Import Competition and Household Debt[†]

Jean-Noël Barrot MIT
Erik Loualiche MIT
Matthew Plosser NY Fed
Julien Sauvagnat Bocconi

July 2017

Abstract

We analyze the effect of import competition on household balance sheets from 2000 to 2007 using individual data on consumer finances. We exploit variation in exposure to foreign competition using industry-level shipping costs and initial differences in regions industry specialization. We show that household debt increased significantly in regions where manufacturing industries are more exposed to import competition. A one standard deviation increase in exposure to import competition explains 30% of the cross-regional variation in household leverage growth, and is mostly driven by home equity extraction. Our results highlight the distributive effects of globalization and their consequences for household finances.

[†]Jean-Noël Barrot is with MIT Sloan School of Management. Contact: jnbarrot@mit.edu. Erik Loualiche is with MIT Sloan School of Management. Contact: erikl@mit.edu. Matthew Plosser is with Federal Reserve Bank of New York. Contact: matthew.plosser@ny.frb.org. Julien Sauvagnat is with Bocconi University. Contact: julien.sauvagnat@unibocconi.it. We thank David Autor, Nittai Bergman, Douglas Diamond, Nicola Gennaioli, Luigi Guiso, Jonathan Parker, Fabiano Schivardi, Antoinette Schoar, David Thesmar, participants at the MIT Finance Retreat, MIT Finance Lunch, Bocconi, NYU Stern, UCLA, the MIT/Harvard finance workshop, INSEAD, HEC Paris, Princeton, Yale, Berkeley, Columbia, Darmouth, Marco Fanno alumni workshop, Adam Smith workshop, CEPR Second Annual Spring Symposium in Financial Economics, ASU Sonoran, NBER (Corporate Finance and Capital Markets), USC Dornsife INET, Macrofinance Society meetings, Northeastern finance conference, SFS Cavalcade, Summer Real Estate Research Symposium, WFA, and our discussants, Manual Adelino, Asaf Bernstein, Emily Breza, Jim Goldman, John Krainer, Matthew Notowidigdo, Amiyatosh Purnanadam, Richard Stanton and Jialan Wang for their valuable suggestions. We thank Jacob Conway for outstanding research assistance. The views expressed in this paper are those of the authors and do not necessarily reflect the position of the Federal Reserve Bank of New York or the Federal Reserve System.

1 Introduction

Two phenomena impacted the U.S. economy in the years preceding the Great Recession. One is the dramatic rise in household debt from 2000 to 2007.[1] The other is an unprecedented increase in import competition triggered by the expansion of China and other low-wage countries in global markets, with substantial labor market consequences.[2] The coincidence of these two phenomena is illustrated in Figure 1 which displays a dramatic acceleration in both aggregate U.S. household leverage and net Chinese imports to the U.S. in the decade prior to the crisis.

We hypothesize that these two phenomena are linked, and that the impact of import competition on labor markets affected household debt expansion from 2000 to 2007. More precisely, we argue that the displacement of domestic production by imports fueled demand for credit in impacted areas. We examine our hypothesis using a large, nationally representative panel dataset of anonymous consumer credit records, the Federal Reserve Bank of New York's Consumer Credit Panel/Equifax Data (CCP). We exploit cross-regional variation in exposure to import competition to study the impact of import penetration on household balance sheets.

Figure 2 illustrates our main finding. We trace out total debt growth across regions with high and low exposure to import competition from 2000 to 2007, relative to their 2000 level. As evidenced in Panel A, while debt increases by more than 100% in both groups, it grows by an additional 20 percentage points for areas with high exposure to import competition over the sample period. In Panel B, we examine the growth of debt-to-income ratios – obtained after scaling total debt by income – across regions. The same pattern arises: leverage increases significantly more in exposed areas in the run up to the crisis. These correlations suggest a link between regional exposure to import penetration and the boom, and subsequent bust, of household credit.

To properly identify the causal link between import penetration and household balance sheets, we use variation in exposure to international trade driven by historical industry composition at the commuting zone (CZ) level. To measure exposure to import competition, we build on prior work (Bernard et al., 2006b; Barrot et al., 2016) and use industry-level shipping costs (SC) obtained from import data and computed as the markup of Cost-Insurance-Freight over the price paid by the importer. We find SC to be strong predictors of the increase in import penetration and its consequences for U.S. output and employment at the industry level. A one standard deviation decrease in SC leads to a 1 percentage point increase in net

[1] See Mian and Sufi (2009), Mian and Sufi (2014) among others.

[2] See Pierce and Schott (2016), Autor et al. (2013), Acemoglu et al. (2016), Autor et al. (2014) among others.

import penetration from China between 2000 and 2007 (the average is 4% over the same period), to a drop in domestic output by 12 percentage points, and to a drop in domestic employment by 6 percentage points over the same period. To measure *regional* exposure to import competition, we compute the weighted average SC for each CZ using 1998 employment shares across sectors as weights. We confirm the adverse effect of import competition on local labor markets:[3] exposed CZs experience higher unemployment growth from 2000 to 2007. Quantitatively, a one standard deviation increase in SC explains 20% of the cross-CZ standard deviation in unemployment growth in this period. Similar economic magnitudes are obtained when we consider the effects of a one standard deviation increase in SC on total income growth.

We next test whether CZ exposure to low shipping cost industries causes an increase in household leverage. We find that a one standard deviation decrease in SC is associated with a 5.8 percentage point increase in aggregate household debt, which amounts to 30% of the cross-CZ variation in household debt growth from 2000 to 2007. We obtain similar results when we consider debt-to-income ratios. We compare these magnitudes with the effect of house price appreciation, another determinant of household leverage identified in the literature (Mian and Sufi, 2011) and find them to be of comparable magnitude. Finally, we study how the effects vary across debt types. Most of the effect is driven by mortgage debt, the largest category of household borrowing.

Using the CCP data, we zoom-in at the individual level and confirm that our main findings are not the byproduct of migration patterns across differentially exposed areas, and that they hold after controlling for individual-level risk profiles ex ante. We also use the individual panel to show that most of the effect is coming from the intensive margin, specifically, from increases in mortgage balances rather than new mortgages. We then measure equity extraction using the methodology of Bhutta and Keys (2016), and find that the increase in leverage is due to households extracting equity from their homes in response to their exposure to import competition. Using individual data from the Home Mortgage Disclosure Act (HMDA), we confirm that the increase in household debt triggered by import competition is accounted for by refinancing loans rather than new loans. Finally, we examine the aftermath of this increase in leverage during the Great Recession of 2008-2010. Using individual-level data on mortgage defaults and foreclosures, we find worse outcomes during the crisis for households in regions that were more exposed to import penetration.

We confirm our main findings with a series of additional tests. Using the Panel Study of Income Dynamics (PSID), a longitudinal survey that collects both household debt and labor

[3] See Pierce and Schott (2016), Autor et al. (2013), Acemoglu et al. (2016), Autor et al. (2014), among others.

outcomes, we link variations in income and debt at the individual level, albeit in a smaller sample. We exploit denial data from HMDA to make sure that we are not picking up the effect of differential credit supply shifts across high and low SC areas. We also check that our results are robust to using alternative measures of industry exposure to Chinese competition provided in the literature, or alternative methodologies to compute shipping costs.

In the last section of the paper, we discuss the potential explanations for the sensitivity of household debt to import competition. The textbook version of the life-cycle consumer theory predicts agents use debt to smooth consumption when income shocks are transitory (Friedman, 1957). Yet the displacement of U.S. manufacturing jobs induced by Chinese import penetration seems long-lasting in hindsight. The fact that exposed households reacted to this shock by taking on more debt is consistent with several candidate hypotheses. First, it could be that most of debt growth is concentrated among workers for whom the shock was effectively transitory, namely, those with higher education backgrounds that were able to switch to less exposed industries (Autor et al., 2014). Alternatively, although the displacement effect of import penetration seems permanent in hindsight, it might have been perceived as transitory initially, leading affected workers to borrow in order to smooth consumption.[4] We provide suggestive evidence for both channels. In particular, we use individual expectations data from the Health and Retirement Study (HRS) survey to test the latter. We show that households systematically underestimate the persistence of unemployment spells caused by import competition.

Our paper bridges the literature on the displacement effects of international trade and the literature on the causes and consequences of the rise in household leverage in the 2000s. Our findings first shed light on the distributive consequences of the rise of import competition in the U.S. in the past decade. We add to a recent stream of studies considering the effect on labor markets of the acceleration of Chinese import penetration (Pierce and Schott, 2016; Autor et al., 2013, 2014; Dix-Carneiro, 2014; Krishna and Senses, 2014; Caliendo and Parro, 2015; Acemoglu et al., 2016; Hakobyan and McLaren, 2016), or of trade shocks more generally (Bernard et al., 2006a,b; Artuç et al., 2010; Ebenstein et al., 2014). Hsieh and Ossa (2016) and di Giovanni et al. (2014) analyze the welfare effect of China's trade integration. Liebersohn (2017) investigates the link between industry composition and house prices. Our contribution relative to these papers is our analysis of household balance sheets' response to an increase in import competition, and our finding that the mortgage market serves as a mechanism to absorb these shocks. More generally, our work illustrates the distributive

[4] It could also be that credit demand is driven by ratchet effects in consumption, whereby affected households increase their credit demand in order to maintain consumption levels, even if the shock is perceived as being long lasting. Yet another interpretation is that affected households lever up to invest in human or physical capital in response to the shock, rather than to smooth consumption.

effects of globalization (see Goldberg and Pavcnik (2007) for a review), and its impact on inequality (Helpman et al., 2010; Antras et al., 2015).

Our findings also relate to prior work studying the dramatic rise in leverage in the 2000s and its consequences. Mian and Sufi (2009) and Mian and Sufi (2011) show that the advent of securitization allowed low-income or subprime borrowers to take on more mortgage debt. Subsequent work has demonstrated how the outward shift in credit supply fueled the increase in debt. Adelino et al. (2016b) and Adelino et al. (2016a) present evidence consistent with an expectations-based view where both home buyers and lenders were buying into increasing housing values and defaulted once prices dropped. Building on these findings, we document that part of the rise in credit from 2000 to 2007 in regions with exposure to trade is the consequence of higher credit demand associated with adverse labor market shocks. Our findings provide an illustration for the idea in Rajan (2011) and Kumhof et al. (2015) that the rise in inequality is a long-run determinant of leverage.[5] We also find our effects to be stronger where house prices appreciated the most, namely, where the relaxation of households' borrowing constraints made it easier for them to lever up (Mian and Sufi, 2011; Cooper, 2013; Chen et al., 2013). Finally we relate to early work on the role of consumption smoothing motives for mortgage refinancing and home equity extraction as in Hurst and Stafford (2004).

Another contribution of this paper is the estimation of the response of household leverage decisions to negative income or employment shocks such as those triggered by import competition. A number of recent studies have focused on the effect of credit availability on labor supply[6] and demand.[7] We consider the other direction of the relationship, namely, how households use their balance sheet to insure against labor income shocks. A few studies have studied the response to incomes shocks of credit card debt,[8] or automobile debt[9]. We analyze the response to a large shock to U.S. local labor markets and find heterogeneous responses across debt types.

In the remainder of the paper, we discuss our empirical strategy (Section 2), we present the results (Section 3) and discuss their interpretation (Section 4). Section 5 concludes.

[5] Coibion et al. (2014) measure inequality directly and find that it has a negative effect on the availability of credit.

[6] See for instance Benmelech et al. (2011), Chodorow-Reich (2014), or Barrot and Nanda (2016).

[7] See for instance Mondragon (2014) Ganong and Noel (2015), Donaldson et al. (2016), Cohen-Cole et al. (2016), Bos et al. (2016), or Bernstein (2016).

[8] See for instance Gross and Souleles (2002), Agarwal et al. (2007), or Agarwal and Qian (2014).

[9] See for instance Aaronson et al. (2012).

2 Data and Empirical Strategy

2.1 Household debt

To study household leverage decisions, we use data from the Federal Reserve Bank of New York's Consumer Credit Panel/Equifax Data (CCP), an anonymized nationally representative sample of five percent of all individuals with a credit record and a valid Social Security Number.[10] The CCP tracks individuals over time at a quarterly frequency and collects data on their debt holdings, payment history, credit scores and geographic location. Debt holdings are broken down into mortgages, junior liens such as home equity lines of credit, auto loans, credit card debt, as well as other types of loans.[11]

Our dataset presents two caveats. First, the CCP includes limited demographic information on each individual: age, credit score and zip code. Therefore we compute a variety of demographic controls at the zip code level from the 2000 Census and the IRS to proxy for individual demographic characteristics. Second, the CCP does not allow us to directly measure home equity extraction and thus capture the propensity of individuals to borrow against the value of their home. Given our hypothesis that some households levered up as a response to labor income shocks, this is where we would expect the effect to be the largest. For this, we use the methodology of Bhutta and Keys (2016) which captures equity extractions including, but not necessarily limited to, home equity lines of credit (HELOC) and second liens. Finally, we obtain house price indices from CoreLogic[12] and unemployment data from the Bureau of Labor Statistics (BLS).

To complement the measure of equity extraction from Bhutta and Keys (2016), we use data from the Home Mortgage Disclosure Act (HMDA), which requires mortgage lenders to report mortgage applications and originations. The benefit of the HMDA data is a large coverage of over 90% of all mortgages. Moreover for each individual application, HMDA collects the location, the loan amount, the loan type (refinancing or purchase) and whether the loan was ultimately approved or denied by the lender.

We also use the Panel Study of Income Dynamics (PSID), which allows us to trace out the specific effect of household income on individual debt levels in a longitudinal dataset in which we have information on each individual's industry of occupation. The PSID contains information on a sample of 5000 individuals since 1968, but it is biannual since 1999. We

[10] See Lee and van der Klaauw (2010) for a description of the CCP data.

[11] Due to inconsistent collection of student debt data over the period of interest, we exclude student debt from our analysis.

[12] When house prices from CoreLogic are not available at the county-level, we use house prices data at the state level. We have county-level data on house prices for geographical areas covering 95% of the U.S. total population.

use the PSID Core Sample and we follow Blundell et al. (2008) to filter the data.

Finally, to capture the change in mortgages due to new house purchases we use the Building Permits Survey (BPS) from the Census. The survey provides data on the number of new housing units authorized by building permits at an annual frequency by counties.

2.2 Exposure to import competition

This subsection presents our proxy for industry exposure to import competition based on shipping costs. We provide evidence that shipping costs are a strong predictor of the increase in Chinese imports to the U.S. across industries in the 2000s, as well as of the associated drop in domestic output and employment. We then detail our procedure to aggregate shipping costs at the commuting zone level in order to measure regional labor market exposure to import competition. Finally, we examine potential threats to our identification strategy.

Shipping costs — To capture exposure to import competition, we build on prior work (Bernard et al., 2006b; Barrot et al., 2016) and use industry-level shipping costs (SC). More precisely, we exploit product-level U.S. import data and compute the various costs associated with shipments, called Cost-Insurance-Freight, as a percentage of the price paid by the importer. We obtain these data at the six-digit NAICS codes level from from Peter Schott's website for 1989 to 1999. SC are a structural characteristic rooted in the nature of the output produced by any given industry.[13] According to Hummels (2007), SC depends on the weight-to-value ratio: the markup is larger for goods that are heavy relative to their value, because they are more expensive to transport.[14]

We also note that shipping costs are an empirical counterpart to the trade costs grounded in gravity-type equations that hold across a large set of trade models (see Arkolakis et al. (2014)). In Appendix A, we show theoretically how shipping costs map into differential domestic industry exposure to foreign productivity shocks. For a given rise in aggregate productivity in a foreign country, its exports to the domestic country are more responsive – higher trade elasticity – in low SC than in high SC industries. This differential exposure

[13] The main limitation of SC is that it does not take into account unobserved costs of shipping – for instance time to ship (Hummels and Schaur, 2013) or information barriers and contract enforcement costs, holding costs for the goods in transit, inventory costs due to buffering the variability of delivery dates, or preparation costs associated with shipment size (Anderson and van Wincoop, 2004). Unless these costs are correlated in systematic ways with SC, they are likely to introduce noise in our measure of the sectoral exposure to import competition, which should generate an attenuation bias in our results. For recent contributions to the literature that adopt a structural approach to measure trade costs and estimate their effect on trade, see for instance Hummels and Skiba (2004), Das et al. (2007), or Irarrazabal et al. (2013).

[14] Our findings are quantitatively and qualitatively similar if we use weight-to-value ratios rather than our measure of shipping costs.

translates into larger impact of foreign productivity shocks on local output, especially local labor markets.

We check that SC measured in 1998 effectively predict exposure to import penetration in the 2000s. We start by analyzing import penetration in the U.S. over this period. Figure 3 illustrates the change in U.S. import penetration (Panel A) and net import penetration (Panel B), measured respectively as imports and imports minus exports divided by domestic expenditures where expenditures are the sum of domestic shipments (domestic output) plus imports less exports. Import and net import penetration increase by approximately 3.5 percentage points between 2000 and 2007. Decomposing this increase across countries of origin, we find that high income countries' contribution to this change is virtually zero. The deepening of the trade deficit is entirely driven by the contribution of low income countries, itself dominated by the contribution of China.

There are a variety of reasons rooted in Chinese history that explain the surge in exports in the 2000s. Zhu (2012) shows that the country's annual aggregate productivity growth was 2.45% between 1988 and 1998 and jumped up to 4.68% in between 1998 and 2007 – with productivity growth in manufacturing reaching 13.4% per year. This acceleration can be tied to a series of political decisions in the late nineties that stimulated the exit of the least productive incumbents. In 1995, the Chinese government reduced its commitment to stable employment in the State sector, allowing the least efficient state-owned firms to exit. In 1997, the 15th Congress of the Chinese Communist party legalized the development of private enterprises. Finally, the lead-up to China's accession to WTO in 2001 was associated with tariff cuts and a broadening of trade rights.[15]

Given that China accounts for virtually all of the U.S. trade deficit, we focus on the effect of shipping costs on Chinese imports. We check whether industries with lower SC were indeed those that experienced the highest penetration by Chinese imports. To do so, we sort manufacturing industries into terciles of shipping costs measured in 1998. We then compute, in each year, the contribution of Chinese imports and net imports to total U.S. imports and net imports by SC terciles. We present the time series in Figure 4. Before 2000, the growth in Chinese import share is similar across SC terciles. However after 2000 the contribution of low SC imports from China to U.S. imports and net imports shoots up. This demonstrates that virtually all of the acceleration of Chinese import penetration happened in low SC industries.

We then turn to a regression setting to confirm that SC predict the increase in import penetration even after controlling for sector-level characteristics. In Table 2, we consider the

[15]Additionally, the end of the Multi-fiber Agreement (MFA) textile and clothing quotas in 2002 and 2005 fueled the surge of Chinese exports even further.

change in Chinese imports, exports and net imports, all scaled by U.S. total expenditures, between 2000 and 2007. We regress each of these ratios on shipping costs as well as industry characteristics measured in 1998 including employment, value added, shipments, total factor productivity (TFP), TFP growth, and the lagged change in Chinese imports, exports and net imports over the prior seven years. We find that SC, measured in 1998, strongly predict the increase in Chinese import penetration and net import penetration. More precisely, a one standard deviation in SC[16] leads to a 1% increase in net import penetration from China between 2000 and 2007 – the average is 4% over the same period. Note that these effects are obtained after controlling for import and net import growth from 1991 to 1999. If SC were spuriously correlated with declining industries, these control variables would absorb most of the effect. We find similar effects when we consider import penetration from all countries, rather than Chinese import penetration alone (Appendix Table A.1). This does not come as a surprise, given our finding in Figure 3 that China drives most of import penetration growth over the period.

If low SC industries are subject to greater import competition, one would expect the domestic output and employment of such industries to drop over the period. In Table 3, we consider the effect of SC on output, value added and employment growth between 2000 and 2007. Consistent with the previous set of results, we find that a one standard deviation decrease in SC is associated with a 13 percentage point drop in output and value added, and a 6 percentage point drop in employment. Taken together, these results confirm that shipping cost are a valid proxy for industry exposure to import competition, and that they predict displacement of domestic output and labor in the 2000s.

Commuting zone exposure — Throughout the paper, we consider Commuting Zones (CZs) as the geographical unit of analysis, following Autor and Dorn (2013). CZs represent labor market clusters of U.S. counties and cover the entire land area of the U.S.[17] Our measure of import competition is based on the location of the business, but employees tend to live in their place of employment. Hence, CZs are well suited for our analysis because they represent a labor market unit that allows household outcome measures to be impacted by shocks to nearby employers.

To measure any given CZ's exposure to import competition, we exploit its historical industry composition measured in 1998, using employment data from the Census' County Business Patterns (CBP). Consider region J: its industry composition expressed in terms of

[16]The standard deviation of SC across 6-digit NAICS industries is equal to 0.031, see Table 1.

[17]See David Dorn's website for more details on CZs definition and construction: ddorn.net/data.htm. CZs are aggregated as clusters of counties that are characterized by strong within-cluster and weak between-cluster commuting ties.

industry labor shares is $\{\ell_J^h\}_h$. To assess the impact of the rise of import penetration across regions, we interact SC in industry h, θ_h, with industry composition in the region, expressed in labor share:

$$\text{SC}_J = \sum_h \ell_J^h \theta_h$$

We find substantial heterogeneity in employment-weighted shipping costs across CZs. Figure 5 presents the distribution of SC for each CZ across the U.S. territory. As shown in Table 1, the average SC across CZs is 5.05%, with a 10th percentile and a 90th percentile of 3.58% and 6.66% respectively, and a standard deviation of 2.1%.

Our baseline specification takes the form of the following cross-sectional regression at the CZ or individual level:

$$X_J = \beta \text{ SC}_J + \delta' \mathbf{X}_J + u_J, \tag{2.1}$$

where X_J is the 2000-07 growth in the outcome variable of interest and $\mathbf{X}$ a vector of controls. The coefficient of interest, β, measures the effect of SC exposure on the outcome variable of interest.

One potential concern with this approach is that SC_J is computed using manufacturing industries only, which represents roughly 20% of total CZ employment on average. One might expect the effect of SC on a given CZ's aggregate outcomes should differ if manufacturing is a large share of total CZ employment. If anything, this heterogeneity would bias our estimates downwards. In robustness tests, we weight specifications by the CZ employment share of tradable industries and find virtually identical results.

2.3 Identification

Our empirical strategy rests on the identifying assumption that CZ-level exposure to high and low SC industries is orthogonal to local demand shocks for imports or local productivity shocks, and that exposure only affects household debt through increased import competition and its adverse effects on local labor markets. Our identifying assumption is therefore that U.S. industry-level import demand or productivity shocks are orthogonal to shipping costs.

A first identification threat is the fact that low productivity industries in the U.S. might have lower SC on average. For instance, take industries in decline irrespective of China's import competition: workers in these industries might be more likely to become unemployed, and might also take on more debt to sustain their consumption. Import penetration might also increase in these declining industries without being the main force driving unemployment

and household leverage patterns. If for some reason SC is lower in these declining industries, the relation we emphasize in this paper might be spurious. We feel that this is unlikely to be the case for the following reason. If industries with low SC indeed experience a negative productivity shock over the period, then we would expect them to export less. In columns (3) and (4) of Table 2, we find that U.S. exports rise relatively more in low SC than in high SC industries, which is inconsistent with the hypothetical correlation of SC with negative industry-level productivity shocks in the U.S. In addition, productivity growth of U.S. manufacturing industries is not correlated with SC (see columns (7-8) of Table 3); to the contrary the productivity growth tends to decline with SC over the sample period.

A related concern is that the U.S. might have experienced a negative aggregate productivity shock over this period. This hypothesis does not invalidate our econometric methodology. It does however affect the interpretation of our results as coming from higher productivity in China (push factor), or to lower productivity in the U.S. (pull factor). The differential pass-through across industries with high and low SC leads to a similar increase in imports in low SC industries in both cases. The fact that we only see an increase in net imports from China, and that this coincides with a surge in Chinese productivity growth largely mitigates this concern.

We also consider the case of reverse causality, namely that the increase in household debt might have affected labor market outcomes. Recent studies link individual leverage to the ease of finding a new job for an unemployed worker. Cohen-Cole et al. (2016), for instance, argues that access to debt allows unemployed workers to search for a job longer. Bos et al. (2016) find that worse credit scores reduce the likelihood of finding a job, and Bernstein (2016) shows that debt overhang leads to a reduction in labor supply. Hence, the causality might run from household debt to unemployment. However, none of these stories can easily account for the fact that areas where household debt increased in the first place are precisely those exposed to low SC industries that also experienced high import penetration over the period.

A related reverse causality hypothesis argues that rising house prices spurred both household demand for credit (Mian and Sufi, 2011), as well as corporate investments (Chaney et al., 2012). Greater local corporate demand for intermediate goods might in turn increase import penetration. Our findings would be consistent with this view if low SC areas are also areas where house prices appreciated the most, which is not what we find empirically. Moreover, if capital and labor are complements, then this channel predicts that employment should go up where credit demand increases. Instead, we find that unemployment rises more in areas with higher debt growth. Lastly, we condition on house prices; therefore, competing channels predicated on house price appreciation are accounted for throughout our analysis.

3 Results

As outlined earlier, we investigate the role of import competition for household debt over the period from 1999 to 2007. We start at the commuting zone level by examining employment variables, our first stage, and subsequently measures of debt, our second stage. Then, we zoom-in and look directly at individual debt using our measure of exposure to import penetration.

3.1 Labor markets

We start presenting further evidence for the validity of our instrument and its first stage. In Table 3, columns (5-6), we found that employment growth is stronger in industries with low trade exposure. We turn our focus to Commuting Zones and after mapping shipping costs into geographical areas, we reproduce the specification:

$$\Delta L_J = \beta \ \mathrm{SC}_J + \delta' \mathbf{X}_J + u_J, \tag{3.1}$$

This first stage regression is similar to the one used in Autor et al. (2013). ΔL_J is the 2000-2007 change in a CZ level employment variable and $\mathbf{X}_J$ a vector of CZ controls. Regressions are weighted by CZ adult population. Table 4, Panel A, presents the results of these cross-sectional regressions where we consider the log change in the number of unemployed people and the change in the unemployment rate. We find that unemployment increases in regions with low SC, that is regions with higher import penetration, relative to less exposed regions. A one standard deviation increase in SC is associated with a 7 percentage point lower growth in the number of unemployed people, and a 0.2 percentage point lower increase in unemployment, which amounts to 20% of the cross-sectional standard deviation in the change in unemployment rates over the period. When we include house price appreciation in our specification, we find it to be associated with lower unemployment growth. This is consistent with the finding in Charles et al. (2016) that housing booms had a positive effect on employment. The effect of house price appreciation is of the same order of magnitude as the effect of SC.

In Panel B, we consider the effect of exposure to import competition on household income growth. We consider successively the average and median household income growth per working-age adult and regress it on our proxy for import competition, at the CZ level. Average and median household income are obtained from Autor et al. (2013) and defined as the sum of individual incomes of all working-age household members (age 16-64), divided by the number of household members of that age group, over the period 2000-2007. Total income

comprises wage and salary income, business and investment income, social security and welfare income, and income from other non-specified sources. We find that a one standard deviation in SC is associated with a 1.5 to 3 percentage point higher growth in average income. The magnitude of the effect on median income is similar.

3.2 Household debt at the commuting zone level

We now turn to our core analysis: the sensitivity of household debt growth to import competition. We estimate a similar specification as (3.1) with our measures of debt as dependent variables:

$$\Delta D_J = \beta \ \mathrm{SC}_J + \delta' \mathbf{X}_J + u_J, \tag{3.2}$$

We first consider the log change in total debt in Panel A of Table 5. Across specifications, the coefficients are highly statistically significant. They are little affected by the introduction of controls. A one standard deviation increase in SC is associated with a 5.7 percentage point lower debt growth over the period, which amounts to approximately 30% of the cross-sectional standard deviation of the log change in total debt over the sample period. A concern with debt growth is that it could be mechanically driven by increases in income. This is the reason why we consider the effect of SC on changes in debt-to-income ratios in Panel B. Here again, we find the coefficients to be statistically and economically significant, with a one standard deviation in SC explaining 25% of the cross-sectional variation in the change in DTI ratios. We find similar results in Appendix Table A.2 where we use the weight-to-value ratio instead of shipping costs to proxy for CZ exposure to import competition.

By means of comparison, we also introduce house price appreciation between 2000 and 2007 as a dependent variable in the regression. The increase in house prices has been found by Mian and Sufi (2011) to be a major driver of households refinancing and leverage decision. House price appreciation is positively associated with both debt growth and DTI growth, with an economic magnitude that is similar to the effect of import competition: a one standard deviation change in house price appreciation explains approximately 25% of the cross-sectional variation in debt growth.

Finally we use the breakdown of total debt from the CCP. We consider the three main categories of debt, mortgages, auto loans and credit cards. We also subdivide mortgage debt into mortgage loans and home equity lines of credit (HELOC). We present the results in Table 6. In 2000, the average household balance sheet was composed of approximately 78% mortgage debt, 7% automobile debt, 8% credit card debt, and 7% other debt. In columns (1) to (3), we find that mortgage debt growth is more sensitive to SC exposure than

other categories. The effect is especially pronounced for HELOC. Auto debt (column (4)) does not vary much with SC across commuting zones which is consistent with the finding that automobile debt captures durable consumption (see Di Maggio et al. (2014)). Regions with high exposure to import competition are unlikely to raise additional debt to fund new consumption. Finally, we find an increase in credit card debt in regions with higher exposure to trade. Given the importance of mortgages to household balance sheets, we conclude that most of the cross-sectional variation in overall debt growth is explained by differences in mortgage borrowing.

Taken together, these results indicate that the increased penetration by Chinese imports over the 2000-2007 period significantly affected household debt, primarily via mortgages. To better identify the channels through which import penetration affects household debt, we zoom-in at the individual level using the CCP.

3.3 Household debt at the individual level

3.3.1 Consumer credit panel

The CCP is instrumental to our study of the link between import penetration and the rise in household leverage for several reasons. First, our commuting zone results could be explained by migration; for instance, if individuals with higher debt systematically leave high SC areas. We rule this concern out by running our tests at the individual level, thereby controlling for household movement. Second, we have greater detail on the source of the increase in debt. Do households extract equity out of their house? Answering such questions allows us to separate demand-driven theories for the increase in household debt from supply-driven ones. Third, the richness of the dataset allows for tighter controls – in particular, we control for individuals' age and credit score, for state fixed effects, for other demographics at the zip code level, and for house prices at the most granular level available from CoreLogic. This enables us to more precisely rule out the hypothesis that the rise in household leverage is explained by local house price appreciation. Finally, the granularity of the CCP allows us to consider heterogeneity in households' response to import competition (see Section 4).

We merge the CCP with our measures of trade exposure using industry composition at the CZ level. Hence our regressions consider the effect of exposure to import competition in the cross-section of CZ on debt growth at the individual level. We run the following specification:

$$\Delta D_{i,J} = \beta \ \mathrm{SC}_J + \delta' \mathbf{X}_J + \gamma' \mathbf{Z}_i + u_{i,J}, \tag{3.3}$$

where $\Delta D_{i,J}$ is the 2000-07 growth in measures of household credit over the sample period for individual i in CZ J. $\mathbf{X}_J$ and $\mathbf{Z}_i$ are vectors of CZ and individual level covariates respectively.[18] We restrict the sample to individuals who do not move from the CZ where they lived in 2000.[19] This ensures that our findings at the CZ level are not driven by migration patterns.

We present the results in Table 7. In Panel A, we consider the change in the log of total debt plus one.[20] Across specifications, the coefficient on SC is negative and significant, and similar to the results we found at the individual level. The increase in debt is significantly higher in CZ where industries have higher exposure to import competition. Although the introduction of individual level controls for age and credit score attenuates the coefficient slightly, the results remain significant. Similarly, we find in Panel B that individuals in CZ with low exposure to import competition experience a lower growth in their debt-to-income ratio. Finally, we introduce in columns (5) and (10) county-level house price appreciation to explain the rise in debt, and find as in Table 5 that local house prices are associated with higher debt growth.

We next analyze the effect of import competition on debt growth by types of debt. In Panel A of Table 8, we consider the effect of SC on the extensive margin, namely the propensity to take on debt. We run logistic regressions where the sample is restricted to individuals with zero debt as of 2000Q4 and where the dependent variable is an indicator for having a positive debt balance in 2007Q4.[21] SC have virtually no effect on total debt, a negative effect on mortgage debt and a positive effect on other types of debt. In Panel B, we study the intensive margin of the effect of SC for each type of debt, namely, the effect for individuals that hold debt both in 2000 and 2007. We find that even for this sample, exposure to import competition has a positive effect on total and mortgage debt growth and a negative effect on auto debt, which is what one would expect if auto debt is a proxy for durable consumption.

3.3.2 Panel study of income dynamics

While the sample size is quite small relative to the CCP, the PSID allows us to compute SC at the level of each individual's industry of occupation, rather than at the commuting zone level. In particular, we trace out the effect of import competition on income and estimate the elasticity of debt to income at the individual level. In Table 9, we consider the effect of SC based on households' occupation in the PSID. In Panel A, we first run a regression of

[18] Some controls, for instance income, are defined at the zip code level. Formally they are included in $\mathbf{Z}_i$.
[19] In unreported regressions, we find very similar results when we include both movers and non-movers.
[20] So that it includes both growth at the intensive and at the extensive margin.
[21] For sub-categories of debt these two restrictions must hold within category.

employment status and income on SC. We find results similar to the first part of our analysis, where employment and labor income drop for households in occupations more exposed to import competition. We confirm our previous results for debt and debt-to-income ratios, as both quantities rise for the most exposed areas. In Panel B, we use data from the PSID on the type of household debt to decompose the effect. Most of the increase in debt is driven by mortgage debt and to a smaller extent credit card balances. There are no effects on auto loans.

In Panel C, we first estimate in column (2) a naive regression of debt growth on income growth and find a positive coefficient. In column (3) we use SC as an instrument for income and estimate the instrumental variable specification of debt regressed on instrumented income. We find a negative coefficient, contrary to the OLS coefficient. This suggests that the endogeneity of income and debt growth runs counter to, and obfuscates, our inference that debt is used to smooth negative income shocks. In addition, this regression directly links for a given individual a drop in income caused by import competition to an increase in debt. Finally, we extend the specification to debt-to-income in columns (4) to (6), and find again a negative coefficient in the instrumental variable specification.

3.4 Home equity extraction

If borrowers are using mortgage debt to smooth income shocks from import competition, this suggests that they have housing equity to use as collateral. To examine the role of home equity in explaining the rise in household debt due to import competition, we follow Bhutta and Keys (2016) and construct a measure of home equity extraction using the CCP. We present the results in Table 10. We consider two variables: an extraction flag that is an indicator for equity extraction during the sample period, and the value of the equity extracted. We find there is more equity extraction in areas more exposed to import competition. The point estimates are statistically significant and indicate that an increase in SC is associated with both a lower propensity to extract home equity, and a lower value of home equity extraction. Bhutta and Keys (2016) further show that equity extraction is concentrated in areas with high house price appreciation, where households "cash-in" the capital gains of their investment. We therefore split the sample into areas with high versus low house price appreciation instrumented with the elasticity of housing supply obtained from Saiz (2010), to see where equity extraction comes from. We only find a significant relation between SC and both the propensity to extract equity and the amount of home equity extracted in areas with low housing supply elasticities, those that experienced large house price appreciation before the crisis.

To complement our direct findings using the CCP, we examine refinancing activity from a different perspective using the HMDA data. We present our results in Table 11. We estimate the change in applications for refinancing loans to demand for all other types of loans across CZ. We find across specifications that the demand for refinancing was higher in areas with higher exposure to import competition (columns (3) and (4)). The surge in demand for refinancing contrasts with demand for home purchases, which shows no significant differences across areas (columns (1) and (2)). We find similar effects when we focus on originations rather than applications (see Appendix Table A.3).

These results suggest that the interaction of rising house prices in the first half of the 2000s and the rise of import competition during that same period led to a sharp increase in household debt through home equity extraction. We compare our results to current theories of consumption choice in Section 4 to see how they match with what we document empirically.

3.5 Delinquencies, foreclosure and credit scores

We now move on to the consequences of the credit expansion triggered by import competition. We investigate individual level outcomes throughout as well as after the crisis such as changes in credit scores, mortgage delinquencies, and foreclosure. In Table 12, we present the results of this analysis. We measure credit scores, delinquencies, and foreclosure starting in 2001 to the onset of the Great Recession in 2007 and during the Great Recession from 2008 to 2011. We first investigate the effects on individuals credit scores (columns (1) and (2)) and whether credit scores had fallen by a large amount (columns (3) and (4)). We find exposure to import competition had a negative impact on individuals' credit score during the crisis. We then find that CZ with higher exposure to import competition experience higher delinquencies and foreclosures, especially during the crisis (columns (6) and (8)).

Finally, we investigate the role of house price growth and equity extraction during the boom by, again, instrumenting house price growth from 2000 to 2007 with the elasticity of housing supply obtained from Albert Saiz.[22] We estimate our specification on each subsample for the later period from 2008 to 2011. In Table 13, we find that the decrease in credit scores, and the increase in delinquencies and foreclosures between 2008 and 2011 in low SC areas were significantly larger in areas with low housing supply elasticity. The worse outcomes for areas exposed to house price appreciation are consistent with our earlier findings that equity extraction was more prevalent for low SC counties with high price appreciation.

[22]The correlation between the elasticity of housing supply and SC is 0.01 in the sample.

3.6 Credit supply

One contribution of the paper is to show that part of the cross-regional variation in household debt growth originates from higher demand from households. We consider the hypothesis that we are capturing regions with higher growth in credit supply rather than credit demand. This would be the case if credit supply loosens significantly more in low SC areas. We doubt that differential credit supply could explain the results. First, the evidence in Table 11 that areas with higher exposure to import competition do not experience higher volumes of new purchase loans mitigate the concern that they might be subject to looser credit supply. Second, our individual-level regressions tightly control for the risk profile of borrowers. To explain our results, regional credit supply shocks would have to affect household borrowing irrespective of their age and credit score, which is unlikely.

However, since we cannot formally reject this hypothesis, we investigate variations in outcomes that we expect to be driven by an increase in the supply of credit. First we focus on the rate of denials in mortgage applications from HMDA in Table A.4. We find that denial rates are higher in areas with higher exposure to import competition. This is consistent with the idea that demand for such loans increases more in these areas. This applies only to refinancing loans. Reassuringly, we do not find any such evidence for new purchase loans. While these findings do not dismiss geographical variations in the supply of credit, they suggest that our baseline finding cannot be fully explained by differential credit supply shocks. We pursue in this direction by gathering information on new housing from the Building Permit Survey (see Table A.5). We find that there is no significant variation in the growth of new permits in more exposed areas. Our point estimates suggest a relative but insignificant increase in new permits in areas with higher SC. This is further evidence that our findings are unlikely to come from CZ-specific shocks to the supply of credit. We also inspect the supply side of the economy and do not find any increase in loans to small businesses in exposed areas over the sample period (see Appendix Table A.6). Finally, we find no robust relationship between SC and house price growth between 2000 and 2007 (see Appendix Table A.7). Overall, the evidence appears inconsistent with the idea that low SC areas experience a positive credit supply shock across all debt types.

3.7 Robustness

To further assess the robustness of our findings, we present alternative specifications in Appendix Table A.8. We first consider different measures of exposure to import competition and their effects on household debt. We explore the effects of Chinese import penetration using respectively the Acemoglu et al. (2016) instrument for the change in exposure to

Chinese imports, a measure of industry trade costs estimated from industry level gravity equations, the NTR-gap from Pierce and Schott (2016), as well as the employment share of textile. In each case, the results confirm that household debt increases in areas with higher exposure to import competition.

We then run several variations of our main specification. We first introduce industry controls in our specification (column (5)), namely value added over total output, payroll over total output, TFP and TFP growth, all computed at the CZ level using 1998 labor shares as weights. We then reestimate SC using only Chinese imports (column (6)). To assess whether the results are driven by a spurious correlation with California and its (low SC) computer industry, we reestimate our baseline regression excluding respectively California from the sample in column (7), and the computer industry from the computation of SC at the CZ level in column (8). We then reestimate our baseline regression after including a dummy for coastal regions in column (9), and a dummy for California, Florida, Nevada and Arizona in column (10) (states in which the house price boom was large). In column (11), we add industry level tariffs to SC in our measure of exposure to import competition. In column (12), we weight regressions by the employment share of tradable industries - rather than by adult population. As shown in Appendix Table A.8, our results are robust across all these specifications. Finally, we check that our results do not simply reflect differences across CZs in their sensitivity to the business cycle. For this, we reestimate our baseline regression with local betas as additional controls, where local betas are estimated as the sensitivity of employment in each CZ to aggregate U.S. employment over the period 1991-1999. As shown in Appendix Table A.9, the estimates on SC – although slightly weaker – remain statistically significant.

Our setting also allows us to run two-stage-least-squares (2SLS) regressions analysis, as an alternative to the reduced form specification in equation 3.2. In Appendix Table A.10, we use SC to instrument successively for the change in import penetration from China, the change in unemployment rates, and the average annual income growth between 2000 and 2007. The results indicate that an increase by one percentage point in Chinese import penetration leads to a 20 percentage point higher household debt growth over the period. A one percentage point increase in the unemployment rate leads to a increase by 34 percentage point in household debt growth. Finally, an increase by 10% in total income growth over the period, which corresponds to an average *annual* income growth of 1.6%, leads to an increase by 5.4% higher household debt growth.

Next, we ask whether households are more likely to use debt to smooth the adverse consequences of labor market shocks when other insurance mechanisms are not available. In Appendix Table A.11, we separately run our baseline regression in the sample of CZs

with high and low unemployment insurance. For this, we use data on weekly maximum unemployment benefit (drawn from Chetty (2008) and completed with data from the U.S. Department of Labor), and sort CZs based on whether they lie above or below the median in 2000. We find that while SC drives the growth in unemployed workers in both high and low unemployment insurance areas, the growth in household debt and debt-to-income ratios is largely driven by the latter. Intertemporal smoothing with debt thus seems to serve as a substitute to other smoothing mechanisms such as unemployment insurance.

4 Understanding the Channel

We next discuss the possible interpretations for our findings. Neoclassical consumption theory (Friedman, 1957) links income shocks and consumption smoothing motives. According to the permanent income hypothesis (PIH), consumption only responds to permanent shifts in income, not to transitory ones. As an immediate corollary of the PIH, debt only responds to transient fluctuations and not to permanent ones. To formalize this point we recall the textbook formulation of the permanent income hypothesis with quadratic utility in Appendix B. If labor follows an AR(1) process of the form $y_{t+1} = \bar{y} + \rho(y_t - \bar{y}) + \varepsilon_{t+1}$, we show that the change in borrowing is given by:

$$b_{t+1} - b_t = -\frac{1-\rho}{1-\beta\rho}\left(y_t - \bar{y}\right), \tag{4.1}$$

where β represents agents' subjective discount factor. Households increase their debt whenever their income falls below its average level, $\bar{y}$. The response of borrowing to labor income variations depends on the persistence of the labor income process. If shocks have no persistence ($\rho = 0$), debt responds one to one to deviations of labor income from its trend. When labor income is more persistent ($\rho \to 1$), the borrowing response is muted, going to zero in the limit.

We find suggestive evidence that the increase in leverage is the strongest for those for whom the shock supposedly was more short-lived. The evidence presented in Artuç et al. (2010) or Autor et al. (2014) indicate that the impact of import competition on labor income varies significantly across workers. Workers with higher levels of education and higher wages typically relocate into different industries after being hit by import competition, while low-skilled workers, or workers with industry-specific capital are more permanently affected. Hence, in line with the PIH, it could be that households who increase borrowing the most are those that are indeed hit by a transitory shock, because they can easily find another job. In light of equation 4.1 the effects are concentrated among individuals that have an

income process with low persistence ($\rho \ll 1$). For this, we test whether the increase in debt is stronger for higher income and more educated workers. In Figure 6 we present the point estimates and confidence intervals of cross-sectional regressions of the change in the debt-to-income ratio from 2000Q4 to 2007Q4 on our proxy for import competition, at the individual level. The specifications are similar to column (10) of Table 7 and are run separately across deciles of individual age (a), individual credit score (b), zip code income (c), and zip code share of the population with at least college education (d). Although the differences across deciles are only weakly significant, the results suggest that the effects are concentrated for middle aged individuals with relatively higher credit scores, living in zip codes with higher income and education. Hence, in line with the PIH, the effect of import competition on the growth in debt seems relatively stronger for individuals for whom prior research has found the shock to be shorter lived.

Alternatively we entertain the hypothesis of a deviation from rational expectations. Workers that are permanently excluded from the labor market may have only anticipated a temporary shock. In other words even if the data generating process for income is persistent ($\rho \sim 1$), households perceive it as if $\rho \ll 1$, and they form borrowing and consumption decisions with these distorted expectations. To check whether this is the case, we analyze realized and expected duration of unemployment spells across high and low SC areas. We draw from the Health and Retirement Study (HRS), a longitudinal survey conducted every two years. Individuals are asked about their current job status (employed, unemployed, retired), and about their expectations of future labor outcome. In particular, they are asked what they think is the probability that they would find an equally good job within the next few months if they were to lose their job right now. In Figure 7, we plot the probability that an individual that was employed at time t-2 and not at time t finds a job at time t+2 (blue bars), and the average perceived probability to find a job after becoming unemployed (red bars). Averages are computed across participants in the HRS waves of 2000, 2002 and 2004. While the probability to exit unemployment is lower by 10 percentage points in low than in high SC areas, the expected probability is similar, if not slightly higher in low SC areas. Hence, individuals in low SC areas seem to overestimate their ability to exit unemployment in the period. We confirm in Appendix Table A.12 that this holds in CZ-level cross-sectional regressions after including the full set of controls of our baseline specification.[23] Hence, households exposed to import competition might be taking more debt because they expect the shock to be more transitory than it actually ended up being.[24]

[23]HRS waves sample individuals located in 106 commuting zones. However, these 106 commuting zones cover 56 % of the U.S. total population

[24]Our results may also be consistent with other hypotheses according to which individuals also borrow in the face of permanent shocks. Carroll (2000) model consumption decisions when consumers have utility

5 Conclusion

We analyze the effect of import competition on household balance sheets from 2000 to 2007 using individual-level data on leverage and defaults. We exploit cross-regional variation in exposure to foreign import competition using industry level shipping costs and initial differences in regions' industry specialization. We confirm the adverse effect of import competition on local labor markets during this period and we show that household debt increased significantly in regions where manufacturing industries are more exposed to import competition. A one standard deviation increase in exposure to import competition explains 30% of the cross-regional variation in the growth in household leverage over the period, and is mostly driven by home equity extraction. Our results highlight the distributive effects of globalization and the role played by the mortgage market to absorb them.

functions featuring habits and shows that the optimal consumption response to a negative permanent income shock will be weaker, potentially leading to borrowing to finance this excess consumption. In a similar vein, Bertrand and Morse (Forthcoming) look at the role of external habit on the consumption profile of households. Chetty and Szeidl (2016) show that households do not respond one to one to permanent shocks when they have "consumption commitments" – i.e., when they own goods such as housing that cannot be adjusted in response to fluctuations in income. The illiquidity of these goods creates excessive smoothness of consumption, leading to a dampened response of consumption to income shocks, permanent or transitory, and therefore to potentially higher borrowing. This might explain the finding in Pistaferri (2001) that the marginal propensity to save out of permanent shocks is significantly different from zero. We leave a proper quantification of this channel to future research.

References

Aaronson, Daniel, Sumit Agarwal, and Eric French, "The spending and debt response to minimum wage hikes," *American Economic Review*, 2012, *102* (7), 3111–3139.

Acemoglu, Daron, David Autor, David Dorn, Gordon H. Hanson, and Brendan Price, "Import Competition and the Great U.S. Employment Sag of the 2000s," *Journal of Labor Economics*, 2016, *34*, S141–S198.

Adelino, Manuel, Antoinette Schoar, and Felipe Severino, "Loan originations and defaults in the mortgage crisis: Further evidence," 2016.

_ , _ , and _ , "Loan originations and defaults in the mortgage crisis: The role of the middle class," *Review of Financial Studies*, 2016, p. hhw018.

Agarwal, Sumit and Wenlan Qian, "Consumption and debt response to unanticipated income shocks: Evidence from a natural experiment in singapore," *American Economic Review*, 2014, *104* (12), 4205–4230.

_ , Liu Chunlin, and Nicholas S Souleles, "The Reaction of Consumer Spending and Debt to Tax Rebates-Evidence from Consumer Credit Data," *Journal of Political Economy*, 2007, *115* (6), 986–1019.

Anderson, James E. and Eric van Wincoop, "Trade Costs," *Journal of Economic Literature*, 2004, *42* (3), 691–751.

Antras, Pol, Alonso de Gortari, and Oleg Itskhoki, "Inequality, costly redistribution and welfare in an open economy," Technical Report, Working Paper 2015.

Arkolakis, Costas, Treb Allen, and Yuta Takahashi, "Universal Gravity," Mimeo, Yale University 2014.

Artuç, Erhan, Shubham Chaudhuri, and John McLaren, "Trade Shocks and Labor Adjustment: A Structural Empirical Approach," *American Economic Review*, 2010, *100* (3), 1008–1045.

Autor, David H. and David Dorn, "The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market," *American Economic Review*, 2013, *103* (5), 1553–97.

_ , _ , and Gordon H. Hanson, "The China Syndrome: Local Labor Market Effects of Import Competition in the United States," *American Economic Review*, 2013, *103* (6), 2121–68.

_ , _ , _ , and Jae Song, "Trade Adjustment: Worker Level Evidence," *Quarterly Journal of Economics*, 2014, *129* (4), 1799–1860.

Barrot, Jean-Noel and Ramana Nanda, "Can Paying Firms Quicker Affect Aggregate Employment?," 2016.

Barrot, Jean-Noël, Erik Loualiche, and Julien Sauvagnat, "The Globalization Risk Premium," 2016. Working Paper MIT Sloan.

Benmelech, Efraim, Nittai K Bergman, and Amit Seru, "Financing labor," 2011.

Bernard, Andrew B, J Bradford Jensen, and Peter K Schott, "Survival of the Best Fit: Exposure to Low-wage Countries and the (uneven) Growth of US Manufacturing Plants," *Journal of International Economics*, 2006, *68* (1), 219–237.

_ , _ , and _ , "Trade Costs, Firms and Productivity," *Journal of Monetary Economics*, 2006, *53* (5), 917–937.

Bernstein, Asaf, "Household Debt Overhang and Labor Supply," 2016. Mimeo.

Bertrand, Marianne and Adair Morse, "Trickle-Down Consumption," *Review of Economics and Statistics*, Forthcoming.

Bhutta, Neil and Benjamin J. Keys, "Interest Rates and Equity Extraction During the Housing Boom," *American Economic Review*, 2016, *106* (7), 1742–1774.

Blundell, Richard, Luigi Pistaferri, and Ian Preston, "Consumption Inequality and Partial Insurance," *American Economic Review*, December 2008, *98* (5), 1887–1921.

Bos, Marieke, Emily Breza, and Andres Liberman, "The Labor Market Impacts of Credit Market Information," *Working Paper*, 2016. Mimeo.

Caliendo, Lorenzo and Fernando Parro, "Estimates of the Trade and Welfare Effects of NAFTA," *Review of Economic Studies*, 2015, *82* (1), 1.

Carroll, Christopher D., "Risky Habits and the Marginal Propensity to Consume Output of Permanent Income, or, How Much Would a Permanent Tax Cut Boost Japanese Consumption?," *International Economic Journal*, 2000, *14* (4), 1–40.

Chaney, Thomas, "Distorted Gravity: The Intensive and Extensive Margins of International Trade," *American Economic Review*, 2008, *98* (4), 1707–1721.

_ , David Sraer, and David Thesmar, "The Collateral Channel: How Real Estate Shocks Affect Corporate Investment," *American Economic Review*, 2012, *102* (6), 2381–2409.

Charles, Kerwin Kofi, Erik Hurst, and Matthew J Notowidigdo, "Housing Booms, Manufacturing Decline, and Labor Market Outcomes," 2016.

Chen, Hui, Michael Michaux, and Nikolai Roussanov, "Houses as ATMs? Mortgage Refinancing and Macroeconomic Uncertainty," Working Paper 19421, NBER 2013.

Chetty, Raj, "Moral Hazard versus Liquidity and Optimal Unemployment Insurance," *Journal of Political Economy*, 2008, *116* (2), 173–234.

_ and Adam Szeidl, "Consumption Commitments and Habit Formation," *Econometrica*, 2016, *84* (2), 855–890.

Chodorow-Reich, Gabriel, "The Employment Effects of Credit Market Disruptions: Firm-level Evidence from the 2008–9 Financial Crisis," *Quarterly Journal of Economics*, 2014, *129* (1), 1–59.

Cohen-Cole, Ethan, Kyle Herkenhoff, and Gordon Phillips, "The Impact of Consumer Credit Access on Employment, Earnings and Entrepreneurship," 2016. Mimeo.

Coibion, Olivier, Yuriy Gorodnichenko, Marianna Kudlyak, and John Mondragon, "Does greater inequality lead to more household borrowing? New evidence from household data," 2014.

Cooper, Daniel, "House price fluctuations: the role of housing wealth as borrowing collateral," *Review of Economics and Statistics*, 2013, *95* (4), 1183–1197.

Das, Sanghamitra, Mark J Roberts, and James R Tybout, "Market Entry Costs, Producer Heterogeneity, and Export Dynamics," *Econometrica*, 2007, *75* (3), 837–873.

di Giovanni, Julian, Andrei A. Levchenko, and Jing Zhang, "The Global Welfare Impact of China: Trade Integration and Technological Change," *American Economic Journal: Macroeconomics*, 2014, *6* (3), 153–83.

Dix-Carneiro, Rafael, "Trade Liberalization and Labor Market Dynamics," *Econometrica*, 2014, *82* (3), 825–885.

Donaldson, Jason Roderick, Giorgia Piacentino, and Anjan Thakor, "Household Debt and Unemployment," 2016.

Ebenstein, Avraham, Ann Harrison, Margaret McMillan, and Shannon Phillips, "Estimating the Impact of Trade and Offshoring on American Workers using the Current Population Surveys," *Review of Economics and Statistics*, 2014, *96* (4), 581–595.

Friedman, Milton, *A Theory of the Consumption Function*, Princeton University Press, 1957.

Ganong, Peter and Pascal Noel, "How Does Unemployment Affect Consumer Spending?," 2015.

Goldberg, Pinelopi Koujianou and Nina Pavcnik, "Distributional Effects of Globalization in Developing Countries," *Journal of Economic Literature*, 2007, *45*, 39–82.

Gross, David B and Nicholas S Souleles, "Do Liquidity Constraints and Interest Rates Matter for Consumer Behavior? Evidence from Credit Card Data," *Quarterly Journal of Economics*, 2002, pp. 149–185.

Hakobyan, Shushanik and John McLaren, "Looking for Local Labor Market Effects of NAFTA," *The Review of Economics and Statistics*, 2016, *98* (4), 728–741.

Helpman, Elhanan, Oleg Itskhoki, and Stephen Redding, "Inequality and Unemployment in a Global Economy," *Econometrica*, 2010, *78* (4), 1239–1283.

Hsieh, Chang-Tai and Ralph Ossa, "A global view of productivity growth in China," *Journal of international Economics*, 2016, *102*, 209–224.

Hummels, David, "Transportation Costs and International Trade in the Second Era of Globalization," *Journal of Economic Perspectives*, 2007, *21* (3), 131–154.

_ **and Alexandre Skiba**, "Shipping the Good Apples Out? An Empirical Confirmation of the Alchian-Allen Conjecture," *Journal of Political Economy*, 2004, *112* (6), 1384–1402.

Hummels, David L. and Georg Schaur, "Time as a Trade Barrier," *American Economic Review*, 2013, *103* (7), 2935–59.

Hurst, Erik and Frank Stafford, "Home Is Where the Equity Is: Mortgage Refinancing and Household Consumption," *Journal of Money, Credit and Banking*, December 2004, *36* (6), 985–1014.

Irarrazabal, Alfonso, Andreas Moxnes, and Luca David Opromolla, "The Tip of the Iceberg: A Quantitative Framework for Estimating Trade Costs," *NBER Working Paper*, 2013.

Krishna, Pravin and Mine Zeynep Senses, "International Trade and Labour Income Risk in the U.S.," *The Review of Economic Studies*, 2014, *81* (1), 186.

Kumhof, Michael, Romain Rancière, and Pablo Winant, "Inequality, leverage, and crises," *The American Economic Review*, 2015, *105* (3), 1217–1245.

Lee, Donghoon and Wilbert van der Klaauw, "An Introduction to the FRBNY Consumer Credit Panel," Staff Reports 479, Federal Reserve Bank of New York 2010.

Liebersohn, C. Jack, "Housing Demand, Regional House Prices and Consumption," 2017. Mimeo, MIT Sloan.

Maggio, Marco Di, Amir Kermani, and Rodney Ramcharan, "Monetary Policy Pass-Through: Household Consumption and Voluntary Deleveraging," Technical Report, Berkeley 2014.

Melitz, Marc J, "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity," *Econometrica*, 2003, *71* (6), 1695–1725.

Mian, Atif and Amir Sufi, "The Consequences of Mortgage Credit Expansion: Evidence from the U.S. Mortgage Default Crisis," *The Quarterly Journal of Economics*, 11 2009, *124* (4), 1449–1496.

_ **and** _ , "House Prices, Home Equity-Based Borrowing, and the US Household Leverage Crisis," *American Economic Review*, August 2011, *101* (5), 2132–56.

_ **and** _ , "What explains the 2007–2009 drop in employment?," *Econometrica*, 2014, *82* (6), 2197–2223.

Mondragon, John, "Household credit and employment in the Great Recession," *Available at SSRN 2521177*, 2014.

Pierce, Justin R. and Peter K. Schott, "The Surprisingly Swift Decline of U.S. Manufacturing Employment," *American Economic Review*, 2016, *106* (7), 1632–1662.

Pistaferri, Luigi, "Superior Information, Income Shocks, and the Permanent Income Hypothesis," *Review of Economics and Statistics*, 2001, *83* (3), 465–476.

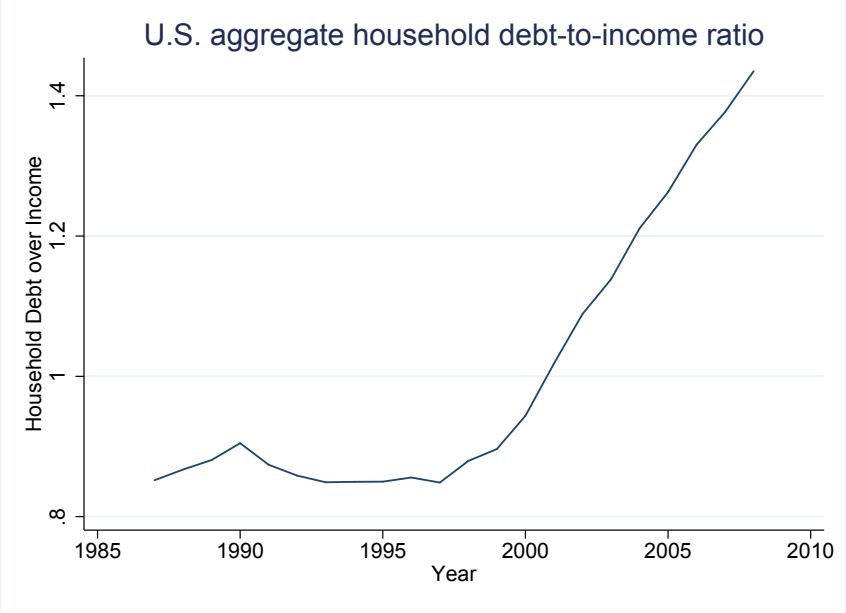
Rajan, Raghuram G, *Fault lines: How hidden fractures still threaten the world economy*, Princeton University Press, 2011.

Saiz, Albert, "The Geographical Determinants of Housing Supply," *Quarterly Journal of Economics*, 2010, *125* (3), 1253–1296.

Zhu, Xiaodong, "Understanding China's growth: Past, present, and future," *The Journal of Economic Perspectives*, 2012, *26* (4), 103–124.

Figures

Panel A. Debt-to-income ratio



Panel B. Chinese imports

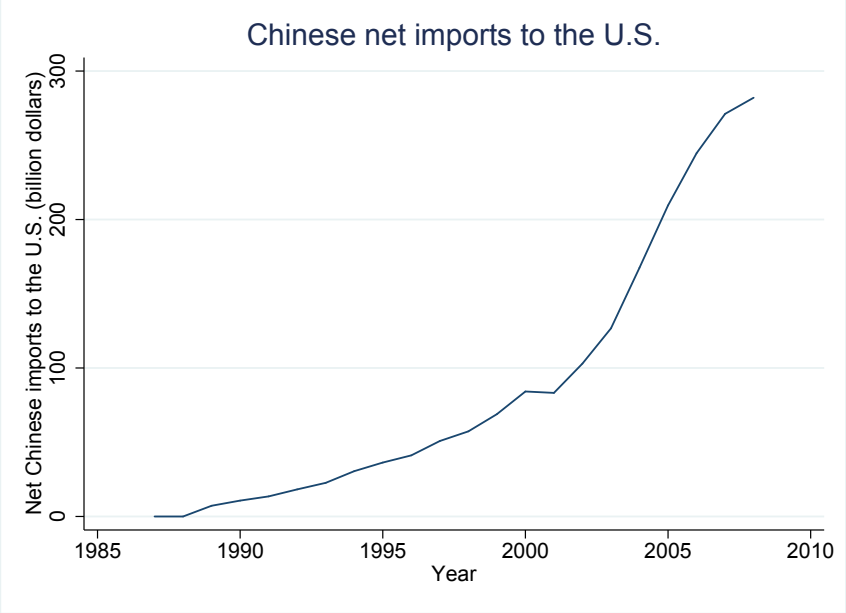
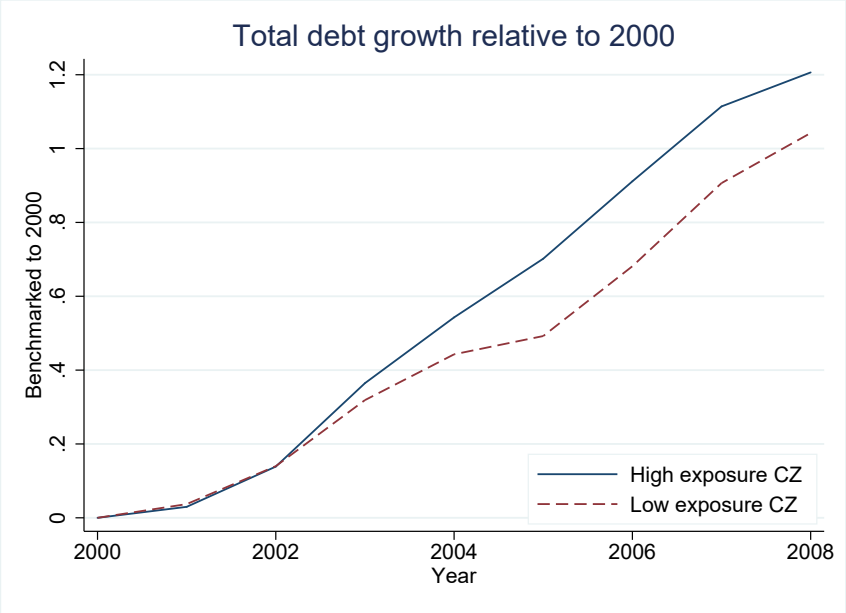


Figure 1

Aggregate U.S. Household Debt-to-Income Ratio and Chinese Net Imports to the U.S.

Note: This figure presents the time series of U.S. aggregate household debt-to-income ratio from 1987 to 2007 (panel A), and of the value of Chinese net imports to the U.S. over the same period (panel B).

Panel A. Total household debt



Panel B. Debt to income ratio

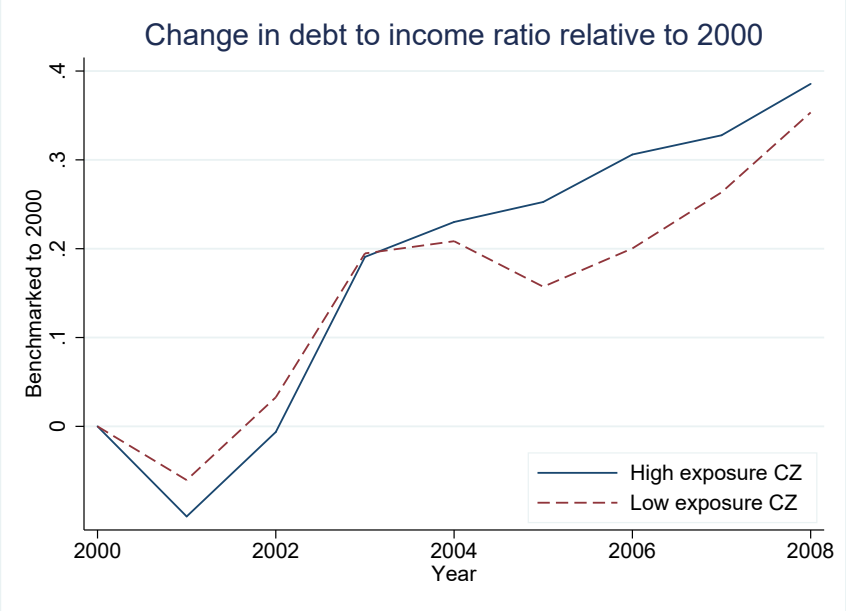
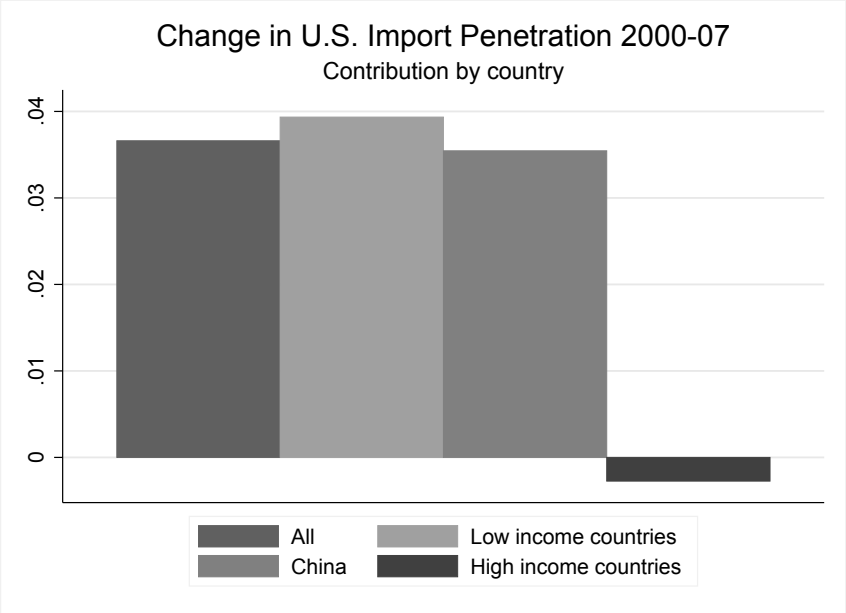


Figure 2

Household Debt Across High and Low Exposure Areas

Note: This figure presents the cumulative debt growth (panel A) and change in debt to income ratio (panel B) for Commuting Zones in the top (low exposure) and bottom (high exposure) quintiles of shipping costs measured prior to 1999.

Panel A. Contribution to imports



Panel B. Contribution to net imports

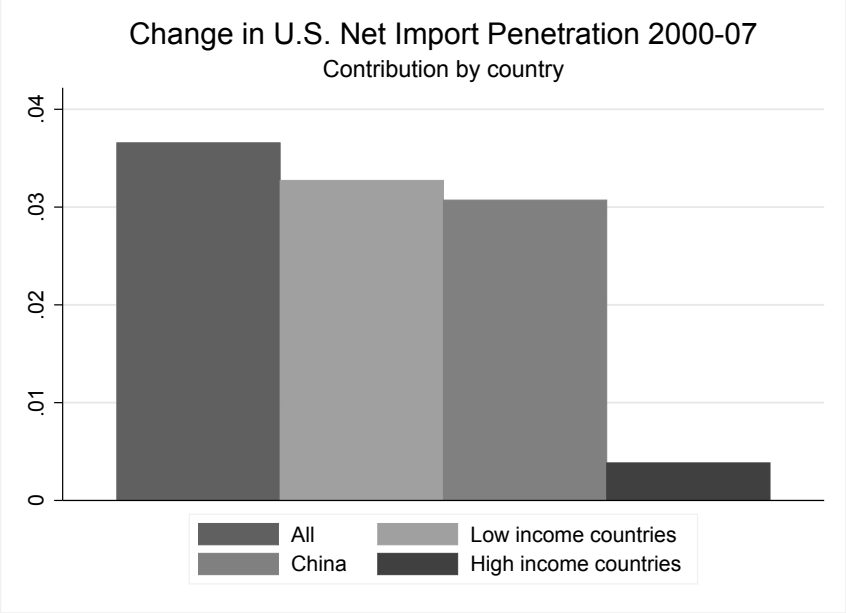
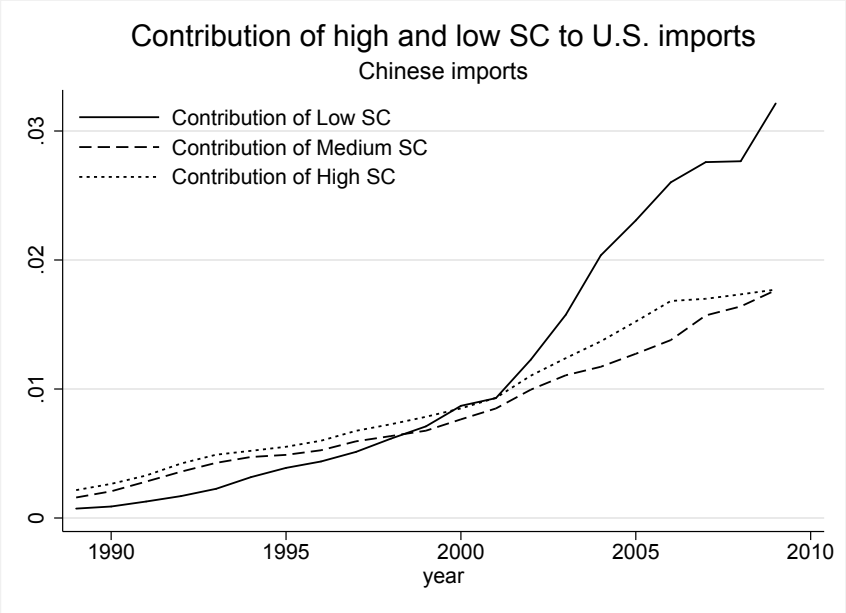


Figure 3

Contribution to U.S. Import and Net Import Penetration by Country

Note: This figure presents the change in U.S. import penetration (panel A) and net import penetration (panel B) from 2000 to 2007. Import penetration is measured as the ratio of imports to U.S. expenditures themselves measured as domestic shipments plus net imports. We decompose the change in import penetration by countries: low income countries (including China), China, and high income countries.

Panel A. Contribution to imports



Panel B. Contribution to net imports

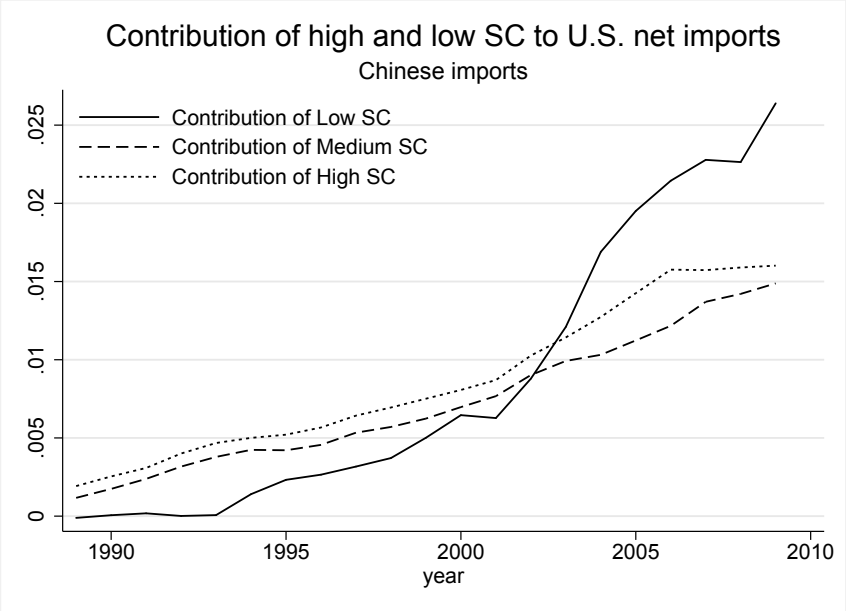


Figure 4

Contribution of High and Low SC to U.S. Net Imports from China

Note: This figure presents the contribution of high, medium, and low shipping costs industries to U.S. import penetration (panel A) and net import penetration (panel B) from China. The contribution to import penetration is defined as imports divided by total U.S. expenditures, themselves measured as domestic shipments plus net imports.

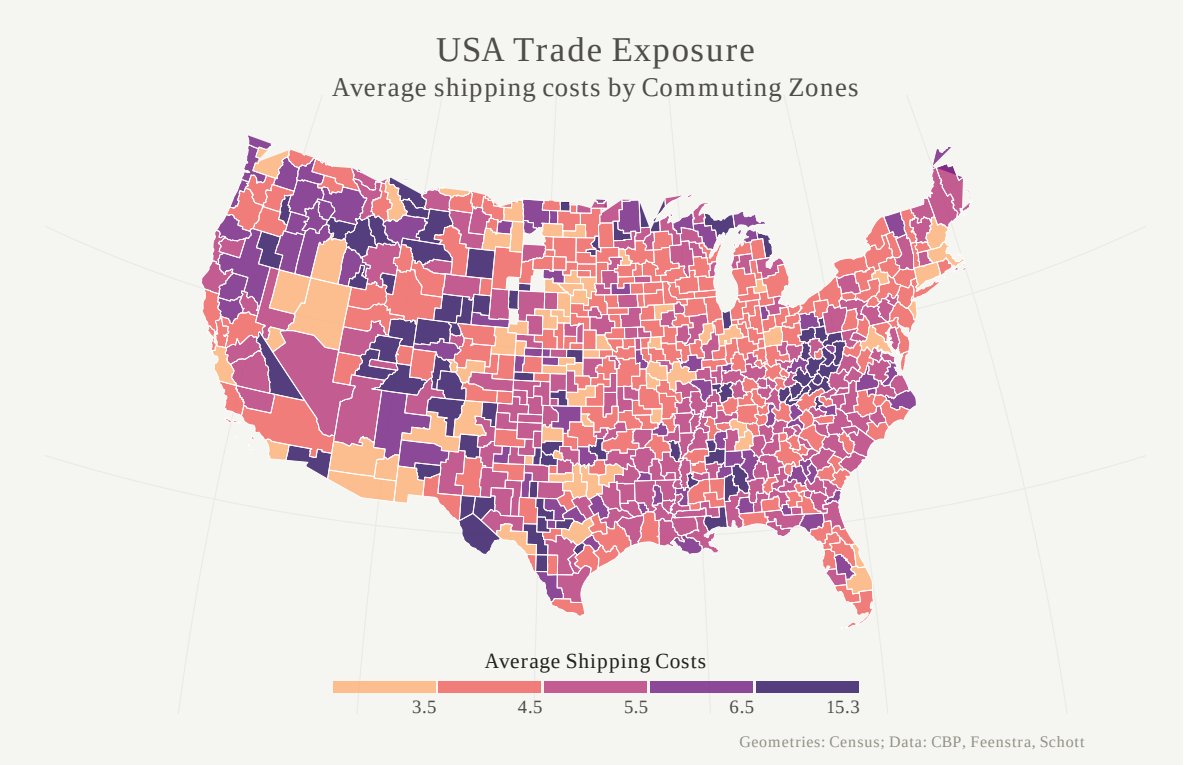
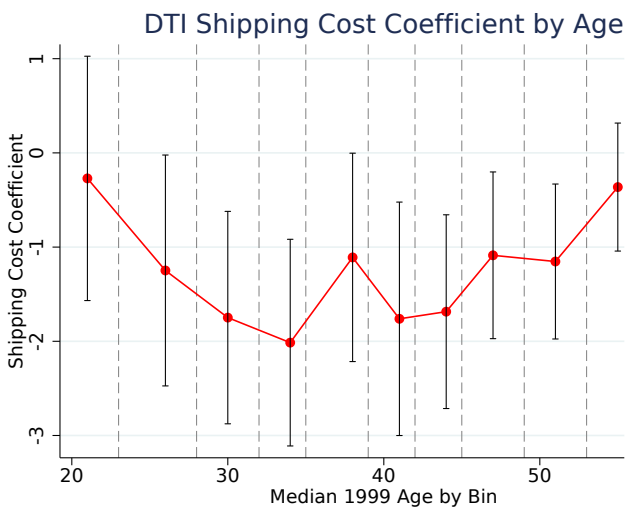
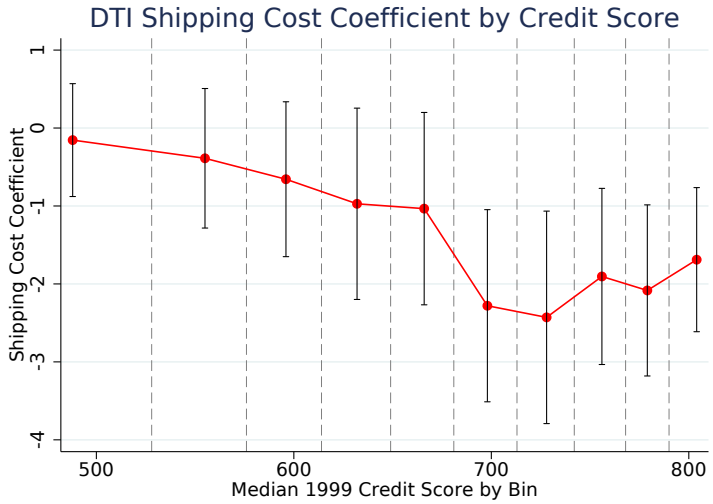


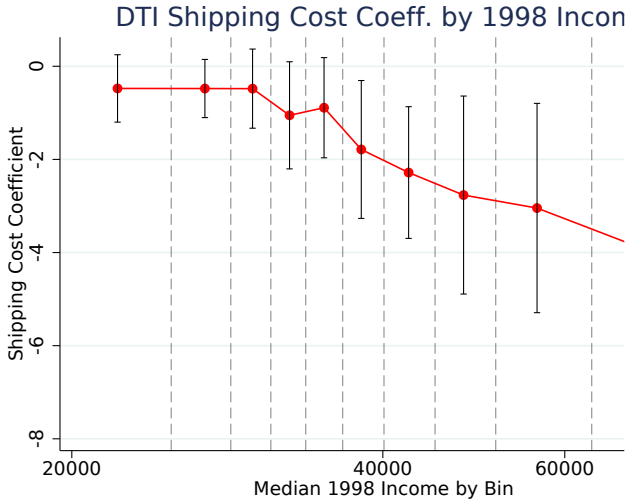
Figure 5
Average Shipping Costs by Commuting Zones
Note: This figure presents the distribution of shipping (%) costs across commuting zones.



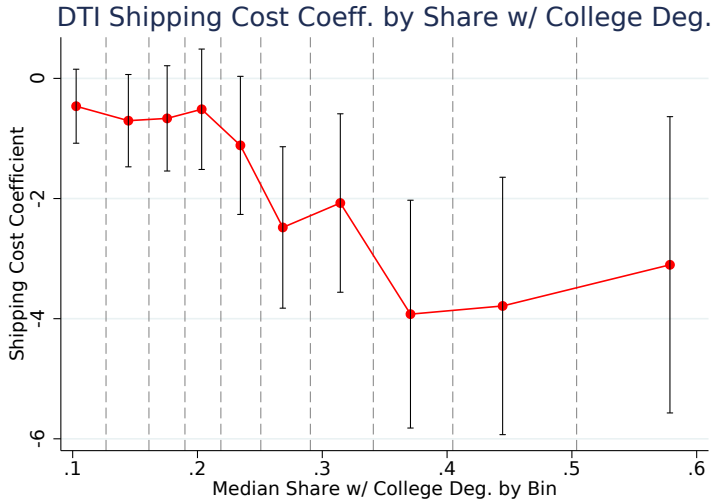
(a) DTI: SC coefficient by individual age



(b) DTI: SC coefficient by individual credit score



(c) DTI: SC coefficient by zipcode income



(d) DTI: SC Coefficient by zipcode education

Figure 6

Heterogeneous Treatment Effects

Note: This figure presents the point estimates and confidence intervals of cross-sectional regressions of the change in the debt-to-income ratio from 2000Q4 to 2007Q4 on shipping costs, our proxy for import competition, at the individual level. The specifications are similar to column (10) of Table 7 and are run separately across deciles of individual age (a), individual credit score (b), zip code income (c), and zip code share of the population with at least college education (d).

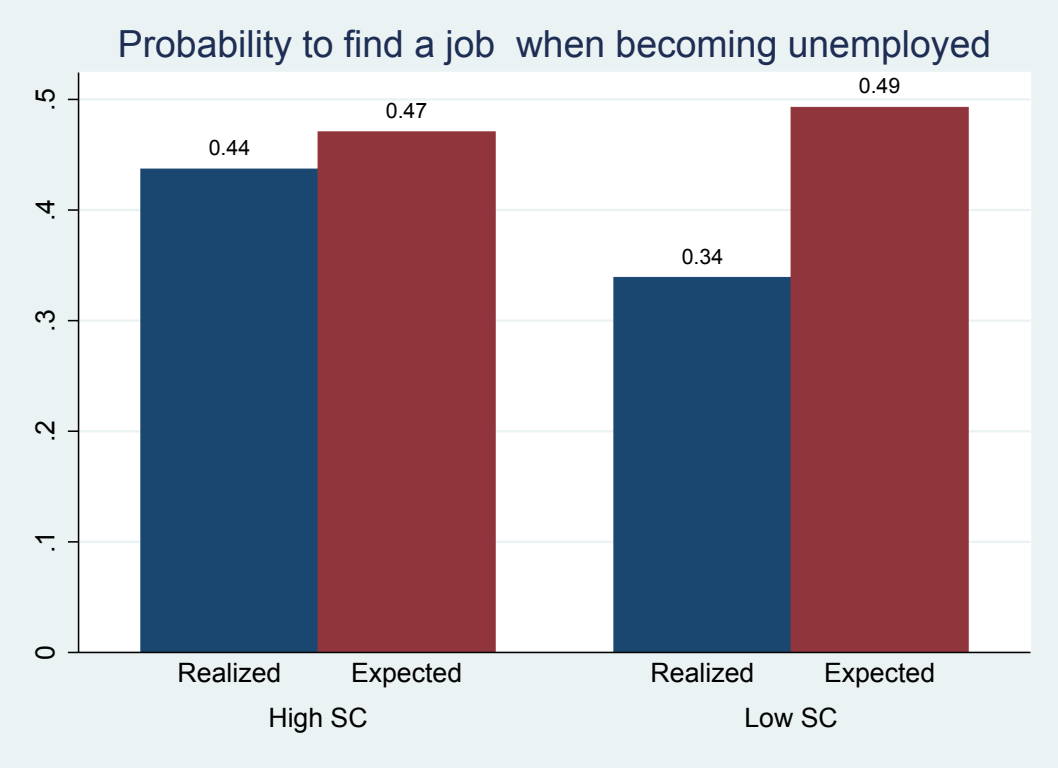


Figure 7

Realized and Expected Duration of Unemployment Spells

Note: This figure presents realized and expected duration of unemployment spells. We draw from the Health and Retirement Study (HRS), a longitudinal survey conducted every two years. Individuals are asked about their current job status (employed, unemployed, retired), and about their expectations of future labor outcome. In particular, they are asked: "Suppose you were to lose your job this month. What do you think are the chances that you could find an equally good job in the same line of work within the next few months?" Red bars present the average perceived probability to find a job after becoming unemployed, computed across participants in the HRS waves of 2000, 2002 and 2004. Blue bars present the probability that an individual who was employed in year 2000 (according to HRS), but not in year 2002, finds a job in year 2004. High SC (respectively Low SC) denote commuting zones that lie in the top tercile (respectively bottom tercile) of the distribution of shipping costs.

Tables

Table 1
Summary Statistics

	Observations	Mean	Median	Std. dev.
6-digit NAICS industry level				
Shipping costs	379	0.042	0.036	0.031
$\Delta_{2000-2007}$ Imports (China)	379	0.053	0.019	0.080
$\Delta_{2000-2007}$ Exports (China)	379	0.006	0.001	0.013
$\Delta_{2000-2007}$ Net imports (China)	379	0.048	0.011	0.082
$\Delta_{2000-2007}$ Log shipments	379	0.065	0.131	0.552
$\Delta_{2000-2007}$ Log value added	379	0.051	0.088	0.568
$\Delta_{2000-2007}$ Log employment	379	-0.306	-0.237	0.442
$\Delta_{2000-2007}$ TFP	379	0.022	0.012	0.213
CZ Level				
Shipping costs	733	0.049	0.044	0.021
$\Delta_{2000-2007}$ Log # unemployed	733	0.117	0.145	0.253
$\Delta_{2000-2007}$ Unemployment rate	733	0.003	0.004	0.012
$\text{Average}_{2000-2007}$ income growth	715	0.036	0.019	0.107
$\text{Median}_{2000-2007}$ income growth	715	0.009	-0.002	0.095
$\Delta_{2000-2007}$ Log debt	733	0.596	0.589	0.204
$\Delta_{2000-2007}$ DTI	733	0.414	0.377	0.320
$\Delta_{2000-2007}$ HPI	733	0.356	0.325	0.170
Individual Level				
$\Delta_{2000-07}$ Log(Debt+1)	5,128,389	0.222	0.275	4.122
$\Delta_{2000-07}$ Log(Debt)	4,125,283	0.632	0.425	2.235
$\Delta_{2000-07}$ DTI	4,752,692	0.713	0.015	3.159
Extract Flag	3,069,768	0.478	0.000	0.500
Extract Value	3,069,768	5.162	0.000	5.453
$\Delta_{2000-07}$ Credit Score	4,919,039	20.584	21.000	80.961
$\Delta_{2007-11}$ Credit Score	4,661,428	8.660	9.000	70.288
Mtg. Delinq. $_{2000-07}$	5,128,389	0.136	0.000	0.342
Mtg. Delinq. $_{2007-11}$	5,044,524	0.118	0.000	0.322
Foreclosure $_{2000-07}$	5,128,389	0.031	0.000	0.174
Foreclosure $_{2007-11}$	5,047,699	0.040	0.000	0.196

Note: This table presents summary statistics for the three samples used in this paper. Panel A presents statistics for 379 6-digit NAICS manufacturing industries. Panel B presents statistics for 733 Commuting Zones, and Panel C presents statistics for the individual-level sample obtained from the CCP.

Table 2
Shipping Costs and International Trade Flows, Industry Level

	$\Delta_{2000-07}$ Trade flows / (Shipments+Net imports)					
	Chinese trade flows					
	Imports		Exports		Net imports	
	(1)	(2)	(3)	(4)	(5)	(6)
Shipping costs	-0.475*	-0.350**	-0.077*	-0.050**	-0.402	-0.320**
	(0.243)	(0.144)	(0.046)	(0.020)	(0.249)	(0.147)
Log employment		0.013**		-0.001		0.015**
		(0.006)		(0.001)		(0.007)
Log value added		-0.005		0.004		-0.010
		(0.012)		(0.004)		(0.015)
Log shipments		-0.010		-0.004		-0.006
		(0.011)		(0.003)		(0.013)
TFP		0.187		-0.029*		0.224
		(0.135)		(0.017)		(0.145)
TFP growth		-0.003		0.075*		-0.087
		(0.134)		(0.041)		(0.174)
$\Delta_{1991-1999}$ Imports		0.795***				
		(0.193)				
$\Delta_{1991-1999}$ Exports				0.064		
				(0.555)		
$\Delta_{1991-1999}$ Net imports						0.782***
Observations	379	379	379	379	379	379
R^2	0.031	0.328	0.030	0.186	0.021	0.289

Note: This table presents cross-sectional regressions assessing the effect of shipping costs on the change in U.S. imports from China, U.S. exports to China, and U.S. net imports from China between 2000 to 2007, all normalized by U.S. expenditures measured as domestic shipments plus net imports. Regressions are weighted by the industry share in total U.S. expenditures. Robust standard errors are reported in parentheses. *, ** and *** means statistically different from zero at 10%, 5% and 1% level of significance.

Table 3
Import Competition and Domestic Output, Industry Level

	$\Delta_{2000-07}$ Log flows						$\Delta_{2000-07}$ Log TFP	
	Shipments		Value added		Employment			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Shipping costs	5.865***	4.360***	6.165***	5.265***	2.565**	2.103***	-1.648	-0.685
	(1.947)	(1.132)	(2.334)	(1.640)	(1.003)	(0.665)	(1.278)	(0.541)
Log employment		-0.125*		-0.153*		-0.145***		-0.030
		(0.074)		(0.088)		(0.054)		(0.032)
Log value added		-0.045		-0.030		0.075		0.021
		(0.141)		(0.171)		(0.101)		(0.055)
Log shipments		0.225*		0.217		0.085		-0.007
		(0.123)		(0.168)		(0.068)		(0.053)
TFP		-0.199		0.394		-0.104		1.037*
		(0.442)		(0.562)		(0.308)		(0.561)
TFP growth		-0.769		-1.248		-1.013*		-0.513
		(0.760)		(0.938)		(0.534)		(0.552)
$\Delta_{1991-1999}$ Log shipments		-0.178						
		(0.129)						
$\Delta_{1991-1999}$ Log value added				-0.076				
				(0.164)				
$\Delta_{1991-1999}$ Log employment						0.459***		
						(0.133)		
$\Delta_{1991-1999}$ TFP								0.248***
								(0.079)
Observations	379	379	379	379	379	379	379	379
R^2	0.109	0.235	0.106	0.200	0.034	0.214	0.026	0.530

Note: This table presents cross-sectional regressions assessing the effect of shipping costs on the change in domestic shipments, value added, employment and TFP from 2000 to 2007. Regressions are weighted by the industry share in total U.S. expenditures. Robust standard errors are reported in parentheses. *, ** and *** means statistically different from zero at 10%, 5% and 1% level of significance.

Table 4
Import Competition and Labor Market Outcomes, CZ Level

Panel A: Unemployment	$\Delta_{2000-07}$ Log # Unemployed				$\Delta_{2000-07}$ Unemployment rate			
Shipping costs	-6.017***	-4.451***	-3.427***	-3.291***	-0.227***	-0.128***	-0.089**	-0.081**
	(1.326)	(1.121)	(1.136)	(1.075)	(0.055)	(0.044)	(0.044)	(0.038)
Δ HPI				-0.526***				-0.029***
				(0.078)				(0.005)
Log employment		0.186	0.036	-0.133*		0.007	0.001	-0.008**
		(0.115)	(0.099)	(0.079)		(0.005)	(0.004)	(0.004)
Share Exposed		0.618***	0.198	-0.232		0.054***	0.038***	0.015*
		(0.229)	(0.241)	(0.218)		(0.010)	(0.011)	(0.008)
Log income		0.584***	0.070	-0.000		0.024***	0.004	-0.000
		(0.155)	(0.208)	(0.181)		(0.006)	(0.008)	(0.006)
Log Debt		-0.227*	-0.020	0.159*		-0.008	0.001	0.011***
		(0.132)	(0.111)	(0.086)		(0.005)	(0.005)	(0.004)
DTI		0.087	0.078	0.052		0.001	-0.000	-0.002
		(0.143)	(0.098)	(0.072)		(0.006)	(0.004)	(0.003)
$\Delta_{91,99}$ HMDA loan origination		-0.018	-0.002	-0.009		-0.001	0.000	-0.000
		(0.015)	(0.014)	(0.011)		(0.001)	(0.001)	(0.000)
$\Delta_{91,99}$ CH Import Penetration		0.749	1.684	4.339**		-0.015	0.086	0.232**
		(3.220)	(2.613)	(1.952)		(0.176)	(0.138)	(0.090)
Census controls	No	No	Yes	Yes	No	No	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
Observations	733	733	733	733	733	733	733	733
R^2	0.094	0.196	0.355	0.494	0.063	0.235	0.376	0.578
Magnitude SC	-0.127	-0.094	-0.073	-0.070	-0.005	-0.003	-0.002	-0.002
Magnitude HP				-0.089				-0.005

Panel B: Income	Average annual income growth				Median annual income growth			
Shipping costs	1.449***	0.741***	0.730**	0.694***	0.982***	0.797***	0.966***	0.928***
	(0.361)	(0.272)	(0.310)	(0.266)	(0.363)	(0.245)	(0.297)	(0.254)
Δ HPI				0.199***				0.205***
				(0.024)				(0.020)
Log employment		-0.067	-0.063	0.002		-0.095***	-0.092**	-0.026
		(0.042)	(0.040)	(0.029)		(0.035)	(0.036)	(0.024)
Share Exposed		-0.479***	-0.433***	-0.269***		-0.464***	-0.405***	-0.236***
		(0.058)	(0.071)	(0.051)		(0.059)	(0.064)	(0.047)
Log income		-0.109**	-0.040	-0.013		-0.143***	-0.158**	-0.130***
		(0.042)	(0.071)	(0.052)		(0.040)	(0.064)	(0.049)
Log Debt		0.059	0.053	-0.016		0.095**	0.092**	0.022
		(0.047)	(0.044)	(0.031)		(0.037)	(0.039)	(0.026)
DTI		-0.003	-0.025	-0.014		-0.009	-0.038	-0.027
		(0.051)	(0.039)	(0.025)		(0.038)	(0.033)	(0.020)
$\Delta_{91,99}$ HMDA loan origination		0.008	0.001	0.004		0.008**	0.003	0.005*
		(0.005)	(0.005)	(0.003)		(0.004)	(0.004)	(0.003)
$\Delta_{91,99}$ CH Import Penetration		1.856*	1.443*	0.435		2.272**	1.566*	0.528
		(1.008)	(0.837)	(0.563)		(0.991)	(0.800)	(0.591)
Census controls	No	No	Yes	Yes	No	No	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
Observations	715	715	715	715	715	715	715	715
R^2	0.052	0.312	0.377	0.574	0.024	0.378	0.433	0.645
Magnitude SC	0.031	0.016	0.015	0.015	0.021	0.017	0.020	0.020
Magnitude HP				0.034				0.035

Note: This table presents cross-sectional regressions of the change in the log number of unemployed workers and the change in unemployment rate from 2000 to 2007 in Panel A (respectively average and median household income growth in Panel B) on shipping costs at the commuting zone level. Average and median household income, available for 715 commuting zones, are obtained from Autor et al. (2013) and defined as the sum of individual incomes of all work-age household members (age 16-64), divided by the number of household members of that age group. Total income comprises wage and salary income, business and investment income, social security and welfare income, and income from other non-specified sources. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share with education < high school, share with high school diploma only, unemployment rate, poverty rate, and percent urban, measured at the commuting zone level. Regressions are weighted by adult population in each CZ as of 2000. Robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 5
Import Competition and Household Debt Growth, CZ Level

	Panel A: $\Delta_{2000-07}$ Log debt				Panel B: $\Delta_{2000-07}$ DTI			
Shipping costs	-3.258***	-2.354***	-2.670***	-2.748***	-7.169***	-3.629**	-3.689***	-3.726***
	(0.784)	(0.745)	(0.664)	(0.638)	(1.952)	(1.467)	(1.341)	(1.351)
Δ HPI				0.304***				0.146
				(0.043)				(0.098)
Log employment		-0.185***	-0.191***	-0.093		-0.382***	-0.435***	-0.388***
		(0.066)	(0.061)	(0.063)		(0.133)	(0.127)	(0.139)
Share Exposed		-0.923***	-0.977***	-0.729***		-0.602*	-0.707**	-0.588*
		(0.167)	(0.167)	(0.154)		(0.314)	(0.336)	(0.326)
Log income		-0.024	0.147	0.187*		-0.157	-0.027	-0.007
		(0.089)	(0.123)	(0.109)		(0.175)	(0.251)	(0.248)
Log Debt		0.172**	0.169***	0.066		0.377***	0.426***	0.377***
		(0.069)	(0.064)	(0.065)		(0.144)	(0.134)	(0.146)
DTI		0.050	0.065	0.080		0.382**	0.405***	0.413***
		(0.062)	(0.046)	(0.051)		(0.148)	(0.118)	(0.123)
$\Delta_{91,99}$ HMDA loan origination		0.019**	0.010	0.014*		0.011	0.012	0.013
		(0.009)	(0.009)	(0.008)		(0.020)	(0.020)	(0.021)
$\Delta_{91,99}$ CH Import Penetration		2.673*	2.258	0.725		2.533	2.437	1.700
		(1.605)	(1.480)	(1.356)		(3.108)	(3.409)	(3.509)
Census controls	No	No	Yes	Yes	No	No	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
Observations	733	733	733	733	733	733	733	733
R^2	0.051	0.416	0.488	0.574	0.058	0.546	0.566	0.571
Magnitude SC	-0.069	-0.050	-0.057	-0.058	-0.152	-0.077	-0.078	-0.079
Magnitude HP				0.052				0.025

Note: This table presents cross-sectional regressions of debt growth from 2000Q4 to 2007Q4 on shipping costs, at the commuting zone level. We consider the log change in debt in Panel A, and the change in debt to income ratio in Panel B. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share with education < high school, share with high school diploma only, unemployment rate, poverty rate, and percent urban, measured at the commuting zone level. Regressions are weighted by adult population in each CZ as of 2000. Robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 6
Import Competition and Household Debt Growth by Debt Type, CZ Level

	$\Delta_{2000-07}$ Log debt				
	All mortgage (1)	Mortgage loans (2)	HELOC (3)	Auto (4)	Credit card (5)
Shipping costs	-3.276***	-2.539*	-8.194**	-0.797	-1.327***
	(0.710)	(1.497)	(3.304)	(0.675)	(0.448)
Δ HPI	0.352***	0.220*	0.323	0.243**	-0.075**
	(0.048)	(0.124)	(0.212)	(0.122)	(0.031)
Log Employment	-0.094	0.121	0.028	0.178**	-0.094***
	(0.068)	(0.149)	(0.246)	(0.081)	(0.036)
Share Exposed	-0.822***	-1.330***	-2.829***	-0.627***	-0.343***
	(0.166)	(0.443)	(0.629)	(0.164)	(0.107)
Log Income	0.204	0.520	0.615	0.132	-0.068
	(0.128)	(0.321)	(0.467)	(0.113)	(0.061)
Log Debt	0.058	-0.139	-0.083	-0.228**	0.114***
	(0.070)	(0.152)	(0.272)	(0.095)	(0.040)
DTI	0.074	0.263*	0.046	0.249***	-0.010
	(0.057)	(0.145)	(0.258)	(0.066)	(0.037)
$\Delta_{91,99}$ HMDA loan origination	0.025***	0.090***	0.120***	-0.003	0.008
	(0.009)	(0.021)	(0.036)	(0.010)	(0.006)
$\Delta_{91,99}$ CH Import Penetration	0.191	7.426*	2.758	1.381	1.417
	(1.550)	(4.051)	(5.752)	(1.507)	(0.930)
Census controls	Yes	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.
Observations	733	733	733	733	733
R^2	0.490	0.467	0.127	0.363	0.327
Magnitude SC	-0.069	-0.054	-0.173	-0.017	-0.028
Magnitude HP	0.060	0.037	0.055	0.041	-0.013

Note: This table presents cross-sectional regressions of debt growth from 2000Q4 to 2007Q4 on shipping costs, at the commuting zone level, separately for each type of debt (mortgage loans, home equity lines of credit, auto debt, and credit card debt). Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share with education < high school, share with high school diploma only, unemployment rate, poverty rate, and percent urban, measured at the commuting zone level. Regressions are weighted by adult population in each CZ as of 2000. Robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 7

Import Competition and Household Debt Growth, Individual Level

	Panel A: Δ Log (debt+1)					Panel B: Δ DTI				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Shipping Costs	-1.923**	-2.450***	-1.854***	-1.956***	-2.046***	-2.111***	-1.293***	-1.171**	-1.262***	-1.322***
	(0.781)	(0.673)	(0.642)	(0.644)	(0.625)	(0.536)	(0.463)	(0.461)	(0.460)	(0.454)
Δ HPI					0.180***					0.140***
					(0.050)					(0.049)
Log Employment		-0.014**	-0.020***	-0.024***	-0.028***		0.014**	0.007	0.004	0.001
		(0.006)	(0.006)	(0.006)	(0.006)		(0.006)	(0.006)	(0.007)	(0.007)
Share Exposed		-0.683***	-0.878***	-0.869***	-0.840***		-0.436***	-0.481***	-0.479***	-0.455***
		(0.125)	(0.120)	(0.117)	(0.109)		(0.108)	(0.107)	(0.106)	(0.107)
Log Income		-0.183***	0.008	0.037*	0.038**		-0.047*	-0.024	-0.006	-0.005
		(0.025)	(0.019)	(0.019)	(0.019)		(0.027)	(0.025)	(0.025)	(0.025)
Log Debt +1			-0.262***	-0.269***	-0.269***					
			(0.001)	(0.002)	(0.002)					
DTI								-0.050***	-0.054***	-0.054***
								(0.013)	(0.014)	(0.014)
$\Delta_{91,99}$ HMDA Loan Origination		0.022***	0.015**	0.011	0.008		0.017***	0.017***	0.013**	0.011**
		(0.008)	(0.008)	(0.008)	(0.007)		(0.005)	(0.005)	(0.005)	(0.005)
$\Delta_{91,99}$ CH Import Penetration		0.181	0.424	0.297	0.303		1.203	1.290	1.214	1.214
		(1.165)	(1.028)	(1.001)	(0.990)		(1.007)	(1.017)	(1.001)	(0.979)
Credit Score			0.004***					0.001***		
			(0.000)					(0.000)		
Age			-0.051***					-0.026***		
			(0.001)					(0.001)		
Risk Bins	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Age Bins	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Census	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,128,389	5,128,389	5,128,389	5,128,389	5,128,389	4,752,698	4,752,698	4,752,698	4,752,698	4,752,698
R-Squared	0.002	0.003	0.076	0.079	0.079	0.006	0.007	0.033	0.044	0.044

Note: This table presents cross-sectional regressions of debt growth from 2000Q4 to 2007Q4 on shipping costs, at the individual level. We consider the log change in debt in Panel A (where we add 1 all balances), and the change in debt to income ratio in Panel B (where debt is measured at the individual level and income is the average IRS income from an individual's zip code). Individual level data comes from the FRBNY CCP/Equifax Data, while shipping costs, along with employment and share exposed controls, are measured at the commuting zone level. Changes in house prices are from the most granular index available from CoreLogic. In some regressions, we also include quantile indicators variables for 5 percentile bins of age and credit score. Census controls are zip code-level variables for the vacancy rate, percent white, percent black, share with education <high school, share with high school diploma only, unemployment rate, poverty rate, and percent urban, all drawn from the 2000 census. Debt to income is trimmed at the +/- 2.5% level. We restrict to individuals between 15-57 in 1999 that do not change commuting zones during the observation period. Standard errors are clustered at the commuting zone level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 8

Import Competition and Household Debt Growth by Debt Type, Individual Level

	Panel A: Extensive margin (Debt dummy)					Panel B: Intensive margin (Δ Log debt)				
	(1) Any	(2) Mtg	(3) Auto	(4) CCard	(5) Other	(6) Total	(7) Mtg	(8) Auto	(9) CCard	(10) Other
Shipping Costs	-0.003	-0.255**	0.241	0.040	0.419***	-2.098***	-1.323***	0.693**	-0.268	-0.360
	(0.079)	(0.109)	(0.152)	(0.088)	(0.117)	(0.505)	(0.404)	(0.278)	(0.260)	(0.498)
Δ HPI	0.000	-0.013	-0.019	0.032***	0.022	0.119**	0.167***	0.027	-0.040**	0.081**
	(0.016)	(0.017)	(0.032)	(0.008)	(0.015)	(0.048)	(0.038)	(0.020)	(0.020)	(0.033)
Log Employment	-0.003***	-0.002	-0.002	0.001	-0.006***	-0.004	0.005	-0.015***	-0.006**	-0.012**
	(0.001)	(0.002)	(0.003)	(0.001)	(0.002)	(0.005)	(0.005)	(0.003)	(0.002)	(0.006)
Share Exposed	-0.023	-0.049*	-0.033	-0.110***	0.002	-0.596***	-0.412***	-0.043	-0.079*	-0.521***
	(0.019)	(0.026)	(0.043)	(0.019)	(0.028)	(0.106)	(0.089)	(0.057)	(0.041)	(0.099)
Log Income	-0.005	-0.006	-0.002	-0.023***	-0.001	0.010	0.039***	-0.008	0.024***	-0.024
	(0.003)	(0.006)	(0.005)	(0.005)	(0.004)	(0.017)	(0.013)	(0.009)	(0.008)	(0.018)
Log Debt +1	0.002***	0.024***	0.017***	0.013***	0.011***	-0.204***	-0.017***	-0.008***	-0.093***	-0.106***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)
$\Delta_{91,99}$ HMDA Loan Origination	-0.004***	-0.008***	-0.004**	-0.002*	-0.001	0.009*	0.003	-0.005	-0.002	0.009
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.005)	(0.004)	(0.004)	(0.003)	(0.007)
$\Delta_{91,99}$ CH Import Penetration	0.015	-0.143	-0.285	0.066	-0.010	0.557	0.739	0.351	-0.182	0.634
	(0.168)	(0.292)	(0.293)	(0.189)	(0.312)	(0.793)	(0.890)	(0.740)	(0.435)	(1.183)
Risk Bins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age Bins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,057,918	2,998,825	3,529,640	1,375,562	2,414,223	4,125,283	1,607,372	843,714	2,981,706	1,586,362
R-Squared						0.117	0.042	0.011	0.034	0.024
Psuedo R-Squared	0.016	0.087	0.035	0.034	0.018					
# of 1s	2,813,595	949,266	1,097,640	624,271	811,542					

Note: This table presents cross-sectional regressions of debt growth from 2000Q4 to 2007Q4 on shipping costs, at the individual level. For extensive margin analysis (Panel A), logistic regressions are run for individuals starting with zero debt of a certain type in 2000Q4, with our dependent variable an indicator for having a positive debt balance (within type) in 2007Q4, so that this panel analyzes individuals entering a new debt market. Logit marginal coefficients are reported. For intensive margin analysis, changes in debt are calculated as changes in log debt from 2000Q4 to 2007Q4, without adding 1 to zero balances, so that individuals with zero balances in at least one of these two periods are excluded from this regression specification. The coefficient of interest estimates differential exposure to import competition, as proxied by shipping costs. Individual level data comes from the FRBNY CCP/Equifax Data, while shipping costs, along with employment and share exposed controls, are measured at the commuting zone level. Changes in house prices are from the most granular index available from CoreLogic. In some regressions, controls for individual age and credit score in 1999 are replaced by quantile indicators variables for 5 percentile bins. Census controls are zip code-level variables for the vacancy rate, percent white, percent black, share with education <high school, share with high school diploma only, unemployment rate, poverty rate, and percent urban, all drawn from the 2000 census. Standard errors are clustered at the commuting zone level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 9
Individual-level Analysis using the PSID

	Panel A: change 1999-2007							
	Unemployed (2007)		ΔLog(labor inc.+1)		ΔLog(debt+1)		ΔDTI	
Shipping costs	−0.549*	−0.517	9.748***	10.529***	−10.871**	−13.237**	−7.095**	−8.712**
	(0.318)	(0.392)	(2.814)	(3.290)	(5.049)	(6.080)	(2.798)	(3.514)
Individual level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	No	Yes	No	Yes	No	Yes
Observations	719	719	719	719	719	719	719	719
R^2	0.041	0.081	0.202	0.239	0.291	0.329	0.121	0.160
	Panel B: split of ΔDTI							
	Total debt		Mortgage		Credit card		Auto	
Shipping costs	−7.095**	−8.712**	−6.632**	−7.421**	−2.468***	−2.930***	0.270	0.216
	(2.798)	(3.514)	(2.712)	(3.584)	(0.830)	(1.030)	(0.198)	(0.243)
Individual level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	No	Yes	No	Yes	No	Yes
Observations	719	719	642	642	680	680	602	602
R^2	0.121	0.160	0.131	0.182	0.059	0.100	0.046	0.100
	Panel C: IV regressions							
	ΔLog(debt+1)				ΔDTI			
	OLS	OLS	IV		OLS	OLS	IV	
Shipping costs	−13.237**				−8.712**			
	(6.080)				(3.514)			
ΔLog(labor inc.+1)		0.194***				−0.008		
		(0.018)				(0.005)		
ΔLog(labor inc.+1) (instrumented)			−1.614*				−0.214**	
			(0.858)				(0.104)	
Individual level controls	Yes	Yes	Yes		Yes	Yes	Yes	
State FE	Yes	Yes	Yes		Yes	Yes	Yes	
Observations	719	719	719		719	719	719	
R^2	0.329	0.331			0.160	0.231		

Note: This table presents cross-sectional regressions of unemployment, income and debt growth on shipping costs, at the individual level. Individual-level exposure to shipping costs is measured using the industry where the individual is active in 1999. Controls are drawn from PSID and include race, education, gender marital status dummies, age, labor income, total debt value, debt-to-income ratio and the number of family members measured in 1999. Robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 10
Import Competition and Home Equity Extraction, Individual level

	Extract Flag			Extract Value		
		Housing supply elasticity			Housing supply elasticity	
	All	Low	High	All	Low	High
Shipping Costs	-0.457***	-1.511***	0.076	-6.422***	-24.760***	-1.807
	(0.147)	(0.363)	(0.361)	(1.709)	(5.217)	(4.166)
Δ HPI	0.060***	0.035	0.054***	0.864***	0.470	0.736***
	(0.012)	(0.024)	(0.014)	(0.151)	(0.282)	(0.167)
Log Employment	0.002	-0.006	0.001	0.040	-0.056	0.008
	(0.002)	(0.004)	(0.003)	(0.027)	(0.054)	(0.034)
Share Exposed	-0.103***	-0.354***	-0.057	-1.557***	-4.758***	-1.299**
	(0.032)	(0.051)	(0.042)	(0.396)	(0.684)	(0.514)
Log Income	0.033***	0.019***	0.034***	0.584***	0.401***	0.568***
	(0.005)	(0.006)	(0.005)	(0.054)	(0.077)	(0.052)
Log Debt +1	0.021***	0.021***	0.022***	0.237***	0.248***	0.236***
	(0.000)	(0.001)	(0.000)	(0.004)	(0.010)	(0.006)
$\Delta_{91,99}$ HMDA Loan Origination	-0.005***	0.014	-0.008*	-0.029*	0.274	-0.063
	(0.002)	(0.021)	(0.004)	(0.018)	(0.274)	(0.044)
$\Delta_{91,99}$ CH Import Penetration	0.431	1.603***	-0.154	6.773	20.716**	-1.119
	(0.333)	(0.620)	(0.919)	(4.175)	(7.652)	(10.011)
Risk Bins	Yes	Yes	Yes	Yes	Yes	Yes
Age Bins	Yes	Yes	Yes	Yes	Yes	Yes
Census	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,069,768	1,036,888	1,211,557	3,069,768	1,036,888	1,211,557
R-Squared				0.070	0.051	0.072
Pseudo R-Squared	0.044	0.032	0.047			
# of 1s	1,468,027	548,927	563,168			

Note: This table presents cross-sectional regressions of proxies for home equity extraction from 2000Q4 to 2007Q4 on shipping costs, at the individual level. Equity extraction in a given year is identified as in Bhutta and Keys 2016, with an extract flag defined as an indicator for equity extraction in at least one calendar year from between 2001 and 2007, inclusive. This indicator is used as the dependent variable in a logistic regression, while the log translated *value* extracted is used as the dependent variable in an OLS specification. Marginal effects are reported in logit specifications. Regressions are performed using the entire sample, and separately for areas with low (that is, below median) and high (above median) housing supply elasticity. The elasticity of housing supply is obtained from Saiz (2010). Individual level data comes from the FRBNY CCP/Equifax Data, while shipping costs, along with employment and share exposed controls, are measured at the commuting zone level. Changes in house prices are from the most granular index available from CoreLogic. In some regressions, controls for individual age and credit score in 1999 are replaced by quantile indicators variables for 5 percentile bins. Census controls are zip code-level variables for the vacancy rate, percent white, percent black, share with education <high school, share with high school diploma only, unemployment rate, poverty rate, and percent urban, all drawn from the 2000 census. Standard errors are clustered at the commuting zone level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 11
Shipping Cost and Loan Applications (HMDA), Number of Loans, CZ Level

	$\Delta_{2000-07}$ Log Applications			
	Home Purchase		Refinancing	
	(1) Number (#)	(2) Value ($)	(3) Number (#)	(4) Value ($)
Shipping costs	-0.937	-0.574	-3.575***	-4.244***
	(0.993)	(1.013)	(1.023)	(1.080)
Denial rate	-0.082	-0.494**	-1.923***	-2.253***
	(0.234)	(0.215)	(0.240)	(0.257)
Log average applicant income	-0.368*	-0.442**	-0.743***	-0.888***
	(0.209)	(0.188)	(0.193)	(0.194)
Log average loan amount	0.169	0.064	0.226	0.302
	(0.236)	(0.209)	(0.268)	(0.211)
Log application volume	-0.226***	-0.075*	-0.301***	-0.208***
	(0.048)	(0.045)	(0.062)	(0.058)
CZ controls	Yes	Yes	Yes	Yes
Census controls	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop
Observations	733	733	733	733
R-squared	0.331	0.558	0.674	0.811

Note: This table presents cross-sectional regressions of growth in loan applications separately for refinancing loans and for other types of loans from 2000Q4 to 2007Q4 on shipping costs, at the commuting zone level. Growth in loan applications is measured as the log change in the number of loan applications. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share with education < high school, share with high school diploma only, unemployment rate, poverty rate, and percent urban, measured at the commuting zone level. Regressions are weighted by adult population in each CZ as of 2000. Robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 12
Import Competition, Delinquencies and Foreclosures

	Δ Credit Score		Bottom Credit Δ Decile		Mortgage Delinquency		Foreclosure	
	(1) 2000q4-2007	(2) 2007q4-2011	(3) 2000q4-2007	(4) 2007q4-2011	(5) 2001-2007	(6) 2008-2011	(7) 2001-2007	(8) 2008-2011
Shipping Costs	-17.177	26.247**	0.046	-0.112**	-0.023	-0.233***	-0.088***	-0.281***
	(12.914)	(10.416)	(0.038)	(0.052)	(0.052)	(0.079)	(0.031)	(0.074)
Δ HPI	8.477***	-7.282***	-0.013***	0.027***	-0.022**	0.007	-0.012***	0.006
	(1.304)	(0.982)	(0.003)	(0.004)	(0.009)	(0.008)	(0.003)	(0.005)
Log Employment	0.066	-0.419***	0.001**	0.002***	0.002**	0.002*	0.001***	0.001*
	(0.156)	(0.122)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
Share Exposed	-4.289*	7.128***	0.008	-0.033***	-0.009	-0.069***	0.001	-0.055***
	(2.246)	(1.719)	(0.006)	(0.010)	(0.014)	(0.019)	(0.006)	(0.016)
Log Income	-0.768	-2.052***	0.000	0.010***	0.010***	0.013***	0.001	0.008***
	(0.499)	(0.380)	(0.001)	(0.002)	(0.003)	(0.003)	(0.001)	(0.002)
Log Debt +1	1.607***	-0.488***	-0.003***	0.002***	0.017***	0.009***	0.003***	0.002***
	(0.053)	(0.047)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$\Delta_{91,99}$ HMDA Loan Origination	0.320**	-0.204*	-0.001*	0.001	-0.004***	-0.002**	-0.002***	-0.002**
	(0.154)	(0.119)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
$\Delta_{91,99}$ CH Import Penetration	-60.973***	-26.101	0.231***	0.248*	0.019	0.176	0.023	0.006
	(23.331)	(20.501)	(0.082)	(0.127)	(0.167)	(0.215)	(0.059)	(0.158)
Risk Bins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age Bins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,919,039	4,661,428	4,919,039	4,661,428	4,919,039	4,661,428	4,919,039	4,661,428
R-squared	0.059	0.018						
Pseudo R-squared			0.036	0.040	0.135	0.098	0.127	0.096

Note: This table analyzes mortgage delinquencies and foreclosures at the individual level. Logistic regressions are performed using indicators for these bad outcomes having occurred between 2001Q1 and 2008Q4, or between 2001Q1 and 2011Q4, both inclusive. The analysis is restricted to individuals appearing in Equifax in 2000Q4, 2007Q4, and the relevant end period (either 2008Q4 or 2011Q4) for a given regression. Individual level data comes from the FRBNY CCP/Equifax Data, while shipping costs, along with employment and share exposed controls, are measured at the commuting zone level. Changes in house prices are from the most granular index available from CoreLogic. In some regressions, controls for individual age and credit score in 1999 are replaced by quantile indicators variables for 5 percentile bins. Census controls are zip code-level variables for the vacancy rate, percent white, percent black, share with education <high school, share with high school diploma only, unemployment rate, poverty rate, and percent urban, all coming from the 2000 census. Standard errors are clustered at the commuting zone level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 13

Import Competition, Delinquencies and Foreclosures, Low versus High Housing Supply Elasticities

	Δ Credit Score		Bottom Credit Δ Decile		Mortgage Delinquency		Foreclosure	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Housing supply elasticity	Low	High	Low	High	Low	High	Low	High
Shipping Costs	187.029***	31.983	-0.792***	-0.154	-0.556***	-0.292	-0.704***	-0.288**
	(31.552)	(30.100)	(0.152)	(0.131)	(0.194)	(0.200)	(0.203)	(0.130)
Δ HPI	-5.795***	-3.733***	0.023***	0.012**	0.019*	-0.003	0.009	0.001
	(1.482)	(1.164)	(0.006)	(0.005)	(0.010)	(0.007)	(0.006)	(0.004)
Log Employment	-0.518	0.350	0.002	-0.001	0.000	-0.000	0.001	0.002*
	(0.476)	(0.233)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)
Share Exposed	14.500***	12.644***	-0.073***	-0.043**	-0.096***	-0.093***	-0.089***	-0.042**
	(4.498)	(3.371)	(0.021)	(0.019)	(0.018)	(0.026)	(0.023)	(0.016)
Log Income	-1.604**	-1.278***	0.008***	0.005**	0.018***	0.011***	0.008***	0.007***
	(0.622)	(0.431)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)
Log Debt +1	-0.752***	-0.421***	0.002***	0.001***	0.010***	0.009***	0.003***	0.002***
	(0.086)	(0.050)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$\Delta_{91,99}$ HMDA Loan Origination	0.731	-0.290	-0.003	0.001	0.003	-0.000	0.006	-0.000
	(2.605)	(0.331)	(0.010)	(0.001)	(0.011)	(0.002)	(0.006)	(0.001)
$\Delta_{91,99}$ CH Import Penetration	-144.532*	76.105	0.882***	-0.203	0.947***	-0.520	0.552**	-0.126
	(76.676)	(68.364)	(0.282)	(0.272)	(0.224)	(0.443)	(0.219)	(0.277)
Risk Bins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age Bins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,595,061	1,749,317	1,595,061	1,749,317	1,595,061	1,749,317	1,595,061	1,749,317
R-squared	0.016	0.019						
Pseudo R-squared			0.042	0.038	0.094	0.101	0.086	0.098
# of 1s			187,945	182,166	204,451	238,785	79,161	80,820

Note: This table analyzes mortgage delinquencies and foreclosures at the individual level. Logistic regressions are performed using indicators for these bad outcomes having occurred between 2001Q1 and 2008Q4, or between 2001Q1 and 2011Q4, both inclusive. Logit specifications report marginal effects. The analysis is restricted to individuals appearing in Equifax in 2000Q4, 2007Q4, and the relevant end period (either 2008Q4 or 2011Q4) for a given regression. Individual level data comes from the FRBNY CCP/Equifax Data, while shipping costs, along with employment and share exposed controls, are measured at the commuting zone level. Changes in house prices are from the most granular index available from CoreLogic. The elasticity of housing supply is obtained from Saiz (2010). In some regressions, controls for individual age and credit score in 1999 are replaced by quantile indicators variables for 5 percentile bins. Census controls are zip code-level variables for the vacancy rate, percent white, percent black, share with education <high school, share with high school diploma only, unemployment rate, poverty rate, and percent urban, all coming from the 2000 census. Standard errors are clustered at the commuting zone level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.