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

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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

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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 theoretical model that examines how the choice of exchange rate regime can affect a firm's employment. Our model is based on a quasi-small open economy framework in which there are two countries: Home and Foreign. Foreign represents the

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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 the Home cannot have a significant impact on the Foreign market.

2.1 Households

Households have the same preferences in each country. A representative household in Home maximizes a lifetime utility function specified as

$$\mathbb{E}_{t-1} \sum_{t=0}^{\infty} \beta^t \left[\log C_t - \frac{L_t^{1+\phi}}{1+\phi} \right]$$

where C_t and L_t are consumption and labor supply, respectively. $\phi > 0$ and is the inverse of the Frisch elasticity of labor supply. The household budget constraint is

$$
\begin{aligned}
& C_t + I_t + \frac{B_t}{P_t} + \frac{\mathcal{E}_t B_t^*}{P_t} + \frac{M_t}{P_t} \\
\leq \ & \frac{W_t}{P_t} L_t + \frac{R_t}{P_t} K_t + (1 + i_{t-1}) \frac{B_{t-1}}{P_t} + \left(1 + i_{t-1}^*\right) \frac{\mathcal{E}_t B_{t-1}}{P_t} + \frac{\Pi_t}{P_t} + \frac{M_{t-1} + T_t}{P_t}
\end{aligned}
\tag{1}
$$

where W_t and R_t are the nominal wage rate and nominal capital rental rate in period t, respectively. Π_t is the aggregate profit in period t. P_t is the price for the final good. In our model, we assume that the final good can serve as both consumption and capital input in production. We use K_t to represent the capital stock held by the representative household at the beginning of period t, while B_t and B_t^* represent home-currency denominated and foreign-currency denominated bonds, respectively. $\mathcal{E}_t$ is the nominal exchange rate between Home and Foreign which is defined as the price of Home currency in terms of Foreign currency. Thus, a higher value of $\mathcal{E}_t$ corresponds to a depreciation of the Home currency. The optimal conditions on bond holdings and the real money balance for the representative household in Home are

$$
\begin{aligned}
(1 + i_t)^{-1} &= \mathbb{E}_t \left[Q_{t,t+1} \right] \tag{2} \\
(1 + i_t^*)^{-1} &= \mathbb{E}_t \left[Q_{t,t+1} \frac{\mathcal{E}_{t+1}}{\mathcal{E}_t} \right] \tag{3}
\end{aligned}
$$

where

$$Q_{t,t+1} \equiv \beta \frac{P_t C_t}{P_{t+1} C_{t+1}}$$

is the stochastic discount factor, which is implied by the log utility on consumption as in the

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standard literature. To facilitate an analytical solution, we assume complete capital depreciation and hence, $K_{t+1} = I_t$.[1] Hence, the optimal condition on investment is

$$\mathbb{E}_t \left[\beta \frac{C_t}{C_{t+1}} \frac{R_{t+1}}{P_{t+1}} \right] = 1. \tag{4}$$

For technical convenience, we assume a cash-in-advance constraint such that

$$C_t + I_t \le \frac{M_t}{P_t}. \tag{5}$$

As holding money does not bring utility to the household, in equilibrium the equality holds in Equation (5).

Households in Foreign will have similar optimal conditions. If we assume complete international financial markets and consider Foreign as the aggregation of all countries outside Home, as discussed in Gali and Monacelli (2005), we can show that the international risk sharing condition under log utility (on consumption) assumption implies that

$$\mathcal{E}_t = \frac{P_t C_t}{P_t^* C_t^*} \tag{6}$$

where C_t^* and P_t^* are Foreign consumption and Foreign aggregate price, respectively.

The final good consists of two parts: Home-produced goods Y_{Ht} and Foreign-produced goods Y_{Ft} imported by Home. The aggregation is as follows

$$Y_t = \frac{Y_{Ht}^{\gamma} Y_{Ft}^{1-\gamma}}{\gamma^{\gamma} (1-\gamma)^{1-\gamma}} \tag{7}$$

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[2]

$$Y_{Ht}^* = \omega \frac{Y_t^*}{P_{Ht}^*}$$

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_{Ht} and Y_{Ft}

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[1]As we discuss in the subsequent analysis, the assumption of complete capital depreciation has a negligible impact on the main theoretical results.

[2]Assuming Cobb-Douglas aggregation between goods from different countries, the form of the demand for Home's aggregate export in our model is in line with Gali and Monacelli (2005).

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are aggregations over a continuum of differentiated goods as

$$Y_{Ht} = \left[\int_0^1 Y_{Ht}(i)^{\frac{\theta-1}{\theta}} di \right]^{\frac{\theta}{\theta-1}} \tag{8}$$

$$Y_{Ft} = \left[\int_0^1 Y_{Ft}(j)^{\frac{\theta-1}{\theta}} dj \right]^{\frac{\theta}{\theta-1}} \tag{9}$$

where $\theta(> 1)$ 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

$$Y_t(j) = \frac{A_t K_t(j)^{1-\alpha} L_t(j)^{\alpha}}{\alpha^{\alpha}(1-\alpha)^{1-\alpha}}$$

where $Y_t(j)$ denotes output by firm j. $K_t(j)$ and $L_t(j)$ are capital input and labor input by firm j, respectively. A_t 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

$$MC_t(j) = \frac{R_t^{1-\alpha} W_t^{\alpha}}{A_t}.$$

Our model illustrates the main theoretical mechanism through which labor intensity affects the consequences of exchange rate regime flexibility changes on firms' employment without the complexity of adding firm heterogeneity. We found that introducing heterogeneity, such as using different labor intensity in production, results in higher-order deviations in our analytical results but no additional insight.[3] Therefore, we opted to retain the simplified version of the model by assuming symmetric firms.

Output by firm j can be sold to domestic or foreign agents, $Y_t(j) = Y_{Ht}(j) + Y_{Ht}^*(j)$, where

$$Y_{Ht}(j) = \left(\frac{P_{Ht}(j)}{P_{Ht}} \right)^{-\theta} Y_{Ht}, \quad Y_{Ht}^*(j) = \left(\frac{P_{Ht}^*(j)}{P_{Ht}^*} \right)^{-\theta} Y_{Ht}^* \tag{10}$$

and Y_{Ht} and Y_{Ht}^* are aggregate output sold to domestic and foreign agents, respectively. In our model, we assume local currency pricing, which means that the prices of Home's exported goods

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[3]Please refer to the third remark on Lemma 1.

are denominated in foreign currency.

We assume price rigidity as in Devereux and Engel (2003), i.e., firms set their own prices one period before the sales happen. A domestic producer chooses price decision $P_{Ht}(j)$ at period $t-1$ to maximize the present value of period t's profit from the Home market. Specifically, the optimization problem is

$$\max_{P_{Ht}(j)} \mathbb{E}_{t-1}\left[Q_{t-1,t}\left(P_{Ht}(j) - MC_t(j)\right)Y_{Ht}(j)\right].$$

The first order condition with respect to $P_{Ht}(j)$ implies

$$P_{Ht}(j) = \frac{\theta}{\theta-1}\frac{\mathbb{E}_{t-1}\left[Q_{t-1,t}MC_t(j)Y_{Ht}(j)\right]}{\mathbb{E}_{t-1}\left[Q_{t-1,t}Y_{Ht}(j)\right]}. \tag{11}$$

For an exporter, the exporting price $P^*_{Ht}(j)$ is chosen to maximize the expected payoff from Foreign market

$$\max_{P^*_{Ht}(j)} \mathbb{E}_{t-1}\left[Q_{t-1,t}\left(\mathcal{E}_t P^*_{Ht}(j) - MC_t(j)\right)Y^*_{Ht}(j)\right].$$

The first order condition with respect to $P^*_{Ht}(j)$ implies

$$P^*_{Ht}(j) = \frac{\theta}{\theta-1}\frac{\mathbb{E}_{t-1}\left[Q_{t-1,t}MC_t(j)Y^*_{Ht}(j)\right]}{\mathbb{E}_{t-1}\left[Q_{t-1,t}\mathcal{E}_t Y^*_{Ht}(j)\right]}. \tag{12}$$

As we assume no asymmetries between firms, we will drop the firm index j in the following analysis. As in our model the degrees of exchange rate flexibility directly affect the behavior of exporters but not non-exporters, we focus mainly on exporting firms. We can now show the following lemma.

Lemma 1 *Under the assumption of complete capital depreciation, the optimal price set by exporting firms in Foreign is*

$$P_{Ht} = \frac{\theta}{\theta-1}\mathbb{E}_{t-1}\left[MC_t\right] \tag{13}$$

$$P^*_{Ht} = \frac{\theta}{\theta-1}\mathbb{E}_{t-1}\left[\frac{MC_t}{\mathcal{E}_t}\right]. \tag{14}$$

Proof. See Appendix A. ∎

Several remarks are in order regarding Lemma 1. First, it shows that optimal prices set by exporters rely on the expectations of their marginal costs denominated in Foreign currency.

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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_t or $MC_t/\mathcal{E}_t$) are also log-normally distributed. According to Lemma 1, firms are more likely to set higher domestic and export prices P_{Ht} and P_{Ht}^* as the volatility in MC_t and $MC_t/\mathcal{E}_t$ increase. This can be explained as follows. We can show that given any realized values of MC_t and $MC_t/\mathcal{E}_t$, the optimal prices for domestic producers and exporters are $P_{Ht} = \theta/(\theta - 1) MC_t$ and $P_{Ht}^* = \theta/(\theta - 1) MC_t/\mathcal{E}_t$ 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_{Ht} or P_{Ht}^* from the optimal flexible price may result in much more rapid declines in profit than a positive deviation. The following graph shows such a pattern.[4] To understand the result intuitively, we decompose a firm's profit into two components. The first component is the profit earned from selling one unit of output, which is $P_{Ht} - MC_t$ in terms of foreign currency. The second component is related to the quantity sold to customers, which is $P_{Ht}^{-\theta}$. The second component is log-linear, which implies that a one percent deviation (either increase or decrease) from the optimal flexible price will result in the same absolute change in quantity demanded. However, a one percent decrease from the optimal flexible price will result in a greater decline in unit profit than a one percent increase. This is due to the fact that changes in price have a greater impact on unit profit as price approaches the marginal cost. Therefore, we show 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.

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[4]In this example, we set θ to 6 and assume that the realized value of the marginal cost in Foreign currency is $MC_t = MC_t/\mathcal{E}_t = 1$. The optimal price that maximizes the profit is $P_{Ht} = P_{Ht}^{*opt} = \theta/(\theta - 1)$. We plot the relationship between $(P_{Ht} - MC_t) P_{Ht}^{-\theta}$ (which is proportional to profit) and the percentage deviation of price P_{Ht} from its optimal level P_{Ht}^{opt}.
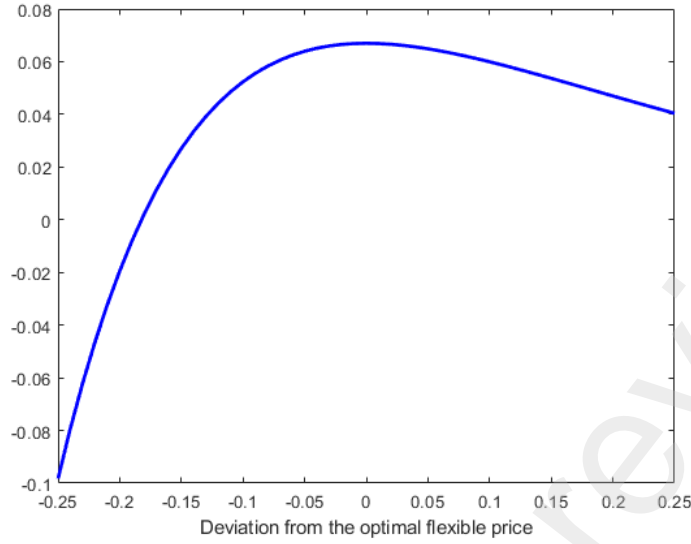
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Figure 1: Profit vs Prices

Third, two assumptions – complete depreciation of the capital stock and symmetric firms – greatly simplify our derivation and provide an intuitive pricing formula. This formula states that the price will equal the steady-state markup multiplied by the expected marginal cost. However, if we relax these two assumptions, we can show that, more generally,[5]

$$P_{Ht} = \frac{\theta}{\theta-1}\mathbb{E}_{t-1}\left[MC_t\right]\left(1 + Cov_{t-1}\left(\frac{MC_t}{\mathbb{E}_{t-1}[MC_t]}, \frac{M_t/(P_t C_t)}{\mathbb{E}_{t-1}[M_t/(P_t C_t)]}\right)\right) \tag{15}$$

$$P_{Ht}^* = \frac{\theta}{\theta-1}\mathbb{E}_{t-1}\left[\frac{MC_t}{\mathcal{E}_t}\right]\left(1 + Cov_{t-1}\left(\frac{MC_t/\mathcal{E}_t}{\mathbb{E}_{t-1}[MC_t/\mathcal{E}_t]}, \frac{M_t^*/(P_t^* C_t^*)}{\mathbb{E}_{t-1}[M_t^*/(P_t^* C_t^*)]}\right)\right) \tag{16}$$

where we have used the cash-in-advance assumptions that $M_t = P_t\left(C_t + I_t\right)$ and $M_t^* = P_t^*\left(C_t^* + I_t^*\right)$. After defining $\hat{X}_t \equiv \log\left(X_t/E_{t-1}\left[X_t\right]\right)$, the two equations above can be approximately re-written as

$$P_{Ht} = \frac{\theta}{\theta-1}\mathbb{E}_{t-1}\left[MC_t\right]\left(1 + \mathbb{E}_{t-1}\left[\widehat{MC_t} \cdot \widehat{\frac{M_t}{P_t C_t}}\right]\right)$$

$$P_{Ht}^* = \frac{\theta}{\theta-1}\mathbb{E}_{t-1}\left[\frac{MC_t}{\mathcal{E}_t}\right]\left(1 + \mathbb{E}_{t-1}\left[\widehat{\frac{MC_t}{\mathcal{E}_t}} \cdot \widehat{\frac{M_t^*}{P_t^* C_t^*}}\right]\right).$$

Assuming that there are no large shocks in the economy, the expectation terms inside the paren-

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[5]The two assumptions together imply that the investment-to-consumption ratio in equilibrium is constant, as shown in Appendix A. With this result, the covariance term in Equation (16) disappears, leading to the price equation in Lemma 1. When $\delta < 1$, the investment-to-consumption ratio becomes dependent on the trajectory of capital stocks. In the case of heterogeneous firms, the investment-to-consumption ratio is influenced by the average labor intensity across the economy, which is in turn determined by the distribution of firms.

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theses ($\mathbb{E}_{t-1}\left[\widehat{MC_t} \cdot \widehat{\frac{M_t}{P_t C_t}}\right]$ and $\mathbb{E}_{t-1}\left[\widehat{\frac{MC_t}{\mathcal{E}_t}} \cdot \widehat{\frac{M_t^*}{P_t^* C_t^*}}\right]$) will be of higher order. As a result, the effects of exchange rate movements on these terms will be dominated by the impacts on $\mathbb{E}_{t-1}[MC_t]$ and $\mathbb{E}_{t-1}\left[\frac{MC_t}{\mathcal{E}_t}\right]$. Therefore, it is reasonable to retain the two simplifying assumptions.

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

$$M_t = M_{t-1} + T_t.$$

2.4 Factor Markets

Labor market. We adopt a similar wage-setting assumption as in Blanchard and Galí (2007) in which nominal wages are determined as

$$W_t = W_{t-1}^{\psi} (\mu^w P_t MRS_t)^{1-\psi}$$

where W_{t-1} is the nominal wage rate in the previous period. MRS_t is the marginal rate of substitution between consumption and leisure. $\mu^w (\geq 1)$ is the markup on wages, assumed to be a constant in the model. If the labor market is perfectly competitive and there is no wage rigidity, MRS_t is equal to the equilibrium real wage. In our model, MRS_t can be obtained by deriving the first-order condition with respect to L_t in the household optimization problem as follows,

$$MRS_t = C_t L_t^{\phi}. \tag{17}$$

$$W_t = W_{t-1}^{\psi} \left(\mu^w P_t C_t L_t^{\phi}\right)^{1-\psi}. \tag{18}$$

As in Blanchard and Galí (2007), we introduce a sufficiently large, steady-state wage markup μ^w into our model to ensure that the equilibrium real wage is always greater than MRS_t. The sufficiently high wage markup ensures desired labor demand can always be supported by the desired labor supply. In the case of rigid wages, the labor supply condition no longer holds, and the equilibrium labor input is determined solely by firms' labor demand. It is worth noting that wage setting could be more complex, for example, through collective bargaining, resulting in wages remaining above workers' reservation wages. However, the *ad hoc* wage evolution assumption in our model simplifies the theoretical derivation, and replacing this simple wage rule

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with a rigid wage derived from general equilibrium does not alter our main results qualitatively.

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

$$R_t K_t = (1 - \alpha) MC_t \left(\frac{\frac{1}{2} P_t (C_t + I_t)}{P_{Ht}} + \frac{\frac{1}{2} P_t^* (C_t^* + I_t^*)}{P_{Ht}^*} \right) = (1 - \alpha) MC_t \left(\frac{1}{2} \frac{M_t}{P_{Ht}} + \frac{1}{2} \frac{M_t^*}{P_{Ht}^*} \right). \tag{19}$$

where we used the assumption $\gamma = 1/2$ and the cash-in-advance constraint.

2.5 Shocks

In our model, Home producers face two types of shocks: supply shocks, which are represented by productivity shocks (A_t) in the Home economy; and demand shocks, which are represented by Home and Foreign nominal demand shocks (M_t and M_t^*). The supply shock follows a log-normal distribution, with $\log A_t$ drawn from $N(0, \sigma_a^2)$. We assume that there is no serial correlation between shocks in period t and period $t + 1$, but relaxing this assumption would not change our qualitative results.

The model assumes that the Foreign nominal demand shock, denoted by $\log M_t^*$, is drawn from a log-normal distribution that is independent of any Home shocks, i.e., $\log M_t^* \sim N(0, \sigma_m^2)$. For simplicity, it is assumed that the home and foreign countries are symmetric and the steady-state 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 ($\mathcal{E}_t = 1$), then

$$P_t C_t = P_t^* C_t^*. \tag{20}$$

By the cash-in-advance constraint, (48) and (49), (20) imply

$$M_t = M_t^*. \tag{21}$$

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 $\log M_t$ is independently drawn from the same distribution $N(0, \sigma_m^2)$. 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_t is responsive to the real shock A_t 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.

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2.6 Log-linear Approximation

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

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

In the rest of our analysis, we assume $\phi = 0$ for simplicity.

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:[6]

$$p_{Ht}^{flexible} = \alpha\psi w_{t-1} - (1-\alpha)k_t + \frac{\sigma_a^2}{2\alpha} + \frac{\alpha\left(\left(1 - \psi + \frac{1}{2}\frac{1-\alpha}{\alpha}\right)^2 + \frac{1}{4}\frac{(1-\alpha)^2}{\alpha^2} - \psi\frac{1-\alpha}{\alpha}\right)}{2}\sigma_m^2 \qquad (22)$$

and

$$p_{Ht}^{*flexible} = \alpha\psi w_{t-1} - (1-\alpha)k_t + \frac{\sigma_a^2}{2\alpha} + \frac{\alpha\left(\left(1 - \psi + \frac{1}{2}\frac{1-\alpha}{\alpha}\right)^2 + \frac{1}{4}\frac{(1-\alpha)^2}{\alpha^2} + \frac{(1+\alpha)\psi}{\alpha}\right)}{2}\sigma_m^2. \qquad (23)$$

Under the fixed exchange rate regime, it is easy to show that

$$p_{Ht}^{fixed} = p_{Ht}^{*fixed} = \alpha\psi w_{t-1} - (1-\alpha)k_t + \frac{\sigma_a^2}{2\alpha} + \frac{\alpha\left(1 - \psi + \frac{1-\alpha}{\alpha}\right)^2}{2}\sigma_m^2. \qquad (24)$$

2.7 Equilibrium

We now compute the differences in prices under different exchange rate regimes. For firms that operate in the domestic market, by Equation (24), we have the following:

$$p_{Ht}^{flexible} - p_{Ht}^{fixed} = -\frac{1-\alpha}{2}\left(1 + \frac{1}{2}\frac{1-\alpha}{\alpha}\right)\sigma_m^2 \leq 0. \qquad (25)$$

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[6]See Appendix B for more details.

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which implies that flexible exchange rates always yield lower prices in the domestic market for Home produced goods than fixed exchange rates. For exporters,

$$p_{Ht}^{*flexible} - p_{Ht}^{*fixed} = \left(\psi - \frac{1-\alpha}{2} \left(1 + \frac{1}{2} \frac{1-\alpha}{\alpha} \right) \right) \sigma_m^2. \tag{26}$$

We can now show the following lemma.

Lemma 2 *If $\phi = 0$, we can show that*

$$\frac{\partial \left(p_{Ht}^{flexible} - p_{Ht}^{fixed} \right)}{\partial \alpha} > 0$$

$$\frac{\partial \left(p_{Ht}^{*flexible} - p_{Ht}^{*fixed} \right)}{\partial \alpha} > 0$$

and there exists a threshold $\bar{\alpha} \in [0, 1]$ such that for $\alpha \gtreqqless \bar{\alpha}$,

$$p_{Ht}^{*flexible} \gtreqqless p_{Ht}^{*fixed}.$$

Proof. See Appendix C. ■

A few remarks are in order. First, our model demonstrates that flexible exchange rates can lead to lower prices for firms when they rely heavily on capital in their production processes. 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 capital stock is pre-determined 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 to reduce uncertainty in capital rental rates faced by firms, which in turn may lead them to set lower prices.

Second, for firms that rely heavily on labor-intensive production technologies, fixed exchange rates are more likely to result in lower exporting prices. 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, in our model, the marginal cost can be largely determined by the wage rate in the previous period. It is important to note that the wage rate in the previous period is not influenced by the exchange rate in the current period. In such cases, fixing the

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exchange rate can help to reduce fluctuations in the nominal exchange rate without significantly increasing the volatility in firms' marginal costs. This, in turn, can help induce exporting firms to set lower exporting prices.

Third, even in the extreme case where there is no wage rigidity, fixed exchange rates may not result in substantially higher prices compared to flexible exchange rates, as long as labor intensity in production is high. This is because unlike in the capital market, where the supply of capital is predetermined in each period, equilibrium labor supply can be adjusted to respond to external shocks. This reduces the need for wage adjustments to accommodate such shocks, which in turn limits fluctuations in the marginal cost of production. Therefore, in such cases, fixed exchange rates do not necessarily create significant pressure on firms to raise their preset prices compared to flexible exchange rates.

Fourth, while the conventional trade literature often considers prices as a measure to assess comparative advantage, our model highlights the importance of factor intensities in shaping the impact of exchange rate regime changes on firms' pricing decisions. This feature connects our work to the literature on firm-level comparative advantage (Crozet and Trionfetti, 2013). Yet, our primary focus differs from existing contributions because we concentrate specifically on the comparative advantage driven by a country's exchange rate regime policy, thus offering a different and novel perspective in this area.

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

$$L_t = \alpha \frac{MC_t}{W_t} \left(\frac{1}{2} \frac{M_t}{P_{Ht}} + \frac{1}{2} \frac{M_t^*}{P_{Ht}^*} \right).$$

The presence of wage rigidity implies that employment is determined by the labor demand condition. Given the realization of macro variables in period t, such as A_t, M_t, and M_t^*, lower prices in either the domestic market (P_{Ht}) or foreign market (P_{Ht}^*) result in higher employment. We can present the following proposition.

Proposition 1 *Under the assumptions in Lemma 2, given any realized M_t, M_t^* and A_t, we can show that*

$$\frac{\partial \left(L_t^{flexible} - L_t^{fixed} \right)}{\partial \alpha} < 0.$$

and there exists a threshold $\bar{\alpha}^L \in [0, 1]$ such that for $\alpha \gtreqless \bar{\alpha}^L$,

$$L_t^{flexible} \lesseqgtr L_t^{fixed}.$$

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Proof. See Appendix D. ∎

Given any realized values of M_t, M_t^*, and A_t, Equation (18) implies that the wage rate is pinned down. Consequently, a firm's employment is determined by the preset prices in the domestic and foreign markets. Lower prices set by a firm in both markets result in higher employment. Based on Lemma 2, the role of exchange rate flexibility in determining preset prices differs according to the production technology. Specifically, higher labor intensity in production leads firms to set higher prices under flexible exchange rates. This has immediate implications for employment: flexible exchange rates are less (more) desirable for encouraging firms to hire workers if the labor intensity in production is sufficiently high (low).

One potential caveat to our theory is that under a flexible exchange rate regime, the money aggregate M_t does not respond to real shock A_t. However, if the Home central bank could choose the optimal money supply by responding to both the real productivity shock A_t 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:

$$\log (M_t) = a \log (M_t^*) + b \log (A_t). \tag{27}$$

As long as the labor intensity and wage rigidity degrees are sufficiently high, 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 in the money supply rule in (27) to encourage firms to hire more workers. Although the domestic money supply responds to the supply shock, the nominal exchange rate is still required to remain stable to maintain high employment. However, as the degree of wage rigidity decreases, 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.

3 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

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exchange rate regime data in Klein and Shambaugh (2008).[7] Our analysis spanned from 2000 to 2013, and we provide a more detailed interpretation of the data below.

3.1 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.[8] 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

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

[8]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.

$$fixed_{kt} \equiv \sum_{i=1}^{N} \overline{\left(\frac{Export_{ki}}{Export_k} \right)} \times fixed_{cit} \tag{28}$$

$$peg_{kt} \equiv \sum_{i=1}^{N} \overline{\left(\frac{Export_{ki}}{Export_k} \right)} \times kspeg_{cit} \tag{29}$$

$$inpeg_{kt} \equiv \sum_{i=1}^{N} \overline{\left(\frac{Export_{ki}}{Export_k} \right)} \times inkspeg_{cit} \tag{30}$$

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

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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

$$logrer_{kt} \equiv \sum_{i=1}^{N} \overline{\left(\frac{Export_{k,i}}{Export_k} \right)} \times \log(rer_{cit}) \tag{31}$$

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.

3.2 Empirical Specification

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

$$\log(emp_{kt}) = \beta_0 + \beta_1 \cdot fixed_{kt} + \beta_2 \cdot (labor_k \times fixed_{kt}) + Z'_{kt}\lambda + \gamma_{ht} + \gamma_k + \epsilon_{kt} \qquad (32)$$

where subscripts k, h and t denote firm, industry at the CIC 4-digit level[9] 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 (32) 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

$$\begin{aligned}
\log(emp_{kt}) =& \beta_0 + \beta_1 \cdot peg_{kt} + \beta_2 \cdot (labor_k \times peg_{kt}) \\
& + \theta_1 \cdot inpeg_{kt} + \theta_2 \cdot (labor_k \times inpeg_{kt}) + Z'_{kt}\lambda + \gamma_{ht} + \gamma_k + \epsilon_{kt}.
\end{aligned} \qquad (33)$$

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

4 EMPIRICAL RESULTS

4.1 Baseline results

The results of the baseline regressions for specifications (32) and (33) 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

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[9]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.[10]

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).

4.2 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.

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[10]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.

$$fixed_{kt} \equiv \sum_{i=1}^{N} \frac{Export_{hi}}{Export_h} \times fixed_{cit} \tag{34}$$

$$peg_{kt} \equiv \sum_{i=1}^{N} \frac{Export_{hi}}{Export_h} \times kspeg_{cit} \tag{35}$$

$$inpeg_{kt} \equiv \sum_{i=1}^{N} \frac{Export_{hi}}{Export_h} \times inkspeg_{cit} \tag{36}$$

$$logrer_{kt} \equiv \sum_{i=1}^{N} \frac{Export_{hi}}{Export_h} \times logrer_{cit} \tag{37}$$

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

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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).[11] 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:

$$\log(emp_{kt}) = \beta_0 + \beta_1 \cdot (labor_k \times post\ 2006\ dummy) + Z'_{kt}\lambda + \gamma_{ht} + \gamma_k + \epsilon_{kt} \qquad (38)$$

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

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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 on the variable *post* 2006 *dummy*, without controlling for any time trend. As shown, the coefficients are positive and statistically significant. On the interaction term *labor* $\times$ *post* 2006 *dummy*, the coefficients take the opposite sign and are also statistically significant. These findings support 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), we include the industry-time fixed effect and the coefficients on the post-2006 dummy drop from these types of regressions. Nevertheless, the coefficients on the interaction term *labor* $\times$ *post* 2006 *dummy* remain negative and statistically significant, confirming the robustness of our results. It is worth noting that the coefficient on the real exchange rate term is negative in Column (1) of Table 7. However, this may be attributed to the lack of control for the time trend in this regression. Once we add the $Industry \times Time$ fixed effect, the coefficient on the real exchange rate term becomes positive, indicating that an exchange rate depreciation leads to higher levels of employment for firms.

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

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dominant currency paradigm.

4.3   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 2, 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

$$\log(price)_{k,p,i,t} = \beta_0 + \beta_1 \cdot fixed_{c,i,t} + \beta_2 \cdot (labor_k \times fixed_{c,i,t}) + Z_{k,t}\lambda + \gamma_{k,p,i} + \gamma_t + \epsilon_{k,p,i,t} \quad (39)$$

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

$$\begin{aligned}
\log(price)_{k,p,i,t} = &\beta_0 + \beta_1 \cdot kspeg_{c,i,t} + \beta_2 \cdot (labor_k \times peg_{c,i,t}) \\
&+ \theta_1 \cdot inpeg_{c,i,t} + \theta_2 \cdot (labor_k \times inpeg_{c,i,t}) + Z_{kt}\lambda + \gamma_{k,p,i} + \gamma_t + \epsilon_{k,p,i,t}.
\end{aligned} \quad (40)$$

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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.

5 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.

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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.

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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.

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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.

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Table 7: Policy Shock in the Exchange Rate Regime

	(1)	(2)	(3)	(4)
$labor \times post$ 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
$Industry \times Time$ 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.

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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.

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APPENDIX

A   Proof of Lemma 1

In this section, we present the proof of Lemma 1. By (7) and (8), the Dixit-Stiglitz demand structure implies

$$Y_{Ht}(j) = \left(\frac{P_{Ht}(j)}{P_{Ht}}\right)^{-\theta} Y_{Ht} = \left(\frac{P_{Ht}(j)}{P_{Ht}}\right)^{-\theta} \frac{\gamma P_t Y_t}{P_{Ht}}.$$

Note that we do not have government expenditure in our model, so

$$Y_t = C_t + I_t$$

and

$$Y_{Ht}(j) = \left(\frac{P_{Ht}(j)}{P_{Ht}}\right)^{-\theta} \frac{\gamma P_t (C_t + I_t)}{P_{Ht}}.$$

Similarly,

$$Y_{Ht}^*(j) = \left(\frac{P_{Ht}^*(j)}{P_{Ht}^*}\right)^{-\theta} \frac{(1-\gamma) P_t^* (C_t^* + I_t^*)}{P_{Ht}^*}.$$

Using the expressions of $Y_{Ht}(j)$ and $Y_{Ht}^*(j)$ in (11) and (12), we obtain

$$P_{Ht} = \frac{\theta}{\theta - 1} \frac{E_{t-1}\left[Q_{t-1,t} MC_t P_t (C_t + I_t)\right]}{E_{t-1}\left[Q_{t-1,t} P_t (C_t + I_t)\right]} \tag{41}$$

$$P_{Ht}^* = \frac{\theta}{\theta - 1} \frac{E_{t-1}\left[Q_{t-1,t} MC_t P_t^* (C_t^* + I_t^*)\right]}{E_{t-1}\left[Q_{t-1,t} \mathcal{E}_t P_t^* (C_t^* + I_t^*)\right]} \tag{42}$$

where we have used the fact that all prices are set before the sales, so they can be taken out of the expectation operators. The firm index i has been dropped due to symmetry.

We now consider the individual demand for capital input in production. For any domestic firm, based on our assumption of the Cobb-Douglas production function, we can show that

$$R_t K_t = (1-\alpha) MC_t (Y_{Ht} + Y_{Ht}^*) = (1-\alpha) MC_t \left(\frac{\gamma P_t (C_t + I_t)}{P_{Ht}} + \frac{(1-\gamma) P_t^* (C_t^* + I_t^*)}{P_{Ht}^*}\right).$$

Note that $K_t = I_{t-1}$, then

$$R_t I_{t-1} = (1-\alpha) MC_t \left(\frac{\gamma P_t (C_t + I_t)}{P_{Ht}} + \frac{(1-\gamma) P_t^* (C_t^* + I_t^*)}{P_{Ht}^*}\right). \tag{43}$$

By multiplying each side of Equation (43) by $Q_{t-1,t}$ and taking the expectation at period $t - 1$,

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we can obtain

$$E_{t-1}\left[Q_{t-1,t}R_t\right]I_{t-1} = (1-\alpha)\left(\frac{\gamma E_{t-1}\left[Q_{t-1,t}MC_tP_t\left(C_t+I_t\right)\right]}{P_{Ht}} + \frac{(1-\gamma)E_{t-1}\left[Q_{t-1,t}MC_tP_t^*\left(C_t^*+I_t^*\right)\right]}{P_{Ht}^*}\right).$$
(44)

Using Equations (4), (41) and (42), we can re-write (44) as

$$P_{t-1}I_{t-1} = \frac{\theta-1}{\theta}(1-\alpha)\left(\gamma E_{t-1}\left[Q_{t-1,t}P_t\left(C_t+I_t\right)\right]+(1-\gamma)E_{t-1}\left[Q_{t-1,t}\mathcal{E}_tP_t^*\left(C_t^*+I_t^*\right)\right]\right). \quad (45)$$

Note that

$$Q_{t-1,t} = \beta\frac{P_{t-1}C_{t-1}}{P_tC_t} \text{ and } \mathcal{E}_t = \frac{P_tC_t}{P_t^*C_t^*}.$$

So Equation (45) can be re-written as

$$\frac{I_{t-1}}{C_{t-1}} = \frac{\beta(1-\alpha)(\theta-1)}{\theta}\left(\gamma E_{t-1}\left[1+\frac{I_t}{C_t}\right]+(1-\gamma)E_{t-1}\left[1+\frac{I_t^*}{C_t^*}\right]\right) \quad (46)$$

This is the case as Foreign behaves as a closed economy, as implied by Gali and Monacelli (2005). Hence we follow the same steps above and obtain the following condition in Foreign

$$\frac{I_{t-1}^*}{C_{t-1}^*} = \frac{\beta(1-\alpha)(\theta-1)}{\theta}E_{t-1}\left[1+\frac{I_t^*}{C_t^*}\right]. \quad (47)$$

Iterating (47) forward till $t\to\infty$, we can obtain

$$\frac{I_{t-1}^*}{C_{t-1}^*} = \sum_{\tau=0}^{\infty}\left(\frac{\beta(1-\alpha)(\theta-1)}{\theta}\right)^{\tau+1} + \lim_{\tau\to\infty}\left(\frac{\beta(1-\alpha)(\theta-1)}{\theta}\right)^{\tau+1}E_{t-1}\left[\frac{I_{t+\tau}^*}{C_{t+\tau}^*}\right].$$

The only bounded solution implies that

$$\lim_{\tau\to\infty}\left(\frac{\beta(1-\alpha)(\theta-1)}{\theta}\right)^{\tau+1}E_{t-1}\left[\frac{I_{t+\tau}^*}{C_{t+\tau}^*}\right] = 0.$$

Hence,

$$\frac{I_{t-1}^*}{C_{t-1}^*} = \frac{\frac{\beta(1-\alpha)(\theta-1)}{\theta}}{1-\frac{\beta(1-\alpha)(\theta-1)}{\theta}}.$$

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Then substituting the ratio I^*_{t-1}/C^*_{t-1} into (46), we can obtain

$$
\begin{aligned}
\frac{I_{t-1}}{C_{t-1}} &= \frac{\beta(1-\alpha)(\theta-1)}{\theta}\left(1+\gamma E_{t-1}\left[\frac{I_t}{C_t}\right]+(1-\gamma)E_{t-1}\left[\frac{I^*_t}{C^*_t}\right]\right) \\
&= \cdots \\
&= \sum_{\tau=0}^{\infty}\left(\frac{\beta(1-\alpha)(\theta-1)}{\theta}\right)^{\tau+1}+\lim_{\tau\to\infty}\left(\frac{\beta(1-\alpha)(\theta-1)}{\theta}\right)^{\tau+1}\left[\gamma E_{t-1}\left[\frac{I_{t+\tau}}{C_{t+\tau}}\right]+(1-\gamma)E_{t-1}\left[\frac{I^*_{t+\tau}}{C^*_{t+\tau}}\right]\right]
\end{aligned}
$$

Again the bounded solution implies that

$$
\lim_{\tau\to\infty}\left(\frac{\beta(1-\alpha)(\theta-1)}{\theta}\right)^{\tau+1}\left[\gamma E_{t-1}\left[\frac{I_{t+\tau}}{C_{t+\tau}}\right]+(1-\gamma)E_{t-1}\left[\frac{I^*_{t+\tau}}{C^*_{t+\tau}}\right]\right]\to 0
$$

and then,

$$
\frac{I_{t-1}}{C_{t-1}}=\sum_{\tau=0}^{\infty}\left(\frac{\beta(1-\alpha)(\theta-1)}{\theta}\right)^{\tau+1}=\frac{\frac{\beta(1-\alpha)(\theta-1)}{\theta}}{1-\frac{\beta(1-\alpha)(\theta-1)}{\theta}}. \tag{48}
$$

Similarly, the foreign investment-to-consumption ratio is

$$
\frac{I^*_{t-1}}{C^*_{t-1}}=\sum_{\tau=0}^{\infty}\left(\frac{\beta(1-\alpha)(\theta-1)}{\theta}\right)^{\tau+1}=\frac{\frac{\beta(1-\alpha)(\theta-1)}{\theta}}{1-\frac{\beta(1-\alpha)(\theta-1)}{\theta}}. \tag{49}
$$

As the investment-to-consumption ratio in both countries is a constant over time, we can show that

$$
\begin{aligned}
P_{Ht} &= \frac{\theta}{\theta-1}\frac{E_{t-1}\left[Q_{t-1,t}MC_t\left(1+\frac{\frac{\beta(1-\alpha)(\theta-1)}{\theta}}{1-\frac{\beta(1-\alpha)(\theta-1)}{\theta}}\right)P_tC_t\right]}{E_{t-1}\left[Q_{t-1,t}\left(1+\frac{\frac{\beta(1-\alpha)(\theta-1)}{\theta}}{1-\frac{\beta(1-\alpha)(\theta-1)}{\theta}}\right)P_tC_t\right]} \\
&= \frac{\theta}{\theta-1}\frac{E_{t-1}\left[\beta\frac{P_{t-1}C_{t-1}}{P_tC_t}MC_tP_tC_t\right]}{E_{t-1}\left[\beta\frac{P_{t-1}C_{t-1}}{P_tC_t}P_tC_t\right]}=\frac{\theta}{\theta-1}E_{t-1}\left[MC_t\right] \\
P^*_{Ht} &= \frac{\theta}{\theta-1}\frac{E_{t-1}\left[Q_{t-1,t}MC_t\left(1+\frac{\frac{\beta(1-\alpha)(\theta-1)}{\theta}}{1-\frac{\beta(1-\alpha)(\theta-1)}{\theta}}\right)P^*_tC^*_t\right]}{E_{t-1}\left[Q_{t-1,t}\mathcal{E}_t\left(1+\frac{\frac{\beta(1-\alpha)(\theta-1)}{\theta}}{1-\frac{\beta(1-\alpha)(\theta-1)}{\theta}}\right)P^*_tC^*_t\right]} \\
&= \frac{\theta}{\theta-1}\frac{E_{t-1}\left[\beta\frac{P_{t-1}C_{t-1}}{P_tC_t}MC_tP^*_tC^*_t\right]}{E_{t-1}\left[\beta\frac{P_{t-1}C_{t-1}}{P_tC_t}\frac{P_tC_t}{P^*_tC^*_t}P^*_tC^*_t\right]}=\frac{\theta}{\theta-1}E_{t-1}\left[\frac{MC_t}{\mathcal{E}_t}\right]
\end{aligned}
$$

which completes the proof of Lemma 1.

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B DERIVING LOG-LINEAR APPROXIMATIONS TO PRICES

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

$$m_t = p_t + c_t$$

where we have used the result derived in Appendix A that the consumption-to-investment ratio is a constant in our model. Then the log-linearization of the marginal cost gives us

$$
\begin{aligned}
mc_t &= \alpha w_t + (1 - \alpha) r_t - a_t \\
&= \alpha \left(\psi w_{t-1} + (1 - \psi) m_t \right) + (1 - \alpha) r_t - a_t
\end{aligned}
\tag{50}
$$

where we have used the wage rigidity assumption. For the nominal exchange rate, we can show that

$$\mathcal{E}_t = m_t - m_t^*. \tag{51}$$

By inserting Equation (19) into the above we can show that:

$$r_t + k_t = mc_t + \frac{1}{2} (m_t - \hat{p}_{Ht}) + \frac{1}{2} (m_t^* - \hat{p}_{Ht}^*). \tag{52}$$

Combining Equations (50), (52) and (50), we can show that

$$mc_t = \psi w_{t-1} + \left(1 - \psi + \frac{1}{2} \frac{1-\alpha}{\alpha} \right) m_t + \frac{1}{2} \frac{1-\alpha}{\alpha} m_t^* - \left(\frac{1-\alpha}{\alpha} \right) \left(\frac{1}{2} p_{Ht} + \frac{1}{2} p_{Ht}^* + k_t \right) - \frac{1}{\alpha} a_t. \tag{53}$$

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

$$\bar{P}_H = \bar{P}_H^* = \frac{\theta}{\theta - 1} \bar{M}C.$$

Then, under flexible exchange rates,

$$
\begin{aligned}
p_{Ht}^{flexible} &= \psi w_{t-1} - \left(\frac{1-\alpha}{\alpha} \right) \left(\frac{1}{2} p_{Ht}^{flexible} + \frac{1}{2} p_{Ht}^{*flexible} + k_t \right) \\
&\quad + \frac{\left(1 - \psi + \frac{1}{2} \frac{1-\alpha}{\alpha} \right)^2 + \frac{1}{4} \frac{(1-\alpha)^2}{\alpha^2}}{2} \sigma_m^2 + \frac{1}{2\alpha^2} \sigma_a^2
\end{aligned}
\tag{54}
$$

where w_{t-1}, p_{Ht}, p_{Ht}^* and k_t are all pre-determined variables, and hence, they can be taken out

of the expectation operator. Similarly,

$$
\begin{aligned}
p_{Ht}^{*flexible} &= \psi w_{t-1} - \left(\frac{1-\alpha}{\alpha}\right)\left(\frac{1}{2}p_{Ht}^{flexible} + \frac{1}{2}p_{Ht}^{*flexible} + k_t\right) \\
&\quad + \frac{\left(\psi - \frac{1}{2}\frac{1-\alpha}{\alpha}\right)^2 + \left(\frac{1}{2}\frac{1-\alpha}{\alpha} + 1\right)^2}{2}\sigma_m^2 + \frac{1}{2\alpha^2}\sigma_a^2.
\end{aligned}
\tag{55}
$$

Under fixed exchange rates, we have

$$
p_{Ht}^{fixed} = \psi w_{t-1} - \left(\frac{1-\alpha}{\alpha}\right)\left(\frac{1}{2}p_{Ht}^{fixed} + \frac{1}{2}p_{Ht}^{*fixed} + k_t\right) + \frac{\left(1 - \psi + \frac{1-\alpha}{\alpha}\right)^2}{2}\sigma_m^2 + \frac{1}{2\alpha^2}\sigma_a^2
\tag{56}
$$

and

$$
p_{Ht}^{*fixed} = \psi w_{t-1} - \left(\frac{1-\alpha}{\alpha}\right)\left(\frac{1}{2}p_{Ht}^{fixed} + \frac{1}{2}p_{Ht}^{*fixed} + k_t\right) + \frac{\left(1 - \psi + \frac{1-\alpha}{\alpha}\right)^2}{2}\sigma_m^2 + \frac{1}{2\alpha^2}\sigma_a^2.
\tag{57}
$$

We now solve Equations (54) to (57). First, we have

$$
p_{Ht}^{*flexible} - p_{Ht}^{flexible} = \Delta
\tag{58}
$$

where

$$
\Delta \equiv \left(\frac{\left(\psi - \frac{1}{2}\frac{1-\alpha}{\alpha}\right)^2 + \left(\frac{1}{2}\frac{1-\alpha}{\alpha} + 1\right)^2}{2} - \frac{\left(1 - \psi + \frac{1}{2}\frac{1-\alpha}{\alpha}\right)^2 + \frac{1}{4}\frac{(1-\alpha)^2}{\alpha^2}}{2}\right)\sigma_m^2 = \psi\sigma_m^2.
\tag{59}
$$

Substituting (58) into (54), we have

$$
p_{Ht}^{flexible} = \alpha\psi w_{t-1} - (1-\alpha)k_t + \frac{\sigma_a^2}{2\alpha} + \frac{\alpha\left(\left(1 - \psi + \frac{1}{2}\frac{1-\alpha}{\alpha}\right)^2 + \frac{1}{4}\frac{(1-\alpha)^2}{\alpha^2} - \psi\frac{1-\alpha}{\alpha}\right)}{2}\sigma_m^2
\tag{60}
$$

and

$$
p_{Ht}^{*flexible} = \alpha\psi w_{t-1} - (1-\alpha)k_t + \frac{\sigma_a^2}{2\alpha} + \frac{\alpha\left(\left(1 - \psi + \frac{1}{2}\frac{1-\alpha}{\alpha}\right)^2 + \frac{1}{4}\frac{(1-\alpha)^2}{\alpha^2} + \frac{(1+\alpha)\psi}{\alpha}\right)}{2}\sigma_m^2.
\tag{61}
$$

Under fixed exchange rates, it is easy to show that

$$
p_{Ht}^{fixed} = p_{Ht}^{*fixed} = \alpha\psi w_{t-1} - (1-\alpha)k_t + \frac{\sigma_a^2}{2\alpha} + \frac{\alpha\left(1 - \psi + \frac{1-\alpha}{\alpha}\right)^2}{2}\sigma_m^2.
\tag{62}
$$

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C   PROOF OF LEMMA 2

Combining Equations (60), (61) and (62), we can show that

$$
\begin{aligned}
p_{Ht}^{flexible} - p_{Ht}^{fixed} &= -\frac{(1-\alpha)}{2}\left(1 + \frac{1-\alpha}{2\alpha}\right)\sigma_m^2 \\
p_{Ht}^{*flexible} - p_{Ht}^{*fixed} &= \left(\psi - \frac{1-\alpha}{2}\left(1 + \frac{1-\alpha}{2\alpha}\right)\right)\sigma_m^2.
\end{aligned}
$$

Note that $\frac{1-\alpha}{2}\left(1 + \frac{1}{2}\frac{1-\alpha}{\alpha}\right)$ is decreasing in α. Hence, as α increases, i.e., production becomes more labor intensive, both $p_{Ht}^{flexible} - p_{Ht}^{fixed}$ and $p_{Ht}^{*flexible} - p_{Ht}^{*fixed}$ will decline.

In one extreme case when $\alpha \to 1$, that is, the labor-intensity is very high, we have

$$
p_{Ht}^{flexible} - p_{Ht}^{fixed} = 0 \text{ and } p_{Ht}^{*flexible} - p_{Ht}^{*fixed} = \psi\sigma_m^2 > 0. \tag{63}
$$

In another extreme case when $\alpha \to 0$, we can easily show that

$$
p_{Ht}^{flexible} - p_{Ht}^{fixed} < 0 \text{ and } p_{Ht}^{*flexible} - p_{Ht}^{*fixed} < 0. \tag{64}
$$

Due to continuity, there exists a threshold $\bar{\alpha} \in [0,1]$ such that for $\alpha \gtreqless \bar{\alpha}$,

$$
p_{Ht}^{*flexible} \gtreqless p_{Ht}^{*fixed}.
$$

.

D   PROOF OF PROPOSITION 1

As shown in the previous analysis, both $p_{Ht}^{flexible} - p_{Ht}^{fixed}$ and $p_{Ht}^{*flexible} - p_{Ht}^{*fixed}$ are decreasing in α, which implies that, as α falls, prices are relatively higher when the exchange rates are more flexible. Mathematically, we have

$$
\frac{\partial\left(L_t^{flexible} - L_t^{fixed}\right)}{\partial\alpha} < 0.
$$

For given M_t, M_t^*, and A_t, the cash-in-advance constraint and (18) imply that wage rate W_t is pinned down. Hence, employment only depends on the preset prices by firms. When $\alpha \to 1$, as shown in (63),

$$
p_{Ht}^{flexible} - p_{Ht}^{fixed} = 0 \text{ and } p_{Ht}^{*flexible} - p_{Ht}^{*fixed} = \psi\sigma_m^2 > 0.
$$

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This implies

$$P_{Ht}^{flexible} = P_{Ht}^{fixed} \text{ and } P_{Ht}^{*flexible} > P_{Ht}^{*fixed}.$$

Note that employment is decreasing in price. We can easily show that when $\alpha \to 1$

$$L_t^{flexible} < L_t^{fixed}.$$

When $\alpha \to 0$, using Equation (64),

$$p_{Ht}^{flexible} - p_{Ht}^{fixed} < 0 \text{ and } p_{Ht}^{*flexible} - p_{Ht}^{*fixed} < 0$$

This implies

$$P_{Ht}^{flexible} < P_{Ht}^{fixed} \text{ and } P_{Ht}^{*flexible} < P_{Ht}^{*fixed}.$$

Given realized M_t, M_t^*, and A_t, we can easily show that

$$L_t^{flexible} > L_t^{fixed}.$$

Due to continuity, there exists a threshold $\bar{\alpha}^L \in [0, 1]$ such that for $\alpha \gtreqless \bar{\alpha}^L$,

$$L_t^{flexible} \lesseqgtr L_t^{fixed}.$$

E   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

$$\max_{P_{Ht}^{US}(j)} \mathbb{E}_{t-1} \left[Q_{t-1,t} \left(\mathcal{E}_t^{H,US} P_{Ht}^{US}(j) - MC_t(j) \right) Y_{Ht}^i(j) \right]$$

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

$$Y_{Ht}^i(j) = \left(\frac{P_{Ht}^{US}(j)}{P_{Ht}^{US}}\right)^{-\theta} Y_{Ht}^i$$

where Y_{Ht}^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

$$Y_{Ht}^i = \gamma^c \frac{M_t^i}{\mathcal{E}_t^{i,US} P_{Ht}^{US}}.$$

The complete international financial market assumption implies that

$$\mathcal{E}_t^{H,US} = \frac{P_t^H C_t^H}{P_t^{US} C_t^{US}},\ \mathcal{E}_t^{i,US} = \frac{P_t^i C_t^i}{P_t^{US} C_t^{US}}.$$

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

$$P_{Ht}^{US} = \frac{\theta}{\theta - 1} \mathbb{E}_{t-1}\left[\frac{MC_t}{\mathcal{E}_t^{H,US}}\right]. \tag{65}$$

The only difference between Equations (65) and (14) in Lemma 1 is the replacement of the bilateral exchange rate between Home and the export destination country $\mathcal{E}_t$ with the bilateral exchange rate between Home and the United States $\mathcal{E}_t^{H,US}$. This means that the export price (in US dollars) is only affected by the exchange rate between the Home currency and the US dollar.[12] Following the same steps in the benchmark model, we can demonstrate that firms 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

---

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

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.[13]

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 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

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

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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).

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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.

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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.

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