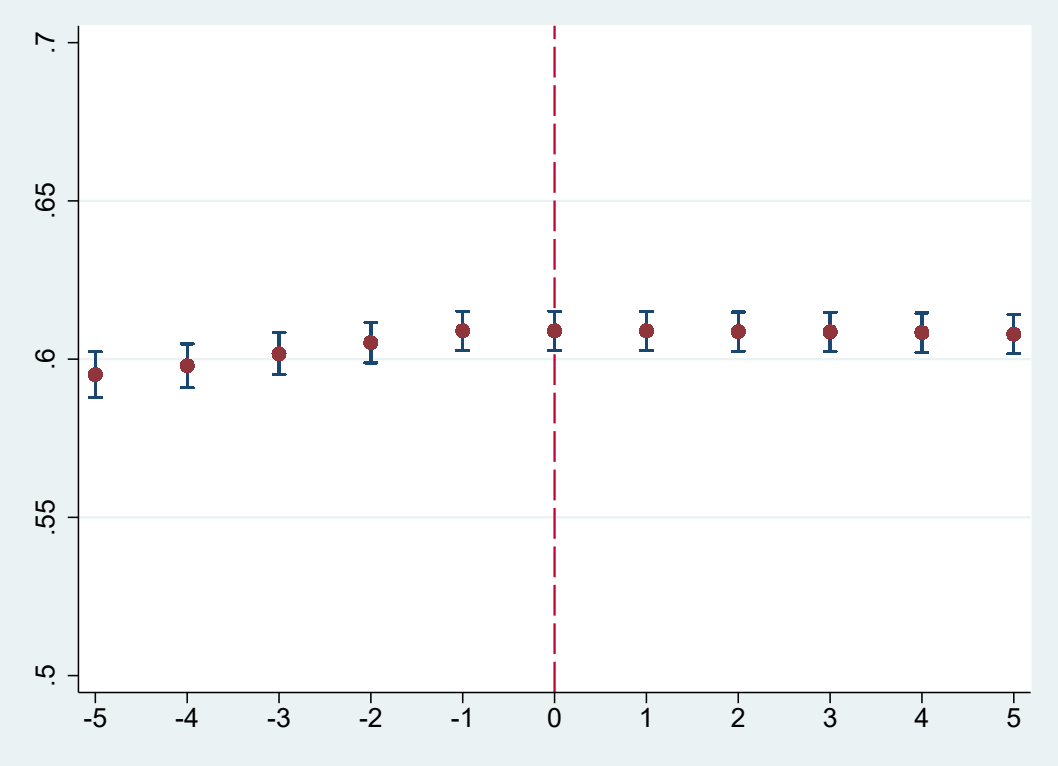


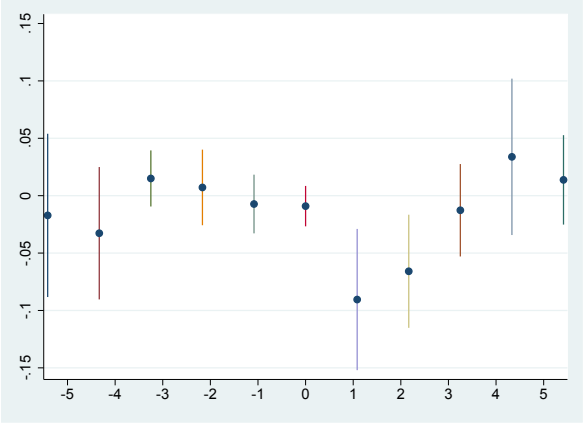
Figure 4: **Parallel Trends Assumption: Firm Outcomes around the Reform**

The chart plots the estimates of β and the 90% confidence intervals as in the following equation separately for each year over the window of [-5, +5] years relative to the year in which firms announce the share-split structure reform. The sample includes SOE listed firms that either export directly or through subsidiaries on the sample period of 2000-2006. In each event year, we estimate the following equation which is weighted by lagged firm assets:

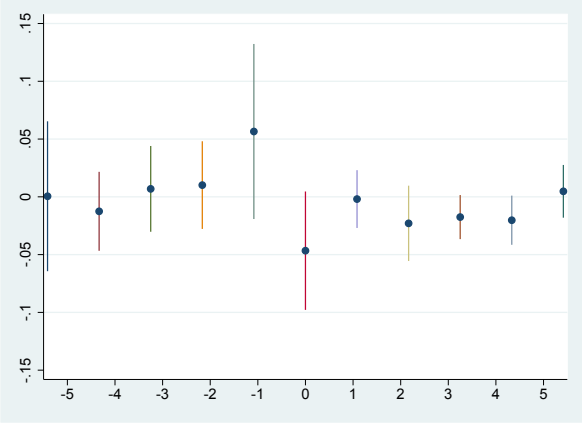
$$\text{Outcome}_{i,t} = \alpha + \beta \times Nontrade\%_i + \gamma \times X_{i,t} + \theta_t + v_{i,t},$$

In Panel A, the dependent variable is net other receivable. Net other receivable is the difference between the outstanding balance of "other receivable" and "other payable." In Panel B, the dependent variable is the sum of the differences between the outstanding balance of "accounts receivable" and "accounts payable," between "notes receivable" and "notes payable," between "accounts prepaid" and "accounts advances," and between "profits receivable" and "profits payable." Both other receives/other payables and normal receivables/payables are scaled by total assets and only include trade credit between public firms and related parties. In Panel C, the dependent variable is the amount of cash dividends scaled by sales (Payout%). In Panel D, CEO Turnover is an indicator variable coded as 1 if the firm experienced CEO departure for reasons other than tenure expiration, retirement, personal health and job transfer. Standard errors are clustered at the industry level.

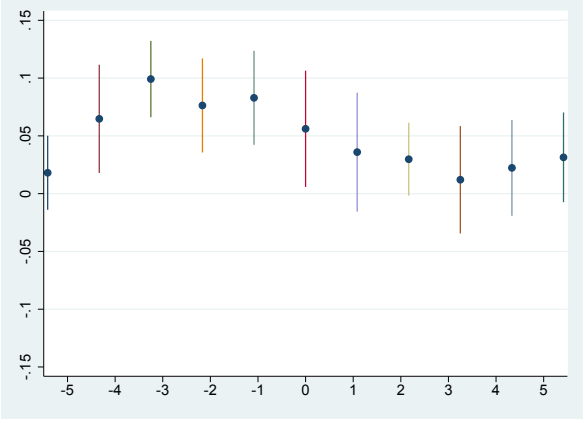
Panel A: Other Net Receivables



Panel B: Normal Net Receivables



Panel C: Payout%



Panel D: CEO Turnover

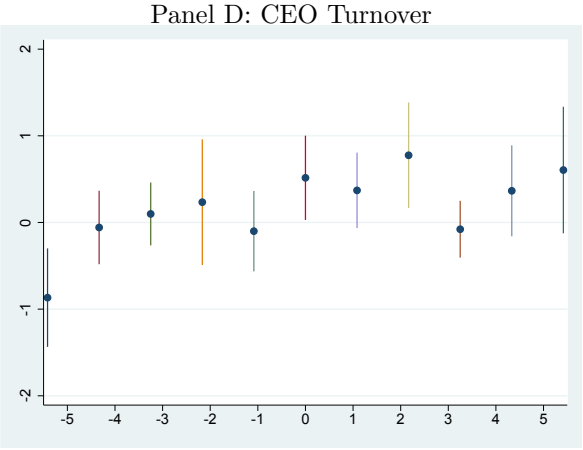


Figure 5: **Parallel Trends Assumption: Price Elasticities around the Reform**

The chart plots the estimates of β_2 and the 90% confidence intervals as in the following equation separately for each 2 months over the window of [-12, +12] months relative to the month in which firms announce the share-split structure reform. In each 2-month period, the regression is weighted by lagged firm assets.

$$ln(p_{i,p,d,s}) = \alpha + \beta_1 \cdot ln(RER_{s,d}) + \beta_2 \cdot ln(RER_{s,d}) \times Nontrade\%_i + \kappa \times Z + \epsilon_{i,p,d,s}.$$

The numbers on the x-axis indicate the 2-month windows relative to the event month. For example, "-6" indicates the window of [-12, -11] and "0" indicates the window of [0, 1]. Standard errors are clustered at the product-destination level.

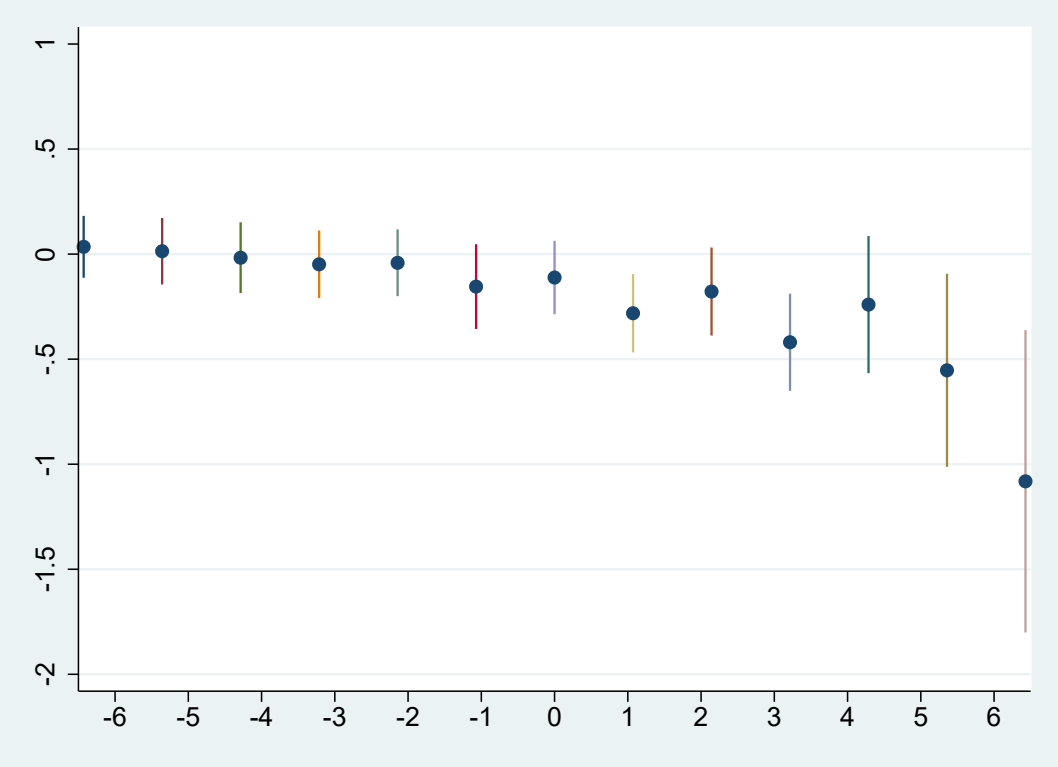


Table 1: **Descriptive Statistics: Firm-level Data**

This table presents descriptive statistics on publicly listed firms that either export directly or through their subsidiaries. The sample period is 2002-2009. Net other receivables are the difference between the outstanding balance of "other receivable" and "other payable." Net normal receivables are the sum of the differences between the outstanding balance of "accounts receivable" and "accounts payable," between "notes receivable" and "notes payable," between "accounts prepaid" and "accounts advances," and between "profits receivable" and "profits payable." Both other receives/other payables and normal receivables/payables are scaled by total assets and only include trade credit between public firms and related party parties. Payout% is the amount of cash dividends scaled by sales. CEO Turnover is an indicator variable coded as 1 if the firm experienced CEO departure for reasons other than tenure expiration, retirement, personal health and job transfer. Capex is the amount of capital expenditure scaled by total assets. TFP is the total factor productivity. SOE is a dummy variable coded as 1 if the ultimate owner of the public firm is either a government entity or a state-owned enterprise, and 0 otherwise. Nontrade% is the number of non-tradable shares (as a percentage of total shares) owned by the top three largest non-tradable shareholders six months prior to the announcement of the share-split structure reform. All Nontrade% is the amount of non-tradable shares (as a percentage of total shares) owned by the all non-tradable shareholders six months prior to the announcement of the share-split structure reform. Long-term Debt is the amount of debt that is scheduled to be due after more than one year scaled by total assets. Cash is the amount of cash and cash equivalents scaled by total assets. Ln (Assets) is the logarithm of total asset. ST is a dummy variable coded as 1 if the firm receives "special treatment" by the CSRC, and 0 otherwise. BH is a dummy variable coded as 1 if the firm is cross-listed in the B- or H-share market.

	N	Mean	Std	P1	P25	P50	P75	P99
Net other receivables	3112	0.146	7.840	-0.153	-0.002	0.000	0.006	0.237
Net normal receivables	3112	0.005	0.030	-0.088	-0.001	0.000	0.007	0.131
Payout%	3112	0.020	0.033	0.000	0.000	0.007	0.026	0.158
CEO Turnover	3112	0.074	0.261	0.000	0.000	0.000	0.000	1.000
Capex	3112	0.074	0.076	0.001	0.021	0.048	0.099	0.372
SOE	3112	0.706	0.456	0.000	0.000	1.000	1.000	1.000
Post	3112	0.477	0.500	0.000	0.000	0.000	1.000	1.000
Nontrade%	3112	0.539	0.135	0.237	0.431	0.555	0.642	0.763
All Nontrade%	3112	0.581	0.130	0.239	0.496	0.608	0.680	0.779
Long-term Debt	3112	0.054	0.085	0.000	0.000	0.017	0.075	0.385
Cash	3112	0.160	0.108	0.011	0.084	0.136	0.213	0.530
Ln(Asset)	3112	21.454	0.977	19.615	20.792	21.346	22.006	24.488
ST	3112	0.046	0.210	0.000	0.000	0.000	0.000	1.000
BH	3112	0.133	0.340	0.000	0.000	0.000	0.000	1.000

Table 2: **Effect of Share-Split Structure Reform on Corporate Outcomes**

This table presents estimates of the effect of the share-split structure reform on corporate outcomes for publicly listed firms that either export directly or through subsidiaries.The sample period of 2000-2009. The following regression is weighted by lagged firm assets:

$$Outcome_{i,t} = \alpha + \beta_1 \times Nontrade\%_i \times Post_{i,t} + \beta_2 \times Post_{i,t} + \beta_3 \times X_{i,t} + \theta_i + \theta_t + v_{i,t}.$$

$Nontrade\%_i$ is the number of non-tradable shares (as a percentage of total shares) owned by the top three largest non-tradable shareholders of firm i six months prior to the announcement of the share-split structure reform. $Nontrade\%_i$ is time invariant and is fully absorbed by firm fixed effects. In Panel A, the dependent variable is net other receivable. Net other receivable is the difference between the outstanding balance of "other receivable" and "other payable." In Panel B, the dependent variable is the sum of the differences between the outstanding balance of "accounts receivable" and "accounts payable," between "notes receivable" and "notes payable," between "accounts prepaid" and "accounts advances," and between "profits receivable" and "profits payable." Both other receives/other payables and normal receivables/payables are scaled by total assets and only include trade credit between public firms and related parties. In Panel C, the dependent variable is the amount of cash dividends scaled by sales (Payout%). In Panel D, CEO Turnover is an indicator variable coded as 1 if the firm experienced CEO departure for reasons other than retirement and criminal reasons. In Panel E, the dependent variable is the amount of capital expenditure scaled by total assets. In Panel F, the dependent variable is the total factor productivity (TFP). Control variables include Ln(Total Assets), Long-term Debt, Cash holdings, ST, and BH. Please refer Table 1 for details. Standard errors are clustered at the industry level.

	All		SOE		Non-SOE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Net Other Receivables					
Post	0.008	0.017**	0.011	0.021**	0.002	0.008
	(0.90)	(2.08)	(1.06)	(2.04)	(0.21)	(0.59)
Post × Nontrade%	-0.038***	-0.044***	-0.043**	-0.048***	-0.024	-0.034
	(-2.63)	(-3.17)	(-2.46)	(-2.88)	(-1.13)	(-1.50)
N	3112	3112	2196	2196	916	916
adj. R^2	0.26	0.28	0.29	0.31	0.25	0.28
	Panel B: Net Normal Receivables					
Post	-0.002	-0.005	0.008	0.002	-0.042	-0.035
	(-0.15)	(-0.43)	(1.17)	(0.13)	(-1.35)	(-1.21)
Post × Nontrade%	-0.010	-0.011	-0.027*	-0.027*	0.076	0.068
	(-0.50)	(-0.59)	(-1.80)	(-1.94)	(1.35)	(1.28)
N	3112	3112	2196	2196	916	916
adj. R^2	0.28	0.29	0.31	0.32	0.19	0.20
	Panel C: Payout%					
Post	0.010	0.019**	0.015*	0.026***	-0.013	-0.013
	(1.33)	(2.32)	(1.76)	(3.08)	(-1.36)	(-1.42)
Post × Nontrade%	-0.030**	-0.032**	-0.039***	-0.041***	0.019	0.011
	(-2.08)	(-2.26)	(-2.68)	(-2.93)	(0.93)	(0.62)
N	3112	3112	2196	2196	916	916
adj. R^2	0.60	0.61	0.62	0.63	0.54	0.58
	Panel D: Forced CEO turnover					
Post	-0.084*	-0.096	-0.095**	-0.133**	0.084	0.230**
	(-1.91)	(-1.46)	(-2.39)	(-2.06)	(0.90)	(2.08)
Post × Nontrade%	0.204***	0.225***	0.228***	0.260***	-0.161	-0.230
	(3.18)	(2.87)	(4.07)	(3.64)	(-0.98)	(-1.34)
N	3112	3112	2196	2196	916	916
adj. R^2	0.03	0.05	0.00	0.03	0.09	0.11
	Panel E: Capital Expenditure					
Post	-0.043***	-0.031*	-0.047***	-0.031	0.043	0.045
	(-3.31)	(-1.67)	(-2.95)	(-1.39)	(1.39)	(1.32)
Post × Nontrade%	0.095***	0.093***	0.105***	0.099***	-0.109*	-0.099
	(3.76)	(3.78)	(3.48)	(3.37)	(-1.74)	(-1.63)
N	3112	3112	2196	2196	916	916
adj. R^2	0.46	0.48	0.47	0.50	0.43	0.45
	Panel F: TFP					
Post	-0.011	-0.100	-0.015	-0.072	-0.445**	-0.545**
	(-0.06)	(-0.38)	(-0.06)	(-0.23)	(-2.15)	(-2.41)
Post × Nontrade%	0.241	0.226	0.223	0.165	1.215***	1.226***
	(0.74)	(0.66)	(0.56)	(0.39)	(3.13)	(3.16)
N	2941	2941	2075	2075	866	866
adj. R^2	0.89	0.89	0.88	0.89	0.89	0.90
Controls	X	X	X	X	X	X
Firm FE	X	X	X	X	X	X
Year FE		X		X		X

standard errors in parentheses

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 3: **Descriptive Statistics: Customs-Firm Matched Sample**

Panel A presents descriptive statistics on exports at the firm-destination-product-year-month level on the sample period from January 2000 through December 2006. Price is the value per unit [renminbi (RMB) dollars] for product p exported to destination d by firm i as of year-month s. RER is the real exchange rate defined as $ER_{s,d} \times CPI_t/CPI_{s,d}$. *$ER_{s,d}$ is the nominal exchange rate defined as the price of the domestic currency (RMB) in terms of the foreign currency of country d as of month s.* CPI_s *and* $CPI_{s,d}$ *represent the monthly consumer price index of China and of the corresponding destination country d, respectively. Value - FOB (US$) is the total free-on-board value of goods exported in US dollars. Post is a dummy variable coded as 1 if exports are made after the announcement of the share-split structure reform, and 0 otherwise. Public is a dummy variable coded as 1 if the export is made by listed firms, and 0 otherwise. Nontrade% is the number of non-tradable shares (as a percentage of total number of shares) owned by the top three largest non-tradable shareholders six months prior to the announcement of the share-split structure reform. Panel B presents descriptive statistics at the level of 1,011 exporters, including publicly listed firms and their exporting subsidiaries. No. Dest, No. Prod, No. Dest × Prod, and No. Dest × Time are the number of destination markets, the number of 6-digit Harmonization Code products, the number of destination-products markets, and the number of destination-year-month. Value-FOB (M $US) is the total number of units exported in millions. Panel C compares export-related characteristics between public firms and their exporting subsidiaries.*

Panel A: Sample Unit Level

	N	Mean	Std	P1	P25	P50	P75	P99
RER	1052069	18.38	170.84	0.05	0.11	0.14	0.78	195.49
Price	1052069	42386	2727204	0.30	12.12	34.29	143.93	259566
Value - FOB ($US)	1052069	91063	762864	20	2212	9912	37472	1331400
Post	1052069	0.20	0.40	0.00	0.00	0.00	0.00	1.00
Public	1052069	0.23	0.42	0.00	0.00	0.00	0.00	1.00
Nontrade%	1052069	0.55	0.13	0.24	0.45	0.56	0.66	0.78

Panel B: Exporter Level

	N	Mean	Std	P1	P25	P50	P75	P99
No. of Dest	1011	13.91	12.82	1	3	9	22	43
No. of Prod	1011	93.74	209.64	1	4	19	85	1106
No. of Dest × Prod	1011	243.17	791.54	1	5	34	151	3756
No. of Dest × Time	1011	218.02	385.84	1	7	54	243	2051

Panel C: Public Firms vs. Subsidiaries

	Mean	Std	Mean	Std	Dif	t-stat
Value - FOB (M $US)	146.26	33.31	78.11	10.83	68.15	2.54
No. Dest	13.17	0.80	14.15	0.47	-0.98	-1.04
No. Prod	87.13	14.20	95.88	7.42	-8.75	-0.57
No. Dest× Product	233.42	51.95	246.32	28.36	-12.90	-0.22
No. Dest × Time	213.92	25.57	219.34	13.78	-5.43	-0.19

Table 4: **Descriptive Statistics: Trade Types and Top 20 Exports**

Panel A presents descriptive statistics on exports aross trade types. Panel B presents descriptive statistics on exports cross top 20 goods. The sample period is from January 2000 through December 2006. No. Dest, No. Prod, No. Dest × Prod, and No. Dest × Time are the number of destination markets, the number of 6-digit Harmonization Code products, the number of destination-products markets, and the number of destination-year-month. Value–FOB (M $US) is the total number of units exported in millions.

	Value–FOB (M $US)	No.of Dest	No. of Prod-Dest	No. of Prod	No. of Dest × Time
Ordinary Trade	88608.38	1936	3146873409	18627856	9108324
Feeding Processing Trade	35156.74	1936	103164649	4351396	8410000
Processing Trade	5241.80	1444	13184161	1283689	2896804
Equipment & Goods	3124.67	1089	9042049	739600	1132096
Leasing trade	1532.53	16	36	16	324
Storage of Transit Goods	483.77	1849	25735329	1580049	2408704
Inbound and Outbound Goods	377.33	1156	889249	103684	354025
Small-amount Border Trade	292.13	1	3364	3364	3364
Equipment for Import for Processing on Order	161.11	784	1423249	208849	549081
Free Assistance and Goods	13.94	100	1521	1089	441
Contracting Foreign Project Exporting Goods	10.15	4	225	225	9
Export Processing Zone & Import Equipment	10.10	169	9216	5041	5776
Outward Processing Trade	3.28	1	4	4	16
Other overseas donated materials	2.14	36	441	361	256
Barter Trader	0.03	1	1	1	1
Others	122.93	1681	29441476	3115225	2064969

	HS Code	Value–FOB (M $US)	No. Dest	No. Dest × Time
Color Television	852812	3924.53	1936	1819801
Iron Ore Fines	260111	3530.83	49	3481
Transmission Apparatus Incorporating Reception Apparatus	852520	3240.87	1681	1050625
Airplanes And Other Aircraft	880240	3082.25	9	676
Containers, specially, designed	860900	3019.41	576	361201
Lighting Fixtures	852990	2890.63	1936	2193361
Other devices, appliances and instruments	901380	2584.71	1600	1077444
Parts And Accessories Of Motor Vehicles	870899	2153.08	1600	1240996
Electronic circuits; monolithic integrated, other than digital	854219	1693.40	900	857476
Monolithic integrated ci	854230	1604.39	1296	1557504
Air Condition Mach, Window/ Wall Type	841510	1505.33	1849	1800964
Parts And Accessories For Automatic Data Processing Machines	847330	1436.50	1681	2016400
Oils petroleum, bituminous, distillates, except crude	271000	1374.61	400	269361
Machines and mechanical appliances having individual functions	847989	1319.72	1521	972196
Video recording or reproducing apparatus	852190	937.87	1369	410881
Flat-rolled products of iron or non-alloy steel	720839	926.70	484	85264
Hybrid integrated circui	854240	879.25	729	558009
Printed Circuits	853400	850.21	1296	1052676
Tankers For The Transport of Goods	890120	843.41	16	784
Waste and scrap of iron or steel	720449	820.69	64	3969

Table 5: **Effect of Share-Split Structure Reform on Price Elasticities**

This table presents the estimates of the effect of the share-split structure reform on the elasticity of export price to real-exchange-rate changes. The sample period is from January 2000 through December 2006. The sample includes goods exported by public firms and their exporting subsidiaries. We estimate the following difference-in-differences framework by weighing observations using lagged total assets of the public firm:

$$ln(p_{i,p,d,s}) = \alpha + \beta_1 \cdot ln(RER_{s,d}) + \beta_2 \cdot ln(RER_{s,d}) \times Post_{i,t} \times Nontrade_i + \beta_3 \cdot ln(RER_{s,d}) \times Post_{i,s} + \beta_4 \cdot ln(RER_{s,d}) \times Nontrade_i + \beta_5 \cdot Nontrade_i \times Post_{i,t} + \beta_6 \cdot Post_{i,s} + \gamma \times Z + \epsilon_{i,p,d,s}.$$

The dependent variable is the logarithm of export value per unit [renminbi (RMB) dollars] at the subsidiary-product-destination-year-month level. $p_{i,p,d,s}$ is the total value divided by total quantity for product p exported by firm i to destination d as of year-month s. $RER_{s,d}$ is the real exchange rate defined as $ER_{s,d} \times CPI_s / CPI_{s,d}$. $ER_{s,d}$ is the nominal exchange rate defined as the price of the domestic currency (RMB) in terms of the foreign currency of country d as of month s. CPI_s and $CPI_{s,d}$ represent the monthly consumer price index of China and of the corresponding destination country d, respectively. Z is a full set of trade categories, firm (or firm-year-month), destination-product, and destination-year-month fixed effects. Post is a dummy variable coded as 1 for all year-months after firm i has announced the reform, and 0 otherwise. In columns (2)-(4), Nontrade is the percentage of non-tradable ownership by the three largest non-tradable shareholders (Nontrade%) six months prior to the reform announcement as of year-month s. In columns (5)-(7), Nontrade is a dummy variable coded as 1 if Nontrade% excesses 50%, and 0 otherwise. Standard errors are clustered at the product-destination level.

		Continuous Nontrade%			Dummy Nontrade%		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(ERE)	-0.140***	-0.099***			-0.121***		
	(0.023)	(0.030)			(0.023)		
ln(ERE) × Post × Nontrade		-0.117**	-0.134***	-0.186***	-0.034**	-0.040***	-0.054***
		(0.049)	(0.052)	(0.057)	(0.013)	(0.014)	(0.015)
ln(ERE) × Post	-0.008	0.057**	0.068**	0.089***	0.012	0.016	0.017
	(0.007)	(0.025)	(0.028)	(0.031)	(0.009)	(0.010)	(0.012)
ln(ERE) × Nontrade		-0.058*	-0.054*	-0.039	-0.017**	-0.015*	-0.011
		(0.033)	(0.032)	(0.032)	(0.009)	(0.008)	(0.008)
Post × Nontrade		0.256***	0.169**		0.074***	0.051**	
		(0.075)	(0.079)		(0.023)	(0.024)	
Post	0.072***	-0.068	-0.085*		0.025	-0.026	
	(0.011)	(0.042)	(0.045)		(0.018)	(0.021)	
Constant	4.391***	4.380***	4.525***	4.537***	4.389***	4.557***	4.559***
	(0.026)	(0.026)	(0.024)	(0.024)	(0.026)	(0.010)	(0.009)
Trade Type	X	X	X	X	X	X	X
Firm	X	X	X		X	X	
Dest × Prod	X	X	X	X	X	X	X
Dest × Time			X	X		X	X
Firm × Time				X			X
N	1052060	1052060	1052060	1052060	1052060	1052060	1052060
adj. R^2	0.84	0.84	0.84	0.84	0.84	0.84	0.84

standard errors in parentheses

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 6: **Effect of Share-Split Structure Reform on Volume Elasticities**

This table presents the estimates of the effect of the share-split structure reform on the elasticity of export volume to real-exchange-rate changes. The sample period is from January 2000 through December 2006. The sample includes goods exported by public firms and their exporting subsidiaries. We estimate the following difference-in-differences framework by weighing observations using lagged total assets of the public firm:

$$ln(q_{i,p,d,s}) = \alpha + \beta_1 \cdot ln(RER_{s,d}) + \beta_2 \cdot ln(RER_{s,d}) \times Post_{i,t} \times Nontrade_i + \beta_3 \cdot ln(RER_{s,d})$$
$$\times Post_{i,s} + \beta_4 \cdot ln(RER_{s,d}) \times Nontrade_i + \beta_5 \cdot Nontrade_i \times Post_{i,t} + \beta_6 \cdot Post_{i,s} + \gamma \times Z + \epsilon_{i,p,d,s}.$$

The dependent variable is the logarithm of export volume at the subsidiary-product-destination-year-month level. $q_{i,p,d,s}$ is the total quantity for product p exported by firm i to destination d as of year-month s. $RER_{s,d}$ is the real exchange rate defined as $ER_{s,d} \times CPI_s/CPI_{s,d}$. $ER_{s,d}$ is the nominal exchange rate defined as the price of the domestic currency (RMB) in terms of the foreign currency of country d as of month s. CPI_s and $CPI_{s,d}$ represent the monthly consumer price index of China and of the corresponding destination country d, respectively. Z is a full set of trade categories, firm (or firm-year-month), destination-product, and destination-year-month fixed effects. Post is a dummy variable coded as 1 for all year-months after firm i has announced the reform, and 0 otherwise. In columns (2)-(4), Nontrade is the percentage of non-tradable ownership by the three largest non-tradable shareholders (Nontrade%) six months prior to the reform announcement as of year-month s. In columns (5)-(7), Nontrade is a dummy variable coded as 1 if Nontrade% excesses 50%, and 0 otherwise. Standard errors are clustered at the product-destination level.

		Continuous Nontrade%			Dummy Nontrade%		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(ERE)	-0.019	-0.060			-0.041		
	(0.032)	(0.048)			(0.034)		
ln(ERE) × Post × Nontrade		0.295***	0.294***	0.292***	0.065***	0.063***	0.064***
		(0.068)	(0.068)	(0.075)	(0.018)	(0.018)	(0.020)
ln(ERE) × Post	0.020**	-0.140***	-0.128***	-0.138***	-0.016	-0.002	-0.013
	(0.010)	(0.036)	(0.039)	(0.043)	(0.014)	(0.016)	(0.018)
ln(ERE) × Nontrade		0.066	0.063	0.064	0.023*	0.022*	0.022
		(0.060)	(0.060)	(0.062)	(0.013)	(0.013)	(0.013)
Post × Nontrade		0.193	0.213		-0.015	-0.012	
		(0.138)	(0.138)		(0.037)	(0.036)	
Post	0.096***	-0.003	-0.081		0.113***	0.046	
	(0.020)	(0.074)	(0.077)		(0.028)	(0.033)	
Constant	6.959***	6.971***	7.071***	7.087***	6.961***	7.041***	7.050***
	(0.037)	(0.037)	(0.044)	(0.044)	(0.037)	(0.015)	(0.014)
Trade Type	X	X	X	X	X	X	X
Firm	X	X	X		X	X	
Dest × Prod	X	X	X	X	X	X	X
Dest × Time			X	X		X	X
Firm × Time				X			X
N	1052060	1052060	1052060	1052060	1052060	1052060	1052060
adj. R^2	0.78	0.78	0.78	0.78	0.78	0.78	0.78

standard errors in parentheses

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 7: **Effect of Share-Split Structure Reform on Price Elasticities: Robustness**

This table presents the estimates of the effect of the share-split structure reform on the elasticity of export price to real-exchange-rate changes. The sample period is from January 2000 through December 2006. The sample includes goods exported by public firms and their exporting subsidiaries. We estimate the following difference-in-differences framework:

$$ln(p_{i,p,d,s}) = \alpha + \beta_1 \cdot ln(RER_{s,d}) + \beta_2 \cdot ln(RER_{s,d}) \times Post_{i,t} \times Nontrade_i + \beta_3 \cdot ln(RER_{s,d}) \times Post_{i,s} + \beta_4 \cdot ln(RER_{s,d}) \times Nontrade_i + \beta_5 \cdot Nontrade_i \times Post_{i,t} + \beta_6 \cdot Post_{i,s} + \gamma \times Z + \epsilon_{i,p,d,s}.$$

See Table 5 for details. In Panel A, ordinary least squares (OLS) is performed. In Panel B, observations are weighed by the square root of the number of bilateral transactions aggregated at the level of firm-product-destination-year-month. In Panel C, observations are weighed by firms' lagged sales. In Panel D, observations are weighted by firms' lagged market capitalization. In Panel E, observations are weighted by firms' lagged assets and the sample period is 2004-2006. In Panel F, observations are weighted by firms' lagged assets and only goods exported to OECD countries are included. In Panel G, Nontrade% is the three largest non-tradable shareholders' shares excluding shares paid to tradable shareholders as compensation. In columns (1)-(3), Nontrade is the percentage of non-tradable ownership by the three largest non-tradable shareholders (Nontrade%) six months prior to the reform announcement as of year-month s. In columns (4)-(6), Nontrade is a dummy variable coded as 1 if Nontrade% excesses 50%, and 0 otherwise. Standard errors are clustered at the product-destination level.

	Continuous Nontrade%			Dummy Nontrade%		
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A. Ordinary Least Squares					
ln(ERE) × Post × Nontrade	-0.067***	-0.075***	-0.080***	-0.012*	-0.014**	-0.015**
	(0.025)	(0.025)	(0.027)	(0.007)	(0.007)	(0.007)
ln(ERE) × Post	0.032**	0.028*	0.031*	0.004	-0.005	-0.004
	(0.014)	(0.015)	(0.016)	(0.006)	(0.007)	(0.007)
N	1052060	1052060	1052060	1052060	1052060	1052060
adj. R^2	0.78	0.79	0.79	0.78	0.79	0.79
	Panel B. WSL, W= $\sqrt{No.\ Transactions}$					
ln(ERE) × Post × Nontrade	-0.070***	-0.078***	-0.079***	-0.012*	-0.014**	-0.014**
	(0.025)	(0.025)	(0.027)	(0.007)	(0.007)	(0.007)
ln(ERE) × Post	0.034**	0.028*	0.029*	0.004	-0.006	-0.005
	(0.014)	(0.015)	(0.016)	(0.006)	(0.007)	(0.008)
N	1052060	1052060	1052060	1052060	1052060	1052060
adj. R^2	0.79	0.79	0.80	0.79	0.79	0.80
	Panel C. WSL, W=Sales					
ln(ERE) × Post × Nontrade	-0.222***	-0.237***	-0.283***	-0.056***	-0.062***	-0.075***
	(0.047)	(0.049)	(0.052)	(0.012)	(0.013)	(0.014)
ln(ERE) × Post	0.108***	0.116***	0.136***	0.022**	0.025**	0.026**
	(0.025)	(0.026)	(0.029)	(0.009)	(0.011)	(0.012)
N	1051915	1051915	1051915	1051915	1051915	1051915
adj. R^2	0.84	0.84	0.85	0.84	0.84	0.85
	Panel D. WSL, W=Market Cap					
ln(ERE) × Post × Nontrade	-0.107*	-0.115**	-0.192***	-0.025	-0.027*	-0.048***
	(0.055)	(0.057)	(0.062)	(0.016)	(0.016)	(0.018)
ln(ERE) × Post	0.050*	0.059*	0.094***	0.005	0.009	0.011
	(0.029)	(0.032)	(0.035)	(0.012)	(0.013)	(0.015)
N	1052060	1052060	1052060	1052060	1052060	1052060
adj. R^2	0.82	0.82	0.83	0.82	0.82	0.83
	Panel E. WSL, W=Assets, 2004-2006					
ln(ERE) × Post × Nontrade	-0.101**	-0.111**	-0.159***	-0.031**	-0.035***	-0.049***
	(0.047)	(0.049)	(0.055)	(0.013)	(0.013)	(0.015)
ln(ERE) × Post	0.049**	0.057**	0.078***	0.011	0.016	0.018
	(0.024)	(0.026)	(0.030)	(0.009)	(0.010)	(0.012)
N	646012	646012	646012	646012	646012	646012
adj. R^2	0.85	0.85	0.86	0.85	0.85	0.86
	Panel F. WSL, W=Assets, OECD					
ln(ERE) × Post × Nontrade	-0.132**	-0.136**	-0.189***	-0.040**	-0.042**	-0.056***
	(0.065)	(0.066)	(0.073)	(0.017)	(0.017)	(0.020)
ln(ERE) × Post	0.064**	0.067*	0.090**	0.013	0.015	0.016
	(0.032)	(0.035)	(0.039)	(0.011)	(0.012)	(0.015)
N	787885	787885	787885	787885	787885	787885
adj. R^2	0.83	0.83	0.83	0.83	0.83	0.83
	Panel G.WSL, W=Assets, Nontrade% after compensation					
ln(ERE) × Post × Nontrade	-0.128**	-0.144***	-0.191***	-0.025*	-0.035**	-0.051***
	(0.050)	(0.052)	(0.057)	(0.013)	(0.014)	(0.016)
ln(ERE) × Post	0.054**	0.063***	0.079***	0.001	0.013	0.009
	(0.022)	(0.024)	(0.027)	(0.007)	(0.008)	(0.010)
N	1052060	1052060	1052060	1052060	1052060	1052060
adj. R^2	0.84	0.84	0.84	0.84	0.84	0.84
Trade Type	X	X	X	X	X	X
Firm	X	X		X	X	
Prod × Dest	X	X	X	X	X	X
Dest × Time		X	X		X	X
Firm × Time			X			X

standard errors in parentheses

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 8: **Effect of Share-Split Structure Reform on Price Elasticities across Markets**

This table presents the estimates of the effect of the share-split structure reform on the elasticity of export price to real-exchange-rate changes across different destination-product markets. The sample period is from January 2000 through December 2006. We estimate the following difference-in-differences framework by weighing observations using public firm's lagged total assets:

$$ln(p_{i,p,d,s}) = \alpha + \beta_1 \cdot ln(RER_{s,d}) + \beta_2 \cdot ln(RER_{s,d}) \times Post_{i,t} \times Nontrade_i + \beta_3 \cdot ln(RER_{s,d}) \times Post_{i,s} + \beta_4 \cdot ln(RER_{s,d}) \times Nontrade_i + \beta_5 \cdot Nontrade_i \times Post_{i,t} + \beta_6 \cdot Post_{i,s} + \gamma \times Z + \epsilon_{i,p,d,s}.$$

See Table 5 for details. In Panel A, four subsamples are formed based on whether the travel distance (in 1,000 (k) miles) from the public firm to the capital city of the destination country falls into one of the following four intervals: [5k, + ∞], (5k, 3k], (3k, 1k], and (0, 1k]. In Panel B, four subsamples are formed based on whether the Herfindahl-Hirschman Index (HHI) in a destination-product market as of year $t-1$ falls into one of the following four intervals: [0, 0.1], (0.1, 0.25], (0.25, 0.5], and (0.5, 1]. The HHI index is calculated using the entire population of Chinese exporters provided by the Chinese Customs Office. In Panel C, four subsamples are formed based whether the number of years elapsed since the first time an exporter entered into a destination-product market falls into one of the following four intervals: [0, 1], (1,2], (2, 4], and (4,6]. In columns (1)-(4), Nontrade is the percentage of non-tradable ownership by the three largest non-tradable shareholders (Nontrade%) six months prior to the reform announcement as of year-month s. In columns (5)-(8), Nontrade is a dummy variable coded as 1 if Nontrade% excesses 50%, and 0 otherwise. Standard errors are clustered at the product-destination level.

	Continuous Nontrade%				Dummy Nontrade%			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: Travel Distance							
	[5k, $+\infty$]	[3k, 5k]	[1k, 3k]	[0, 1K]	[5k, $+\infty$]	[3k, 5k]	[1k, 3k]	[0, 1K]
ln(ERE) × Post × Nontrade	-0.312***	-0.344**	-0.134**	0.082	-0.076***	-0.053*	-0.030	-0.018
	(0.095)	(0.151)	(0.065)	(0.115)	(0.024)	(0.031)	(0.020)	(0.029)
ln(ERE) × Post	-0.112*	0.146	0.029	0.017	0.048**	0.021	0.014	0.022
	(0.068)	(0.104)	(0.071)	(0.080)	(0.024)	(0.028)	(0.020)	(0.027)
N	527972	87224	274938	133178	527972	87224	274938	133178
adj. R^2	0.84	0.91	0.85	0.84	0.84	0.91	0.85	0.84
	Panel B: Herfindahl-Hirschman Index (HHI)							
	[0, 0.1]	[0.1, 0.25]	[0.25,0.5]	[0.5, 1]	[0, 0.1]	[0.1, 0.25]	[0.25,0.5]	[0.5, 1]
ln(ERE) × Post × Nontrade	-0.309*	-0.286***	-0.110	-0.090	-0.057**	-0.086***	-0.028	-0.013
	(0.165)	(0.079)	(0.072)	(0.074)	(0.027)	(0.024)	(0.025)	(0.026)
ln(ERE) × Post	0.151*	0.151***	0.073	0.049	0.019	0.043*	0.028	0.005
	(0.087)	(0.049)	(0.045)	(0.045)	(0.021)	(0.023)	(0.023)	(0.022)
N	389106	220976	138917	106440	389106	220976	138917	106440
adj. R^2	0.77	0.84	0.87	0.89	0.77	0.84	0.87	0.89
	Panel C: Export History							
	[0, 1]	(1, 2]	(2, 4]	(4, 6]	[0, 1]	(1, 2]	(2, 4]	(4, 6]
ln(ERE) × Post × Nontrade	-0.257**	-0.231**	-0.099	-0.073	-0.078***	-0.040	-0.027	-0.020
	(0.103)	(0.108)	(0.093)	(0.070)	(0.024)	(0.036)	(0.029)	(0.019)
ln(ERE) × Post	0.134**	0.088	0.040	0.024	0.036*	-0.008	0.002	-0.004
	(0.056)	(0.063)	(0.056)	(0.040)	(0.019)	(0.030)	(0.024)	(0.019)
N	500617	189835	216034	108614	500617	189835	216034	108614
adj. R^2	0.85	0.87	0.87	0.87	0.85	0.87	0.87	0.87
Trade Type	X	X	X	X	X	X	X	X
Dest × Prod	X	X	X	X	X	X	X	X
Dest × Time	X	X	X	X	X	X	X	X
Firm × Time	X	X	X	X	X	X	X	X

standard errors in parentheses

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 9: **Effect of Share-Split Structure Reform on Price Elasticities: External Financing Dependence**

This table presents the estimates of the effect of the share-split structure reform on the elasticity of export price to exchange-rate changes. The sample period is from January 2000 through December 2006. We estimate the following difference-in-differences framework by weighing observations using public firms' lagged total assets:

$$ln(p_{i,p,d,s}) = \alpha + \beta_1 \cdot ln(RER_{s,d}) + \beta_2 \cdot ln(RER_{s,d}) \times Post_{i,t} \times Nontrade_i + \beta_3 \cdot ln(RER_{s,d}) \times Post_{i,s} + \beta_4 \cdot ln(RER_{s,d}) \times Nontrade_i + \beta_5 \cdot Nontrade_i \times Post_{i,t} + \beta_6 \cdot Post_{i,s} + \gamma \times Z + \epsilon_{i,p,d,s}.$$

See Table 5 for details. Four subsamples are formed based on four quantiles of the distribution of the value of external financing dependence (EXFIN). For each firm i as of year t, EXFIN is calculated as the capital expenditures minus cash flows of operations in year scaled by capital expenditures. Financial variables are taken from year t-1. In columns (1)-(4), Nontrade is the percentage of non-tradable ownership by the three largest non-tradable shareholders (Nontrade%) six months prior to the reform announcement as of year-month s. In columns (5)-(8), Nontrade is a dummy variable coded as 1 if Nontrade% excesses 50%, and 0 otherwise. Standard errors are clustered at the product-destination level.

	Continuous Nontrade%				Dummy Nontrade%			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln(ERE) × Post × Nontrade	-0.295***	-0.221**	-0.160**	0.125**	-0.064***	-0.056**	-0.044**	0.034*
	(0.083)	(0.100)	(0.074)	(0.060)	(0.022)	(0.025)	(0.022)	(0.019)
ln(ERE) × Post	0.155***	0.113**	0.064	-0.084**	0.044**	0.026	-0.010	-0.044**
	(0.045)	(0.055)	(0.042)	(0.036)	(0.020)	(0.021)	(0.015)	(0.018)
Trade Type	X	X	X	X	X	X	X	X
Firm	X	X	X	X	X	X	X	X
Dest × Prod	X	X	X	X	X	X	X	X
Dest × Time	X	X	X	X	X	X	X	X
Firm × Time	X	X	X	X	X	X	X	X
N	255195	258107	241912	259316	255195	258107	241912	259316
adj. R^2	0.86	0.83	0.88	0.85	0.86	0.83	0.88	0.85

standard errors in parentheses

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 10: **Effect of Share-Split Structure Reform on Price Elasticities: SOEs vs Non-SOEs**

This table presents the estimates of the effect of the share-split structure reform on the elasticity of export price to exchange-rate changes. The sample period is from January 2000 through December 2006. We estimate the following difference-in-differences framework by weighing observations using public firms' lagged total assets:

$$ln(p_{i,p,d,s}) = \alpha + \beta_1 \cdot ln(RER_{s,d}) + \beta_2 \cdot ln(RER_{s,d}) \times Post_{i,t} \times Nontrade_i + \beta_3 \cdot ln(RER_{s,d}) \times Post_{i,s} + \beta_4 \cdot ln(RER_{s,d}) \times Nontrade_i + \beta_5 \cdot Nontrade_i \times Post_{i,t} + \beta_6 \cdot Post_{i,s} + \gamma \times Z + \epsilon_{i,p,d,s}.$$

See Table 5 for details. Two subsamples are stratified by firms' SOE status. In columns (1)-(3), Nontrade is the percentage of non-tradable ownership by the three largest non-tradable shareholders (Nontrade%) six months prior to the reform announcement as of year-month s. In columns (4)-(6), Nontrade is a dummy variable coded as 1 if Nontrade% excesses 50%, and 0 otherwise. Standard errors are clustered at the product-destination level.

	Continuous Nontrade%			Dummy Nontrade%		
	(1)	(2)	(3)	(4)	(5)	(6)
			Panel A. SOEs			
ln(ERE) × Post × Nontrade	-0.094*	-0.115**	-0.175***	-0.033**	-0.041**	-0.059***
	(0.052)	(0.055)	(0.061)	(0.015)	(0.016)	(0.018)
ln(ERE) × Post	0.048*	0.061**	0.085**	0.015	0.021*	0.022
	(0.027)	(0.030)	(0.034)	(0.011)	(0.012)	(0.014)
N	829569	829569	829569	829569	829569	829569
adj. R^2	0.85	0.85	0.85	0.85	0.85	0.85
			Panel B. Non-SOEs			
ln(ERE) × Post × Nontrade	-0.002	-0.001	0.008	-0.000	0.003	0.002
	(0.044)	(0.047)	(0.055)	(0.011)	(0.011)	(0.012)
ln(ERE) × Post	0.005	-0.024	-0.024	0.004	-0.019	-0.014
	(0.024)	(0.027)	(0.031)	(0.008)	(0.012)	(0.013)
N	222491	222491	222491	222491	222491	222491
adj. R^2	0.84	0.84	0.85	0.84	0.84	0.85
Trade Type	X	X	X	X	X	X
Firm	X	X		X	X	
Prod × Dest	X	X	X	X	X	X
Dest × Time		X	X		X	X
Firm × Time			X			X

standard errors in parentheses
$*p < 0.10, **p < 0.05, ***p < 0.01$

Large Shareholders and Sticky Prices: Evidence from a Corporate Governance Reform

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A.1 Theoretical Framework

In this section, we develop a simple model which is consistent with the financial constraint channel through which large shareholders influence firms' product pricing. As we discuss in Section 2, this model develops only one of many potential channels and we do not aim to disentangle those.

A.1.1 Model

We present a simple static model of export pricing and show how the exporter's external financial constraints affect responses of export prices to exchange-rate movement. Trade finance mainly involves borrowing using trade credit (accounts receivable) as collateral. Exporters obtain working capital loans, credit lines, discounted prepayments, or credit guarantees provided by the importer's bank (Ahn et al., 2011). Costs of this external financing, however, can be substantially reduced by either of the following cases. First, an exporting subsidiary can directly borrow from less tunneled public firms, rather than from banks. Second, an exporting subsidiary can borrow from a bank under the guarantee of a less tunneled public firm.

In a similar vein as Berman et al. (2012), we extend Melitz and Ottaviano (2015) and include exchange-rate movement and the firm's heterogeneity in financial constraints. For simplicity, external financial constraints are introduced through the working-capital channel. Firms must borrow a fraction of labor bill θ_i with an interest rate r up-front, before production takes place. The larger the fraction they need to borrow up-front, the more financially constrained they are. Therefore, the marginal cost of the firm is given by

$$mc_i = w(1 + \theta_i r),$$

where w is unit labor cost. Without loss of generality, the marginal cost is rewritten as $mc_i = \frac{w}{\varphi_i}$, where $\varphi_i = \frac{1}{1+\theta_i r}$, which implies a firm with better financial conditions will have a higher φ_i and therefore a lower marginal cost. Furthermore, firms are assumed to be indexed by financial-constraint parameter φ_i.

Following Melitz and Ottaviano (2015) and Berman et al. (2012), the inverse demand

function for variety produced by firm i exported to destination country d is

$$p_{id}S_d = a - bx_{id} - kX_d, \tag{A.1}$$

where p_{id} is the export price in home currency and S_d is the nominal exchange rate between the home country and destination country d, which is the price of the domestic currency in terms of the currency of country d. Hence, a rise in S_d implies the appreciation of domestic currency. x_{id} is the consumption demand in country d for variety produced by firm i, and X_d is the consumption demand in country d over all varieties. $a, b, andk$ are positive parameters. The individual firm will maximize the following profit function:

$$\max_{p_{id}} \ (p_{id} - mc_i)x_{id}.$$

This optimization problem yields

$$p_{id} = \frac{1}{2}\frac{w}{\varphi_i} + \frac{(a - kX_d)}{2S_d}. \tag{A.2}$$

Substituting equation A.2 into the profit function, we can show a threshold φ_d^* exists for which operating profits are zero. For the firm with zero operating profit, we have the following conditions:

$$\frac{w}{\varphi_d^*} = \frac{(a - kX_d)}{S_d}.$$

Given the demand function in equation A.1, only those firms that cover their marginal cost (have better financial access such that $\varphi_i > \varphi_d^*$) can survive and produce. All other firms exit the industry. Surviving firms maximize their profits. The threshold φ_d^* summarizes the effects of both the average price and number of firms on the performance measures of all firms.

Using this condition, we can rewrite the optimal export price for firm i as below:

$$p_{id} = \frac{w}{2}(\frac{1}{\varphi_i} + \frac{1}{\varphi_d^*}).$$

Denoting the real exchange rate $q_d = \frac{S_d P}{P_d}$, where P is the CPI of domestic country and

P_d is the CPI price of destination country d. Firms will take P, P_d, and w as given. We can derive the elasticity of export price to the real exchange rate as

$$e(p_{id}) = \frac{d\ln(p_{id})}{d\ln(q_d)} = \frac{-\varphi_i}{\varphi_i + \varphi_d^*} < 0. \tag{A.3}$$

The relation between the elasticity of export price to the real exchange rate $e(p_{id})$ and financial condition (φ_i) can be expressed as follows:

$$\frac{\partial e(p_{id})}{\partial \varphi_i} < 0. \tag{A.4}$$

Equations A.3 and A.4 suggest the export price (in domestic currency) increases when the real exchange rate depreciates (a decrease in S_d) and firms with better financial conditions increase their export price more. Similarly, in the face of a real appreciation, firms that are less financially constrained will decrease their export price more in order to stabilize the demand. In other words, firms with a better financial condition can "price to market" more. We summarize the first prediction we bring to the data:

Prediction 1: *As a firm becomes more (less) financially constrained, the elasticity of the export price in home currency to a real exchange-rate change increases (decreases).*

The export price in the destination (local) currency, or the currency of country d, is given by $p_{id}^* = p_{id}S_d$. Then the elasticity of the export price in terms of destination-country currency to the real exchange rate can be defined as

$$e(p_{id}^*) = \frac{d\ln(p_{id}^*)}{d\ln(q_d)} = \frac{\varphi_d^*}{\varphi_i + \varphi_d^*} > 0.$$

The better the financial condition (the smaller θ_i is or the higher φ_i is), the lower the exchange-rate pass-through to the price of home variety i in country d. In other words, for firms that are less financially constrained, the price of export good i in destination country d will be more stabilized because better financial conditions improve their ability to "price to market."

For the trade volume, we have

$$x_{id} = \frac{wS_d}{2b}(\frac{1}{\varphi_d^*} - \frac{1}{\varphi_i}) \tag{A.5}$$

$$e(x_{id}) = \frac{d\ln(x_{id})}{d\ln(q_d)} = \frac{-\varphi_d^*}{\varphi_i - \varphi_d^*} < 0. \tag{A.6}$$

Note $\varphi_i - \varphi_d^* > 0$, which implies the elasticity of trade volume to the real exchange-rate change is negative. More important, the value of the volume elasticity increases with the financial condition φ_i:

$$\frac{\partial e(x_{id})}{\partial \varphi_i} > 0. \tag{A.7}$$

The result in equation A.5 shows that when the real exchange-rate depreciates, the trade volume will increase. This effect is easy to understand because the home goods become cheaper after the real depreciation. Nevertheless, as illustrated by equation A.7, when firms are facing different financial conditions, the export volume of those firms that are less constrained will increase less because their prices are more stabilized. Similarly, in the face of a real appreciation, demand for home goods will fall. But demand for goods produced by less financially constrained firms will decrease less. We therefore make the following predictions:

Prediction 2: *As a firm becomes more (less) financially constrained, the elasticity of the export volume to a real exchange-rate change decreases (increases).*

A.1.2 Discussion

In sum, firms with better financial conditions price to market more to stabilize their export price in the destination/local market. For these firms, the exchange-rate pass-through to export price (in destination currency) will be lower (lower elasticity of export price in local currency to exchange-rate changes); the exchange-rate pass-through to trade volume will also be lower (less negative elasticity of trade volume to exchange-rate changes).

The intuition is simple. As in Melitz and Ottaviano (2015) and Berman et al. (2012), a linear demand system with horizontal product differentiation implies the price elasticity

of demand increases with prices faced by consumers, which is in contrast to the case of constant elasticity of substitution (CES) demand. When all exporters in the home country benefit from a decrease in the relative cost of production (a real exchange-rate depreciation with respect to a specific destination), prices faced by consumers fall, so the price elasticity of demand falls.

This effect implies exporters can increase their markup to maximize their profits in the face of a real depreciation. We can define the markup of export price to marginal cost as μ_{id}. From equation A.2, we can get:

$$\mu_{id} = \frac{p_{id}}{\frac{w}{\varphi_i}} = \frac{1}{2} + \frac{a - kX_d}{2S_d}\frac{\varphi_i}{w} = \frac{1}{2}(1 + \frac{\varphi_i}{\varphi_d^*}). \tag{A.8}$$

Equation A.8 implies $\frac{\partial \mu_{id}}{\partial S_d} < 0$; that is, when an exchange rate depreciates, the markup μ_{id} increases. The reason is that $\frac{\partial \mu_{id}}{\partial S_d} < 0$, and exporters react by increasing their markup in this destination so that pricing to market and incomplete pass-through of exchange-rate changes into prices faced by consumers occur. Furthermore, because firms with better financial access have a lower marginal cost and thus charge a lower price, they face a lower demand elasticity. This implies that when a real exchange rate depreciates, less financially constrained firms can increase their markup more than others, or $\frac{\partial \mu_{id}^2}{\partial S_d \partial \varphi_i} < 0$ indicated by equation A.8. Similarly, when a real appreciation occurs, price faced by consumers increases and exporters respond by decreasing their markups, and less financially constrained firms will decrease more.

Figure A.1: **China's Bilateral Exchange Rates against U.S. Dollar**

This chart plots the monthly nominal and real exchange rates of RMB against U.S. dolars over the sample period of January 2001 through December 2006.

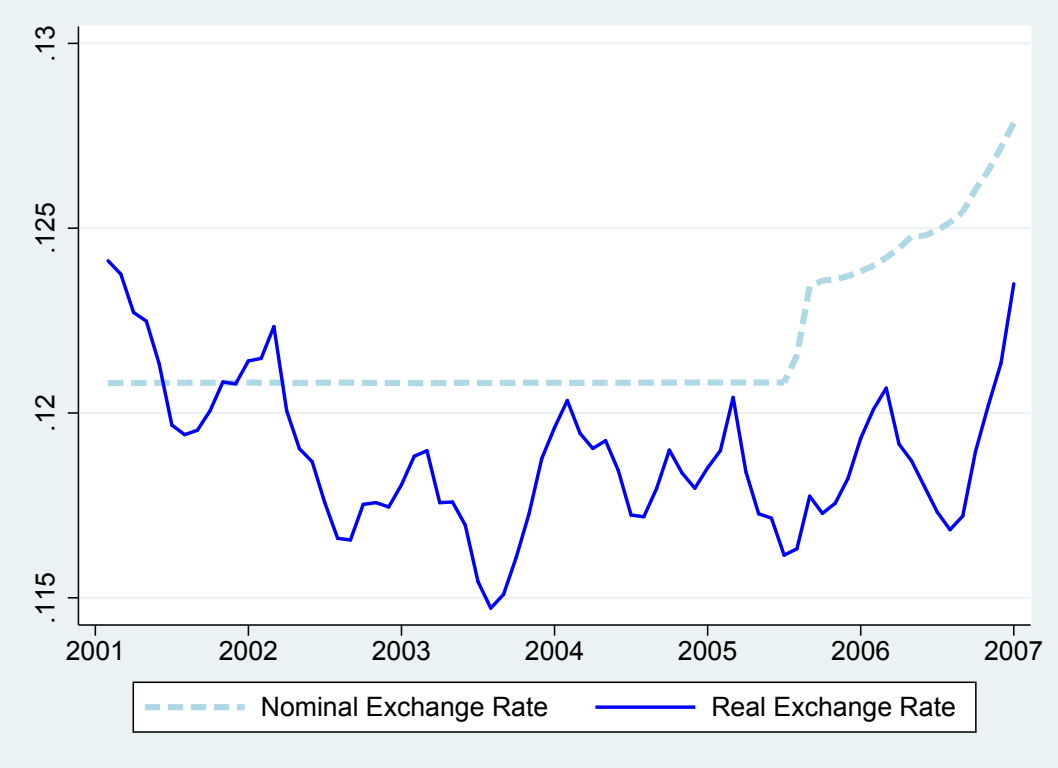

Figure A.2: **Timeline of China's Share-Split Structure Reform**

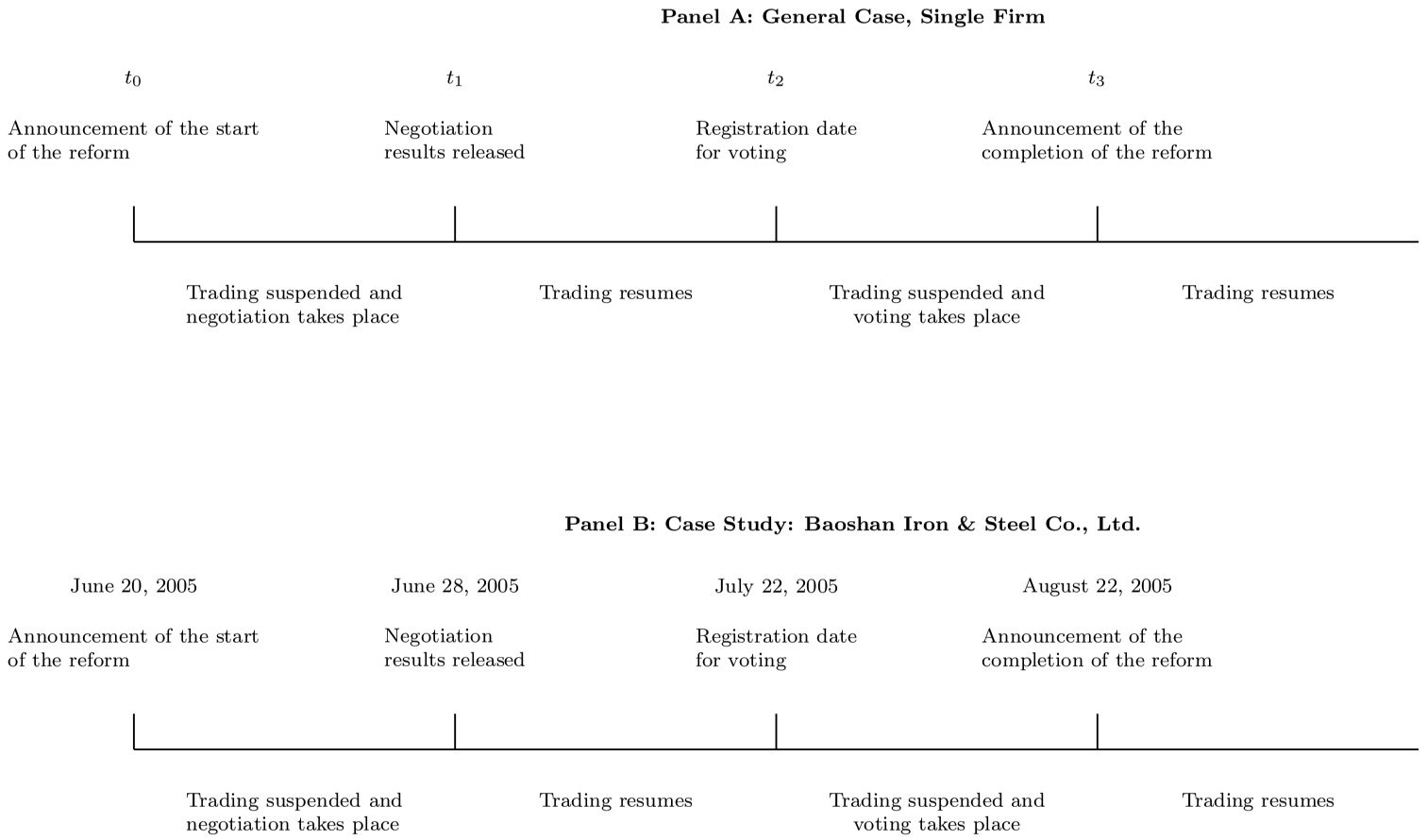

Table A.1: **Effect of Share-Split Structure Reform on Forced CEO Turnover**

This table presents estimates of the effect of the share-split structure reform on corporate outcomes for publicly listed firms that either export directly or through subsidiaries on the sample period of 2000-2006. The following regression is weighted by lagged firm assets:

$$Turnover_{i,t} = \alpha + \beta_1 \times Nontrade\%_i \times Post_{i,t} + \beta_2 \times Post_{i,t} + \beta_3 \times X_{i,t} + \theta_i + \theta_t + v_{i,t}.$$

$Nontrade\%_i$ is the number of non-tradable shares (as a percentage of total shares) owned by the top three largest non-tradable shareholders of firm i six months prior to the announcement of the share-split structure reform. $Nontrade\%_i$ is time invariant and is fully absorbed by firm fixed effects. The dependent variable is an indicator variable coded as 1 if the firm experienced forced CEO departure for reasons other than tenure expiration, retirement, personal health, and job transfer. In Panel A and B, two subsamples are formed based on whether the annualized stock return in the previous year is positive or negative. In Panel C and D, two subsamples are formed based on whether the return on total assets (ROA) in the previous year excesses 3% or not. Control variables include Ln(Total Assets), Long-term Debt, Cash holdings, ST, and BH. Please refer Table 1 for details. Standard errors are clustered at the industry level.

	All		SOE		Non-SOE	
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Negative Stock Returns					
Post	-0.148	-0.230	-0.217**	-0.304**	0.124	0.114
	(-1.62)	(-1.56)	(-2.43)	(-2.22)	(0.77)	(0.68)
Post × Nontrade%	0.258	0.285*	0.389**	0.403**	-0.146	-0.197
	(1.62)	(1.75)	(2.29)	(2.53)	(-0.49)	(-0.71)
N	1669	1669	1185	1185	484	484
adj. R^2	0.15	0.17	0.18	0.21	0.07	0.15
	Panel B: Positive Stock Returns					
Post	0.021	0.029	0.017	-0.030	0.135	0.406**
	(0.54)	(0.40)	(0.40)	(-0.70)	(0.70)	(2.10)
Post × Nontrade%	0.006	0.007	0.053	0.043	-0.462	-0.554
	(0.07)	(0.08)	(0.74)	(0.54)	(-1.11)	(-1.37)
N	1288	1288	902	902	386	386
adj. R^2	0.09	0.09	0.06	0.06	0.20	0.24
	Panel C: Low ROA					
Post	-0.120	-0.134*	-0.094	-0.083	0.014	-0.005
	(-1.53)	(-1.80)	(-1.17)	(-1.22)	(0.07)	(-0.03)
Post × Nontrade%	0.327**	0.311**	0.270*	0.256*	-0.020	-0.100
	(2.32)	(2.33)	(1.74)	(1.74)	(-0.05)	(-0.27)
N	1627	1627	1177	1177	450	450
adj. R^2	0.02	0.02	-0.01	0.00	0.06	0.05
	Panel D High ROA					
Post	0.010	-0.051	0.053	-0.111	0.062	0.305
	(0.14)	(-0.38)	(0.50)	(-0.77)	(0.49)	(1.27)
Post × Nontrade%	-0.007	0.235	-0.061	0.286	-0.151	-0.106
	(-0.03)	(1.11)	(-0.24)	(1.36)	(-0.57)	(-0.37)
N	813	813	536	536	277	277
adj. R^2	-0.07	0.02	-0.10	0.08	-0.03	0.09
Controls	X	X	X	X	X	X
Firm FE	X	X	X	X	X	X
Year FE		X		X		X

standard errors in parentheses

$*p < 0.10, **p < 0.05, ***p < 0.01$