Masking the Truth or Softening the Blow? U.S. Banking Deregulation and Sectoral Reallocation after the China Trade Shock

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Abstract

We study how state-level banking deregulation during the 1980's affected the sectoral reallocation between tradable and non-tradable industries a decade later, between 1990 and 2007, following the China trade shock. States that opened their local banking markets earlier were effectively financially more integrated by the 1990's. Based on a simple theoretical model, we argue that financially more open states should see a swifter reallocation between import-exposed tradable and non-tradable industries. The model emphasizes the stabilizing effect of financial integration on non-tradable demand by households: faced with an adverse shocks to the terms-of-trade, households in more open states can more easily smooth consumption. This stabilizes consumer demand for and prices of non-tradables and thus facilitates the sectoral reallocation from tradable industries exposed to import competition towards the non-tradable sector. Consistent with the model predictions, we find that financially more open states and commuter zones saw a stronger and swifter drop in tradable output and employment and an bigger increase in non-tradable output and employment while non-tradable wages and prices — and in particular housing prices — dropped less in more financially integrated states. Our findings illustrate the role of better access to finance for households in the adjustment to spillovers from external trade shocks in heterogeneous monetary unions.

Keywords: banking deregulation, China trade shock, sectoral reallocation, house prices

JEL Classification: F16, F41, G18, G21, J20

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1 Introduction

During the 1990's and early 2000's, growing import competition from China disrupted the U.S. manufacturing sector. This "China Syndrome" was first documented by Autor, Dorn and Hanson (2013) who show that U.S. labor market regions (commuting zones) with manufacturing industries that were particularly exposed to Chinese competition also saw the biggest drops in manufacturing employment and wages.

The seminal papers by Autor et al. (2013) have sparked a considerable body of follow-up empirical work (e.g., Acemoglu, Autor, Dorn, Hanson and Price, 2016; Autor, Dorn and Hanson, 2016; Pierce and Schott, 2016). However, one important and directly related question that has so far remained unaddressed is to what extent geographic differences in financial integration affected the response of U.S. regional economies to the China trade shock and the sectoral reallocation that followed it. In this paper, we attempt to provide an answer.

The China trade shock constituted a major deterioration of the terms of trade of many regional economies in the United States. At a theoretical level, one would expect that regions with easier access to finance would see a swifter sectoral reallocation after a such a terms-of-trade shock. This could happen through various channels. Better access to finance may make it easier for displaced manufacturing workers to retrain or start businesses in other sectors. Better access to finance may also make it easier for directly exposed manufacturing firms to survive the China shock in the first place, thus attenuating the drop in manufacturing employment and wages. Last but not least, easier access to finance may allow consumers to smooth consumption, which props up local demand for non-tradable consumption, thus facilitating the reallocation from manufacturing to non-tradable industries.

To explore these hypotheses empirically, we exploit the fact that the United States experienced a period of significant deregulation of the banking industry during the 1980's. In particular, in the decade before the China shock, individual states opened their local banking markets by allowing banks from outside the state to enter (Jayaratne and Strahan, 1996). Since not all states deregulated at the same time, there was considerably variation at the state level in the number of years that had elapsed since banking liberalization until a local economy was hit by the China shock in the 1990's. Following earlier work co-authored by one of us (Hoffmann and Stewen, 2019), we interpret these number of years as state-level differences in financial integration.

Our results suggest that the China trade shock was indeed attenuated by financial integration. For a given exposure to China, wages and employment decreased by less in more financially

integrated regions. This was primarily the case for employment and wages in non-tradable industries such as real estate sector, as well as for the price of non-tradable goods, in particular for housing prices. Figure 1 depicts the evolution of total employment shares in the manufacturing and real estate sectors, wages, consumption and personal income per capita, as well as house prices for two samples of early and late deregulation states for the time period of 1985-2015. It is evident, that the manufacturing employment share decreased faster, whereas the real estate employment share, wages, personal income, consumption, and house prices increased on average faster in the sample of early deregulation states compared to the sample of late deregulation states during the considered time period. Based on a simple model of trade with consumer demand and production in the tradable- and non-tradable goods sectors, we argue that this pattern supports the view that access to finance primarily worked by stabilizing local consumer demand, thus facilitating the reallocation of displaced workers from the manufacturing to the non-tradable industries.

Our paper directly relates to a growing body of literature - starting with Jayaratne and Strahan (1996) that has used the quasi-experiment of state-level banking deregulation to study the effects of credit supply shock on economic outcomes. More recently Favara and Imbs (2015) have documented the impact of banking deregulation on mortgage credit supply and house prices. Hoffmann and Stewen (2019) show that house prices in states that liberalized early during the 1980's were more correlated with capital inflows into the U.S. after 1997. Mian, Sufi and Verner (2017) show that states that liberalized their banking markets earlier during the 1980's saw more pronounced boom-bust cycles in consumer lending during the late 1980's and early 1990's. Their results support the view that the effect of banking deregulation on credit supply was largely transmitted through an increase in household debt.

While all of these papers study the impact that banking deregulation had on credit supply, our analysis draws attention to the role that banking deregulation played in modulating an aggregate shock to credit *demand*. By the time the China trade shock started to hit in the 1990's, banking deregulation at the state level was largely complete. However, as we have argued in Hoffmann and Stewen (2019), deregulation left a long shadow in the sense that differences in the *de facto* level of integration of state banking markets continued to persist for more than a decade. We condition on these pre-determined differences in financial integration to ask how and through which channels state banking systems that were more integrated with the rest of the country could satisfy the increased credit demand of households and firms. Specifically,

using a simple small-open economy model with financial frictions, we argue that the pattern in the data is consistent with the view that the blow of the China shock got softened mainly because households in more financially integrated states could smooth consumption. This in turn helped stabilize local demand for non-tradable goods and kept wages in the non-tradable sector up, thus facilitating the sectoral reallocation from manufacturing to the non-tradable and services sectors. Hence, differently from earlier papers, we do not focus on the credit supply effect of financial liberalization itself. Rather, we ask how better access to finance of private households can stabilize consumer demand in the presence of large external shock to a region's terms-of-trade and – in so doing — can facilitate the sectoral reallocation of employment.

Our findings here also connect to the broader literature on the role of financial integration in mitigating the costs of adjustments to asymmetric external shocks among regions of a monetary union. In the Eurozone today, like in the United States, the use of a common currency entails that asymmetric terms-of-trade shocks among member states have to be cushioned by internal valuation. However, different from the United States, low levels of financial integration in the Eurozone — in particular also in retail and consumer finance among euro countries – impose high costs of adjustment to terms-of-trade shocks since they lead to drops in consumer demand that make it harder to reallocate resources towards the production of non-tradables.

Finally, our results also add a new perspective on the long-run impact of the China shock on the level and composition of employment in U.S. regional labor markets. Charles, Hurst and Notowidigdo (2016) have argued recently that the true employment effects of the China shock were masked by the concurrent (but largely independent) rise in house prices prior to 2008. Charles et al. (2016) argue that the rise of the housing bubble in the late 1990's made it easier for households to temporarily maintain consumption (mainly through job creation in construction but possibly also through mortgage borrowing and equity withdrawal) even though their income and employment prospects had been permanently harmed by import competition from China. Our results here suggest that at least a part of the increase in house prices that many U.S. states and counties experienced in the years between 1995 and 2005 reflects a sectoral reallocation away from manufacturing towards non-tradables that would appear to be an endogenous response to the China trade shock.

The paper is organized as follows. Section 2 presents a stylized model of how financial openness modulates the response of an economy to a terms-of-trade shock. Section 3 provides a brief discussion of data sources and measurements that we use in our analysis. Sections 4 and

5 discuss our empirical methodology and present our empirical results. Section 6 concludes.

2 Theoretical Framework

To guide our empirical analysis, in this section we present a simple model of tradable and non-tradable production and consumption. The model is deliberately stylized and it emphasizes the role of consumers' demand and their access to finance in facilitating the reallocation of labor between sectors. Our model yields two main predictions about the real consequences of the China trade shock. First, we show that an import shock—modeled here as a deterioration in the terms-of-trade—will tend to decrease wages and employment in the tradable sector relative to the non-tradable sector. The concomitant drop in consumer demand will also depress demand for non-tradable goods and tend to lower local non-tradable prices. Second, easier access to finance will enable households to borrow in order to smooth consumption. This mitigates the negative impact on wages and non-tradable prices after such term-of-trade shock. This in turn will facilitate the reallocation of employment from the exposed tradable sector into the non-tradable sector.

2.1 Environment

We consider a currency union with many regions, $i = 1, ..., I$, each producing goods in the tradable (T) and non-tradable (N) sectors. Time is discrete and indexed by $t = 0, 1, 2...\infty$. To minimize notation we omit the region subscript i unless it is explicitly expressed. The total endogenous supply of labor in region i in period t is L_t, which may be employed in the tradable or non-tradable sector. Labor is the only input factor used in production of homogenous tradable and non-tradable goods,

$$Y_{T,t} = A_T L_{T,t}^{\alpha}, \tag{1}$$

$$Y_{N,t} = A_N L_{N,t,}^{\eta} \tag{2}$$

where A_T and A_N are constant total factor productivity and $\alpha, \eta \in (0, 1)$ are output elasticity of labor exogenously given for the tradable and non-tradable sector respectively. Profit maximiza-

tion in each sector implies that the wage equals marginal productivity of labor in that sector

$$W_{T,t} = \alpha A_T P_{T,t} L_{T,t}^{\alpha-1}, \tag{3}$$

$$W_{N,t} = \eta A_N P_{N,t} L_{N,t}^{\eta-1}, \tag{4}$$

where $P_{T,t}$ and $P_{N,t}$ are the prices of tradable and non-tradable goods respectively, and $P_{T,t}$ is exogenously determined for the whole currency union. Furthermore, labor is assumed to be perfectly mobile between both sectors but not across regions so that wages equalize within a region in each period

$$W_t \equiv W_{T,t} = W_{N,t}. \tag{5}$$

With these assumptions, we can solve for the production-possibility frontier (PPF) of the economy as

$$Y_{T,t}(Y_{N,t}) = A_T \left(L_t - \left(\frac{Y_{N,t}}{A_N} \right)^{\frac{1}{\eta}} \right)^{\alpha} \tag{6}$$

and the profit-maximizing production in the two sectors implies that the economy will choose a combination of tradable and non-tradable output such that the slope of the PPF is given by the (negative of the) 'real exchange rate', $-P_{N,t}/P_{T,t}$,

$$\frac{P_{N,t}}{P_{T,t}} = \frac{\alpha A_T L_{N,t}^{1-\eta}}{\eta A_N L_{T,t}^{1-\alpha}}. \tag{7}$$

The demand side of each region's economy is given by a representative household who maximizes the expected utility defined over the stochastic sequences of consumption, C_t, and employment, L_t,

$$U_0 = \mathbb{E}_0 \left\{ \sum_{t=0}^{\infty} \beta^t \left(\frac{C_t^{1-\sigma}}{1-\sigma} - \frac{L_t^{1+\phi}}{1+\phi} \right) \right\}, \tag{8}$$

where $\mathbb{E}_0$ denotes the expectation based on the information set available in the initial period, β is the intertemporal subjective discount factor, σ and ϕ are inverses of intertemporal elasticities of substitution for the consumption and labor supply respectively. The consumption bundle in

each period, C_t, is given by a CES-aggregation over tradable and non-tradable consumption

$$C_t = \left[\gamma^{\frac{1}{\theta}} C_{T,t}^{\frac{\theta-1}{\theta}} + (1-\gamma)^{\frac{1}{\theta}} C_{N,t}^{\frac{\theta-1}{\theta}}\right]^{\frac{\theta}{\theta-1}}, \tag{9}$$

where $\gamma \in (0,1)$ is the expenditure share going to tradable goods and θ is the intratemporal elasticity of substitution. The household is subject to the period budget constraint

$$P_t C_t + D_t = W_t L_t + \frac{D_{t+1}}{1+r_t}, \tag{10}$$

where $P_t = \left[\gamma P_{T,t}^{1-\theta} + (1-\gamma) P_{N,t}^{1-\theta}\right]^{\frac{1}{1-\theta}}$ is the aggregate price index implied by the CES-aggregate (9) and D_t is an one-period debt.

To capture differences in the financial openness across regions, we follow Aguiar and Gopinath (2007) and assume that the price of debt is sensitive to the level of outstanding debt

$$r_t = r^* + \lambda(exp(D_t - D_{ss}) - 1), \tag{11}$$

where r^* is an exogenous currency union interest rate and D_{ss} represents the region's steady-state level of debt (assumed to be zero). The parameter $\lambda > 0$ captures the sensitivity of the region-specific interest rate to changes in the debt from its steady-state level. In our setting, we can equivalently think of λ as the inverse of the elasticity of credit supply. Specifically, in states that liberalized their banking system earlier credit supply is relatively elastic, so that local interest rate spreads over the economy-wide rate are not very sensitive to local credit demand D_t (low λ). Conversely in states that deregulated later, the supply of credit is relatively more inelastic, i.e. a given demand for credit D_t is associated with a higher interest rate (high λ).

The optimality conditions implied by the maximization of (8) subject to (10) are given by

$$\beta \left(\frac{C_{t+1}}{C_t}\right)^{-\sigma} = \frac{1}{1+r_t} \frac{P_{t+1}}{P_t} \tag{12}$$

$$L_t^{\phi} = \frac{W_t}{P_t C_t^{\sigma}} \tag{13}$$

for $t = 0, 1, 2....$ It is well known that the above demand structure implies linear income expansion path for tradable and non-tradable goods. We can therefore express the tradable and

non-tradable consumption, C_T and C_N, as a fraction of the consumption bundle, C,

$$C_{T,t} = \gamma \left(\frac{P_t}{P_{T,t}} \right)^{\theta} C_t \tag{14}$$

$$C_{N,t} = (1-\gamma) \left(\frac{P_t}{P_{N,t}} \right)^{\theta} C_t. \tag{15}$$

Furthermore, we can write the tradable to non-tradable consumption ratio, C_T/C_N, as a function of the relative price of tradable and non-tradable goods

$$\frac{C_{T,t}}{C_{N,t}} = \frac{\gamma}{1-\gamma} \left(\frac{P_{N,t}}{P_{T,t}} \right)^{\theta}. \tag{16}$$

Finally, the current account of each region can be obtained from the change in the household's optimal stock of foreign assets

$$CA_t = -(D_t - D_{t-1}). \tag{17}$$

A competitive equilibrium in each region i is a set of allocations $\{C_t, C_{T,t}, C_{N,t}, L_t, L_{T,t}, L_{N,t}, D_t\}$ and a system of prices $\{W_t, P_{N,t}, P_t, r_t\}$ so that, given the exogenous price of tradable goods, $P_{T,t}$: i) $\{C_t, C_{T,t}, C_{N,t}, L_t, D_t\}$ solve the household's optimality conditions (12), (13), (14), and (15) subject to the budget constraint (10), the consumption bundle (9) and the interest rate (11), ii) $\{L_{T,t}, L_{N,t}\}$ solve the optimality conditions in the tradable and non-tradable production, (3) and (4), iii) the non-tradable goods market and the labor market clear, i.e. $C_{N,t} = Y_{N,t}$ and $L_{T,t} + L_{N,t} = L_t$.

2.2 Predictions

In our exposition we focus on two polar cases. Region E (which we associate with early liberalizers) is assumed to be financially more integrated (low λ_E) so that consumers can borrow at the union-wide interest rate $r_{E,t} \approx r^*$. By contrast, region L (which we associate with late liberalizers) is assumed to be financially less integrated (high λ_L), and the local interest rate is very sensitive to the level of outstanding debt. Otherwise, regions E and L are identical. Further we assume that households in both regions start with a zero debt, i.e. $B_0 = 0$, such that the currency union interest rate in steady-state is $r^* = 1/\beta - 1$.

We introduce uncertainty in this economy and assume that the logarithmic price of tradable

goods follows an autoregressive process of order one

$$lnP_{T,t} = \tau lnP_{T,t-1} + \varepsilon_t, \tag{18}$$

where ε_t is an exogenous shock to the current price level in the tradable sector (e.g. due to an import shock), $\tau \in (0,1)$ captures the persistence of the shocks, and the initial price level of tradable goods, $P_{T,0}$, is normalized to one. Furthermore, we assume a downward price rigidity in the non-tradable sector implying that the price of non-tradable goods does not drop immediately to the market-clearing price after a shock to the price of tradable goods. Hence, the non-tradable price during the transition periods to the steady state, $\widetilde{P}_{N,t}$, evolves according to

$$ln\widetilde{P}_{N,t} = \rho lnP_{N,t-1} + (1-\rho)lnP_{N,t}, \tag{19}$$

with $\rho \in (0,1)$ and $P_{N,t}$ is the non-tradable price level implied by the optimality condition in the non-tradable sector (4).

Suppose now that in the first time period the whole currency union is hit by a persistent import shock (e.g., from China) such that the price of tradable goods, P_T, falls (i.e., $\varepsilon_1 < 0$).[1] Figure 2 illustrates adjustments in the endogenous variables of interest such as wage, price of non-tradable goods, employment in the tradable and non-tradable sectors, consumption of tradable and non-tradable goods, household debt, and the current account, from their steady-state levels in the early and late liberalized regions E and L after such a terms-of-trade shock. We start with the late deregulation region L. For a given drop in the price of tradable goods, the wage in the tradable sector falls. The optimality condition in production (7) implies that the price of non-tradable goods must drop by the same amount as the price of tradable goods. However, since the price of non-tradable goods cannot drop immediately (because of the price rigidity in this sector), non-tradable goods become relatively more expensive. Therefore, the real wage drops as well. The households' optimality condition (13) implies that the labor supply and/or consumption fall. The intratemporal optimality conditions for consumption given in equations (14) and (15) imply that demand for both tradable and non-tradable goods drop. Since non-tradable goods are relatively more expensive, equation (16) implies that the relative consumption of non-tradable goods drops as well. The market clearing in the non-tradable sector combined

[1] For expositional simplicity, we assume here that both states have the same degree of exposure to this shock. Clearly, our empirical analysis will allow the import exposure to differ along the lines of Autor et al. (2013).

with the optimality condition in production (7) imply that employment in both sectors decreases. Households in region L have no incentives to borrow, because a higher interest rate will raise the cost on the region's debt. Thus, the price of non-tradable goods, wage, employment, and consumption of both goods decline in region L, and there is no incentive to reallocate labor between both sectors.

Now consider the early deregulation region E. Since the region's E interest rate is relatively more competitive, households start to borrow in order to smooth their consumption of non-tradable goods (relative to tradable goods), inducing the economy to run a current account deficit. Hence, borrowing allows consumers to uphold demand for non-tradable goods. This stabilizes the price of non-tradable goods and therefore wage in the non-tradable sector. Since wages have to equalize between two sectors, the optimality condition in production of two sectors (7) implies that labor starts to be reallocated from the tradable to the non-tradable sector. This amounts to a shift in the region's production point along the PPF, at which region E produces and consumes relatively more of non-tradable goods.

The main prediction of our model is that, for a given decline in the price of tradable goods (terms-of-trade shock), there should be a stronger decline in the price of non-tradable goods and wages, and no (or less) sectoral reallocation of employment in the financially closed economy. Conversely, financially integrated regions should see relatively more stable prices of non-tradable goods and a stronger reallocation of labor away from the import-exposed tradable sectors towards non-tradable sectors along with the relatively more stable wages. The key insight we derive from the model is that financial openness affects the real reallocation of large trade shocks through its stabilizing impact on consumer demand. This is in stark contrast with much of the earlier literature that has emphasized how firm-level access to finance helps in cushioning major external shocks. In the remainder of the paper we are now going to confront the predictions of the model with the data.

3 Data and Measurements

Our main data comes from the County Business Patterns (CBP) provided by the U.S. Census Bureau. The CBP provides subnational economic statistics on U.S. business establishments at the state and county levels. The data is arranged by the Standard Industrial Classification (SIC) System from 1990 to 1997 and the North American Industry Classification System (NAICS)

from 1998 to 2007. [2] Information is available on the number of establishments, employment, and annual payroll (which is defined as a sum of wages and salaries paid during one year to all employees). Furthermore, we calculate average wage per employee as annual payroll divided by the number of employees in each sector. [3]

The data on GDP, personal income, consumption expenditures, population size, and price indexes come from the Regional Economic Accounts provided by the U.S. Bureau of Economic Analysis (BEA). As the price index we use Consumer Price Index (CPI) to deflate personal income, consumption expenditures, annual payroll and average wages with a base year of 2009. Finally, the data on house prices indexes at the state level and at the county level are from Lincoln Institute of Land Policy[4] and Federal Housing Finance Agency[5] respectively.

Our measurement of the Chinese import exposure on U.S. sectoral employment structure and other local market outcomes is based on the measurement developed in Autor et al. (2013). The Chinese imports to the U.S. are apportioned to the region according to its share of national industry employment. Accordingly, we use annual trade flow data at the 2-digit SIC industries for the U.S. from 1991 to 2007.[6] Furthermore, similar to this study, we use information on local industry employment structure for the same time period from the CBP data. Then, our measure of a change in Chinese import exposure per worker (ΔIE_{it}) in state i in year t is a sum of the changes in U.S. imports from China per worker ($\frac{\Delta IM_{ucjt}}{L_{ujt-1}}$) over the 2-digit sub-industries in the manufacturing sector weighted by the industry j's share of total employment in state i at the beginning of year t (i.e. $\frac{L_{ijt-1}}{L_{it-1}}$ is predetermined):

$$\Delta IE_{uit} = \sum_j \frac{L_{ijt-1}}{L_{it-1}} \cdot \frac{\Delta IM_{ucjt}}{L_{ujt-1}}. \tag{20}$$

To identify the supply-driven component of Chinese import exposure, similar to Autor et al. (2013), we calculate an instrument for our measure of import exposure per worker as follows:

$$\Delta IE_{oit} = \sum_j \frac{L_{ijt-1}}{L_{it-1}} \cdot \frac{\Delta IM_{ocjt}}{L_{ujt-1}}, \tag{21}$$

[2]The SIC is a United States government system for classifying industries, which was replaced by the NAICS starting in 1998. We applied the bridges between the both systems published on the same source to make the data consistent. For more information about the SIC and the NAICS see: http://www.census.gov/epcd/www/sic.html

[3]There might be a lack of precision in the measurement of the actual average wage, because the variable number of employees consists of full- time and part-time employees.

[4]http://datatoolkits.lincolninst.edu/subcenters/land-values/land-prices-by-state.asp

[5]https://www.fhfa.gov/DataTools/Downloads/Pages/House-Price-Index-Datasets.aspx

[6]The trade flow data at the 4-digit SIC industry level is taken from the online Data Appendix of Autor et al. (2013).

where ΔIM_{ocjt} is a change in Chinese exports to eight other high-income countries[7].

According to our hypothesis, financial openness affected the real reallocation of the China trade shock through its stabilizing impact on consumer demand, in particular for non-tradable goods. To explore this hypothesis empirically, we exploit the fact that the U.S. experienced a period of significant deregulation of the banking industry since the 1970s until the early 1990's (Jayaratne and Strahan, 1996). Since states deregulated in different years, there was a considerable heterogeneity at the state level in the degree of financial liberalization when a local economy was hit by the China shock in the beginning of the 1990s. Hence, our measurement of state financial openness takes into account the continuity in the deregulation process across states and it equals the number of years that have passed since the first year of adopting either Intrastate Branching and Interstate Banking deregulation laws until 1995, the year by which all states have adopted both laws:[8]

$$DI_i = 1995 - \min(Year\,of\,Intrastate\,Branching,\, Year\,of\,Interstate\,Banking). \quad (22)$$

Following equation (22), more financially integrated states are associated with a larger financial deregulation index, since these states began deregulating their banking sector further in the past.[9]

To provide a better overview, Table 1 reports summary statistics of all variables and measurements used in the present study. It also splits the whole sample into two groups of states that deregulated their banking sector before and after 1985.

4 Empirical Framework and Identification

We conduct our analysis at two levels of aggregation. First, at the state-level, which gives us an annual panel of 48 U.S. states (excluding Alaska and Hawaii) for the period from 1991 to 2007. Secondly, we follow Autor et al. (2013) and conduct our analysis also at the commuter-zone level. This has the advantage of considerable finer geographical granularity since there are 722 commuter zones.

[7]These countries include Australia, Denmark, Finland, Germany, Japan, New Zealand, Spain, and Switzerland

[8]With the exception of Iowa which has adopted Interstate Banking law in 1991, but Intrastate Branching only in 1997.

[9]Our measurement of state financial openness is consistent with the deregulation measures used in Hoffmann and Stewen (2019) and Mian et al. (2017)). In fact, our main results are robust to using these alternative measures of financial openness.

At each level of aggregation, we estimate panel equations of the following general form:

$$\Delta Y_{i,t} = \beta_1 \Delta IE_{i,t} + \beta_2 \Delta IE_{i,t} \times DI_{s(i)} + \beta_3 \boldsymbol{X}_{i,t} + \alpha_i + \tau_t + \epsilon_{i,t}, \tag{23}$$

where i indexes the state or commuter zone. The dependent variable $\Delta Y_{i,t}$ stands for a range of local outcomes, including labor market variables (wages and employment in the tradable and non-tradable sectors), non-tradable prices (in particular housing prices), but also other local outcomes such as income, consumption and unemployment. $\Delta IE_{i,t}$ is our location-specific measure of a change in Chinese import exposure per worker, and $DI_{s(i)}$ is our measure of state financial openness, i.e. the number of years elapsed until 1995 that state s, in which commuter zone i is located, has been open.[10] Additionally, the vector $\boldsymbol{X}_{i,t}$ contains a rich set of controls that vary by state and year, such as population growth, growth rate of government expenditures, and various indicators of monetary policy and credit availability. Finally, α_i and τ_t represent location and year fixed effects respectively. All our regressions are weighted using population weights in 1990 and we report robust standards errors clustered by state throughout.

Our main regression (23) is a differences-in-differences (DiD) specification. This specification will correctly identify the 'causal' effect of how financial openness modulates the China trade shock, *i)*, if ΔIE does not affect outcomes through other state characteristics that could be correlated with DI and *ii)* if ΔIE is uncorrelated with local demand for imports. To address the first concern, our second vector of control variables includes a range of interactions of ΔIE with other pre-1990 state-level characteristics, such as the growth rate of non-tradable GDP and wages, employment growth, export to GDP ratio, and house price growth before 1990. Specifically, a broad literature has documented the impact of banking deregulation in the 1980's on economic growth and the correlation of business cycles (Morgan, Rime and Strahan, 2004), trade (Michalski and Ors, 2012), the relative size of tradable and non-tradable sectors, and the growth rate of consumer credit (Mian et al., 2017) as well as firm creation.

To address the second concern, we follow Autor et al. (2013) and instrument Chinese import exposure (and its interactions with DI) with the employment share weighted sum of changes in Chinese exports over manufacturing sub-industries to other parts of the world (ΔIE_{oit}) as described above.

[10] Clearly, when the regression is run at the state-level, $s(i) = i$ for state i.

4.1 A first look at the data

In Figure 3 we take a first look at the data. The figure plots average changes of tradable and non-tradable employment, wages and house prices against the average change in a state's import exposure to Chinese imports over the period from 1991 to 2007. We classify states into two groups: early liberalizers are states that opened their banking markets for banks from other states before 1985. Conversely, states that opened their banking markets only after 1985 are classified as late liberalizers.

The figure sums up the gist of our empirical results: higher exposure to import competition from China generally leads to larger drops in employment and wages in all states. The unconditional correlation between Chinese import exposure and labor market outcomes is significantly negative — this is the original results of Autor et al. (2013). However, importantly, depending on a state's financial openness the relative importance of price and wage adjustment is reversed. In the financially open states (early liberalizers), the negative link between Chinese import exposure and the manufacturing employment is much starker than for the late liberalizers. At the same time, the link between Chinese import exposure and the real estate employment is reversed among the early-liberalizers, whereas it remains strongly negative among the late liberalizers. Turning to wages and prices, we see that average growth rate of wages and house prices is strongly negatively associated with the import exposure among the late liberalizers, while the relationship between import exposure and the growth rates of wages and house prices is insignificant or even positive for the early liberalizers. The same results also hold for the growth rates of state average income and consumption per capita.

These findings strongly support the predictions from our stylized model: financially more open states should see a stronger adjustment in employment patterns following the terms-of-trade shock and relatively higher wages in both sectors. Conversely, late deregulators should see stronger wage declines and a less pronounced reallocation towards non-tradable sectors. In the model this happens because household's ability to borrow stabilizes demand for non-tradable goods and thus their prices. This in turn keeps wages high in the non-tradable sector, providing a strong incentive for the sectoral reallocation of labor from the imports exposed tradable sector to the non-tradable sector. The bottom right graph of Figure 3 shows that prices of the probably most non-tradable good—housing—indeed remained higher in early-liberalized states and were also less affected by import competition, which is consistent with the theory.

4.2 State-level results

Table 2 performs estimation results of the regression model (23) using annual data for 48 states (excluding Alaska and Hawaii). Column 1 estimates an average effect of Chinese import exposure on total employment (Panel A), manufacturing employment (Panel B) and employment in the real estate sector (Panel C). The estimates are in line with the findings in Autor et al. (2013) suggesting a significant negative impact of the Chinese import exposure not only on the number of employees in the manufacturing sector, but also in all sectors. The estimated coefficients indicate that a one-thousand dollar exogenous increase in Chinese import exposure per worker is predicted to reduce the growth rate of state total employment by 0.18 percentage points and by 0.93 percentage points in the manufacturing sector on average per year for the time period from 1991 to 2007. However, when we include the interaction term with the deregulation index in column 2, we find that the negative impact of the Chinese import exposure on employment in all sectors is significantly smaller in early deregulation states, which is determined most probably by a smaller decline in the real estate employment (Panel C). Furthermore, the estimated coefficient on the interaction term with the deregulation index for the manufacturing employment is negative (although it is not statistically significant). These findings provide empirical evidence for our main hypothesis that financial integration in early deregulation states has facilitated a faster sectoral reallocation from the import exposed tradable (manufacturing) sector to the non-tradable sector (real estate and services). Columns 3 and 4, which include the first and the second set of control variables respectively, provide robustness of our findings. The estimated coefficient in column 4 suggests that 10 years of earlier financial deregulation of a state significantly reduce the negative impact of Chinese imports on the growth rate of employment by 0.07 percentage points in all sectors and by 0.2 percentage points in the real estate sector.

Table 3 shows estimation results of the model (23) for the average wage growth rate. The estimated coefficient in column 1 suggests that the Chinese import exposure has caused a significant negative impact on the growth rate of average wage across all sectors, which is consistent with the findings of Autor et al. (2013) study. The estimate implies that a one-thousand dollar exogenous increase in Chinese import exposure per worker is predicted to reduce the growth rate of state average wage by 0.21 percentage points in all sectors on average per year for the time period from 1991 to 2007. However, this negative effect is significantly smaller in early deregulation states. The estimates in column 2 suggest that 10 years of earlier financial deregulation significantly reduce the negative impact of the Chinese imports on the wage growth rate

by 0.16 percentage points. This result is robust to the inclusion of two sets of control variables in columns 3 and 4, and therefore provides a significant evidence for our model prediction: the financially integrated states should have relatively more stable wages. Our intuition behind this finding is that: first, an increasing demand for labor in the real estate sector in the early deregulation states avoided a drop in the average wage; second, only high-skilled workers were able to keep their high-paid jobs in the manufacturing sectors in the early deregulation states.

As mentioned in section 3, there is a lack of precision in the measurement of the average wage per employee, because in the CBP the variable number of employees contains full-time and part-time employees. Therefore, in order to verify our previous results for the average wage growth, we estimate the model (23) with the growth rate of state personal income per capita as a dependent variable. Table 4 reports the estimation results, which are very similar to the previous table. The estimated coefficient in column 1 indicates that a one-thousand dollar exogenous increase in Chinese import exposure per worker is predicted to reduce the growth rate of state personal income by 0.18 percentage points on average per year for the time period from 1991 to 2007. However, the estimates in column 2 suggest that 10 years of earlier financial deregulation mitigate this negative impact by 0.17 percentage points, which is robust to the inclusion of control variable sets in columns 3 and 4. Hence, states that deregulated early experienced a relatively lower decrease in the growth rate of average wages and personal income after the China trade shock.

Next, we examine the exposure of U.S. state-level consumption to import competition from China.[11] We estimate the model (23) with the growth rate of state consumption per capita as a dependent variable. Table 5 reports estimated coefficients for total consumption (Panel A), consumption of goods (Panel B) and consumption of services (Panel C). The results suggest that the Chinese imports exposure caused a significant negative impact on the growth rate of total consumption during our sample period. However, the estimation results in panels B and C indicate that this negative impact can be explained by a stronger decline in the consumption growth of services (non-tradable goods). The results also indicate that the negative impact of Chinese imports on state-level consumption was significantly smaller in early deregulation states. Although the results for consumption and personal income growth are identical, it is notable that the magnitudes of coefficients on both the change in Chinese import exposure and the interaction term with the financial deregulation index for consumption growth are smaller than

[11]The data on personal consumption expenditures at the state level is available on the BEA starting from 1997.

those for the personal income growth. This result indicates that consumption growth reacted less to the China trade shock compared to the personal income growth, which is consistent with the evidence for consumption risk sharing across U.S. regions (e.g., Asdrubali, Sorensen and Yosha (1996), Sorensen and Yosha (1998)).

The next prediction of our model is a negative impact of the China trade shock on the price level of non-tradable goods, which should be significantly mitigated in the early deregulation states. To test this prediction we use state house price indexes in the regression model (23) as a dependent variable, because they contain a substantial non-tradable component. The estimated coefficients documented in Table 6 show that Chinese import exposure has indeed caused a significant negative impact on the growth rate of state house prices. The estimate in column 1 suggests that a one-thousand dollar exogenous increase in Chinese import exposure per worker is predicted to reduce the growth rate of state house prices by 0.85 percentage points on average per year during our sample period. However, the estimates in columns 2 and 3 indicate that this negative effect is considerably smaller in the early deregulation states. 10 years of earlier financial deregulation reduce the negative impact of Chinese imports on the growth rate of state house prices by 0.6 percentage points. The next interesting result is the coefficient on the interaction term with a house supply elasticity taken from Saiz (2010) in column 4 of Table 6, which suggests that the negative impact of Chinese import exposure is significantly stronger in states where house supply is more elastic. Column 5 includes the second set of controls and provides robustness of our findings.

We also want to examine how state local demand for non-tradable goods (in particular housing) reacted to the China trade shock. For this purpose we estimate the effect of Chinese import exposure on mortgage lending [12] The estimation results in Table 7 column 1 suggest that a one-thousand dollar exogenous increase in Chinese import exposure per worker is predicted to reduce the growth rate of mortgage loans by 1.18 percentage points on average per year during our sample period. However, 10 years of earlier deregulation reduce this negative impact by 0.7 percentage points (see columns 2 and 3 with controls). Moreover, columns 4 and 5 include the interaction term with the house supply elasticity, the sets of controls and provide robustness of our findings.

Finally, we estimate the effect of Chinese import competition on the unemployment rate in the U.S. states[13]. The estimated coefficients in Table 8 indicate that a one-thousand dollar

[12]The data on mortgage loans by state is taken from the Federal Housing Finance Agency (www.fhfa.gov).

[13]The unemployment rate statistics at the state level are taken from the BLS.

exogenous increase in Chinese import exposure per worker is predicted to increase the unemployment rate by 0.08 percentage points on average per year for the time period from 1991 to 2007. However, this effect is significantly mitigated in the early deregulation states (see columns 2 to 4).

4.3 Results at commuting zone level

Tables 9 through 12 provide robustness analysis of our findings at the commuting zone (CZ) level. Our sample includes 722 CZs which covers the entire mainland of the United States (both metropolitan and rural areas). Using CZs' local labor markets as sub-economies in our analysis has several advantages. First, it provides a larger sample. Second, CZs are logical geographic units for defining local labor markets and they differ in their exposure to import competition as a result of regional variation in industry specialization (Autor et al., 2013). Our data set at the CZ-level is constructed using data at the county-level as described in Section 3 and crosswalk files from Autor and Dorn (2013) to map counties to the CZs and the CZs to the states. The latter is necessary because our measure of financial integration remains at the state level.

Table 9 reports estimation results for total employment and employment in the manufacturing and real estate sectors. The results confirm that the Chinese imports exposure has caused a significantly negative effect on the employment growth also at the CZ-level. However, this negative effect has been significantly mitigated in the real estate sector in the CZs, where banking markets were more integrated, i.e. the estimated coefficient on the interaction term of import exposure with the deregulation index in Panel C is positive and statistically significant at the 10% level. Tables 10 and 11 perform estimation results for the growth rates of average wage and personal income respectively. It is evident that the average wage and personal income have been significantly less affected by the Chinese import competition in the CZs associated with the early deregulation states. Finally, Table 12 provides estimation results for the growth rate of housing prices in the CZs, which are calculated as population weighted averages of house price indexes in the related counties. The results are very similar to the estimated coefficients reported in Table 6 at the state level and therefore provide strong evidence for the central hypothesis of our study: the China trade shock has caused a significantly negative impact on local labor markets and non-tradable prices; however, financially more integrated regions were able to withstand the "Chinese Syndrome" by keeping local households demand and non-tradable prices stable.

5 Dynamic Responses

Next, we are interested in how persistent the trade shock effects are and we look at the dynamic responses of labor market outcomes and house prices after the China trade shock. For this purpose, we apply a local linear projection method first suggested by Jordà (2005). The cumulative growth in labor market outcome from year t to year $t+h$ is regressed on Chinese import exposure in year t:

$$\Delta X_{i,t+h} = \beta_h \Delta IE_{i,t} + \alpha_i + \tau_t + \epsilon_{i,t+h} \tag{24}$$

where $\Delta X_{i,t+h}$ is a logarithmic change in our central variables of interest in state i from year t to year $t+h$. α_i and τ_t are state and year fixed effects respectively. Then we collect the estimated coefficients of β_h for different forecasting horizons h and plot them for two samples of early and late deregulation states.

Figure 4 shows the estimation results. It is evident that the Chinese import exposure has a significant and persistent negative effect on the growth rate of the manufacturing employment in both samples of early and late deregulation states. The real estate employment tends to increase in the early deregulation states, whereas it decreases in the late deregulation states during the first years after an increase in Chinese imports per worker. However, the latter effect on the growth rate of the real estate employment seems to be not very persistent, i.e. the coefficients become statistically insignificant after three years. Furthermore, the Chinese import exposure has a significant and persistently negative impact on the growth rates of average wage, personal income, consumption, and house prices in the sample of late deregulation states, but not in the sample of early deregulation states. These findings are consistent with the model predictions: financially more integrated states should see a swifter reallocation of labor from the import exposed manufacturing sector into the non-tradable sector, and smaller declines in wages, consumption, and non-tradable prices following the terms-of-trade shock.

6 Conclusion

This paper has studied how financial integration allowed regional economies to cope with the fallout from the China trade shock. Our empirical analysis exploits the wave of state-level banking deregulation that swept through the United States during the 1980's. States that opened their

banking markets for out-of-state banks earlier, had a stronger presence of country-wide banks — and therefore more elastic credit supply — by the early 1990's, when the China trade shock started to deteriorate the terms-of-trade of many local economies across the United States. To guide our analysis, we propose a stylized model of local economies in which financial openness is key in modulating the response to an exogenous shock to the terms of trade. In financially more open economies, households can borrow more easily in response to the negative shocks to wages and employment. This allows them to smooth consumption stabilizing the demand for non-tradable goods. Because non-tradable prices (and in particular house prices) do not decline as much as would be the case without access to credit, wages in the non-tradable sector do not decline as strongly and the reallocation between the import-exposed tradable and the non-tradable sectors takes place more swiftly.

Consistent with the model predictions, we find that early-deregulated states indeed saw a swifter reallocation of labor between import exposed tradable and non-tradable sectors with more pronounced declines in the tradable (manufacturing) employment but lower declines in the non-tradable employment (real estate), wages, and income. Also, house prices remained relatively stable in financially more open states while household borrowing and debt increased more in states with ample credit supply.

Our findings shed new light on how financial integration affects the response of economies to external shocks. Much of the earlier literature has emphasized the role that banking deregulation across U.S. federal states played for credit supply, in particular for firms. By contrast, our results illustrate how banking integration helped accommodate a major credit demand shock by consumers. Financial integration enabled consumers to smooth consumption in the face of an adverse terms-of-trade shock to local economies and thus to their wage incomes. Consumer's ability to borrow stabilized demand for non-tradable goods (in particular housing) and therefore helped keep wages in the non-tradable sector higher than they otherwise would have been. Relatively higher wages in the non-tradable sectors then facilitated the reallocation of labor from distressed tradable sectors to non-tradable sectors. At a general level, our results highlight the importance of integrated markets for retail (consumer) finance in dealing with asymmetric terms-of-trade shocks in monetary unions.

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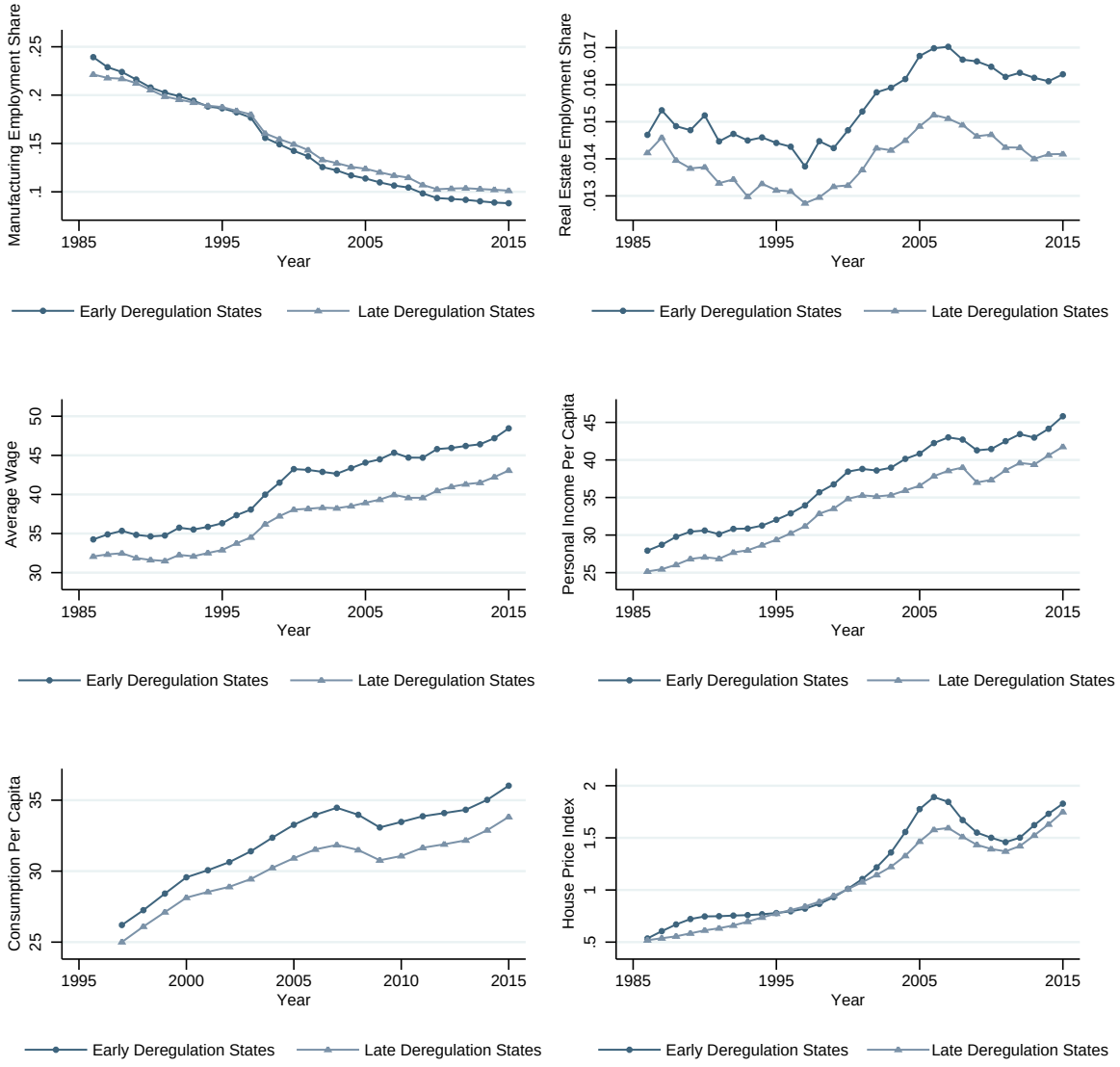
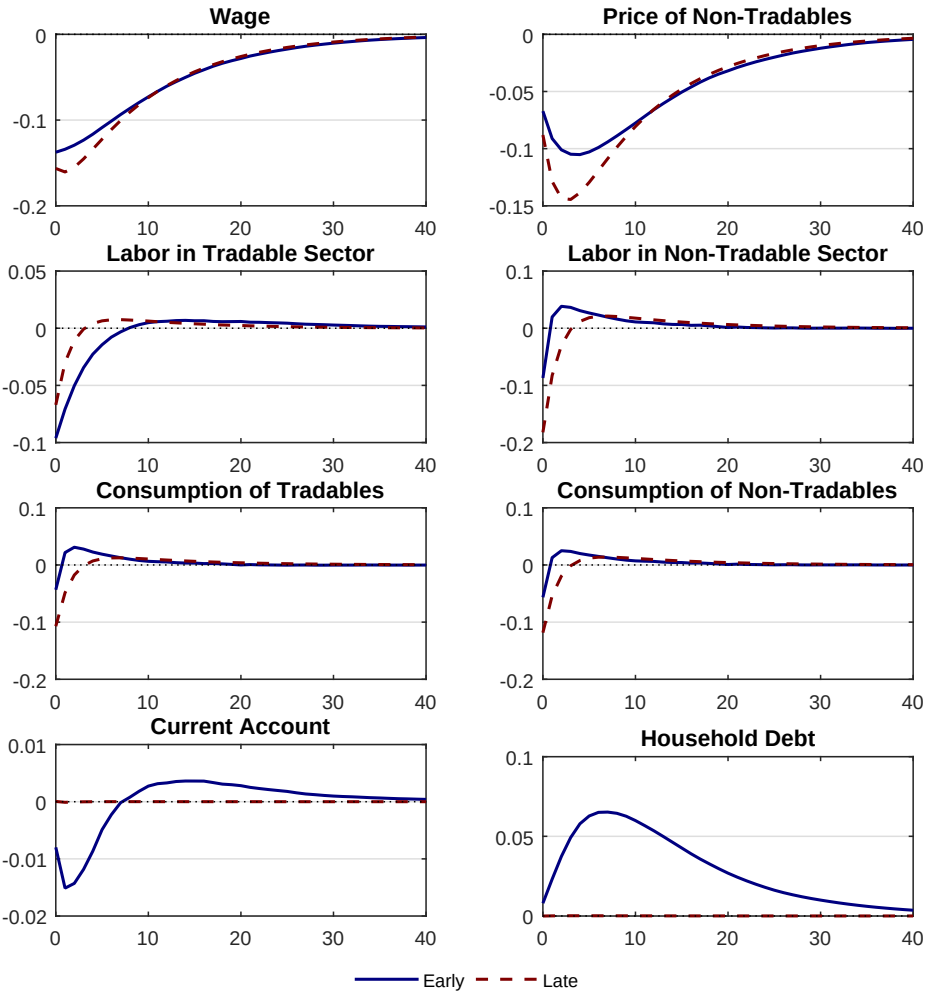
Figures and Tables

Figure 1: Trends in Manufacturing and Real-Estate Employment, Wages, Personal Income, Consumption, and House Prices in Early and Late Deregulation States, 1985-2015



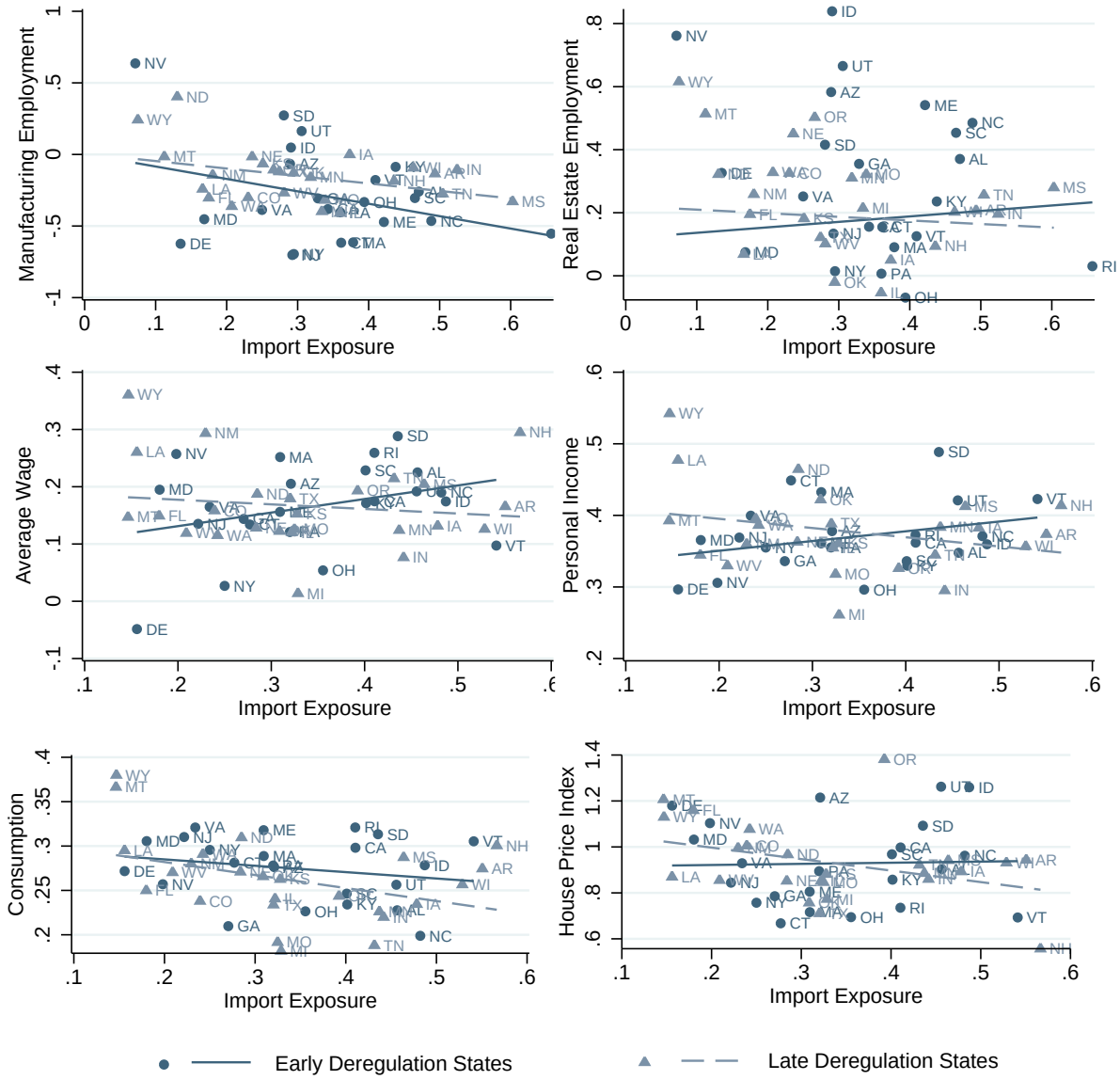
Notes: The figure plots time series of average employment shares in the manufacturing and real estate sectors, average wage, personal income per capita and consumption per capita (the latter three are in thousands of 2009 US Dollars), as well as the average house price indexes for two samples of 23 early deregulation states and 25 late deregulation states (excl. Alaska and Hawaii) from 1985 to 2015. States that deregulated their banking sector before (after) 1985 are classified as early (late) deregulation states.

Figure 2: Model Predictions



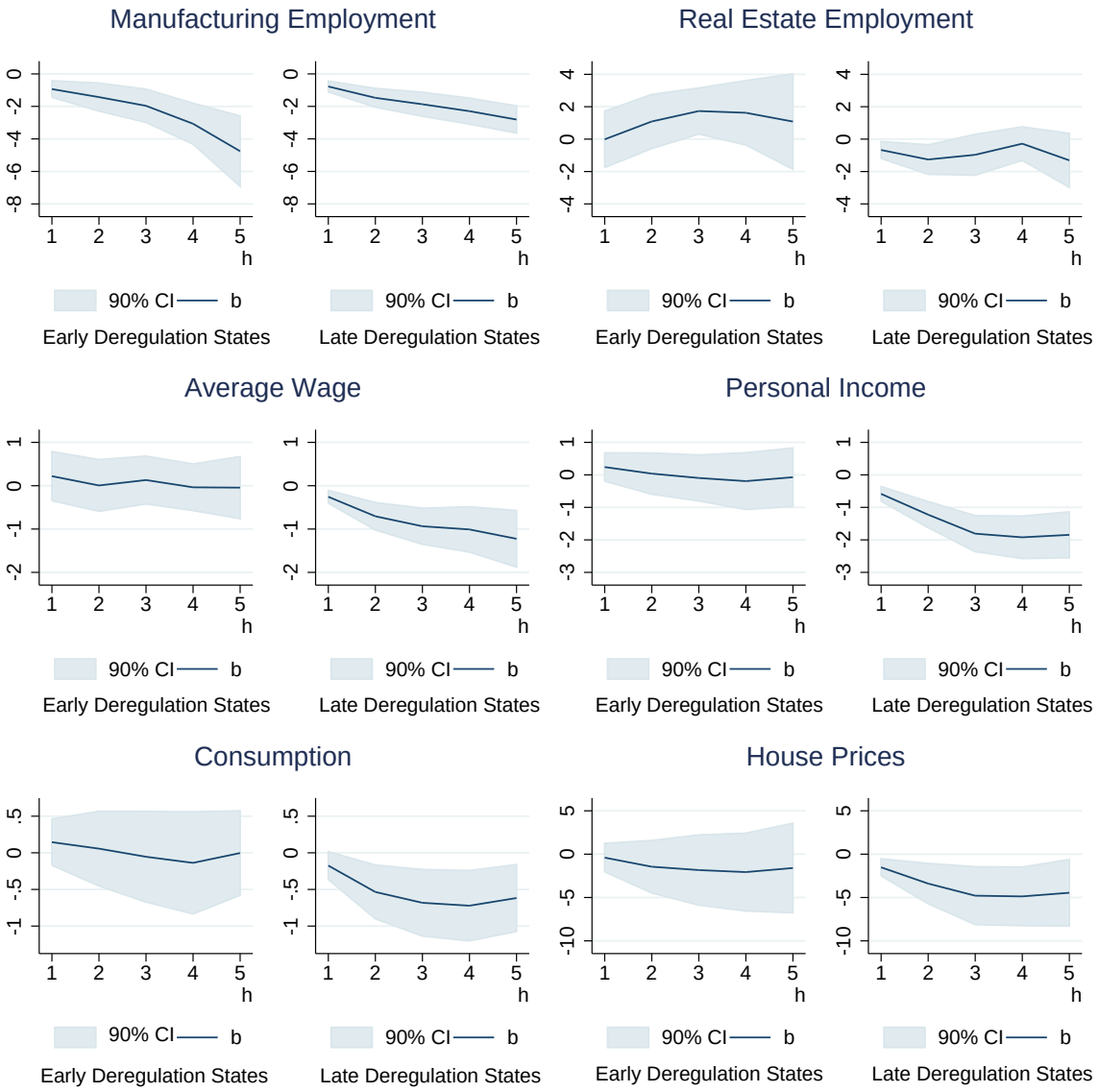
Notes: this figure depicts the logarithmic changes in the endogenous variables from the steady-state levels after a trade-of-term shock for early ($\lambda_E = 0.1$) and late ($\lambda_L = 100$) deregulation regions. The benchmark parametrization of the model: $\alpha = 0.35$, $\eta = 0.65$, $\beta = 0.90$, $\sigma = 0.10$, $\phi = 0.10$, $\theta = 0.10$, $\gamma = 0.35$, $\tau = 0.90$, $\rho = 0.60$.

Figure 3: Long-Run Effects of Chinese Imports Exposure



Notes: The figure depicts the long-run relationship between Chinese import exposure and the central variables of interest for two samples of 23 early deregulation states and 25 late deregulation states (excl. Alaska and Hawaii) over the period from 1990 to 2007. States that deregulated their banking sector before (after) 1985 are classified as early (late) deregulation states. The vertical axes measure the log change of the corresponding dependent variable. The horizontal axes measure the predicted change in import exposure per worker. All regressions are weighted by start of the period state share of national population.

Figure 4: Dynamic Responses after China Trade Shock



Notes: The figure depicts dynamic effects of Chinese import exposure on the central variables of interest for two samples of 23 early deregulation states and 25 late deregulation states (excl. Alaska and Hawaii) for the period from 1990 to 2007. States that deregulated their banking sector before (after) 1985 are classified as early (late) deregulation states. All regressions include state and year fixed effects and are weighted by state share of national population in 1990. Robust standard errors are clustered by state.

Table 1: Summary Statistics

	All States (1)				Early Deregulation States (2)				Late Deregulation States (3)			
Variable	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Change in Import Exposure per Worker	.017	.018	-.034	.072	.017	.018	-.034	.072	.016	.018	-.026	.069
Instrument for Change in Import Exposure	.013	.015	-.019	.059	.013	.015	-.019	.059	.012	.015	-.016	.054
Deregulation Index	15.21	9.48	4	32	22.87	8.51	11	32	8.16	1.54	4	10
Log Change in Employment in All Sectors	.018	.021	-.058	.078	.017	.023	-.058	.078	.018	.019	-.053	.065
Log Change in Employment in Manufacturing	-.015	.046	-.365	.118	-.020	.050	-.365	.118	-.010	.041	-.170	.113
Log Change in Employment Real Estate	.013	.070	-.342	.244	.014	.073	-.290	.244	.013	.067	-.342	.228
Log Change in Average Wage in All Sectors	.014	.018	-.058	.107	.015	.019	-.058	.089	.014	.017	-.045	.107
Log Change in Personal Income per Capita	.022	.019	-.037	.097	.021	.019	-.037	.082	.022	.020	-.035	.097
Log Change in Total Consumption	.027	.013	-.003	.089	.027	.012	.001	.059	.026	.013	-.003	.089
Log Change in Consumption of Goods	.022	.022	-.032	.122	.023	.021	-.027	.081	.022	.022	-.032	.122
Log Change in Consumption of Services	.029	.012	-.001	.075	.030	.011	.004	.063	.029	.012	-.001	.075
Log Change in House Price Index	.056	.041	-.108	.253	.055	.050	-.108	.253	.057	.031	-.095	.218
Log Change in Mortgage Loan	.028	.086	-.368	.547	.030	.077	-.276	.362	.026	.093	-.368	.547
House Supply Elasticity	2.26	.99	.83	5.05	1.96	.79	.83	4.69	2.52	1.07	.86	5.05
Unemployment Rate	.050	.014	-.023	.113	.050	.013	.023	.095	.051	.014	.025	.113

Notes: This table reports means, standard deviations, minimum and maximum values of the main variables used in the present study. The sample includes 48 states (excluding Alaska and Hawaii) and 17 years from 1991 to 2007. States that deregulated their banking sector before (after) 1985 are classified as early (late) deregulation states. The change in import exposure per worker and the instrument are calculated using equations (20) and (21) in the main text. Deregulation index equals number of years since the first year of deregulation. Data on employment and wages come from the CBP. Data on personal income and consumption come from the BEA. Data on unemployment rate come from the BLS. House supply elasticity at the state level is calculated using house supply elasticity at the MSA level from Saiz (2010).

Table 2: Estimation of U.S. Employment Exposure by Sectors to Imports from China

Dependent Variable: Log Change in Employment	(1)	(2)	(3)	(4)
Panel A. All Sectors				
Change in Import Exposure	-0.1802**	-0.2784**	-0.4041***	0.1212
	(0.0872)	(0.1347)	(0.1495)	(0.1413)
Change in Import Exposure × Deregulation Index		0.0054**	0.0080*	0.0056**
		(0.0027)	(0.0044)	(0.0023)
Controls	No	No	Yes	Yes
Pre-Controls × Change in Import Exposure	No	No	No	Yes
Adjusted R^2	0.60	0.64	0.72	0.72
Panel B. Manufacturing				
Change in Import Exposure	-0.9278***	-0.7561***	-0.8936***	-0.6480**
	(0.2111)	(0.2055)	(0.2505)	(0.3133)
Change in Import Exposure × Deregulation Index		-0.0035	-0.0023	-0.0013
		(0.0029)	(0.0025)	(0.0037)
Controls	No	No	Yes	Yes
Pre-Controls × Change in Import Exposure	No	No	No	Yes
Adjusted R^2	0.60	0.69	0.70	0.70
Panel C. Real Estate				
Change in Import Exposure	-0.4090	-1.2633**	-1.5770**	-1.0213
	(0.4311)	(0.5968)	(0.6255)	(0.9570)
Change in Import Exposure × Deregulation Index		0.0243***	0.0285***	0.0207**
		(0.0086)	(0.0101)	(0.0092)
Controls	No	No	Yes	Yes
Pre-Controls × Change in Import Exposure	No	No	No	Yes
Adjusted R^2	0.45	0.56	0.60	0.60

Notes: This table reports the 2SLS estimates. The sample includes 48 states (excluding Alaska and Hawaii) and 17 years from 1991 to 2007. Dependent variable is a change in logarithmic number of employees in all sectors (Panel A), the manufacturing sector (Panel B), the real estate sector (Panel C). The change in import exposure per worker and the instrument are calculated using equations (20) and (21) in the main text. Deregulation index equals number of years since the first year of deregulation. All regressions include state and year fixed effects and are weighted by state share of national population in 1990. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

Table 3: Estimation of U.S. Average Wage Exposure to Imports from China

Dependent Variable: Log Change in Average Wage	(1)	(2)	(3)	(4)
Change in Import Exposure	-0.2116**	-0.2868***	-0.2828**	0.0541
	(0.0921)	(0.1082)	(0.1310)	(0.2107)
Change in Import Exposure × Deregulation Index		0.0161***	0.0165***	0.0126***
		(0.0052)	(0.0049)	(0.0026)
Controls	No	No	Yes	Yes
Pre-Controls × Change in Import Exposure	No	No	No	Yes
Adjusted R^2	0.37	0.52	0.53	0.53

Notes: This table reports the 2SLS estimates. The sample includes 48 states (excluding Alaska and Hawaii) and 17 years from 1991 to 2007. Dependent variable is a change in logarithmic average wage in all sectors. The change in import exposure per worker and the instrument are calculated using equations (20) and (21) in the main text. Deregulation index equals number of years since the first year of deregulation. All regressions include state and year fixed effects and are weighted by state share of national population in 1990. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

Table 4: Estimation of U.S. Personal Income Exposure to Imports from China

Dependent Variable: Log Change in Personal Income per Capita	(1)	(2)	(3)	(4)
Change in Import Exposure	-0.1839*	-0.5239***	-0.4907***	0.0905
	(0.1088)	(0.1443)	(0.1737)	(0.2546)
Change in Import Exposure × Deregulation Index		0.0173***	0.0170***	0.0169***
		(0.0039)	(0.0045)	(0.0029)
Controls	No	No	Yes	Yes
Pre-Controls × Change in Import Exposure	No	No	No	Yes
Adjusted R^2	0.39	0.57	0.56	0.57

Notes: This table reports the 2SLS estimates. The sample includes 48 states (excluding Alaska and Hawaii) and 17 years from 1991 to 2007. Dependent variable is a change in logarithmic personal income per capita. The change in import exposure per worker and the instrument are calculated using equations (20) and (21) in the main text. Deregulation index equals number of years since the first year of deregulation. All regressions include state and year fixed effects and are weighted by state share of national population in 1990. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

Table 5: Estimation of U.S. Consumption Exposure to Imports from China

Dependent Variable: Log Change in Consumption per Capita	(1)	(2)	(3)	(4)
Panel A. Total Consumption				
Change in Import Exposure	-0.0406	-0.2463**	-0.2632**	-0.0417
	(0.0811)	(0.1078)	(0.1239)	(0.2137)
Change in Import Exposure × Deregulation Index		0.0105***	0.0098***	0.0094***
		(0.0019)	(0.0022)	(0.0029)
Controls	No	No	Yes	Yes
Pre-Controls × Change in Import Exposure	No	No	No	Yes
Adjusted R^2	0.58	0.66	0.65	0.65
Panel B. Consumption of Goods				
Change in Import Exposure	-0.1228	-0.1302	-0.1366	0.2652
	(0.1279)	(0.1717)	(0.2052)	(0.3510)
Change in Import Exposure × Deregulation Index		0.0051	0.0058	0.0063
		(0.0033)	(0.0039)	(0.0058)
Controls	No	No	Yes	Yes
Pre-Controls × Change in Import Exposure	No	No	No	Yes
Adjusted R^2	0.52	0.60	0.60	0.60
Panel C. Consumption of Services				
Change in Import Exposure	0.0029	-0.3134***	-0.3386***	-0.2010
	(0.0803)	(0.0940)	(0.1003)	(0.1739)
Change in Import Exposure × Deregulation Index		0.0134***	0.0120***	0.0107***
		(0.0022)	(0.0021)	(0.0021)
Controls	No	No	Yes	Yes
Pre-Controls × Change in Import Exposure	No	No	No	Yes
Adjusted R^2	0.58	0.63	0.60	0.61

Notes: This table reports the 2SLS estimates. The sample includes 48 states (excluding Alaska and Hawaii) and 11 years from 1997 to 2007. Dependent variable is a change in logarithmic total consumption (Panel A), consumption of goods (Panel B), consumption of services (Panel C) per capita. The change in import exposure per worker and the instrument are calculated using equations (20) and (21) in the main text. Deregulation index equals number of years since the first year of deregulation. All regressions include state and year fixed effects and are weighted by state share of national population in 1990. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

Table 6: Estimation of U.S. House Prices Exposure to Imports from China

Dependent Variable: Log Change in House Price Index	(1)	(2)	(3)	(4)	(5)
Change in Import Exposure	-0.8507***	-2.1073***	-2.4465***	-1.9377***	-0.9549**
	(0.3086)	(0.4611)	(0.4915)	(0.4269)	(0.4526)
Change in Import Exposure × Deregulation Index		0.0537***	0.0597***	0.0992***	0.0963***
		(0.0122)	(0.0184)	(0.0113)	(0.0120)
Change in Import Exposure × Deregulation Index × House Supply Elasticity				-0.0334***	-0.0277***
				(0.0067)	(0.0086)
Controls	No	No	Yes	Yes	Yes
Pre-Controls × Change in Import Exposure	No	No	No	No	Yes
Adjusted R^2	0.32	0.44	0.58	0.61	0.61

Notes: This table reports the 2SLS estimates. The sample includes 48 states (excluding Alaska and Hawaii) and 17 years from 1991 to 2007. Dependent variable is a change in logarithmic house price index. The change in import exposure per worker and the instrument are calculated using equations (20) and (21) in the main text. Deregulation index equals number of years since the first year of deregulation. House supply elasticity at the state level is calculated using house supply elasticity at the MSA level from Saiz (2010). All regressions include state and year fixed effects and are weighted by state share of national population in 1990. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

Table 7: Estimation of U.S. Mortgage Exposure to Imports from China

Dependent Variable: Log Change in Mortgage Loan	(1)	(2)	(3)	(4)	(5)
Change in Import Exposure	-1.1782***	-2.6510***	-2.6861***	-2.3277***	-2.5385
	(0.3923)	(0.6792)	(0.7994)	(0.7349)	(1.5570)
Change in Import Exposure × Deregulation Index		0.0649***	0.0712***	0.0990***	0.1296***
		(0.0190)	(0.0210)	(0.0179)	(0.0288)
Change in Import Exposure × Deregulation Index × House Supply Elasticity				-0.0235***	-0.0324**
				(0.0080)	(0.0161)
Controls	No	No	Yes	Yes	Yes
Pre-Controls × Change in Import Exposure	No	No	No	No	Yes
Adjusted R^2	0.05	0.14	0.18	0.19	0.18

Notes: This table reports the 2SLS estimates. The sample includes 48 states (excluding Alaska and Hawaii) and 17 years from 1991 to 2007. Dependent variable is a change in unemployment rate. The change in import exposure per worker and the instrument are calculated using equations (20) and (21) in the main text. Deregulation index equals number of years since the first year of deregulation. House supply elasticity at the state level is calculated using house supply elasticity at the MSA level from Saiz (2010). All regressions include state and year fixed effects and are weighted by state share of national population in 1990. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

Table 8: Estimation of U.S. Unemployment Exposure to Imports from China

Dependent Variable: Change in Unemployment Rate	(1)	(2)	(3)	(4)
Change in Import Exposure	0.0764**	0.1227***	0.1242***	0.0769
	(0.0357)	(0.0394)	(0.0431)	(0.0657)
Change in Import Exposure × Deregulation Index		-0.0022***	-0.0028***	-0.0030***
		(0.0007)	(0.0007)	(0.0011)
Controls	No	No	Yes	Yes
Pre-Controls × Change in Import Exposure	No	No	No	Yes
Adjusted R^2	0.62	0.62	0.61	0.61

Notes: This table reports the 2SLS estimates. The sample includes 48 states (excluding Alaska and Hawaii) and 17 years from 1991 to 2007. Dependent variable is a change in unemployment rate. The change in import exposure per worker and the instrument are calculated using equations (20) and (21) in the main text. Deregulation index equals number of years since the first year of deregulation. All regressions include state and year fixed effects and are weighted by state share of national population in 1990. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

Table 9: Estimation of U.S. Employment Exposure by Sectors to Imports from China (Commuting Zones Results)

Dependent Variable: Log Change in Employment	(1)	(2)	(3)
Panel A. All Sectors			
Change in Import Exposure per Worker	-0.1628***	-0.1973***	0.0753
	(0.0361)	(0.0486)	(0.1090)
Change in Import Exposure per Worker × Deregulation Index		0.0021	0.0015
		(0.0016)	(0.0022)
Pre-Controls × Change in Import Exposure per Worker	No	No	Yes
Adjusted R^2	0.26	0.26	0.26
Panel B. Manufacturing			
Change in Import Exposure per Worker	-0.3379***	-0.2394***	-0.2515
	(0.0736)	(0.0778)	(0.1719)
Change in Import Exposure per Worker × Deregulation Index		-0.0059	-0.0097**
		(0.0054)	(0.0046)
Pre-Controls × Change in Import Exposure per Worker	No	No	Yes
Adjusted R^2	0.26	0.26	0.29
Panel C. Real Estate			
Change in Import Exposure per Worker	-0.0399	-0.2596	0.2985
	(0.1379)	(0.1642)	(0.5465)
Change in Import Exposure per Worker × Deregulation Index		0.0131*	0.0060
		(0.0075)	(0.0109)
Pre-Controls × Change in Import Exposure per Worker	No	No	Yes
Adjusted R^2	0.11	0.11	0.12

Notes: The sample includes 722 commuting zones and 17 years from 1991 to 2007. Dependent variable is a change in logarithmic number of employees in all sectors (Panel A), the manufacturing sector (Panel B), the real estate sector (Panel C). The change in import exposure per worker and the instrument are calculated using equations (20) and (21) in the main text. Deregulation index equals number of years since the first year of deregulation. All regressions include state and year fixed effects and are weighted by commuting zone share of national population in 1990. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

Table 10: Estimation of U.S. Average Wage Exposure to Imports from China (Commuting Zones Results)

Dependent Variable: Log Change in Average Wage	(1)	(2)	(3)
Change in Import Exposure per Worker	-0.0784*	-0.2010***	0.0818
	(0.0426)	(0.0485)	(0.0819)
Change in Import Exposure per Worker × Deregulation Index		0.0073*	0.0077***
		(0.0039)	(0.0021)
Pre-Controls × Change in Import Exposure per Worker	No	No	Yes
Adjusted R^2	0.22	0.22	0.23

Notes: The sample includes 722 commuting zones and 17 years from 1991 to 2007. Dependent variable is a change in logarithmic average wage in all sectors. The change in import exposure per worker and the instrument are calculated using equations (20) and (21) in the main text. Deregulation index equals number of years since the first year of deregulation. All regressions include state and year fixed effects and are weighted by commuting zone share of national population in 1990. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

Table 11: Estimation of U.S. Personal Income Exposure to Imports from China (Commuting Zones Results)

Dependent Variable: Log Change in Personal Income per Capita	(1)	(2)	(3)
Change in Import Exposure per Worker	-0.1110***	-0.2597***	0.1957
	(0.0338)	(0.0576)	(0.1694)
Change in Import Exposure per Worker × Deregulation Index		0.0089***	0.0093***
		(0.0034)	(0.0024)
Pre-Controls × Change in Import Exposure per Worker	No	No	Yes
Adjusted R^2	0.22	0.22	0.23

Notes: The sample includes 722 commuting zones and 17 years from 1991 to 2007. Dependent variable is a change in logarithmic personal income per capita. The change in import exposure per worker and the instrument are calculated using equations (20) and (21) in the main text. Deregulation index equals number of years since the first year of deregulation. All regressions include state and year fixed effects and are weighted by commuting zone share of national population in 1990. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.

Table 12: Estimation of U.S. House Prices Exposure to Imports from China (Commuting Zones Results)

Dependent Variable: Log Change in House Price Index	(1)	(2)	(3)	(4)
Change in Import Exposure per Worker	-0.2760**	-0.9423***	-0.9593***	0.1292
	(0.1318)	(0.2193)	(0.2269)	(0.5613)
Change in Import Exposure per Worker × Deregulation Index		0.0397***	0.0670***	0.0609***
		(0.0152)	(0.0065)	(0.0057)
Change in Import Exposure per Worker × Deregulation Index × House Supply Elasticity			-0.0153***	-0.0098***
			(0.0020)	(0.0033)
Pre-Controls × Change in Import Exposure per Worker	No	No	No	Yes
Adjusted R^2	0.36	0.40	0.46	0.50

Notes: The sample includes 722 commuting zones and 17 years from 1991 to 2007. Dependent variable is a change in logarithmic house price index. The change in import exposure per worker and the instrument are calculated using equations (20) and (21) in the main text. Deregulation index equals number of years since the first year of deregulation. House supply elasticity at the commuting zone level are calculated using house supply elasticity at the MSA level from Saiz (2010). All regressions include state and year fixed effects and are weighted by commuting zone share of national population in 1990. Robust standard errors in parentheses are clustered by state. *,**,*** indicate statistical significance at the 10%, 5%, 1% level respectively.