Exchange Rate Regime Flexibility and Firms' Employment

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Abstract

This paper examines how exchange rate regime flexibility impacts the allocation of labor across firms. Specifically, we investigate how differences in labor-intensity or capital-intensity in production affect employment decisions under various degrees of exchange rate regime flexibility. In a simple theoretical model, we show that firms utilizing more labor-intensive production technologies are more likely to expand their employment when the exchange rate they face becomes less flexible. In contrast, firms employing more capital-intensive technology tend to hire more workers when the exchange rate is more flexible. We test our theory using extensive firm-level data from China and provide robust evidence supporting the theoretical predictions.

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1 Introduction

The relationship between exchange rates and the labor market has been extensively studied in the open economy literature. While earlier research has mainly explored the effects of exchange rates on employment at the country or industry level (Revenga, 1992; Campa and Goldberg, 2001; Klein et al., 2003), more recent studies have shifted focus to analyze the impact on individual firms (Nucci and Pozzolo, 2010; Ekholm et al., 2012; Dai and Xu, 2017). This shift is crucial because it improves the understanding of the mechanisms through which exchange rates influence firms' behavior. Despite the increasing focus on individual firms, the existing literature that uses disaggregate data to examine this relationship has overlooked two important aspects. First, few studies have emphasized how firms' varying characteristics drive their responses to exchange rate shocks differently. Second, most research has focused on the effect of real exchange rate *changes*, with limited attention given to the impact of exchange rate regime *flexibility* on firms' labor inputs. To address these gaps, this paper presents evidence on how firms adjust their employment in response to changes in exchange rate regime flexibility while also taking into account their specific characteristics.

To guide our empirical analysis, we develop a simple theoretical model that highlights the role of labor intensity in production and its effect on exchange rate regime flexibility changes on firms' employment decisions. One key aspect of our model is that firms set prices prior to sales. Assuming price rigidity as in Devereux and Engel (2003), firms' pricing decisions depend on their marginal costs and forecasts of future macroeconomic conditions. Unexpected shocks under the assumption of price rigidity can lead to deviations from desired prices, resulting in lower profits when marginal costs or future macro conditions are uncertain. In this open economy setup, we emphasize the role of exchange rate shocks – as they are particularly important for exporters – in determining firms' export prices. For firms that use capital-intensive production technologies, capital rental costs form a major component of marginal costs. As in this environment, the aggregate capital supply is predetermined, exchange rate adjustments may help to buffer shocks to the domestic capital demand, leading to less volatile changes in the capital rental rate and lower uncertainty for firms. Consequently, we show that flexible exchange rates could encourage firms to expand their employment. In contrast, for firms using labor-intensive production technologies, wages are the primary determinant of marginal costs. In many countries, a high degree of wage rigidity is common, which limits the response of marginal costs to shocks. In this scenario, exchange rate shocks are crucial to firms, especially exporters. Under a fixed exchange rate regime, firms face less uncertainty, which could lead to increased employment.

Empirically, we test our theoretical prediction using Chinese firm-level data from 2000 to 2013. We create a firm-level exchange rate regime flexibility index using firms' export information and analyze how changes in exchange rate regime flexibility affect the employment decisions of firms with different production technologies. We use data from China for two main reasons. First, Chinese firms export to a large number of countries worldwide, and the Chinese RMB has been pegged to the US dollar for a long time period. This has resulted in significant variations in the degree of exchange rate regime flexibility faced by Chinese firms across their exporting destinations. Second, China shifted from a peg system tied to the US dollar to a relatively more managed floating system against a basket of major currencies (that includes the US dollar) in July 2005. This change resulted in a more flexible bilateral exchange rate between China and the US, which provided us with a good opportunity to analyze the behavior of firms that mainly export to the US market before and after the policy change. Our results provide strong support for the theory we present, showing that firms with more labor-intensive technologies are more likely to increase their employment when exchange rate regime flexibility decreases, while those with more capital-intensive technologies are less likely to do so. We conduct several robustness checks and our results remain consistent across all of them.

Our study aligns with three developments in the literature. First, our work is related to a large body of research that focuses on the effect of exchange rate changes on the labor market. Revenga (1992) and Campa and Goldberg (2001) examine the effect of exchange rate movements on employment and wages in the US manufacturing industries. They find that exchange rates have significant implications for employment and smaller but still significant effects on wages. Goldberg et al. (1999), and Klein et al. (2003) investigate the role of exchange rates in affecting labor responses and demonstrate that an appreciation in exchange rates can lead to a significant increase in job reallocation. Moreover, Klein et al. (2003) highlight that job flows respond differently to real exchange rate movements, depending on whether they originate from cycles or trends. Gourinchas (1999) investigates the impact of exchange rate fluctuations on inter- and intra- sectoral job reallocation. More recent studies have shifted towards a more micro-level analysis of the labor market effect of exchange rate movements. Nucci and Pozzolo (2010), Ekholm et al. (2012), and Dai and Xu (2017) explore the effect of exchange rate changes on firms' behavior. Similar to our study, Dai and Xu (2017) use Chinese firm-level data and show that home currency appreciation reduces the relative employment growth in firms that rely more heavily on *exports*; and increases it in firms that rely more heavily on *imported* intermediate inputs. While most studies in this literature focus on the impact of real exchange rate changes, our paper aims to investigate how exchange rate regime flexibility affects firms' decisions.

Second, our work is related to the literature that analyzes the effect of exchange rate movements on trade. Frankel and Rose (2002) use data on over 200 countries to examine the effect of currency unions on trade. They find that a currency union triples a country's trade with other union members. Glick and Rose (2002) analyze the effect of leaving a currency union on trade and find that exiting a currency union leads to economically and statistically significant declines in bilateral trade. Klein and Shambaugh (2006) use the exchange rate regime index developed in Shambaugh (2004) and demonstrate that bilateral trade grows substantially after adopting an exchange rate peg. Moreover, Bergin and Lin (2012) construct a dynamic trade model to explain the dynamic response of trade to a monetary union. They find that the extensive margin of trade in new goods responded several years after EMU implementation and ahead of overall trade volume. More recently, there have been related microeconomic studies focusing on the effect of exchange rate changes on firms' trade with a focus on China and other countries for which rich granular data are available. For instance, Li et al. (2015) analyze Chinese exporters' reaction to RMB exchange rate movements and find that the RMB price response to exchange rate changes is very small, while the volume response is moderate and significant. Bolatto et al. (2022) use Italian firm-level data to investigate the heterogeneous responses of exporting firms to exchange rate movements. Their findings show that a domestic currency appreciation leads export intermediaries to decrease more their prices and less their export volume than direct manufacturing exporters.

Our paper contributes to the literature in two aspects. First, we provide a simple theoretical model to explain how exchange rate regime flexibility influences firms' expectations and affects their pricing and production decisions. This model is crucial in helping us understand the key mechanisms by which firms behave under various exchange rate regimes. Second, our paper highlights the role of firm characteristics in determining the effect of exchange rate regime flexibility on firms' employment. In particular, we emphasize the role of labor intensity in firms' production. Given the significant variations in labor intensity among Chinese firms, our analysis can provide valuable guidance to policymakers to enhance employment opportunities by examining and aggregating the impact of exchange rate regime changes on firms' employment across different labor intensity levels.

The rest of our paper is organized as follows. In Section 2, we propose a theoretical model that explains how the effect of exchange rate regime flexibility on firms' employment depends on labor intensity in production. Section 3 introduces the data used in the empirical analysis and describes the estimation strategy. Section 4 presents the empirical results. Finally, in Section 5, we provide concluding remarks.

2 Model

To guide our empirical analysis, we develop a simple theoretical model that examines how the choice of exchange rate regime can affect a firm's employmnet. Our model is based on a quasi-small open economy framework in which there are two countries: Home and Foreign. Foreign represents the aggregate of all other countries in the world, as in Gali and Monacelli (2005). Home is relatively small compared to Foreign, meaning that any changes in Home cannot have a significant impact on the Foreign market.

2.1 Households

Households have the same preferences in each country. For simplicity, we adopt a one-period model in our analysis. A representative household in the Home country maximizes the utility function specified as

$$\mathbb{E}\left[\log C + v\left(D\right)\right],$$

where C represents consumption and D denotes the real value of the investment portfolio at the end of the period. The function $v\left(D\right)$ expresses the utility derived from holding the investment portfolio. The portfolio choice is made prior to economic shocks. Hence, households will choose the investment portfolio based on their expectations about the future. Let q denote the real price of the portfolio, we can write down the budget constraint of the representative household as

$$C + qD + \frac{M}{P} \leq \frac{WL + R\bar{K} + \Pi + T}{P}$$

where M and T are nominal money balance held by the household and government transfer, respectively. L is the labor input by the representative household. P and W represent the nominal price of the final good and nominal wage rate, respectively. $\bar{K}$ is the capital stock endowment held by the household at the beginning of the period and R is the capital rental rate. We assume that all firms are owned by households and hence, aggregate profit by firms Π enters the income side of the representative household. For technical convenience, we assume a cash-in-advance constraint such that

$$PC \leq M \tag{1}$$

At the beginning of the period, before the realization of all shocks, private agents can trade Arrow-Debreu securities. The first order conditions with respect to investment portfolio is

$$1 = \mathbb{E}\left[\frac{v'\left(D\right)}{C^{-1}} q^{-1}\right] \tag{2}$$

Similar to the macroeconomic literature, the real stochastic discount factor Θ (used to discount the end of period real value to the beginning of the period) in our model is

$$\Theta = \frac{v'\left(D\right)}{C^{-1}} \tag{3}$$

International risk sharing As in the standard literature, the nominal exchange rate is determined by the international risk sharing condition. Let $\mathcal{E}$ denote the nominal exchange rate in Home, which is defined as the price of Foreign currency in terms of Home currency. Based on this definition, a rise in the value of $\mathcal{E}$ is associated with a depreciation in Home currency. To obtain analytical result, we assume two more assumptions in the rest of our analysis: i) perfect international risk sharing, and ii) $v(D)$ takes a linear form.

A first-order condition analogous to (2) must also hold for the representative household in Foreign to invest in the same investment portfolio[1]

$$1 = \mathbb{E}\left[\frac{v'(D^*)}{C^{*-1}}\left(\frac{\mathcal{E}P^*}{P}\right)q^{-1}\right] \tag{4}$$

Combining (2) and (4), the perfect risk sharing assumption implies that Home and Foreign residents value the investment portfolio similarly. Hence,

$$\frac{v'(D^*)}{C^{*-1}}\left(\frac{\mathcal{E}P^*}{P}\right) = \frac{v'(D)}{C^{-1}}$$

Under the assumption that $v(\cdot)$ is linear, we can derive the equilibrium nominal exchange rate as

$$\mathcal{E} = \frac{PC}{P^*C^*} \tag{5}$$

Note that the assumption that $v(D)$ takes a linear form greatly simplifies our analysis, however, it leads to the standard Backus-Smith condition as in the literature to pin down equilibrium exchange rate.

Final good The final good consists of two parts: Home-produced goods Y_H and Foreign produced goods Y_F imported by Home. The aggregation is as follows

$$Y = \frac{Y_H^{\gamma} Y_F^{1-\gamma}}{\gamma^{\gamma}(1-\gamma)^{1-\gamma}}$$

[1] To derive (4), we can write down the budget constraint for a representative Foreign household as

$$C^* + q^* D^* + \frac{M^*}{P^*} \leq \frac{W^*L^* + R^*\bar{K}^* + \Pi^* + T^*}{P^*},$$

where, to invest in the same portfolio in the international financial market, the no-arbitrage condition implies that the Foreign real price of the portfolio is

$$q^* = q\left(\frac{\mathcal{E}P^*}{P}\right)^{-1},$$

where $\mathcal{E}P^*/P$ is the real exchange rate. Then, the first order condition with respect to D^* implies (4).

where γ captures the share of Home produced goods in the final good basket. The aggregate demand for Home export by Foreign is exogenously given by the following relationship due to the assumption that Home is small

$$Y_H^* = \omega \frac{P^* Y^*}{P_H^*}$$

where ω is a constant. For simplicity and consistency with Gali and Monacelli (2005), we assume $\omega = 1 - \gamma$. Relaxing this assumption does not alter any of the qualitative results. Y_H and Y_F are aggregations over a continuum of differentiated goods as

$$Y_H = \left[\int_0^1 Y_H(i)^{\frac{\eta-1}{\eta}}\right]^{\frac{\eta}{\eta-1}}$$

$$Y_F = \left[\int_0^1 Y_F(i)^{\frac{\eta-1}{\eta}}\right]^{\frac{\eta}{\eta-1}}$$

where $\eta (> 1)$ captures the elasticity of substitution between any two differentiated goods produced by Home (Foreign) firms.

The rest of our model assumes, for simplicity, that the share of Home goods expenditure in the final good is 1/2, that is, $\gamma = 1/2$.

2.2 FIRMS

Firms use both labor and capital to produce. We assume the Cobb-Douglas production function in our model

$$Y(j) = \frac{AK(j)^{1-\alpha_j} L(j)^{\alpha_j}}{\alpha_j^{\alpha_j} (1-\alpha_j)^{1-\alpha_j}}$$

where $Y(j)$ denotes output by firm j. $K(j)$ and $L(j)$ are capital input and labor input by firm j, respectively. A is the economy-wide productivity shock. α captures the labor intensity in production. The Cobb-Douglas production function implies that the marginal cost of firm j is

$$MC(j) = \frac{R^{1-\alpha_j} W^{\alpha_j}}{A}$$

Output by firm j can be sold to domestic or foreign agents, $Y(j) = Y_H(j) + Y_H^*(j)$, where

$$Y_H(j) = \left(\frac{P_H(j)}{P_H}\right)^{-\eta} Y_H,\ Y_H^*(j) = \left(\frac{P_H^*(j)}{P_H^*}\right)^{-\eta} Y_H^* \tag{6}$$

and Y_H and Y_H^* are aggregate output sold to domestic and foreign agents, respectively. In our model, we assume local currency pricing for exporters, which means that the prices of Home's exported goods are denominated in foreign currency. To facilitate the rest of our analysis, we define $S_H(j)$ and $S_H^*(j)$ as the market shares of firm j in the domestic market and the export market among all Home firms, respectively. That is,

$$S_H(j) \equiv \frac{P_H(j)\, Y_H(j)}{P_H Y_H}, \text{ and } S_H^*(j) \equiv \frac{P_H^*(j)\, Y_H^*(j)}{P_H^* Y_H^*}$$

Using (6), we can show that

$$S_H(j) = \left(\frac{P_H(j)}{P_H}\right)^{1-\eta}, \text{ and } S_H^*(j) = \left(\frac{P_H^*(j)}{P_H^*}\right)^{1-\eta} \tag{7}$$

We assume price rigidity as in Devereux and Engel (2003), i.e., firms set their own prices before the realization of sales and shocks. A domestic producer chooses price decision $P_H(j)$ at the beginning of the period to maximize the present value of the real profit from the Home market. Specifically, the optimization problem is

$$\max_{P_H(j)} \mathbb{E}\left[\Theta \frac{(P_H(j) - MC(j))\, Y_H(j)}{P}\right]$$

where Θ, as previously defined, is the (real) stochastic discount factor. The first order condition with respect to $P_H(j)$ implies

$$P_H(j) = \frac{\eta}{\eta - 1} \frac{\mathbb{E}\left[\Theta P^{-1} MC(j)\, Y_H(j)\right]}{\mathbb{E}\left[\Theta P^{-1} Y_H(j)\right]} \tag{8}$$

For an exporter, the exporting price $P_H^*(j)$ is chosen to maximize the expected payoff from Foreign market

$$\max_{P_H^*(j)} \mathbb{E}\left[\Theta\left(\mathcal{E} P_H^*(j) - MC(j)\right) Y_H^*(j)\right]$$

The first order condition with respect to $P_H^*(j)$ implies

$$P_H^*(j) = \frac{\eta}{\eta - 1} \frac{\mathbb{E}\left[\Theta P^{-1} MC(j)\, Y_H^*(j)\right]}{\mathbb{E}\left[\Theta P^{-1} \mathcal{E} Y_H^*(j)\right]} \tag{9}$$

In equilibrium, we have

$$Y = C, \text{ and } Y^* = C^*$$

Under the assumption $\gamma = 1/2$, we have

$$Y_H(j) = \frac{1}{2}\left(\frac{P_H(j)}{P_H}\right)^{-\eta} \frac{PC}{P_H}, \text{ and } Y_H^*(j) = \frac{1}{2}\left(\frac{P_H^*(j)}{P_H^*}\right)^{-\eta} \frac{P^* C^*}{P_H^*} \tag{10}$$

Subsituting (10) into (8) and (9), note that prices are pre-determined, we can re-write prices

$P_H(j)$ and $P_H^*(j)$ as

$$P_H(j) = \frac{\eta}{\eta - 1}\mathbb{E}\left[MC(j)\right] \tag{11}$$

$$P_H^*(j) = \frac{\eta}{\eta - 1}\mathbb{E}\left[\frac{MC(j)}{\mathcal{E}}\right] \tag{12}$$

where we have used the definition of the stochastic discount factor, the assumption that $v(\cdot)$ is linear, and the Backus-Smith condition (5).

Two remarks are in order. First, it shows that optimal prices set by exporters rely on the expectations of their marginal costs denominated in Foreign currency. Therefore, nominal exchange rate flexibility will play a significant role in influencing firms' pricing decisions.

Second, if all shocks are log-normally distributed, the marginal costs in terms of Home or Foreign currency ($MC(j)$ and $MC(j)/\mathcal{E}$) are also log-normally distributed. Then firms are more likely to set higher domestic and export prices $P_H(j)$ and $P_H^*(j)$ as the volatilities in $MC(j)$ and $MC(j)/\mathcal{E}$ increase. This can be explained as follows. We can show that given any realized values of $MC(j)$ and $MC(j)/\mathcal{E}$, the optimal prices for domestic producers and exporters are $P_H(j) = \eta/(\eta-1)\,MC(j)$ and $P_H^*(j) = \eta/(\eta-1)\,MC(j)/\mathcal{E}$ if firms can freely set their prices. However, with price rigidity, firms need to set prices before the realization of these variables. This implies that firms' prices may deviate from the optimal flexible prices they wish to set. Mathematically, we can demonstrate that a negative deviation in the price $P_H(j)$ (or $P_H^*(j)$) from the optimal flexible price may result in much more rapid declines in profit than a positive deviation. Figure 1 shows such a pattern.[2] To understand the result intuitively, we decompose a firm's profit into two components. Considering domestic sales only, the first component is the profit earned from selling one unit of output, which is $P_H(j) - MC(j)$. The second component relates to the quantity sold to customers, which is $P_H(j)^{-\eta}$. This second component is log-linear, implying that a one percent deviation (either increase or decrease) from the optimal flexible price results in the same absolute change in quantity demanded. However, a one percent decrease from the optimal flexible price will cause a greater decline in unit profit than a one percent increase. This is due to the fact that changes in price have a more pronounced impact on unit profit as the price approaches the marginal cost. Therefore, we demonstrate that firms are more likely to set higher prices to avoid sharp declines in profits when they are uncertain about marginal costs. The greater the volatility in marginal costs, the higher the prices firms will set.

[2] In this example, we set η to 6 and assume that the realized value of the marginal cost in Foreign currency is $MC(j) = MC(j)/\mathcal{E} = 1$. The optimal price that maximizes the profit is $P_H^{opt}(j) = P_H^{*opt}(j) = \eta/(\eta-1)$. We plot the relationship between $(P_H(j) - MC(j))\,P_H(j)^{-\eta}$ (which is proportional to profit) and the percentage deviation of price $P_H(j)$ from its optimal level $P_H^{opt}(j)$.

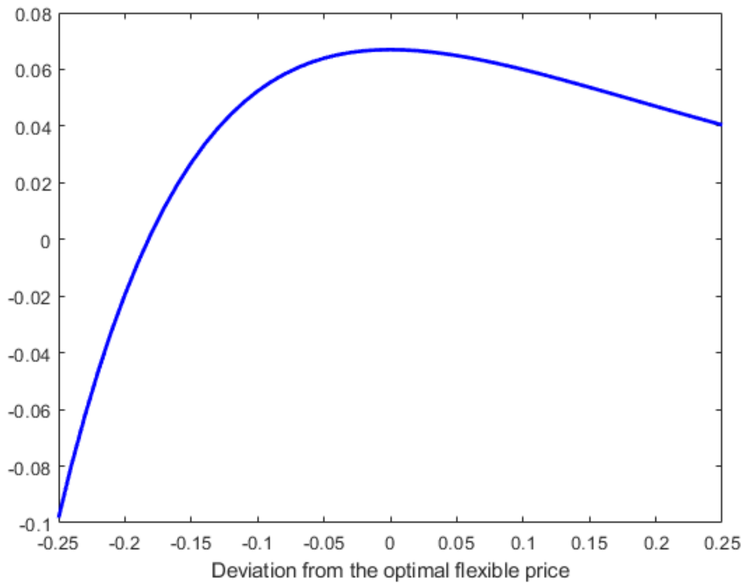

Figure 1: Profit vs Prices

2.3 GOVERNMENT

Since our main focus is on the impact of exchange rate regime choices on output and employment, we make a simplifying assumption regarding government behavior. Specifically, we assume that the government only adjusts the money supply through direct transfers in order to maintain a balanced budget. That is

$$M = T$$

2.4 FACTOR MARKETS

Labor market. We assume wage rigidity in our model such that the nominal wage is determined before the realization of all shocks. For simplicity, we set the wage rate at the beginning of the period to some reservation value $\bar{W}$, where $\bar{W}$ may depend on macroeconomic factors such as the expected CPI price index, GDP, etc. The wage rigidity assumption is adopted in our model to reflect the fact that nominal wages are not frequently adjusted if workers hold employment contracts. In equilibrium, due to the existence of wage rigidity, total employment is determined by the aggregate demand for labor. Although we mainly focus on how exchange rate flexibility affects individual firms' decisions rather than the general equilibrium of the labor market, this *ad hoc* wage rigidity assumption greatly simplifies the derivation without altering our main results regarding how exchange rate flexibility influences firms' behaviors.

Capital market. In equilibrium, the capital market clears. The market clearing condition is

$$R\bar{K} = \int_0^1 (1-\alpha_j)\, MC\,(j)\,(Y_H\,(j) + Y_H^*\,(j))\, dj \tag{13}$$

2.5 SHOCKS

In our model, Home producers face two types of shocks: supply shocks, which are represented by productivity shocks (A) in the Home economy; and demand shocks, which are represented by Home and Foreign nominal demand shocks (M and M^*). The supply shock follows a log-normal distribution, with $\log A$ drawn from $N(0, \sigma_a^2)$.

The model assumes that the Foreign nominal demand shock, denoted by $\log M^*$, is drawn from a log-normal distribution that is independent of any Home shocks, i.e., $\log M^* \sim N(0, \sigma_m^2)$. For simplicity, it is assumed that the home and foreign countries are symmetric and the steadystate exchange rate is equal to one. If Home adopts a fixed exchange rate regime such that the nominal exchange rate is set at its steady-state level ($\mathcal{E} = 1$), then

$$PC = P^*C^*$$

By the cash-in-advance constraint, we have

$$M = M^* \tag{14}$$

Under a fixed exchange rate regime, the stochastic characteristics of the Home money aggregate are assumed to be the same as those of the Foreign money aggregate. If Home adopts a flexible exchange rate, we assume that $\log M$ is independently drawn from the same distribution $N(0, \sigma_a^2)$. That is, the Home central bank aims to maintain its target money supply level, despite nominal shocks. In the benchmark model, we do not assume that M is responsive to the real shock A for simplicity. However, we discuss later in our analysis that our main theoretical results may still be robust even if we allow the money supply to respond to the real productivity shock.

2.6 LOG-LINEAR APPROXIMATION

We use log-linear approximations to solve the model by linearizing all equilibrium conditions. Appendix A provides a detailed exposition of the calculations. Let z denote the deviation of variable Z from its steady state $\bar{Z}$,[3] that is

$$z_t \equiv \log\left(\frac{Z}{\bar{Z}}\right)$$

Note that in the steady state, prices and output have the same values regardless of the exchange rate regime. Therefore, to analyze the differences in prices and output under different exchange rate regimes, we only need to compare the log deviations of these variables from their steady-state values. By using a log-linear approximation to firms' prices under the flexible exchange rate regime, we obtain the following results:[4]

$$p_H^{flexible} = w^{flexible} - \xi^{flexible} + \frac{(1-\alpha_j)^2\lambda^{-2}}{4}\sigma_m^2 + \frac{\sigma_a^2}{2} \tag{15}$$

$$p_H^{*flexible} = w^{flexible} - \xi^{flexible} + \left(1 + \frac{(1-\alpha_j)^2\lambda^{-2}}{4}\right)\sigma_m^2 + \frac{\sigma_a^2}{2} \tag{16}$$

where $\xi^{flexible}$ and $w^{flexible}$ are an aggregate index that contains information of all firms' price decisions and market shares, and the log nominal wage under flexible exchange rates, respectively. Under the fixed exchange rate regime, it is easy to show that

$$p_H^{fixed} = p_H^{*fixed} = w^{fixed} - \xi^{fixed} + \frac{(1-\alpha_j)^2\lambda^{-2}}{2}\sigma_m^2 + \frac{\sigma_a^2}{2} \tag{17}$$

where ξ^{fixed} and w^{fixed} are an aggregate index that contains information of all firms' price decisions and market shares and log nominal wage under fixed exchange rates, respectively.

3 EQUILIBRIUM

We now compute the differences in prices under different exchange rate regimes. For firms that operate in the domestic market, by (15) and (17), we have the following

$$p_H^{flexible}(j) - p_H^{fixed}(j) = \Delta w - \Delta\xi - \frac{(1-\alpha_j)^2\lambda^{-2}}{4}\sigma_m^2 \tag{18}$$

where $\Delta w \equiv w^{flexible} - w^{fixed}$, and $\Delta\xi \equiv \xi^{flexible} - \xi^{fixed}$. w is the log wage rate and ξ is a macro variable which is defined in Appendix A. For exporters,

$$p_H^{*flexible}(j) - p_H^{*fixed}(j) = \Delta w - \Delta\xi + \left(1 - \frac{(1-\alpha_j)^2\lambda^{-2}}{4}\right)\sigma_m^2 \tag{19}$$

[3] We define the steady state of variable Z as the value when there is no shock in the economy.

[4] See Appendix A for more details.

Lemma 1 *Under the assumptions that $v(\cdot)$ is linear and $\gamma = \frac{1}{2}$, we can show that*

$$\frac{\partial(p_H^{flexible}(j) - p_H^{fixed}(j))}{\partial \alpha_j} > 0 \text{ and } \frac{\partial(p_H^{*flexible}(j) - p_H^{*fixed}(j))}{\partial \alpha_j} > 0 \tag{20}$$

Proof. See Appendix B. ■

A few remarks are in order. Lemma 1 demonstrates that when firms use labor more intensively (i.e., α_j increases), they are more likely to set relatively lower prices under a fixed exchange rate regime in both domestic and foreign markets. However, this does not guarantee that a fixed exchange rate regime always results in absolutely lower prices compared to a flexible exchange rate regime, even when labor intensity is sufficiently high. Macroeconomic variables such as w and ξ, which may vary under different exchange rate regimes, also influence firms' pricing decisions. Thus, whether a fixed exchange rate regime or a flexible exchange rate regime can provide an absolute advantage for firms in setting more competitive prices is ambiguous.

Second, we can easily show that

$$p_H^{*flexible}(j) - p_H^{*fixed}(j) > p_H^{flexible}(j) - p_H^{fixed}(j),$$

that is, a fixed exchange rate regime is more likely to enable exporters to set relatively lower prices than domestic producers. The reason is straightforward. Based on our previous analysis, uncertainties lead firms to set higher prices to avoid potential profit loss. When exporting, exchange rate fluctuations become a significant source of uncertainty for firms. Therefore, limiting exchange rate volatility may potentially reduce the risks facing firms and help them set lower prices. Since exchange rate movements do not directly affect firms' pricing decisions in the domestic market, reducing exchange rate volatility does not have as significant an effect on these firms as it does on exporters.

Third, consider a special case where all firms employ the extreme labor-intensive technology in production, with $\alpha_j \to 1$. In this scenario, following the same steps outlined in Appendix A, we can show that $\Delta\xi$ becomes an increasing function of both $p_H^{flexible} - p_H^{fixed}$ and $p_H^{*flexible} - p_H^{*fixed}$, where we have dropped the firm index j due to symmetry in this case. If Δw is sufficiently low, for example the nominal wage rate is primarily determined by social norms which are relatively independent of monetary policies, it can be demonstrated that the fixed exchange rate regime yields absolutely lower prices for exporters. Due to continuity, even if firms differ in their production technologies α_j, as long as the Home production market is dominated by firms using very labor-intensive technologies, it is likely that choosing a fixed exchange rate regime will result in an absolute advantage by enabling exporters to set lower prices.

Fourth, under the scenario described in the third remark, why does a fixed exchange rate regime yield lower exporting prices for exporters that rely heavily on labor-intensive production technologies ($\alpha_j \to 1$)? This is because wage rigidity can make the marginal cost of production—which is mainly driven by labor costs—relatively insensitive to economic shocks. Specifically, the preset wage rate in our model is not influenced by exchange rate movements. In such cases, fixing the exchange rate can help to reduce fluctuations in the nominal exchange rate without significantly increasing the volatility in exporters' marginal costs. This, in turn, can help induce exporting firms to set lower exporting prices.

Fifth, consider another special case where all firms adopt extreme capital-intensive technology in production, i.e., $\alpha_j \to 0$. Our model demonstrates that flexible exchange rates can lead to lower prices for domestic producers if Δw is sufficiently low. This is because fluctuations in capital rental rates have a greater impact on the marginal cost of production when capital is a significant factor. It is worth noting that the equilibrium capital rental rate is determined by both domestic and foreign conditions. Since the capital stock is predetermined (as in the standard macroeconomics literature), the capital rental rate in a given period is primarily influenced by the demand for capital from domestic producers and exporters. When external shocks affect the domestic economy, the conventional wisdom suggests that the Home central bank can use flexible exchange rates to mitigate fluctuations in the demand for capital. This can help reduce uncertainty in capital rental rates faced by firms, which in turn may lead them to set lower prices. Again, due to continuity, even if firms adopt different α_j in production, as long as the domestic production is dominated by capital-intensive firms, it is still quite likely that flexible exchange rates yield lower prices for domestic producers.

We now investigate how exchange rate regime flexibility affects firm employment. Assuming that exporters operate in both domestic and foreign markets, we can show that the labor input by a firm is

$$L(j) = \frac{\alpha_j}{2} \frac{MC(j)}{\bar{W}} \left(P_H(j)^{-\eta} M + P_H^*(j)^{-\eta} M^* \right)$$

Given the realization of macro variables in period t, such as A, M and M^*, lower prices in either the domestic market ($P_H(j)$) or foreign market ($P_H^*(j)$) result in higher employment. We can present the following proposition.

Proposition 1 *Under the assumptions in Lemma 1, given any realized A, M, and M^*, we can show that*

$$\frac{\partial (L^{flexible}(j) - L^{fixed}(j))}{\partial \alpha_j} < 0$$

Proof. See Appendix C. ■

Given any realized values of A, M, and M^*, a firm's employment levels are determined by the preset prices in the domestic and foreign markets. Lower prices set by a firm in both markets typically result in higher employment. Based on Lemma 1, the impact of exchange rate flexibility on preset prices varies depending on the production technology. Specifically, as discussed previously, if production is dominated by labor-intensive firms and Δw is sufficiently low, the higher labor intensity leads exporters to set higher prices under flexible exchange rates. This has direct implications for employment: flexible exchange rates may be less favorable for encouraging firms to hire workers if the labor intensity is sufficiently high. Furthermore, even if there is variation in firms' labor-intensive technology, our model still indicates that firms with labor-intensive technologies are relatively more likely to hire more workers when the exchange rate is less flexible. In our empirical tests, we examine this theoretical prediction by controlling for industry-time fixed effects, which capture the aggregate variables $\Delta\xi$ and Δw in our model.

One potential caveat to our theory is that under a flexible exchange rate regime, the money aggregate M does not respond to real shock A. However, if the Home central bank could choose the optimal money supply by responding to both the real productivity shock A and the Foreign nominal demand shock, would a fixed exchange rate regime still be superior to a flexible exchange rate regime in encouraging firms to hire? Suppose we consider a more general rule for Home monetary policy where the money supply responds to both the real productivity shock and the Foreign nominal demand shock, such as in the following equation

$$\log M = a \log M^* + b \log A \tag{21}$$

As long as the labor intensity degree is sufficiently high in most firms, then the marginal costs facing firms are close to a pre-determined value. In this case, exchange rate fluctuations are the primary source of uncertainty in setting (export) prices. Therefore, the Home central bank may still want to increase the value of a and decrease the value of b in the money supply rule in (21) to encourage firms to hire more workers. Our main result when α_j is sufficiently high (i.e., $\alpha_j \to 1$) still holds in this case. However, if we allow wage to be relatively more flexible, the Home central bank may prefer to use the money supply to stabilize the Home economy by responding more strongly to the domestic supply shock, while allowing the exchange rate to be flexible.

4 Data and empirical specification

To verify our theoretical predictions, we conduct an empirical analysis to investigate the impact of exchange rate regime flexibility on employment and prices at the firm level in China. Our study utilized a database that incorporates variables from various datasets, including China's Customs Statistics, the Annual Survey of Industrial Enterprises Database, and the bilateral exchange rate regime data in Klein and Shambaugh (2008).[5] Our analysis spanned from 2000 to 2013, and we provide a more detailed interpretation of the data below.

4.1 Data

Before presenting the empirical analysis, we will provide an explanation of how we constructed the major indices used in our empirical analysis.

Exchange rate regime flexibility The key variable in the empirical analysis is the exchange rate regime flexibility faced by firms, which is constructed in two steps.

First, an exchange rate regime flexibility index is constructed between China and its export destinations, utilizing the bilateral exchange rate regime measure in Klein and Shambaugh (2008) denoted by $kspeg_{ijt}$. Specifically, $kspeg_{ijt}$ takes value one if two countries in a pair have a direct peg to each other and zero otherwise.[6] However, the $kspeg_{ijt}$ index does not capture indirect pegs between countries. For instance, if China and Country i are both pegged to the Country U (the so-called "sibling" relationship defined in Klein and Shambaugh (2008)), the exchange rate between China and Country i is actually quite stable (we call this relationship indirect peg) but it is not included in $kspeg$ index. To address this issue, a dummy variable $inkspeg_{ijt}$ takes value one if an indirect peg exists for a pair of countries and zero otherwise. In our regressions, we define a variable $fixed_{cit}$ to represent the fixed exchange rate regime between China and the exporting destination country i, where $fixed_{cit} = kspeg_{cit} + inkspeg_{ci}$. This means that we consider both direct and indirect pegs as fixed exchange rate regimes.

In the second step, we construct a firm-level exchange rate regime flexibility index using export information from China's Customs Statistics. Since firms trade with different partners and export to different destinations, they face varying degrees of exchange rate flexibility. To capture this heterogeneity, we construct an export-weighted exchange rate regime flexibility index

[5] The exchange rate index has been updated to include years up to 2018.

[6] Data is available on Prof. Shambaugh's personal website at: https://iiep.gwu.edu/jay-c-shambaugh/data/. As in Shambaugh (2004), we define a country as having a direct peg with a base country in a particular year if it: shares a bilateral exchange rate within ±2% band with a base country; and maintains a perfect flat peg to a base country's currency in 11 out of 12 months. We exclude exchange rates that are maintained within the ±2% band for only one year.

for all firms in our sample.

$$fixed_{kt} \equiv \sum_{i=1}^{N} \overline{\left(\frac{Export_{ki}}{Export_k}\right)} \times fixed_{cit} \tag{22}$$

$$peg_{kt} \equiv \sum_{i=1}^{N} \overline{\left(\frac{Export_{ki}}{Export_k}\right)} \times kspeg_{cit} \tag{23}$$

$$inpeg_{kt} \equiv \sum_{i=1}^{N} \overline{\left(\frac{Export_{ki}}{Export_k}\right)} \times inkspeg_{cit} \tag{24}$$

where N is the number of export destination countries, and k, c, and i represent firm k, China, and export destination Country i, respectively. The term $\overline{\left(\frac{Export_{k,i}}{Export_k}\right)}$ denotes the average share of firm k's export to Country i in its total export over the entire sample period. The variables $fixed_{cit}$, $kspeg_{cit}$, and $inkspeg_{cit}$ are the bilateral exchange rate regime indicators between China and Country i at time t defined in the first step. To avoid potential endogeneity issues, we use the average export share over the sample period to construct the firm-level exchange rate regime flexibility index.

Firm-level employment The employment data used in our analysis at the firm level is obtained from the Annual Survey of Industrial Enterprises Database, which covers over 160,000 manufacturing firms. China's National Bureau of Statistics conducts an annual survey of manufacturing enterprises to collect and maintain this dataset. While this dataset contains rich information, some variables in it are noisy, largely due to misreporting by certain firms. To address this issue, we adopt the approach of Feenstra et al. (2014) and use the following criteria to remove from the sample: (i) firms with less than eight employees; (ii) firms with a gross value of industrial output below 5,000 RMB; (iii) firms with accumulated depreciation below the current year's depreciation; (iv) firms with total assets lower than liquid assets; (v) firms with paid-in capital less than zero; and (vi) firms with missing key financial variables such as total assets, net value of fixed assets, and sales.

Labor intensity The labor intensity of a firm is a measure of the importance of labor input in the production process. In our model, the labor intensity measures the share of labor cost in the total production cost. As detailed cost structure information is not available in our data, we use two proxy measures to capture labor intensity. For the baseline regressions, we compute the labor intensity index by taking the average ratio of total wage payment to firms' value-added over the whole sample period. In the robustness checks, we use an alternative measure by taking the average ratio of total wage payment to firms' sales over the sample period. To avoid any potential endogeneity issues, we take the average value of the two ratios during the entire sample period. In our empirical estimations, we remove observations with extreme values of labor intensity. Specifically, we exclude observations with negative labor intensity (resulting from negative value added in the data) and those with labor intensity values greater than one.

Prices Our theory suggests that exchange rate regime flexibility affects firm-level employment by influencing the prices set by firms. Therefore, in our empirical analysis, we aim to test this mechanism. However, a significant challenge in such tests is the absence of a direct measure for prices. To address this issue, we adopt the method used by Li et al. (2015) and construct firms' export prices as follows. We use indices k, p, i, and t to represent the firm, product, export destination, and year, respectively. We define the export price of product p by firm k to country i in year t as the ratio of trade value $Value_{k,p,i,t}$ to trade volume $Quantity_{k,p,i,t}$. In other words, we use the unit value of exported goods as a proxy for the export price.

Other variables We also include the logarithm of the real exchange rate at the firm level ($\log rer$) in all regressions, in addition to our key regressors, which are the firms' exchange rate regime flexibility measures. We construct the index ($\log rer$) in a similar way as the firm's exchange rate regime flexibility measure. Specifically, the firm k's real exchange rate is computed as

$$logrer_{kt} \equiv \sum_{i=1}^{N} \overline{\left(\frac{Export_{k,i}}{Export_k}\right)} \times \log(rer_{cit}) \tag{25}$$

where $\log(rer_{cit})$ is the real exchange rate between China and the export destination country i at time t. It represents the price of country i's currency in terms of Chinese RMB. An increase in $rer_{k,t}$ implies a depreciation in the real exchange rate faced by firm k.

To account for the influence of individual firms' characteristics on employment, we incorporate a range of control variables in our regression models. These include: firm size measured as the log of a firm's total assets; the log of the average wage paid by a firm; export status, i.e. a dummy variable that equals one if a firm exports in a given period and zero otherwise; firms' net profit margins calculated as firms' earnings after interest and taxes divided by total sales revenues; firms' leverage ratios; firm age; and a subsidy dummy variable which equals one if a firm receives a government subsidy and zero otherwise. We obtain information on all of these variables from the Annual Survey of Industrial Enterprises.

Table 1 provides the summary statistics for the main variables used in regressions.

4.2 Empirical Specification

We test the relationship between degree of exchange rate flexibility and firm-level employment by estimating the following empirical specification:

$$\log(emp_{kt}) = \beta_0 + \beta_1 \cdot fixed_{kt} + \beta_2 \cdot (labor_k \times fixed_{kt}) + Z'_{kt}\lambda + \gamma_{ht} + \gamma_k + \epsilon_{kt} \tag{26}$$

where subscripts k, h and t denote firm, industry at the CIC 4-digit level[7] and year, respectively. $\log(emp)_{kt}$ is the log of firm i's employment in year t. The variable $fixed_{kt}$ denotes the exchange rate regime flexibility faced by firm k at time t. A rise in exchange rate regime flexibility is associated with a decrease in $fixed_{kt}$. The specification (26) includes the interaction term between labor intensity and exchange rate regime flexibility, $labor_k \times fixed_{kt}$. The coefficient on the interaction term indicates the extent to which labor intensity affects the effect of exchange rate regime flexibility on firms' employment. The set of firm-level variables we introduced in the previous section is captured by Z_{kt}. We control for firm fixed effect γ_i to capture any time-invariant characteristics that are specific to firms, and the industry-time fixed effect γ_{ht} to capture the effect of common macro-shocks to firms within the same industry. ϵ_{kt} is the error term. In our regressions, we cluster the standard error at the firm level. Our theory predicts that $\beta_1 < 0$ and $\beta_2 > 0$.

To disentangle the effects of direct and indirect pegs on firms' employment, we decompose the index $fixed_{k,t}$ into $peg_{k,t}$ and $inpeg_{k,t}$ and estimate the following equation

$$\begin{aligned}\log(emp_{kt}) =& \beta_0 + \beta_1 \cdot peg_{kt} + \beta_2 \cdot (labor_k \times peg_{kt}) \\ &+ \theta_1 \cdot inpeg_{kt} + \theta_2 \cdot (labor_k \times inpeg_{kt}) + Z'_{kt}\lambda + \gamma_{ht} + \gamma_k + \epsilon_{kt}.\end{aligned} \tag{27}$$

Our theoretical framework predicts that $\beta_1 < 0, \theta_1 < 0$ and $\beta_2 > 0, \theta_2 > 0$.

5 Empirical Results

5.1 Baseline results

The results of the baseline regressions for specifications (26) and (27) are presented in Table 2. In Columns (1) and (3), we investigate how the impact of exchange rate regime flexibility, as measured by $fixed$, on firms' employment varies depending on the labor intensity in their production processes. In both columns, the coefficients on $fixed$ are negative and statistically significant at the 1% level. This suggests that as labor intensity approaches zero, a lower degree

[7] CIC represents the industry classification in the China Industry Classification system.

of exchange rate flexibility (a higher value of *fixed*) leads to reduced firm employment. Furthermore, the coefficients on the interaction term between labor intensity (*labor*) and exchange rate regime flexibility (*fixed*) in both columns are positive and statistically significant at the 1% level. This implies that as firms adopt more labor-intensive technology in production, a lower degree of exchange rate flexibility (a higher value of *fixed*) is more likely to encourage firms to expand their employment.

Columns (2) and (4) report the results when we decompose the measure *fixed* into direct peg (*peg*) and indirect peg (*inpeg*). We can see that the coefficients on the direct and the indirect pegs are all negative and statistically significant, while the coefficients on the interaction term $labor \times peg$ and $labor \times inpeg$ are positive and statistically significant. The result is again consistent with the theoretical prediction. Interestingly, the coefficient on the interaction term $labor \times inpeg$ is larger than the coefficient on $labor \times peg$, which suggests that changes in the indirect peg index under a certain level of labor intensity have greater impacts on firms' employment than changes in the direct peg index.[8]

The coefficients on the real exchange rate measure in all columns are positive and statistically significant. This finding is consistent with Dai and Xu (2017) who found that exchange rate depreciation leads firms to increase their hiring.

We now examine the quantitative effect of changes in exchange rate regime flexibility on firms' employment. Specifically, we consider a scenario where *fixed* increases by one standard deviation, which amounts to a rise of 0.248 according to Table 1. Drawing on the estimation outcome in Column (3), we find that at a low labor intensity level ($labor = 0.06$, the 10th percentile value of labor intensity in our sample), the change in exchange rate regime flexibility reduces firms' employment by 1.7%, with a statistically significant effect. In contrast, at a high labor intensity level ($labor = 0.55$, the 90th percentile value of labor intensity in our sample), the same change in exchange rate regime flexibility boosts firms' employment by 2.3% (also with a statistically significant effect).

5.2 Robustness Checks

In this section, we perform several robustness checks: (i) adopting alternative measures of our key regressors (labor intensity and exchange rate regime flexibility); (ii) alternative samples by excluding the period of the global financial crisis (GFC henceforth), processing trade firms, trade intermediaries, and state-owned enterprises; (iii) using base-year export as the weight to construct firm-level exchange rate regime flexibility; and (iv) testing the theoretical prediction using the policy shock in the bilateral exchange rate regime between China and the US.

[8] As our theory does not provide a detailed analysis of the difference between the direct peg and the indirect peg, we do not attempt to empirically explain the pattern in this paper. Instead, we leave it for future research.

Alternative measures of labor intensity and exchange rate regime flexibility In this robustness check, we re-estimate the baseline regressions by adopting alternative measures of the key regressors, labor intensity, and exchange rate regime flexibility index.

To construct an alternative measure for labor intensity, we calculate the average firms' wage payment-to-sales ratio during the whole sample period and use the new labor intensity measure in our regressions. The regression results are reported in Columns (1) and (2) in Table 3. We observe that the coefficients on the exchange rate regime flexibility itself are still negative and statistically significant, while the coefficients on the interaction between labor intensity and exchange rate regime flexibility are positive and statistically significant. This indicates that our baseline results are robust to different labor intensity measures.

Second, we construct a new exchange rate regime flexibility index for firms using a different methodology. Specifically, we use the industry-level export share as the weight to compute exchange rate regime flexibility, rather than the firm-level export share, as in the baseline analysis. The formula for the new index is as follows.

$$fixed_{kt} \equiv \sum_{i=1}^{N} \frac{Export_{hi}}{Export_h} \times fixed_{cit} \tag{28}$$

$$peg_{kt} \equiv \sum_{i=1}^{N} \frac{Export_{hi}}{Export_h} \times kspeg_{cit} \tag{29}$$

$$inpeg_{kt} \equiv \sum_{i=1}^{N} \frac{Export_{hi}}{Export_h} \times inkspeg_{cit} \tag{30}$$

$$logrer_{kt} \equiv \sum_{i=1}^{N} \frac{Export_{hi}}{Export_h} \times logrer_{cit} \tag{31}$$

where k and h denote firm and industry, respectively. The rationale behind using the industry export share ($Export_{hi}/Export_h$) as the weight to construct the new exchange rate regime flexibility index is as follows. In our baseline measure, the effect of exchange rates between China and country i on Chinese firms' export decisions are excluded if the firms do not export to country i. However, such decisions may actually reflect the exchange rate effect on firms' exports. For instance, if the Chinese RMB is expected to be too strong compared to country i's currency, firms may choose not to enter country i's market. This issue can be addressed by using industry export as the weight to construct the exchange rate measures as industry-level export usually covers many more destinations than most single firms within the industry. As the exchange rate regime flexibility is now constructed by using industry export, we cluster the standard errors at the industry level in the regressions.

The estimation results using the alternative exchange rate regime flexibility measures are reported in Columns (3) and (4). It should be noted that the effect of exchange rate regime flexibility (and the real exchange rate) on firms' employment is now captured by the industry-time dummy, and hence only the interaction terms between labor intensity and exchange rate regime flexibility remain in this regression. The positive and statistically significant coefficients on those interaction terms confirm the robustness of our baseline results.

Excluding the GFC period, processing trade producers, trade intermediaries, and state-owned enterprises To examine the robustness of our findings, we estimate the relationship between exchange rate regime flexibility and firms' employment under various sample treatments. Specifically, we consider four sample treatments: (i) excluding the GFC periods, (ii) excluding processing trade producers, (iii) excluding trade intermediaries, and iv) excluding state-owned enterprises (SOEs).[9] Tables 4 and 5 report the regression results, and we find that they are consistent with our baseline estimation.

Using base year export to construct firm-level exchange rate regime flexibility In this robustness check, we use the base-year export share to construct the exchange rate regime flexibility measures, which is an alternative method to deal with potential endogeneity issues. Table 6 presents the regression results, and we observe that they are mostly consistent with our baseline results. All coefficients on the interaction terms between exchange rate regime flexibility and labor intensity are positive and statistically significant. Additionally, the coefficients on the exchange rate regime flexibility measures are negative, and most of them are statistically significant. However, the sample sizes in this check are smaller than our baseline estimation, primarily because many firms do not export in the base year, and we do not have the exchange rate regime flexibility measure for those firms.

The policy shock in the exchange rate regime between China and the US In July 2005, China shifted from a peg system (tied to the US dollar) to a relatively more managed floating system against a basket of major currencies that includes the US dollar. This led to a more flexible bilateral exchange rate between China and the US. According to our theory, firms that export to the US market and use more (less) capital-intensive technologies in production are expected to expand (shrink) their employment in response to the exchange rate shock. To test this relationship, we restrict our sample to firms that only export to the US market and estimate the following regression:

$$\log(emp_{kt}) = \beta_0 + \beta_1 \cdot (labor_k \times post\ 2006\ dummy) + Z'_{kt}\lambda + \gamma_{ht} + \gamma_k + \epsilon_{kt} \tag{32}$$

[9] We define a firm as an SOE if more than 50% of the firm's total capital stock is state-owned.

where the dummy variable *post* 2006 *dummy* takes value one for any period after the year 2006 (including 2006) and zero otherwise. Theory predicts that $\beta_1 < 0$.

Table 7 presents the regression results. In Columns (1) and (2), we report the coefficients for the variable *post* 2006 *dummy*, without controlling for any time trend. The coefficients are positive and statistically significant, indicating an initial finding. Conversely, the coefficients for the interaction term $labor \times post$ 2006 *dummy* are negative and also statistically significant, supporting our theoretical prediction that, following the exchange rate regime shock, labor-intensive firms are less likely than capital-intensive firms to expand their employment. In Columns (3) and (4), after including the industry-time fixed effect, the coefficients on the $post - 2006$ dummy decrease, yet the coefficients on the interaction term $labor \times post$ 2006 *dummy* remain negative and statistically significant, confirming the robustness of our findings. It is important to note that the coefficient on the real exchange rate term is negative in Column (1) of Table 7. This could be due to the absence of control for the time trend in this regression. When the $Industry \times Time$ fixed effect is added, the coefficient on the real exchange rate term turns positive, suggesting that an exchange rate depreciation leads to higher levels of employment for firms. Furthermore, the *post* 2006 *dummy* may encompass macroeconomic changes other than exchange rate regime reform in China during the same period. Although we account for firms' characteristics and industry-time fixed effects to capture the effects of other economic shocks on firms, the estimated coefficients might still capture some unintended effects. Therefore, we consider this analysis primarily as a robustness check.

To summarize, we have conducted robustness checks to confirm that our main theoretical prediction holds. There are two more empirical tests we wish to conduct. The first test is to examine whether variations in wage rigidity will impact firms' employment decisions under different degrees of exchange rate regime flexibility. As we have shown in our theoretical framework, a higher degree of wage rigidity increases the likelihood of firms expanding employment under a fixed exchange rate regime. Regrettably, we lack the micro-level data to measure wage rigidity for Chinese firms. Therefore, we are unable to conduct an empirical analysis on wage rigidity and defer it to future research.

The second empirical test we wish to examine is whether our theoretical prediction holds under different assumptions regarding currency pricing. Specifically, Gopinath et al. (2020) highlight the importance of a dominant currency in international trade and suggest that changes in trade prices are primarily linked to fluctuations in the invoice currency, often the US dollar in many countries. Thus, it will be valuable to investigate how the dominant currency paradigm affects the relationship between exchange rate regime flexibility and firms' behavior. Unfortunately, our data indices do not contain information on the invoice currency, preventing us from directly examining the impact of dominant currency pricing on firms' employment and prices. Nonetheless, we provide a theoretical framework in Appendix E under the dominant currency pricing assumption, demonstrating that the bilateral exchange rate regime flexibility between the home country and the US will be significant in firms' decisions if the US dollar serves as an invoice currency. Furthermore, we present suggestive evidence in Appendix E that supports our theory under the dominant currency paradigm.

5.3 Testing the mechanism

Our theoretical framework suggests that the prices set by firms play a crucial role in shaping their employment decisions. When firms set lower prices, they become more competitive in both domestic and foreign markets, leading to increased hiring. As explained in Lemma 1, the impact of exchange rate regime flexibility on firms' price decisions is contingent upon their production technology. Specifically, when labor intensity is high, firms are more likely to set lower prices under a relatively fixed exchange rate regime. However, this pattern weakens as labor intensity decreases. When labor intensity in production is low enough, exporting firms may actually set lower prices under a flexible exchange rate regime. In this section, we empirically test these theoretical predictions.

One challenge in our empirical analysis is the lack of a direct measure of firm prices. To address this issue, we follow the approach taken by Li et al. (2015) and construct firms' export prices using data from China's customs statistics. Specifically, we define the export price of product p by firm k to destination country i at time t as $price_{k,p,i,t}$. This export price is calculated by dividing the trade value of product p that firm k exports to country i in year t ($Value_{k,p,i,t}$) by the trade volume of product p that firm k exports to country i in the same year ($Quantity_{k,p,i,t}$). To avoid the potential effect of the GFC shock on prices through the exchange rate channel, we limit our sample period to the years between 2000 and 2007 for our estimation.

The empirical specification is as follows

$$\log(price)_{k,p,i,t} = \beta_0 + \beta_1 \cdot fixed_{c,i,t} + \beta_2 \cdot (labor_k \times fixed_{c,i,t}) + Z_{k,t}\lambda + \gamma_{k,p,i} + \gamma_t + \epsilon_{k,p,i,t} \quad (33)$$

where $fixed_{c,i,t}$ is the bilateral exchange rate regime index between China and Country i at time t. As in our previous analysis, $fixed_{c,i,t} = kspeg_{c,i,t} + inkspeg_{c,i,t}$ where $kspeg_{c,i,t}$ and $inkspeg_{c,i,t}$ are direct peg and indirect peg, as in Klein and Shambaugh (2008). $fixed_{c,i,t}$ takes value one if China pegs RMB to Country i's currency and zero otherwise. $Z_{k,t}$ is a set of firm characteristics as in our previous regressions. We use the same fixed effect combination as in Li et al. (2015), where $\gamma_{k,p,i}$ represents the firm-product-exporting country fixed effect and γ_t represents the time fixed effect. According to our theory, we expect $\beta_1 > 0$ and $\beta_2 < 0$.

To account for the potentially varying effects of direct pegs and indirect pegs on price levels, we perform the estimation as follows

$$\begin{aligned}\log(price)_{k,p,i,t} =& \beta_0 + \beta_1 \cdot kspeg_{c,i,t} + \beta_2 \cdot (labor_k \times peg_{c,i,t}) \\ &+ \theta_1 \cdot inpeg_{c,i,t} + \theta_2 \cdot (labor_k \times inpeg_{c,i,t}) + Z_{kt}\lambda + \gamma_{k,p,i} + \gamma_t + \epsilon_{k,p,i,t}.\end{aligned} \tag{34}$$

Our theory predicts that $\beta_1 > 0, \theta_1 > 0$ while $\beta_2 < 0, \theta_2 < 0$.

Table 8 shows the estimation results. In Columns (1) and (2), the estimations are conducted using the full sample. Based on Column (1)'s estimation result, we can see that the coefficient on the fixed exchange rate index is positive while the coefficient on the interaction term between fixed exchange rate and labor intensity is negative. Both of them are statistically significant. The estimation result is consistent with the theoretical prediction. In Column (2), when we separate the direct peg and indirect peg, we can show that the coefficients on the direct peg and indirect peg are both positive, while the coefficients on the interaction terms between the exchange rate regime flexibility measures and labor intensity are both negative. Again, all coefficients are statistically significant. In Columns (3) and (4), we drop processing trade producers from the sample. In Columns (5) and (6), we exclude processing trade producers as well as trade intermediaries from the sample. The regression results are similar to the ones in Columns (1) and (2), suggesting that the empirical relationship between exchange rate regime flexibility and export prices is consistent with the theoretical predictions.

6 Concluding Remarks

In conclusion, our study sheds light on the role of exchange rate regime flexibility in influencing the allocation of labor across firms. Through our simple theoretical model, we demonstrate that firms that rely on more labor-intensive production methods are likely to increase their employment levels when the exchange rate is less flexible. Conversely, firms utilizing more capital-intensive technology tend to hire more workers when the exchange rate is more flexible.

Our empirical analysis, which utilizes extensive firm-level data from China, provides strong evidence in support of our theoretical predictions. We find that the observed empirical pattern is robust to various robustness checks.

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Tables

Table 1: Description of variables and summary statistics

Variable	Descriptions	Obs.	Mean	Std.Dev.
log emp	Log employment (number of employees)	2,362,639	4.85	1.12
labor	Labor intensity	2,362,639	0.276	0.197
fixed	Fixed exchange rate	465,177	0.141	0.248
peg	Direct peg	465,177	0.107	0.229
inpeg	Indirect peg	465,177	0.034	0.115
log rer	Log real exchange rate	465,177	0.266	1.37
log wage	Log average firm wage payment	1,881,272	-2.04	0.622
export status	Equal to one if firm exports in the current period, zero otherwise	2,362,639	0.323	0.468
Proft margin	Net profit margin	2,306,204	0.036	0.180
Leverage ratio	Leverage ratio	2,362,639	0.494	2.30
Age	Firm age	2,362,639	10.84	9.75
Subsidy dummy	Equal to one if firm receives government subsidy in the current period, zero otherwise	2,361,857	0.253	0.435

Note: The summary statistics are based on the sample that excludes the extreme values of labor intensity measures.

Table 2: Baseline Regression Results

	(1)	(2)	(3)	(4)
$labor \times fixed$	0.209***		0.337***	
	(0.021)		(0.023)	
$labor \times peg$		0.196***		0.315***
		(0.024)		(0.027)
$labor \times inpeg$		0.336***		0.457***
		(0.048)		(0.048)
$fixed$	-0.037***		-0.091***	
	(0.009)		(0.010)	
peg		-0.045***		-0.088***
		(0.011)		(0.013)
$inpeg$		-0.040**		-0.112***
		(0.019)		(0.019)
$log\ rer$	0.047***	0.048***	0.039***	0.039***
	(0.003)	(0.003)	(0.003)	(0.003)
Control variables	NO	NO	YES	YES
$Industry \times Time$ FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
R-squared	0.883	0.883	0.938	0.938
Observations	432,972	432,972	305,765	305,765

Note: Robust standard errors (in parentheses) are clustered at the firm-level, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Control variables include log average wage payment, export status, profit margin, leverage ratio, firm age and the dummy variable that shows whether the firm receives a subsidy from the government or not.

Table 3: Alternative Measures

	Labor Intensity		EX Rate Regime Flexibility	
	(1)	(2)	(3)	(4)
$labor \times fixed$	0.645***		0.147***	
	(0.067)		(0.015)	
$labor \times peg$		0.606***		0.168***
		(0.074)		(0.022)
$labor \times inpeg$		1.003***		0.103***
		(0.182)		(0.035)
$fixed$	-0.027***			
	(0.009)			
peg		-0.027***		
		(0.010)		
$inpeg$		-0.045***		
		(0.018)		
$log\ rer$	0.039***	0.039***		
	(0.003)	(0.003)		
Control variables	YES	YES	YES	YES
$Industry \times Time$ FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
R-squared	0.938	0.938	0.929	0.929
Observations	305,765	305,765	1,676,610	1,676,610

Note: In Columns (1) and (2), robust standard errors (in parentheses) are clustered at the firm level. In Columns (3) and (4), robust standard errors (in parentheses) are clustered at the industry level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Control variables include log average wage payment, export status, profit margin, leverage ratio, firm age, and the dummy variable that shows whether the firm receives a subsidy from the government or not.

Table 4: Excluding GFC and Processing Trade

	Excluding GFC		Excluding Processing Trade	
	(1)	(2)	(3)	(4)
$labor \times fixed$	0.171***		0.364***	
	(0.029)		(0.027)	
$labor \times peg$		0.179***		0.326***
		(0.035)		(0.033)
$labor \times inpeg$		0.189***		0.501***
		(0.056)	(0.051)	
$fixed$	-0.025*		-0.098***	
	(0.013)		(0.011)	
peg		-0.038**		-0.091***
		(0.017)		(0.014)
$inpeg$		-0.011		-0.125***
		(0.022)		(0.020)
$log\ rer$	0.047***	0.048***	0.033***	0.034***
	(0.004)	(0.004)	(0.003)	(0.003)
Control variables	YES	YES	YES	YES
$Industry \times Time$ FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
R-squared	0.939	0.939	0.941	0.941
Observations	207,869	207,869	229,703	229,703

Note: Robust standard errors (in parentheses) are clustered at the firm-level, *** p <0.01, ** p <0.05, * p <0.1. Control variables include firms' log of average wage, firms' export status dummy, firms' net profit margin, firms' leverage ratio, firms' age, and subsidy dummy.

Table 5: **Excluding Trade Intermediaries and SOEs**

	Excluding Intermediaries		Excluding SOEs	
	(1)	(2)	(3)	(4)
$labor \times fixed$	0.336***		0.312***	
	(0.023)		(0.023)	
$labor \times peg$		0.315***		0.296***
		(0.027)		(0.027)
$labor \times inpeg$		0.458***		0.409***
		(0.048)		(0.048)
$fixed$	-0.091***		-0.080***	
	(0.010)		(0.010)	
peg		-0.088***		-0.079***
		(0.013)		(0.013)
$inpeg$		-0.113***		-0.096***
		(0.019)		(0.019)
$log\ rer$	0.039***	0.040***	0.039***	0.039***
	(0.003)	(0.003)	(0.003)	(0.003)
Control variables	YES	YES	YES	YES
$Industry \times Time$ FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
R-squared	0.938	0.938	0.936	0.936
Observations	305,244	305,244	292,714	292,714

Note: Robust standard errors (in parentheses) are clustered at the firm-level, *** p <0.01, ** p <0.05, * p <0.1. Control variables include log of average firm wage, firm export dummy, firm net profit margin, firm leverage ratio, firm age, and subsidy dummy.

Table 6: **Base Year Export Constructed Exchange Rate Measures**

	(1)	(2)	(3)	(4)
$labor \times fixed$	0.359***		0.336***	
	(0.052)		(0.054)	
$labor \times peg$		0.306***		0.311***
		(0.058)		(0.061)
$labor \times inpeg$		0.634***		0.504***
		(0.131)		(0.115)
$fixed$	-0.075***		-0.074***	
	(0.026)		(0.026)	
peg		-0.046		-0.067**
		(0.031)		(0.032)
$inpeg$		-0.188***		-0.119**
		(0.053)		(0.048)
$log\ rer$	0.056***	0.056***	0.057***	0.057***
	(0.011)	(0.011)	(0.009)	(0.009)
Control variables	NO	NO	YES	YES
$Industry \times Time$ FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
R-squared	0.906	0.906	0.939	0.939
Observations	65,736	65,736	54,830	54,830

Note: Robust standard errors (in parentheses) are clustered at the firm-level, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Control variables include log average wage payment, export status, profit margin, leverage ratio, firm age and the dummy variable that shows whether the firm receives a subsidy from the government or not.

Table 7: Policy Shock in the Exchange Rate Regime

	(1)	(2)	(3)	(4)
labor × *post* 2006 *dummy*	-0.485***	-0.246***	-0.401***	-0.259***
	(0.020)	(0.017)	(0.021)	(0.018)
post 2006 *dummy*	0.330***	0.199***		
	(0.008)	(0.007)		
log rer	-0.074***	0.015***	0.014***	0.015***
	(0.004)	(0.004)	(0.004)	(0.004)
Control variables	NO	YES	NO	YES
Industry × *Time* FE	NO	NO	YES	YES
Firm FE	YES	YES	YES	YES
R-squared	0.852	0.936	0.891	0.941
Observations	216,533	152,297	216,162	152,008

Note: Robust standard errors (in parentheses) are clustered at the firm-level, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Control variables include log average wage payment, export status, profit margin, leverage ratio, firm age and the dummy variable that shows whether the firm receives a subsidy from the government or not.

Table 8: Price regression

	Full Sample		Excluding P. T.		Excluding P. T. and T. I.	
	(1)	(2)	(3)	(4)	(5)	(6)
$labor \times fixed$	-0.133***		-0.093***		-0.094***	
	(0.014)		(0.017)		(0.017)	
$labor \times peg$		-0.174***		-0.119***		-0.119***
		(0.020)		(0.025)		(0.025)
$labor \times inpeg$		-0.076***		-0.060***		-0.061***
		(0.017)		(0.020)		(0.020)
$fixed$	0.040***		0.026***		0.026***	
	(0.005)		(0.006)		(0.006)	
peg		0.026**		0.008		0.009
		(0.010)		(0.011)		(0.011)
$inpeg$		0.029***		0.022***		0.022***
		(0.006)		(0.007)		(0.007)
$log\ rer$	0.023	0.009	0.023	0.011	0.024	0.012
	(0.014)	(0.014)	(0.017)	(0.017)	(0.017)	(0.017)
Control variables	YES	YES	YES	YES	YES	YES
$Firm \times Product \times Country$ FE	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES
R-squared	0.960	0.960	0.961	0.961	0.961	0.961
Observations	837,934	837,934	620,738	620,738	618,144	618,144

Note: In Columns (3) and (4), we exclude processing trade producers. In Columns (5) and (6), we exclude processing trade producers and trade intermediaries. Robust standard errors (in parentheses) are clustered at the firm-level, *** p <0.01, ** p <0.05, * p <0.1. Control variables include log of average firm wage, firm export dummy, firm net profit margin, firm leverage ratio, firm age, and subsidy dummy.

Appendix

A Deriving log-linear approximations to prices

By (5) and (10), we can re-write the capital market clearing condition as follows:

$$R\bar{K} = \int_0^1 (1-\alpha_j)\left(\frac{1}{2}\frac{MC(j)}{P_H(j)}S_H(j)\,M + \frac{1}{2}\frac{MC(j)}{\mathcal{E}P_H^*}S_H^*(j)\,M\right)dj \tag{35}$$

We log-linearize (35) and obtain

$$r = \frac{1}{2}\int_0^1 \varphi_j\left(mc(j) - p_H(j) + s_H(j)\right)dj + \frac{1}{2}\int_0^1 \varphi_j^*\left(mc(j) - e - p_H^*(j) + s_H^*(j)\right)dj + m \tag{36}$$

where e is the log nominal exchange rate and

$$\varphi_j \equiv \frac{(1-\alpha_j)\,\bar{S}_H(j)}{\int_0^1 (1-\alpha_i)\,\bar{S}_H(i)\,di}, \text{ and } \varphi_j^* \equiv \frac{(1-\alpha_j)\,\bar{S}_H^*(j)}{\int_0^1 (1-\alpha_i)\,\bar{S}_H^*(i)\,di}$$

Note that

$$mc(j) = (1-\alpha_j)\,r + \alpha_j w$$

By using (5), we can re-write (36) as

$$0 = \lambda(w-r) + \frac{1}{2}m + \frac{1}{2}m^* + \Xi \tag{37}$$

where

$$\lambda \equiv \frac{1}{2}\left(\int_0^1 \varphi_j\alpha_j dj + \int_0^1 \varphi_j^*\alpha_j dj\right)$$
$$\Xi \equiv \frac{1}{2}\left(\int_0^1 \varphi_j\left(s_H(j) - p_H(j)\right)dj + \int_0^1 \varphi_j^*\left(s_H^*(j) - p_H^*(j)\right)dj\right)$$

The log-linear approximation to the cash-in-advance constraint implies

$$m = p + c$$

Then the log-linearization of the marginal cost gives us

$$mc(j) = w - \frac{1}{2}(1-\alpha_j)\,\lambda^{-1}m - \frac{1}{2}(1-\alpha_j)\,\lambda^{-1}m^* - a - \lambda^{-1}\Xi \tag{38}$$

We now consider how labor intensity will affect the pricing behavior of firms. The steady state prices are

$$P_H(j) = P_H^*(j) = \frac{\eta}{\eta - 1}\bar{MC}(j)$$

Then, we log-linearize (11) and (12) under flexible exchange rates and obtain

$$p_H^{flexible} = w^{flexible} - \xi^{flexible} + \frac{(1-\alpha_j)^2 \lambda^{-2}}{4}\sigma_m^2 + \frac{\sigma_a^2}{2} \tag{39}$$

$$p_H^{*flexible} = w^{flexible} - \xi^{flexible} + \left(1 + \frac{(1-\alpha_j)^2 \lambda^{-2}}{4}\right)\sigma_m^2 + \frac{\sigma_a^2}{2} \tag{40}$$

where $\xi^{flexible}$ is the log deviation of term Ξ from its steady state when the exchange rate regime is flexible. Under fixed exchange rates, it is easy to show that

$$p_H^{fixed} = p_H^{*fixed} = w^{fixed} - \xi^{fixed} + \frac{(1-\alpha_j)^2 \lambda^{-2}}{2}\sigma_m^2 + \frac{\sigma_a^2}{2} \tag{41}$$

B Proof of Lemma 1

By (18) and (19), it is easy to show that

$$\frac{\partial\left(p_H^{flexible}(j) - p_H^{fixed}(j)\right)}{\partial\alpha_j} = \frac{\partial\left(p_H^{*flexible}(j) - p_H^{*fixed}(j)\right)}{\partial\alpha_j} = \frac{(1-\alpha_j)\lambda^{-2}}{2}\sigma_m^2 > 0$$

C Proof of Proposition 1

As shown in the previous analysis, both $p_H^{flexible}(j) - p_H^{fixed}(j)$ and $p_H^{*flexible}(j) - p_H^{*fixed}(j)$ are increasing in α_j, which implies that, as α_j increases, prices are relatively higher when the exchange rates are more flexible. Note that higher prices lead to lower employment given the realization of A, M and M^*. Mathematically, we have

$$\frac{\partial\left(L^{flexible}(j) - L^{fixed}(j)\right)}{\partial\alpha_j} < 0.$$

D Dominant Currency Paradigm

The dominant currency paradigm, as highlighted by Gopinath et al. (2020), suggests that trade prices are primarily determined by fluctuations in the invoice currency, which is often the

US dollar. How does the dominance of the US dollar as an invoice currency affect the relationship between exchange rate regime flexibility and firms' behavior?

In theory, we derive similar equilibrium conditions to the benchmark model by assuming dominant currency pricing (DCP) in export prices instead of local currency pricing. Under DCP, we assume that the export price set by a Home firm to Country i's buyers is denominated in US dollars, instead of Country i's currency.

We denote the prices of Home currency and Country i's currency in terms of US dollar by $\mathcal{E}_t^{H,US}$ and $\mathcal{E}_t^{i,US}$, respectively. A rise in the value of $\mathcal{E}_t^{H,US}$ ($\mathcal{E}_t^{i,US}$) is associated with a depreciation of the Home currency (Country i's currency). The optimal profit earned by Home exporter j from Country i is

$$\max_{P_H^{US}(j)} \mathbb{E}\left[\Theta\left(\mathcal{E}^{H,US} P_H^{US}(j) - MC(j)\right) Y_H^i(j)\right]$$

where $P_H^{US}(j)$ is the optimal dollar price set by firm j. The individual demand from Country i's market $Y_H^i(j)$ is

$$Y_H^i(j) = \left(\frac{P_H^{US}(j)}{P_H^{US}}\right)^{-\eta} Y_H^i$$

where Y_H^i is the aggregate export by Home firms to Country i. Let γ^c denote the share of Chinese exported goods in the total consumption basket of a Country i's consumer, we can obtain

$$Y_H^i = \gamma^c \frac{M^i}{\mathcal{E}^{i,US} P_H^{US}}.$$

The complete international financial market assumption implies that

$$\mathcal{E}^{H,US} = \frac{PC}{P^{US}C^{US}},\ \mathcal{E}^{i,US} = \frac{P^iC^i}{P^{US}C^{US}}.$$

Similar to the proof of Lemma 1, we can show that under the complete capital depreciation assumption,

$$P_H^{US}(j) = \frac{\eta}{\eta-1}\mathbb{E}\left[\frac{MC(j)}{\mathcal{E}^{H,US}}\right]. \tag{42}$$

The only difference between Equations (42) and (12) in Lemma 1 is the replacement of the bilateral exchange rate between Home and the export destination country $\mathcal{E}$ with the bilateral exchange rate between Home and the United States $\mathcal{E}^{H,US}$. This means that the export price (in US dollars) is only affected by the exchange rate between the Home currency and the US dollar.[10] Following the same steps in the benchmark model, we can demonstrate that firms

[10] The result is due to the simplifying assumptions made in the model, such as the log utility function. Relaxing these assumptions may incorporate shocks in the export destinations into the price function, and the exchange rate between Home and US dollar may not be the only determinant of export prices. However, the model still

with labor-intensive production technology are more likely to increase their employment if the exchange rate of the Home currency against the currency of the export destination is less flexible. On the other hand, firms with capital-intensive production technology are more likely to hire more workers if the exchange rate is more flexible.

We conduct an empirical analysis to investigate how the dominant currency paradigm affects the relationship between exchange rate regime flexibility and employment and prices. To this end, we augment the baseline estimation with two additional variables: bilateral exchange rate regime flexibility between the Chinese RMB and the US dollar, and the interaction term between labor intensity and China-US exchange rate regime flexibility. The theoretical prediction suggests that the coefficient on bilateral exchange rate regime flexibility should be negative while the coefficient on the interaction term should be positive. Furthermore, under the dominant currency paradigm, the coefficients on terms with bilateral exchange rate regime flexibility between the Chinese RMB and the currency in the exporting destination are expected to be less significant.

One caveat to our DCP estimation is that our data does not contain information on the invoice currency used in international trade. As a result, we cannot separate firms that use DCP from others in our sample. For this empirical experiment, we assume that all firms follow DCP. It is important to note that the US is China's biggest trading partner, so the bilateral exchange rate regime flexibility between the Chinese RMB and the US dollar may be correlated with the measure of $fixed$ in our baseline estimation. To address this potential collinearity, we exclude firms whose shares of exports to the US are above the sample mean in the regression. In other words, we mainly focus on how the bilateral exchange rate regime flexibility between China and the US will affect firms' behaviors, even though firms may not be involved in trade with US buyers.[11]

Table A1 presents the results of the estimation on employment. In Columns (1) and (2), the industry-time fixed effects are not included, and we observe that the coefficients on $US\ fixed$ are negative, while the coefficients on the interaction term $labor \times US\ fixed$ are positive. All coefficients are statistically significant at the 1% level, which is consistent with our theoretical prediction. In Columns (3) and (4), we control for the industry-time fixed effect, and the time trend captures the bilateral exchange rate regime against the US dollar. Therefore, the coefficients on $US\ fixed$ are dropped from the regressions. The results from Columns (3) and (4) support the theoretical prediction that firms with labor-intensive production technology are more likely to increase employment if the China-US exchange rate is less flexible, while firms with capital-intensive production technology are more likely to hire more workers if the China-US

shows that the exchange rate between Home and US dollar plays a crucial role in determining prices set by Home exporters.

[11] In an unreported robustness check, we exclude the firms that solely export to the US. Our regression results remain robust.

exchange rate is more flexible. Additionally, the insignificant coefficients on terms that include the bilateral exchange rate regime flexibility between China and the export destination suggest that the China-US exchange rate is the primary factor affecting firms' employment decisions, consistent with the DCP literature.

We also examine the theoretical mechanism under DCP by investigating how the exchange rate regime flexibility between China and the US affects export prices when production technology varies. Following the same steps as in the benchmark model, we can show that under dominant currency pricing, a decrease in exchange rate regime flexibility between China and the US is more likely to result in lower (higher) export prices for firms with more labor-intensive (capital-intensive) technologies. The regression results on trade prices are reported in Table A2. In Columns (1) and (2), where we do not control for time fixed effects, the coefficients on the China-US exchange rate regime are not statistically significant. However, the coefficients on the interaction term between the China-US exchange rate regime and labor intensity are both negative and statistically significant, which is consistent with the theoretical prediction under the DCP scenario. In Columns (3) and (4), we add the time fixed effect to the regressions, and as a result, the coefficients on the China-US exchange rate regime flexibility are dropped. In this case, the coefficients on the interaction term between the China-US exchange rate regime and labor intensity are still negative and statistically significant. Furthermore, the interaction term between the bilateral exchange rate regime between China and the export destination country and labor intensity becomes less statistically significant. Interestingly, the coefficients on *peg* are negative and statistically significant in Columns (2) and (4). In Columns (5) and (6), we exclude processing trade producers, and in Columns (7) and (8), we exclude both trade intermediaries and processing trade producers. The results are quite similar to those in Columns (3) and (4).

Table A1: DCP Employment Regression

	(1)	(2)	(3)	(4)
$labor \times US\ fixed$	0.290***	0.309***	0.247***	0.275***
	(0.073)	(0.073)	(0.073)	(0.075)
$labor \times fixed$	-0.027		0.009	
	(0.148)		(0.145)	
$labor \times peg$		-0.083		-0.075
		(0.152)		(0.153)
$labor \times inpeg$		0.378		0.632*
		(0.391)		(0.356)
$US\ fixed$	-0.206***	-0.211***		
	(0.033)	(0.033)		
$fixed$	0.040		-0.027	
	(0.068)		(0.067)	
peg		0.054		0.002
		(0.070)		(0.071)
$inpeg$		-0.055		-0.210
		(0.177)		(0.155)
$log\ rer$	0.061***	0.060***	0.131***	0.130***
	(0.020)	(0.020)	(0.020)	(0.020)
Control variables	YES	YES	YES	YES
$Industry \times Time$ FE	NO	NO	YES	YES
Firm FE	YES	YES	YES	YES
R-squared	0.949	0.949	0.959	0.959
Observations	27,358	27,358	26,526	26,526

Note: We exclude firms whose shares of exports to the US are above the sample mean. Robust standard errors (in parentheses) are clustered at the firm-level, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Control variables include log average wage payment, export status, profit margin, leverage ratio, firm age and the dummy variable that shows whether the firm receives a subsidy from the government or not.

Table A2: DCP Price regression

	All Firms				Excluding P. T.		Excluding P. T. and T. I.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$labor \times US\ fixed$	-0.176***	-0.195***	-0.174***	-0.198***	-0.135**	-0.170**	-0.133**	-0.167**
	(0.048)	(0.055)	(0.048)	(0.056)	(0.066)	(0.076)	(0.067)	(0.077)
$labor \times fixed$	-0.008		-0.007		-0.060		-0.062	
	(0.042)		(0.044)		(0.061)		(0.062)	
$labor \times peg$		0.048		0.054		0.015		0.009
		(0.060)		(0.061)		(0.081)		(0.082)
$labor \times inpeg$		-0.026		-0.031		-0.092		-0.092
		(0.049)		(0.051)		(0.068)		(0.069)
$US\ fixed$	0.009	0.029						
	(0.022)	(0.023)						
$fixed$	-0.023		-0.012		0.009		0.010	
	(0.020)		(0.020)		(0.026)		(0.026)	
peg		-0.072***		-0.053**		-0.021		-0.018
		(0.027)		(0.027)		(0.032)		(0.032)
$inpeg$		-0.004		0.003		0.022		0.022
		(0.022)		(0.022)		(0.028)		(0.029)
$log\ rer$	-0.465***	-0.474***	-0.026	-0.034	-0.028	-0.030	-0.024	-0.025
	(0.044)	(0.044)	(0.035)	(0.035)	(0.040)	(0.040)	(0.040)	(0.040)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES
$Firm \times Product \times Country$ FE	YES	YES	YES	YES	YES	YES	YES	YES
Time FE	NO	NO	YES	YES	YES	YES	YES	YES
R-squared	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952
Observations	158,832	158,832	158,832	158,832	101,906	101,906	101,068	101,068

Note: We exclude the firms whose shares of export to the US are above the sample mean. In Columns (5) and (6), we exclude processing trade producers. In Columns (7) and (8), we exclude processing trade producers and trade intermediaries. Robust standard errors (in parentheses) are clustered at the firm-level, *** p <0.01, ** p <0.05, * p <0.1. Control variables include log of average firm wage, firm export dummy, firm net profit margin, firm leverage ratio, firm age, and subsidy dummy.