Import Competition and Household Debt[†]

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

April 2018

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 to study households use of credit markets in response to income shocks. We show that household debt increases 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. Using data on individual expectations, we find that households in affected areas underestimate the persistence of income shock and lever up in order to smooth consumption. Our results highlight the role played by mortgage markets in absorbing displacement shocks triggered by globalization.

[†]Jean-Noël Barrot is with MIT Sloan School of Management. Contact: jnbarrot@mit.edu. Erik Loualiche is with University of Minnesota, Carlson School of Management. Contact: eloualic@umn.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, Andreas Fuster, 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, National Bank of Belgium, CREST, Tilburg, Rotterdam, EIEF, Geneve, Luxembourg School of Finance, 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, AFA, Georgia State University, University of Pittsburgh, Federal Reserve Bank of Cleveland, Federal Reserve Bank of Minneapolis and our discussants, Manual Adelino, Asaf Bernstein, Emily Breza, Jim Goldman, John Krainer, Matthew Notowidigdo, Amiyatosh Purnanadam, Richard Stanton, Tarun Ramadorai, Benjamin Keys and Jialan Wang for their valuable suggestions. We thank Jacob Conway and Michael Holcomb 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 events 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 occurrences are linked, namely that the adverse 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 which resulted in significant distributional consequences in the ensuing recession. 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 growth in total household debt across regions with high and low exposure to import competition from 2000 to 2007, relative to their 2000 level. 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. This correlation suggests a link between regional exposure to import penetration and the boom, and subsequent bust, in 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 the historical industry composition of employment at the commuting zone (CZ) level. To measure an industry exposure to import competition, we build on prior work (Bernard et al., 2006b; Barrot et al., 2017) 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. 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 find SC strongly predict an increase in import penetration and its adverse effects for U.S. output and employment: exposed CZs experience a large and significant drop in domestic output and value added, as well as higher unemployment and lower income growth from 2000 to 2007.

[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.

We then test whether CZ exposure to low SC industries causes an increase in household leverage. We find that a one standard deviation decrease in SC is associated with a 6 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 different types of debt: most of the effect is driven by mortgage debt, the largest category of household borrowing.

Using the detailed data from the CCP, we zoom-in on individuals 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 growing 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 outcomes, we link variations in import penetration and debt directly at the level of each individual's industry of occupation, 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 verify that our results are robust to using alternative measures of industry exposure to Chinese competition provided in the literature and alternative methods of computing shipping costs. Last, we find that household debt responds less to import competition in States with higher levels of unemployment insurance – consistent with income as the channel through which import competition spurs borrowing.

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 smooth consumption using debt when income shocks are transitory (Friedman, 1957). Yet the displacement of U.S. manufacturing jobs induced by Chinese im-

port 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.[3] 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. In summary, the evidence suggests that U.S. households attempted to smooth the adverse consequences of import competition using mortgage debt.

Our findings 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.[4] 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).

Furthermore, the 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. The 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

[3] 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.

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

(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 effects of globalization (see Goldberg and Pavcnik (2007) for a review), and its impact on inequality (Helpman et al., 2010; Antras et al., 2017).

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[5] and demand.[6] We consider the other direction of the relationship, namely, how households use their balance sheet to insure against labor income shocks. In doing so, 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). Finally, our finding that household debt responds more to import competition in areas with low unemployment insurance speak to prior empirical work on the welfare benefits of unemployment insurance for smoothing consumption (Gruber, 1997; Browning and Crossley, 2001) and mitigating losses on housing markets (Hsu et al., 2018). A few studies have estimated the credit card debt response to income shocks,[7] or automobile debt.[8] 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.

2 Data and Empirical Strategy

In the first part of this section, we present the household debt data. In the second part, we describe the construction of our measure of exposure to import competition.

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

[6] See for instance Mondragon (2014) Ganong and Noel (2017), Donaldson et al. (Forthcoming), Cohen-Cole et al. (2016), Bos et al. (Forthcoming), or Bernstein (2016).

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

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

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, available from the first quarter of 1999.[9] 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.[10] The CCP also includes information on the status of the loan as delinquent, or in a foreclosure process.

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, namely the vacancy rate, percent white, percent black, share of the population without high school education, share with high school diploma only, unemployment rate, poverty rate, and percent urban. 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. We get around this issue by borrowing 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.

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. For each individual application, HMDA collects the location, the loan amount (but not the interest rate), the loan type (refinancing or home purchase), the applicant's income and whether the loan was ultimately approved or denied by the lender. In the analysis presented below, we aggregate HMDA data at the Commuting Zonel (CZ) level according to the location of the purchased property. We thus observe in each year from 1991 to 2007 the number (as well as the total value) of applications, originations, and share of denied applications, separately for both refinancing and home purchase loans. Given that the CCP is available only from 1999, we also use HMDA to measure the long-run change in household debt before 1999, in order to control for prior trends in our specification presented below.

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

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

Another limitation of the CCP is that we cannot directly tie an individual's leverage decisions and its labor market outcomes. To do so, we use the Panel Study of Income Dynamics (PSID), which allows us to estimate the elasticity of debt to import penetration at the level of 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 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 detail our procedure to aggregate shipping costs at the commuting zone level in order to measure regional labor market exposure to import competition. 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. Finally, we discuss 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., 2017) 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 the U.S. Census through 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.[11] According to Hummels (2007), SC essentially depend 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.[12]

We verify that SC are widely dispersed across industries, that they are persistent and

[11] 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. (2015).

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

that they are indeed related to trade flows. We find substantial heterogeneity in SC across industries. In our industry sample that covers 379 unique manufacturing industries (at the 6-digit NAICS industry level), we find SC measured in 1998 to be 4.2% of the price of shipments on average, with a 1^{st} percentile of 0.6% and a 99^{th} percentile of 20%.[13] This distribution is stable over time, with an average SC in 2007 of 4.8% of the price of shipments, a 1^{st} percentile of 0.4% and a 99^{th} percentile of 17%. To check whether SC are indeed strongly persistent, we estimate the following OLS regression over the 379 6-digit NAICS industries indexed by i : $\text{SC}_{i,2007} = \beta \text{SC}_{i,1998} + u_i$, and obtain $\hat{\beta} = 0.91$ and $R^2 = 0.62$.

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)). Theoretically, 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 translates into larger impact of foreign productivity shocks on local output.[14]

We verify 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.[15] 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

[13] The distribution of SC across 3-digit NAICS codes industries is presented in Appendix Table A.1.

[14] This same logic applies to a reduction in tariffs for a particular country.

[15] Countries are classified as low income using the World Bank definition in 1989. They are: Afghanistan, Albania, Angola, Armenia, Azerbaijan, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Burma, Cambodia, Central African Republic, Chad, China, Comoros, Republic of the Congo, Equatorial Guinea, Eritrea, Ethiopia, The Gambia, Georgia, Ghana, Guinea, Guinea-Bissau, Guyana, Haiti, India, Kenya, Laos, Lesotho, Madagascar, Maldives, Mali, Malawi, Mauritania, Moldova, Mozambique, Nepal, Niger, Pakistan, Rwanda, Saint Vincent and the Grenadines, Samoa, Sao Tome and Principe, Sierra Leone, Somalia, Sri Lanka, Sudan, Togo, Uganda, Vietnam, and Yemen.

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.[16]

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, for each SC tertile, the cumulative change in Chinese import and net import penetration, defined as imports or net imports scaled by U.S. total expenditures measured as output (domestic shipments) plus net imports. We present the time series in Figure 4. Between 2000 and 2007, Chinese import penetration increased by 5, 3.5 and 2 percentage points in low SC, medium SC and high SC industries, respectively. This confirms that SC are indeed a good proxy for industry exposure to the surge in Chinese exports to the U.S.

Commuting zone exposure — Throughout the paper, we consider Commuting Zones (CZs) as the geographical unit of analysis. Developed by Tolbert and Sizer (1996) using county-level commuting data from the 1990 Census data, CZs are clusters of counties that are characterized by strong within-cluster and weak between-cluster commuting ties and therefore represent local labor markets. They cover the entire land area of the U.S.

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 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 5.0%, with a median of 4.4% and a standard deviation

[16] 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.

of 2.3%.

Shipping costs and import competition — Next we ensure SC are indeed a good proxy for CZ exposure to import competition, even after controlling for sector-level characteristics. In Table 2, we consider the change in imports from China, and net imports from China (defined as imports from China minus exports to China), scaled by U.S. total expenditures measured as output (domestic shipments) plus net imports, between 2000 and 2007. We compute imports and exports using U.S. data obtained from Peter Schott's website, and shipments using the NBER-CES Manufacturing Industry Database. We aggregate imports, and net imports at the CZ level as we do for SC.

We perform the following cross-sectional regression at the CZ level:

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

where Y_J is the 2000-07 change in Chinese imports, exports and net imports and $\mathbf{X}_J$ a vector of controls measured at the commuting zone level including total employment,[17] the share of manufacturing employment, total income, total debt, house price appreciation between 2000 and 2007,[18] the 1991-99 change in loan originations and the 1991-99 change in the dependent variable. Regressions are weighted by CZ adult population. The coefficient of interest, β, measures the effect of SC exposure on the outcome variable of interest. 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 leads to a 0.4 percentage point decrease in import penetration from China between 2000 and 2007 – which amounts to 16% of the cross-sectional standard deviation. The effects are similar when we consider net import penetration. These results 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.

If low SC areas are subject to greater import competition, one would expect their output to drop and their labor market outcomes to worsen over the period. In Appendix Table A.2, we consider the effect of SC on the 2000-2007 growth in output and value added, obtained from NBER-CES Manufacturing Industry Database and aggregated at the CZ level. We run the same cross-sectional specification as the one presented in Table 2. We find that a one standard deviation increase in SC is associated with a 0.7 and a 1.4 percentage point

[17] We draw employment information from the County Business Patterns (CBP).

[18] We obtain house price indices from CoreLogic. 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.

higher value added and output growth, respectively, which amounts to 30% and 50% of the cross-CZ standard deviations of these two variables. This confirms that the higher exposure to import competition in low SC areas leads to lower output growth.

We turn to employment and consider the effect of SC on a variety of labor market outcomes all measured at the CZ level. Using the same cross-sectional regression framework, we show in Panel A of Appendix Table A.3 that a one standard deviation increase in SC leads to a 7% increase in the number of unemployed, and to a 0.2 percentage point increase in the unemployment rate, or 28% and 16% of these variables' cross-sectional standard deviation, respectively.[19] Panel B of the same table considers the effect of exposure to import competition on average and median total household income growth.[20] Again, the effects are statistically significant and economically large: a one standard deviation increase in SC is associated with a 0.14 and 0.19 percentage point higher (annualized) average and median income growth, or 13.3% and 19.9% of the cross-CZ standard deviation of these variables. These findings are very much in line with the literature that has established the effect of Chinese import competition for local labor markets in the U.S. (Pierce and Schott, 2016; Autor et al., 2013, 2014; Acemoglu et al., 2016).

Identification — Our empirical strategy is akin to a difference-in-difference estimation where areas are differentially exposed to the surge in Chinese imports based on their historical industry composition. It rests on the identifying assumption that SC exposure only affects household debt's response through increased import competition. In particular, CZ-level exposure to high and low SC industries needs to be orthogonal to local demand shocks for imports or local productivity shocks. While the exclusion restriction cannot be formally tested here, we consider several identification threats.

A first identification threat is the fact that low productivity industries in the U.S. might have lower SC on average. Consider declining industries irrespective of their exposure to China's import competition: workers in these industries might be more likely to become unemployed, and could also take on more debt to sustain their consumption. Import penetration might also coincidentally 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.

[19] County level unemployment data is obtained from the Bureau of Labor Statistics (BLS) and aggregated at the CZ level

[20] 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.

Reassuringly, we check and find in column (3) of Appendix Table A.2 that SC is uncorrelated with productivity growth.

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 could also lead to higher import penetration in the most affected areas. If a negative aggregate shock in the U.S. was driving the results, however, we would observe imports increasing across all countries. The fact that we only see an increase in net imports from China over the period (see Figure 3), and that this coincides with the surge in Chinese productivity growth and its entry in WTO largely mitigates this concern.

3 Results

We now turn to our core analysis: the sensitivity of household debt growth to import competition. We first investigate the role of import competition for household debt growth in 2000-2007 at the commuting zone level. We then zoom-in to the individual level.

3.1 Household debt at the commuting zone level

We estimate a similar cross-sectional specification as (2.1) with measures of household debt growth as dependent variables:

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

We first consider the log change in total debt in Panel A of Table 3. Across specifications, the coefficients are highly statistically significant. They are only mildly affected by the introduction of controls. A one standard deviation increase in SC is associated with a 6 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 (DTI) ratios in Panel B. Here again, we find the coefficients to be statistically and economically significant, with a one standard deviation in SC explaining 31% of the cross-sectional variation in the change in DTI ratios. We find similar results in Appendix Table A.4

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. We will discuss the impact in terms of import competition when we consider a two-staged least squares specification in the next section.

We break down total debt in its various components. 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 4. 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, in particular HELOC, is more sensitive to SC exposure than other categories. We find that credit card debt also increases more in regions with higher exposure to trade (column (4)). Auto debt (column (5)) 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. (2017)). Households in areas with high exposure to import competition are unlikely to raise additional debt to fund new consumption. 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.

3.2 Instrumental variable specification

We can consider the sensitivity of debt to import competition by instrumenting for import penetration using our shipping cost measure.

We perform a formal instrumental variable (IV) analysis, where the 2000-2007 change in Chinese net imports is instrumented with SC. To be valid, this instrument needs to satisfy an inclusion and an exclusion restriction. The former requires that SC is a strong enough predictor of Chinese import penetration. We have shown in Table 2 that this is the case, and we check below that the F-test are above conventional levels. The latter requires that the

correlation between the instrument and the error term is zero. In other terms, SC should only affect household debt through its effect on Chinese import competition. This is the very same assumption we need for our reduced form analysis to properly identify variations in household debt caused by import penetration.

In Table 5, we run two-stage-least-squares (2SLS) regression analysis. Across specifications, F-tests are above levels recommended by Stock and Yogo (2005), which confirms that the inclusion restriction is indeed satisfied. The results indicate that an increase by one percentage point in Chinese net imports leads to a 15.5 percentage point higher household debt growth (column (3)). This confirms that the strong relationship we document between SC and household debt is directly tied to import competition.

3.3 Household debt at the individual level

Individual level analysis allows us to better control for demographics and risk profiles, as well as to identify the channels through which import penetration affects household debt.

3.3.1 Consumer credit panel

The CCP is instrumental to study of the link between import penetration and the rise in household leverage for several reasons. First, CZ level findings could be driven by migration; for instance, if individuals with higher debt systematically leave high SC areas. We can rule out this concern by running our tests at the individual level, thereby controlling for household movement. Second, CCP provides greater details on the source of the increase in debt which allows us to isolate equity extraction. 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. Fourth, the granularity of the CCP allows us to consider heterogeneity in households' response to import competition (see Section 4).

We merge the CCP with measures of import competition exposure using industry composition at the CZ level. We run the following cross-sectional OLS specification at the individual level:

$$\Delta D_{i,J} = \beta \ \mathrm{SC}_J + \delta' \mathbf{X}_J + \gamma' \mathbf{Z}_i + u_{i,J}, \tag{3.2}$$

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.[21] We restrict the sample to individuals who do not move from the CZ where they lived in 2000.[22] This ensures that our findings at the CZ level are not driven by migration patterns.

We present the results in Table 6. In Panel A, we consider the change in the log of total debt plus one.[23] 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 3 that local house prices are associated with higher debt growth.

The data allows us to separately look at the intensive and extensive margins. In Table 7, we separately analyze the effect of SC exposure on the propensity to take out a new loan at any point in time between 2000 and 2007 (Panel A), and on the 2000-2007 growth in the stock of existing debt (Panel B). We find that all of the effect is coming from the intensive margin: import competition affects the leverage of existing borrowers. One possible reason for this is that these borrowers might refinance there debt. We discuss this mechanism in more details below.

3.3.2 Panel Study of Income Dynamics

A limitation of the CCP is that we assign treatment to individuals based on their CZ rather than their industry of occupation. As a result, it is possible the effects we detect are unrelated to the labor outcomes in specific industries affected by import competition. 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. This allows us to analyze individuals based on their specific industry of employment rather than estimating their exposure using CZ level SC.

In Table 8, we consider the effect of SC based on individuals' self-reported industry in the PSID. In Panel A, we find results similar to the first part of our analysis, where employment and labor income drop while leverage increases for individuals more exposed to import competition. In Panel B, we decompose the effect across various types of debt.

[21] Some controls, for instance income, are defined at the zip code level. Formally they are included in $\mathbf{Z}_i$.
[22] In unreported regressions, we find very similar results when we include both movers and non-movers.
[23] So that it includes both growth at the intensive and at the extensive margin.

Most of the increase in debt is driven by mortgage debt and to a smaller extent credit card balances. Exposure to import competition leads to lower auto debt, consistent with the idea that this captures durable consumption. In Panel C, we instrument for the 2000-2007 change in Chinese net imports using SC and again find statistically significant and economically large results. Taken together, this findings highlight that the effect of import competition on leverage is tied to the actual industry occupation of individuals. They suggest that debt may be used to smooth the adverse labor market consequences of the surge in Chinese imports.

3.4 Home equity extraction

If households are levering in response to the increase in import competition, it is likely they would do so using the collateral value embedded in their homes. We thus explore the role of home equity in explaining the rise in household debt due to import competition. To do so, we follow Bhutta and Keys (2016) and construct a measure of home equity extraction using the CCP. 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 present the results in Table 9. We find there is more equity extraction in areas more exposed to import competition. The point estimates are large and 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.

As pointed out by Bhutta and Keys (2016) equity extraction is more likely to happen 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),[24] to see where equity extraction comes from. The relationship between SC and both the propensity to extract equity and the amount of home equity extracted is only statistically significant in areas with low housing supply elasticities, i.e., 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 loan-level database. We estimate the effect of CZ-level SC exposure on the change in applications separately for home purchase loans and refinancing loans, after controlling for a variety of average CZ-level loan characteristics including denial rates, application income, loan amounts and application volumes, in addition to the controls of our baseline specifications. We present our results in Table 11. Across specifications, we find that the demand for refinancing was higher in areas with higher exposure to import

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

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.5).

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.

3.5 Delinquencies, foreclosure and credit scores

We move on to the consequences of the credit expansion triggered by import competition. We investigate individual level outcomes throughout the run-up as well as after the crisis such as changes in credit scores, mortgage delinquencies, and foreclosure. In Table 10, 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)). Exposure to import competition had no effect on credit scores prior to the crisis, and a negative impact on individuals' credit score thereafter. Similarly, individuals in exposed areas experienced identical or marginally higher rates of mortgage delinquencies and foreclosures in 2000-2007, but significantly higher rates after that.

Again, we split the sample into areas with high versus low 2000-2007 house price appreciation instrumented with the elasticity of housing supply obtained from Saiz (2010). We estimate our specification on each subsample for the later period from 2008 to 2011. In Appendix Table A.6, 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.

3.6 Credit supply

One of our contribution is to show that part of the cross-regional variation in the growth of household debt originates from higher demand from households. We consider the hypothesis that SC might be capturing areas 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. Fortunately, 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.

We go one step further and investigate variations in outcomes that we expect to be driven by an increase in the supply of credit. We focus on the rate of denials in mortgage applications from HMDA in Appendix Table A.7. We find that denial rates for refinancing loans are higher in areas with greater exposure to import competition. This is consistent with the idea that demand for such loans increased in these areas more so than supply. 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 further pursue in this direction by gathering information on new housing from the Building Permit Survey (see Appendix Table A.8). 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 find no robust relationship between SC and house price growth between 2000 and 2007 (see Appendix Table A.8). Finally, 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.9). Overall, the evidence appears inconsistent with the idea that low SC areas experience a positive credit supply shock across all debt types.

That being said, the response of household debt we document certainly depends on the elasticity of credit supply. Earlier studies including Mian and Sufi (2009) and Mian and Sufi (2011) have pointed out the outward shift in the credit supply curve over this period. In periods with tighter credit markets, such a surge in household debt demand would lead to higher interest rates and the effect on the equilibrium level of household debt would likely be weaker.

3.7 Robustness

To further assess the robustness of our findings, we present alternative specifications in Appendix Table A.10. In Panel A, we consider different measures of exposure to import competition from the literature and their effects on household debt. We explore the effects of Chinese import penetration using respectively the NTR-gap from Pierce and Schott (2016), 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, 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.

In Panel B of Appendix Table A.10, we run several variations of our main specification. We start by adding the percentage of employment in routine occupations and the average offshorability index of occupations defined at the commuting zone level and available on David Dorn's website as additional controls (column (1)). We next introduce industry controls in our specification (column (2)), 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 (3)). 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 the computer industry from the computation of SC at the CZ level in column (4) and California from the sample in column (5). We then reestimate our baseline regression after including a dummy for coastal regions in column (6), and a dummy for California, Florida, Nevada and Arizona in column (7) (states in which the house price boom was large). In column (8), we add industry level tariffs to SC in our measure of exposure to import competition. In column (9), we weight regressions by the employment share of tradable industries - rather than by adult population. Results are robust across all these specifications.

To check that our results do not simply reflect differences across CZs in their sensitivity to the business cycle, 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. We show in Appendix Table A.11 that the coefficient on SC – although slightly weaker – remain statistically significant.

We also check whether and how business debt responds to import competition. In Table A.9 we find no effect of SC on the growth in small business loans based on Community Reinvestment Act (CRA) data. This is reassuring evidence that the increase in leverage is household specific. Relatedly, one could argue that part of the household debt is used by individuals to start new businesses. Using Quarterly Workforce Indicators (QWI) data, we also fail to find any relationship between SC and the employment share of start up businesses.

We finally 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.12, we separately run our baseline regression in the sample of CZs with high and low unemployment insurance. To do so, we use data on weekly 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 there is no difference in the effect of import competition on the growth of 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 interpretation of the 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 A. 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 under quadratic utility 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.

Note that this stylized expression of the PIH assumes households are not financially constrained. In the case where they are constrained, because they cannot borrow against future earnings, the PIH predicts no response in borrowing to income shocks. However, if they have valuable collateral to borrow against, for example equity in a home, then we would expect to see them utilize this channel. Our results on equity extraction (see Section 3.4 and Table 9) underscore the importance of collateral.

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 should be 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 6 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.

We also explore how deviation from rational expectations may affect our findings. Workers that are permanently excluded from the labor market may have anticipated a temporary shock. In other words even if the data generating process for income is persistent ($\rho \sim 1$), households might perceive it as if $\rho \ll 1$, and 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. Table 12 confirms that this holds in CZ-level cross-sectional regressions after including the full set of controls of our baseline specification.[25] Hence, households exposed

[25]HRS waves sample individuals located in 106 commuting zones. However, these 106 commuting zones

to import competition might be taking more debt because they expect the shock to be more transitory than it actually ended up being.[26]

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. Using expectations data, we find that households in affected areas underestimate the persistence of the shock and lever up in order to smooth consumption. Our results highlight the role played by mortgage markets in absorbing displacement shocks triggered by globalization.

cover 56 % of the U.S. total population.

[26] 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 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," Working Paper 21320, NBER 2016.

_ , _ , and _ , "Loan originations and defaults in the mortgage crisis: The role of the middle class," *Review of Financial Studies*, 2016, *29* (7), 1635–1670.

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, "Globalization, inequality and welfare," *Journal of International Economics*, 2017, *108*.

Arkolakis, Costas, Treb Allen, and Yuta Takahashi, "Universal Gravity," Working Paper 20787, NBER 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., David Dorn, 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?," Working Paper 22420, NBER 2016.

Barrot, Jean-Noël, Erik Loualiche, and Julien Sauvagnat, "The Globalization Risk Premium," 2017. Working Paper MIT Sloan.

Benmelech, Efraim, Nittai K Bergman, and Amit Seru, "Financing labor," Working Paper 17144, NBER 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. Working Paper University of Colorado.

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*, 2008, *98* (5), 1887–1921.

Bos, Marieke, Emily Breza, and Andres Liberman, "The Labor Market Impacts of Credit Market Information," *The Review of Financial Studies*, Forthcoming.

Browning, Martin and Thomas F. Crossley, "Unemployment Insurance Benefit Levels and Consumption Changes," *Journal of Public Economics*, 2001, *80* (1), 1–23.

Caliendo, Lorenzo and Fernando Parro, "Estimates of the Trade and Welfare Effects of NAFTA," *Review of Economic Studies*, 2015, *82* (1), 1–44.

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.

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," Working Paper 22846, NBER 2016. Mimeo.

Coibion, Olivier, Yuriy Gorodnichenko, Marianna Kudlyak, and John Mondragon, "Does greater inequality lead to more household borrowing? New evidence from household data," Working Paper 19850, NBER 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," *Journal of Finance*, Forthcoming.

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, "Consumer Spending During Unemployment: Positive and Normative Implications," 2017. Mimeo, University of Chicago.

Goldberg, Pinelopi Koujianou and Nina Pavcnik, "Distributional Effects of Globalization in Developing Countries," *Journal of Economic Literature*, 2007, *45* (1), 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, *117* (1), 149–185.

Gruber, Jonathan, "The Consumption Smoothing Benefits of Unemployment Insurance," *American Economic Review*, 1997, *87* (1), 192–205.

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.

Hsu, Joanne W., David A. Matsa, and Brian T. Melzer, "Unemployment Insurance as a Housing Market Stabilizer," *American Economic Review*, 2018, *108* (1), 49–81.

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*, 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," *The Review of Economics and Statistics*, 2015, *97* (4), 777–792.

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, Benjamin J. Keys, Tomasz Piskorski, Rodney Ramcharan, Amit Seru, and Vincent Yao, "Interest Rate Pass-Through: Mortgage Rates, Household Consumption, and Voluntary Deleveraging," *American Economic Review*, 2017, *107* (11), 3550–3588.

Mian, Atif and Amir Sufi, "The Consequences of Mortgage Credit Expansion: Evidence from the U.S. Mortgage Default Crisis," *The Quarterly Journal of Economics*, 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," 2014. Mimeo, Northwestern University.

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.

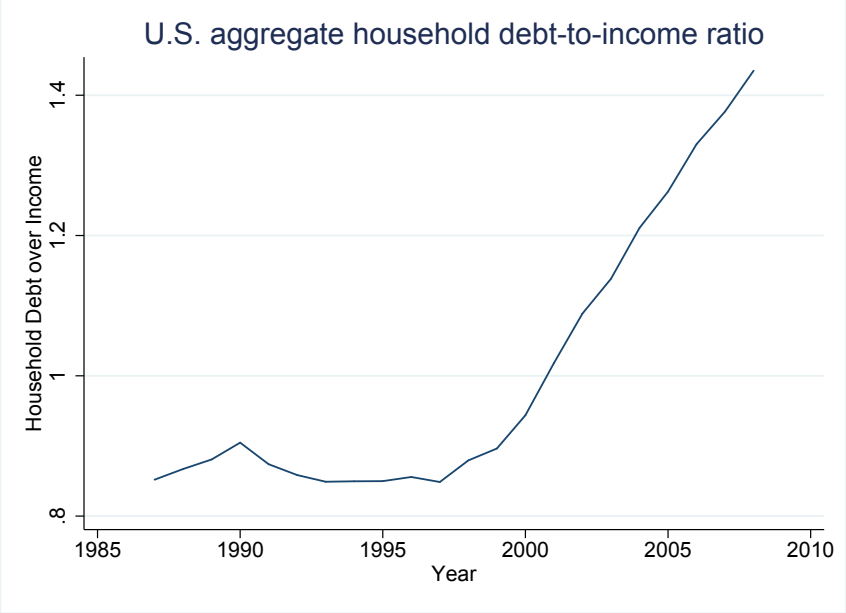
Stock, James and Motohiro Yogo, "Testing for Weak Instruments in Linear IV Regression," in Donald W.K. Andrews, ed., *Identification and Inference for Econometric Models*, New York: Cambridge University Press, 2005, pp. 80–108.

Tolbert, Charles M. and Molly Sizer, "US Commuting Zones and Labor Market Areas: A 1990 Update," 1996. Economic Research Service Staff Paper 9614.

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

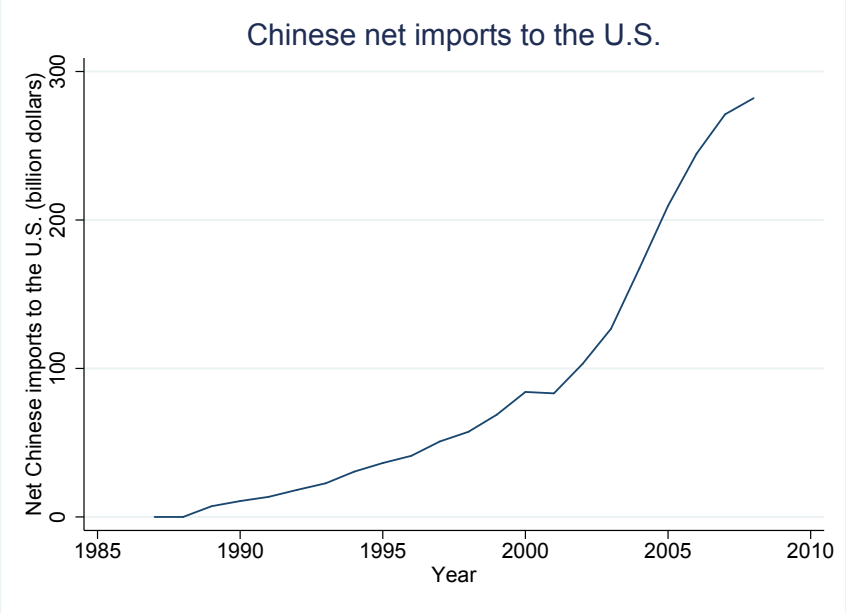


Figure 1

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).

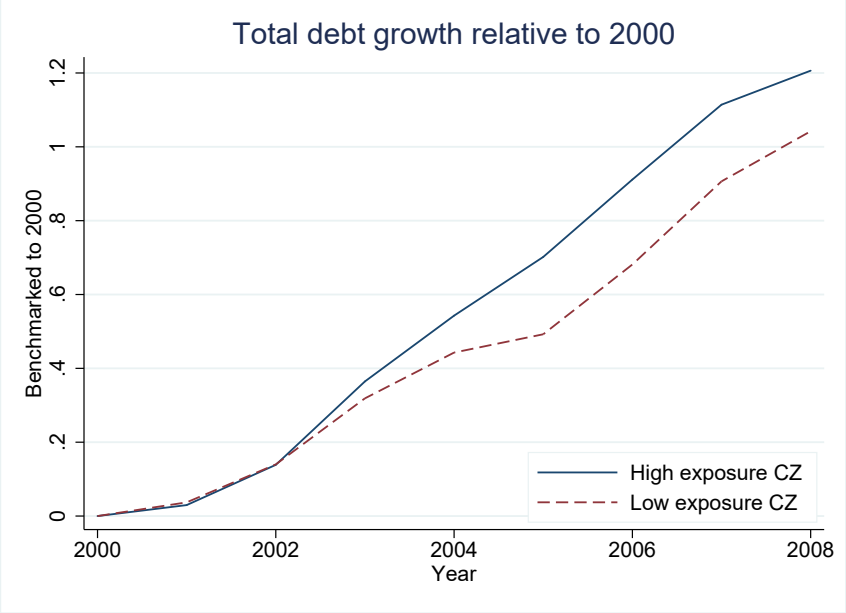
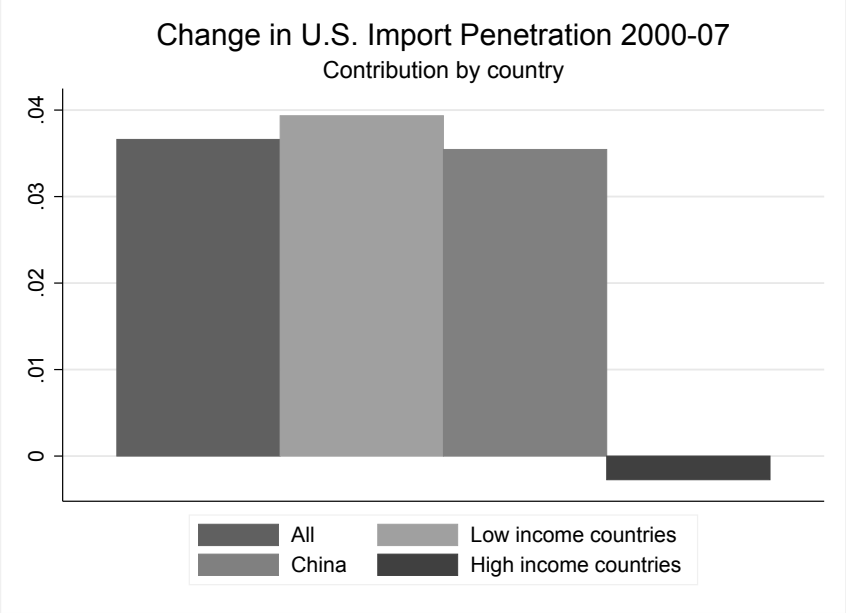


Figure 2

Household Debt Across High and Low Exposure Areas

Note: This figure presents the cumulative debt growth for Commuting Zones in the top (low exposure) and bottom (high exposure) quintiles of shipping costs measured in 1998. Information from the County Business Patterns datasets on the structure of employment across 6-digit NAICS industries by CZs is used to compute Shipping costs at the CZ level.

Panel A. Contribution to imports



Panel B. Contribution to net imports

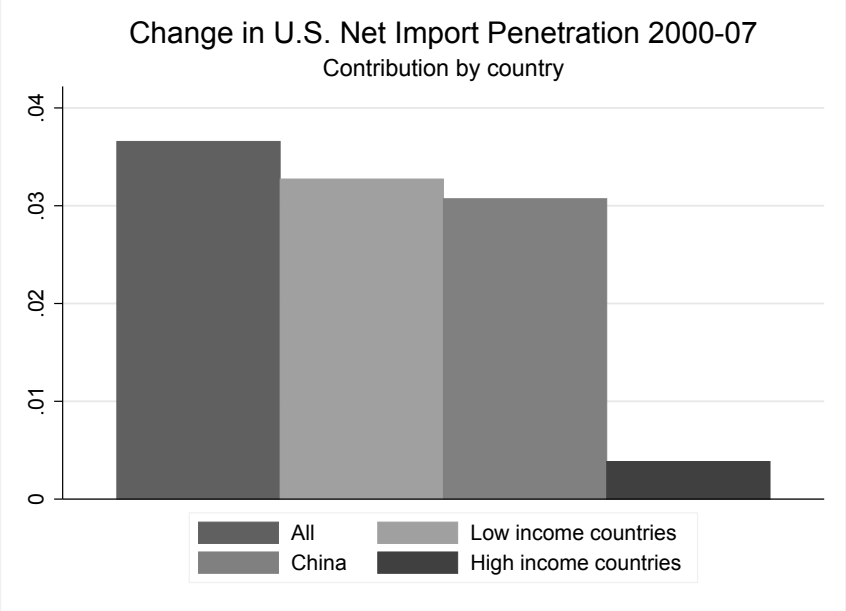
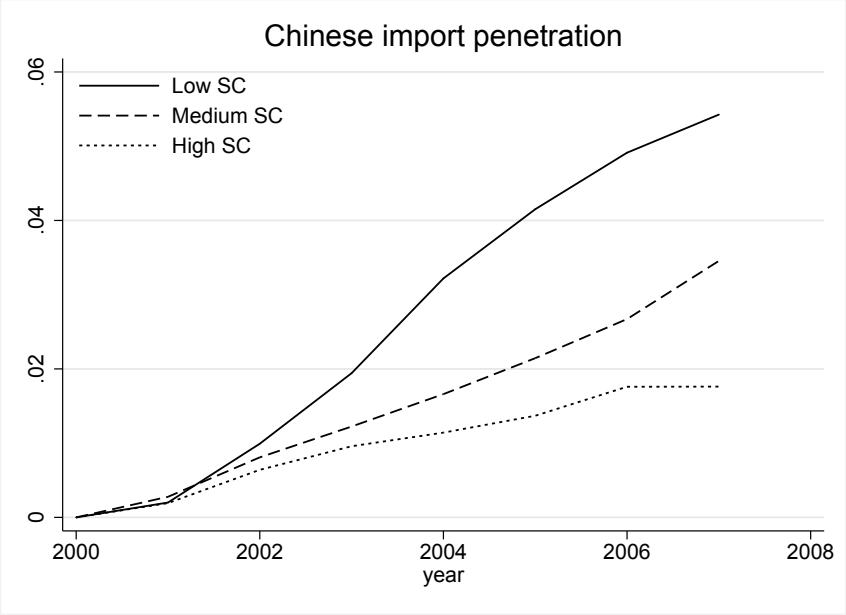


Figure 3
Contribution to U.S. Import and Net Import Penetration by Country

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. Cumulative change in Chinese import penetration



Panel B. Cumulative change in Chinese net import penetration

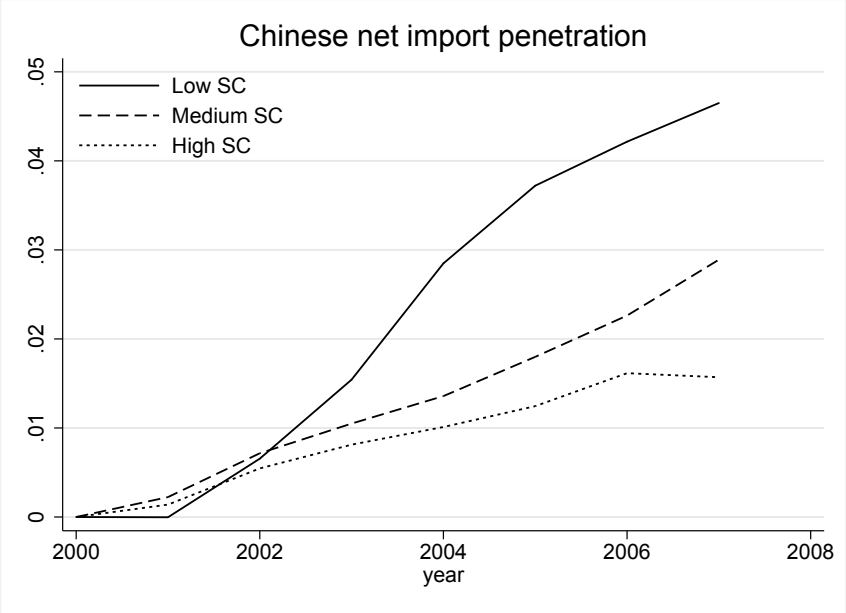


Figure 4
Change in Chine Import Penetration

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.

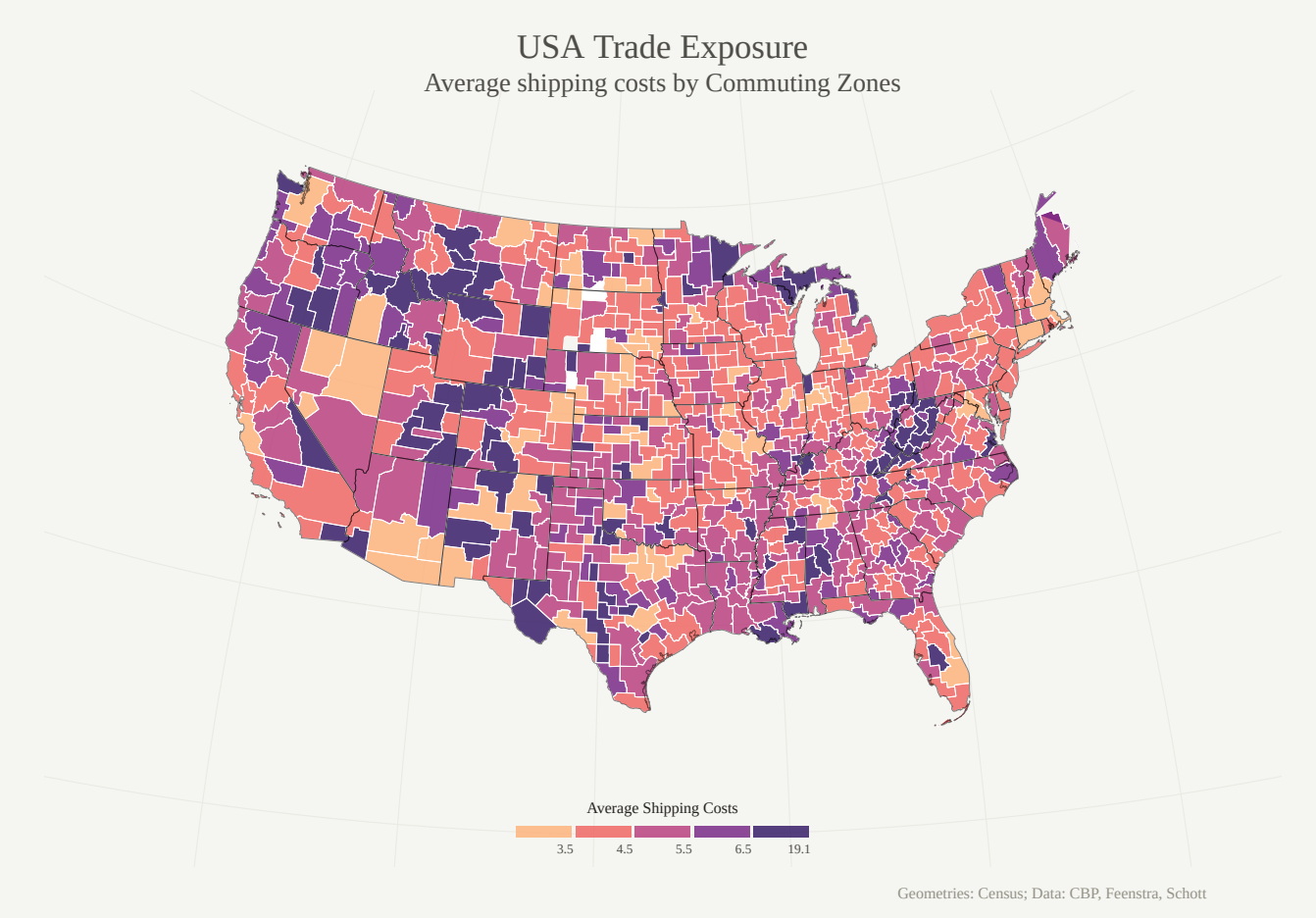
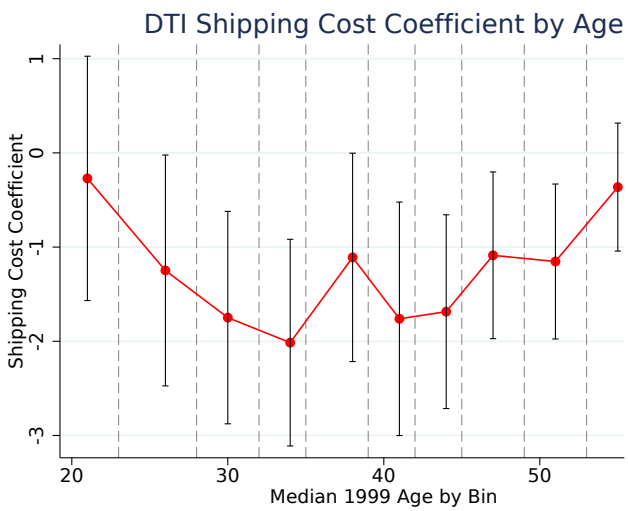


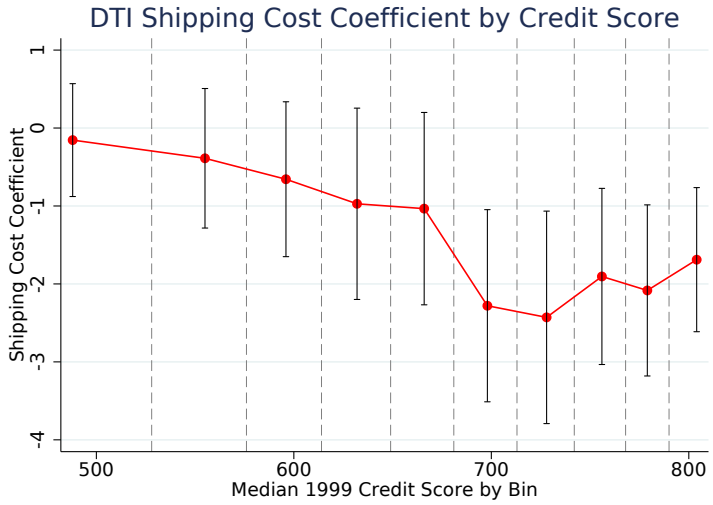
Figure 5

Average Shipping Costs by Commuting Zones

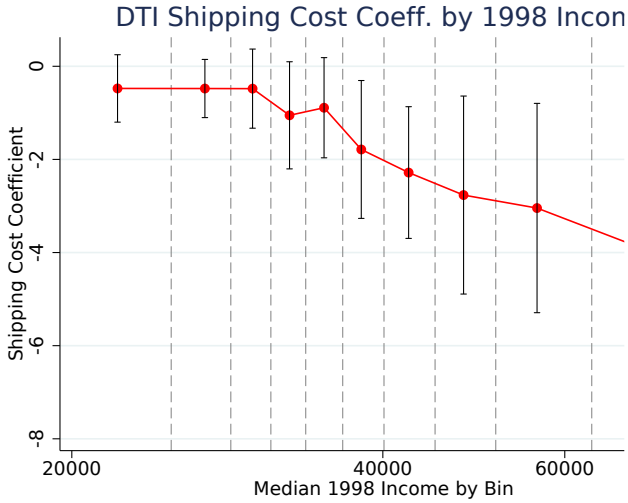
Note: This figure presents the distribution of shipping costs (%) across commuting zones measured in 1998. Information from the County Business Patterns datasets on the structure of employment across 6-digit NAICS industries by CZs is used to compute Shipping costs at the CZ level.



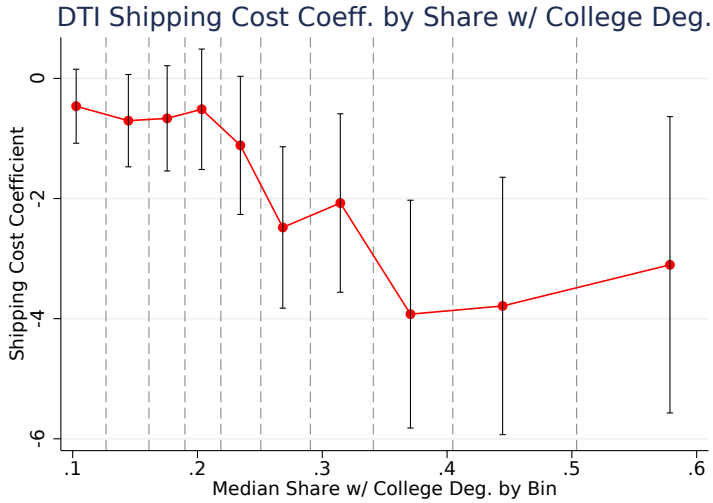
(a) DTI: SC coefficient by individual age



(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 6 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).

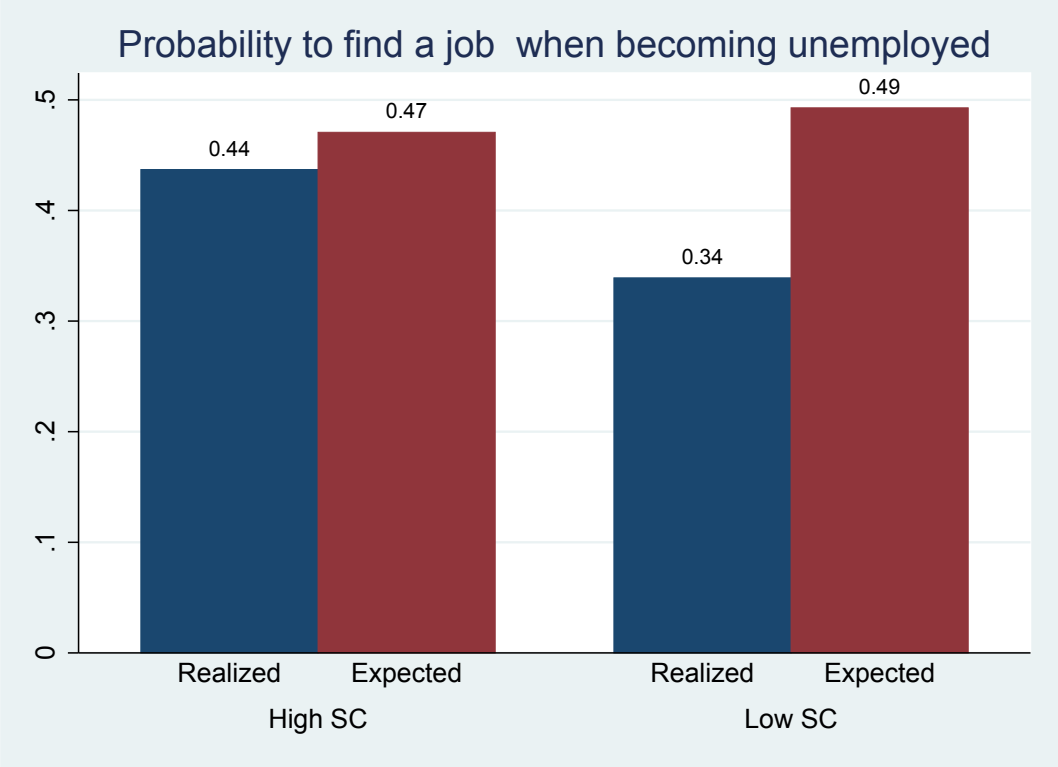


Figure 7

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. Information from the County Business Patterns datasets on the structure of employment across 6-digit NAICS industries by CZs is used to compute Shipping costs at the CZ level.

Tables

Table 1
Summary Statistics

	Observations	Mean	Median	Std. dev.
Panel A: CZ Level				
$\Delta_{00,07}$ CH Import Penetration	734	0.034	0.030	0.026
$\Delta_{00,07}$ Net CH Import Penetration	734	0.030	0.026	0.026
$\Delta_{91,99}$ CH Import Penetration	734	0.012	0.010	0.010
Shipping Costs	734	0.050	0.044	0.023
$\Delta_{00,07}$ log Debt	734	0.596	0.588	0.197
$\Delta_{00,07}$ DTI	734	0.413	0.376	0.324
$\Delta_{00,07}$ log All Mortgage	734	0.753	0.737	0.254
$\Delta_{00,07}$ log Credit Card Debt	734	0.279	0.292	0.164
$\Delta_{00,07}$ log HELOC	734	1.864	1.526	3.124
$\Delta_{00,07}$ log Auto Debt	734	0.552	0.551	0.203
$\Delta_{00,07}$ HPI	734	0.356	0.325	0.170
$\Delta_{91,99}$ Log Loan Origination	734	3.274	2.974	2.022
$\Delta_{00,07}$ Log Loan Applications (Home Purchase)	734	0.475	0.484	0.391
$\Delta_{00,07}$ Log Loan Applications (Refinancing)	734	1.160	1.122	0.432
Probability to exit unemployment (Expected, HRS)	106	0.50	0.49	0.14
Probability to exit unemployment (Realized, HRS)	106	0.39	0.40	0.30
Expectation error (HRS)	106	0.11	0.11	0.34
Panel B: Individual Level				
Δ_{00-07} Log(Debt+1)	5,128,389	0.222	0.275	4.122
Δ_{00-07} Log(Debt)	4,113,069	0.632	0.425	2.235
Δ_{00-07} DTI	4,752,698	0.713	0.015	3.159
Extract Flag_{00-07}	3,069,768	0.478	0.000	0.500
Extract Value_{00-07}	3,069,768	5.162	0.000	5.453
Δ_{00-07} Credit Score	4,919,039	20.584	21.000	80.961
Δ_{07-11} Credit Score	4,661,428	8.660	9.000	70.288
Mtg. Delinq._{00-07}	4,919,039	0.136	0.000	0.342
Mtg. Delinq._{07-11}	4,661,428	0.118	0.000	0.322
$\text{Foreclosure}_{00-07}$	4,919,039	0.031	0.000	0.174
$\text{Foreclosure}_{07-11}$	4,661,428	0.040	0.000	0.196
Shipping Costs	5,128,389	0.042	0.040	0.010

Note: This table presents summary statistics for the two samples used in this paper. Panel A presents statistics for 734 Commuting Zones (CZs) covering the U.S. territory. Information from the County Business Patterns datasets on the structure of employment across 6-digit NAICS industries by CZs is used to compute Shipping costs, and CH Import Penetration, at the CZ level. Information on Debt at the CZ level is based on the aggregation of individual data from FRBNY CCP/Equifax. Changes in house prices between 2000 and 2007 are from the most granular index available from CoreLogic. CH Import Penetration is defined as U.S. imports from China normalized by U.S. expenditures measured as domestic shipments plus net imports. $\Delta_{91,99}$ Log Loan Origination is the log change in the total dollar value of loan origination between 1991 and 1999, and $\Delta_{91,99}$ Log Loan Applications is the log change in the dollar value of loan applications between 2000 and 2007, separately for home purchase loans and refinancing loans, all constructed from HMDA data. The expected and realized probabilities of moving out of unemployment are drawn from the Health and Retirement Study (HRS), a longitudinal survey conducted every two years. "Expected" is the average perceived probability to find a job after becoming unemployed, computed across participants in the HRS waves of 2000, 2002 and 2004. "Realized" is 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. Panel B presents statistics for the individual-level sample obtained from the CCP. 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 between 2001 and 2007, inclusive.

Table 2
Shipping Costs and Chinese Import Penetration

	Δ_{00-07} CH Imp. Penetration			Δ_{00-07} Net CH Imp. Penetration		
Shipping Costs	-0.423***	-0.176***	-0.176***	-0.378***	-0.195***	-0.196***
	(0.093)	(0.054)	(0.054)	(0.077)	(0.054)	(0.054)
$\Delta_{00,07}$ HPI			0.005			0.008**
			(0.004)			(0.004)
Log Employment		-0.001	0.000		-0.007	-0.004
		(0.003)	(0.004)		(0.005)	(0.005)
Employment in Manufacturing (%)		0.026*	0.031**		0.030**	0.036***
		(0.015)	(0.015)		(0.012)	(0.012)
Log Income		-0.011	-0.010		-0.016	-0.015
		(0.012)	(0.012)		(0.010)	(0.010)
Log Debt		0.000	-0.001		0.007	0.005
		(0.004)	(0.004)		(0.005)	(0.005)
$\Delta_{91,99}$ Log Loan Origination		-0.001*	-0.001		-0.001	-0.001
		(0.001)	(0.001)		(0.001)	(0.001)
$\Delta_{91,99}$ CH Import Penetration		1.309***	1.291***			
		(0.136)	(0.135)			
$\Delta_{91,99}$ Net CH Import Penetration					1.073***	1.055***
					(0.117)	(0.112)
Census controls	No	Yes	Yes	No	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
Observations	734	734	734	734	734	734
R^2	0.086	0.537	0.539	0.076	0.490	0.497
Magnitude SC	-0.010	-0.004	-0.004	-0.009	-0.005	-0.005
% dep. var. cross-CZ s.d.	0.382	0.159	0.159	0.342	0.176	0.177

Note: This table presents cross-sectional regressions of the change in Chinese Import Penetration (and Net Chinese Import Penetration) between 2000 to 2007 on shipping costs, at the CZ level. Chinese Import Penetration is defined as U.S. imports from China, normalized by U.S. expenditures measured as domestic shipments plus net imports. Chinese Net Import Penetration is defined as U.S. imports from China minus U.S. exports to China, normalized by U.S. expenditures measured as domestic shipments plus net imports. Information from the County Business Patterns datasets on the structure of employment across 6-digit NAICS industries by CZs is used to compute Shipping costs and Import penetration at the CZ level, as well as Log Employment and the share of employment in Manufacturing at the CZ level. Log Income is drawn from IRS data. Log Debt is based on the aggregation of individual data from FRBNY CCP/Equifax. Changes in house prices between 2000 and 2007 are from the most granular index available from CoreLogic. $\Delta_{91,99}$ Log Loan Origination is the log change in the total dollar value of loan origination between 1991 and 1999, drawn from HMDA data. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share of the population without high school education, share with high school diploma only, unemployment rate, poverty rate, and percent urban, measured at the CZ level. Regressions are weighted by adult population in each CZ as of 2000. Magnitude SC is the effect of a one standard deviation increase in Shipping Costs on the dependent variable. 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 Household Debt Growth, CZ Level

	Panel A: $\Delta_{2000-07}$ Log Debt			Panel B: $\Delta_{2000-07}$ DTI		
Shipping Costs	-3.173***	-2.549***	-2.586***	-7.002***	-4.400***	-4.341***
	(0.751)	(0.629)	(0.607)	(1.883)	(1.320)	(1.317)
$\Delta_{00,07}$ HPI			0.307***			0.207**
			(0.045)			(0.095)
Log Employment		-0.248***	-0.162***		-0.050**	-0.047*
		(0.049)	(0.045)		(0.023)	(0.025)
Employment in Manufacturing (%)		-0.926***	-0.668***		-0.971***	-0.763**
		(0.157)	(0.145)		(0.318)	(0.315)
Log Income		0.068	0.089		0.412*	0.367
		(0.108)	(0.107)		(0.240)	(0.243)
Log Debt		0.231***	0.142***			
		(0.048)	(0.045)			
DTI					0.733***	0.690***
					(0.082)	(0.086)
$\Delta_{91,99}$ Log Loan Origination		0.004	0.011		0.001	0.006
		(0.008)	(0.008)		(0.019)	(0.020)
$\Delta_{91,99}$ CH Import Penetration		0.862	-0.141		0.577	-0.120
		(1.110)	(0.985)		(2.425)	(2.440)
Census controls	No	Yes	Yes	No	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
Observations	734	734	734	734	734	734
R^2	0.050	0.482	0.570	0.057	0.545	0.555
Magnitude SC	-0.074	-0.060	-0.061	-0.164	-0.103	-0.102
% dep. var. cross-CZ s.d.	0.377	0.303	0.307	0.505	0.318	0.313

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 (DTI) in Panel B. Information from the County Business Patterns datasets on the structure of employment across 6-digit NAICS industries by CZs is used to compute Shipping costs at the CZ level, as well as Log Employment and the share of employment in Manufacturing at the CZ level. Log Income is drawn from IRS data. Log Debt is based on the aggregation of individual data from FRBNY CCP/Equifax. Changes in house prices between 2000 and 2007 are from the most granular index available from CoreLogic. CH Import Penetration is defined as U.S. imports from China normalized by U.S. expenditures measured as domestic shipments plus net imports. $\Delta_{91,99}$ Log Loan Origination is the log change in the total dollar value of loan origination between 1991 and 1999, drawn from HMDA data. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share of the population without high school education, share with high school diploma only, unemployment rate, poverty rate, and percent urban, measured at the CZ level. Regressions are weighted by adult population in each CZ as of 2000. Magnitude SC is the effect of a one standard deviation increase in Shipping Costs on the dependent variable. Robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 4
Import Competition and Household Debt Growth by Debt Type, CZ Level

	$\Delta_{2000-07}$ Log debt				
	(1) All Mortgages	(2) Mortgage Loans	(3) HELOC	(4) Credit Card	(5) Auto
Shipping Costs	-3.115***	-3.163***	-7.866**	-1.506***	-0.450
	(0.666)	(0.661)	(3.090)	(0.523)	(0.647)
$\Delta_{00,07}$ HPI	0.358***	0.343***	0.343	-0.108**	0.239*
	(0.049)	(0.048)	(0.215)	(0.043)	(0.125)
Log Employment	-0.156***	-0.144***	-0.002	-0.124***	-0.036
	(0.050)	(0.048)	(0.190)	(0.028)	(0.054)
Employment in Manufacturing (%)	-0.764***	-0.762***	-2.803***	-0.417***	-0.447***
	(0.156)	(0.155)	(0.654)	(0.124)	(0.160)
Log Income	0.113	0.095	0.577	-0.092	-0.172
	(0.122)	(0.124)	(0.493)	(0.085)	(0.112)
Log Debt	0.128***	0.108**	-0.054	0.138***	0.011
	(0.049)	(0.048)	(0.198)	(0.029)	(0.065)
$\Delta_{91,99}$ Log Loan Origination	0.022***	0.022**	0.103***	0.002	-0.008
	(0.008)	(0.009)	(0.039)	(0.006)	(0.011)
$\Delta_{91,99}$ CH Import Penetration	-0.680	-1.161	1.031	0.363	0.060
	(1.102)	(1.086)	(4.672)	(0.762)	(1.164)
Census controls	Yes	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.
Observations	734	734	734	734	734
R^2	0.489	0.464	0.129	0.295	0.332
Magnitude SC	-0.073	-0.074	-0.184	-0.035	-0.011
% dep. var. cross-CZ s.d.	0.287	0.269	0.059	0.215	0.052

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, HELOC - home equity lines of credit -, credit card debt and auto debt). Information from the County Business Patterns datasets on the structure of employment across 6-digit NAICS industries by CZs is used to compute Shipping costs at the CZ level, as well as Log Employment and the share of employment in Manufacturing at the CZ level. Log Income is drawn from IRS data. Log Debt is based on the aggregation of individual data from FRBNY CCP/Equifax. Changes in house prices between 2000 and 2007 are from the most granular index available from CoreLogic. CH Import Penetration is defined as U.S. imports from China normalized by U.S. expenditures measured as domestic shipments plus net imports. $\Delta_{91,99}$ Log Loan Origination is the log change in the total dollar value of loan origination between 1991 and 1999, drawn from HMDA data. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share of the population without high school education, share with high school diploma only, unemployment rate, poverty rate, and percent urban, measured at the CZ level. Regressions are weighted by adult population in each CZ as of 2000. Magnitude SC is the effect of a one standard deviation increase in Shipping Costs on the dependent variable. 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, IV specifications

	Panel A: $\Delta_{2000-07}$ Log debt			Panel B: $\Delta_{2000-07}$ DTI		
$\Delta_{00,07}$ Net CH $\widehat{\text{Import}}$ Penetration	8.384***	15.322***	15.466***	18.499***	18.474*	18.485*
	(2.196)	(5.623)	(5.611)	(5.409)	(10.164)	(10.159)
$\Delta_{00,07}$ HPI			0.202***			0.015
			(0.070)			(0.122)
Log Employment		-0.235***	-0.178***		-0.776***	-0.771***
		(0.054)	(0.063)		(0.100)	(0.118)
Employment in Manufacturing (%)		-1.197***	-1.030***		-0.743	-0.730
		(0.280)	(0.284)		(0.503)	(0.501)
Log Income		0.242	0.257		-0.317	-0.316
		(0.215)	(0.239)		(0.442)	(0.446)
Log Debt		0.223***	0.164***		0.813***	0.809***
		(0.054)	(0.061)		(0.097)	(0.115)
$\Delta_{91,99}$ Log Loan Origination		0.018	0.023		0.024	0.024
		(0.015)	(0.015)		(0.029)	(0.030)
$\Delta_{91,99}$ CH Import Penetration		-17.923**	-18.758**		-22.284*	-22.347*
		(7.458)	(7.342)		(13.424)	(13.335)
Census controls	No	Yes	Yes	No	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
Observations	734	734	734	734	734	734
First-stage F statistic	24.06	10.42	10.56	24.06	10.42	10.56

Note: This table presents 2SLS cross-sectional regressions of debt growth from 2000Q4 to 2007Q4 on (the change in) Chinese import penetration instrumented using 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 (DTI) in Panel B. Information from the County Business Patterns datasets on the structure of employment across 6-digit NAICS industries by CZs is used to compute Shipping costs and Net CH Import Penetration at the CZ level, as well as Log Employment and the share of employment in Manufacturing at the CZ level. Log Income is drawn from IRS data. Log Debt is based on the aggregation of individual data from FRBNY CCP/Equifax. Changes in house prices between 2000 and 2007 are from the most granular index available from CoreLogic. Net CH Import Penetration is defined as U.S. imports from China minus U.S. exports to China, normalized by U.S. expenditures measured as domestic shipments plus net imports. $\Delta_{91,99}$ Log Loan Origination is the log change in the total dollar value of loan origination between 1991 and 1999, drawn from HMDA data. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share of the population without high school education, share with high school diploma only, unemployment rate, poverty rate, and percent urban, measured at the CZ 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, 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)
$\Delta_{00,07}$ 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)
Employment in Manufacturing (%)		-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)
$\Delta_{91,99}$ Log 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 controls	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 to 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 Log employment and the share of employment in manufacturing, are measured at the commuting zone level. Changes in house prices between 2000 and 2007 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 of the population without high school education, 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 7

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)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Shipping Costs	-0.012	0.011	-0.002	-0.002	-1.912***	-2.063***	-2.130***	-2.194***
	(0.088)	(0.082)	(0.081)	(0.079)	(0.530)	(0.504)	(0.510)	(0.510)
$\Delta_{00,07}$ HPI				0.000				0.127**
				(0.016)				(0.050)
Log Employment	-0.000	-0.002*	-0.003**	-0.003***	0.016***	0.003	0.001	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)	(0.005)	(0.005)	(0.006)
Employment in Manufacturing (%)	-0.027	-0.024	-0.023	-0.023	-0.549***	-0.622***	-0.625***	-0.604***
	(0.020)	(0.019)	(0.019)	(0.019)	(0.120)	(0.106)	(0.106)	(0.106)
Log Income	-0.012***	-0.009***	-0.005	-0.005	-0.211***	-0.045**	-0.025	-0.025
	(0.004)	(0.003)	(0.004)	(0.004)	(0.025)	(0.018)	(0.018)	(0.017)
Log Debt +1		0.003***	0.002***	0.002***		-0.183***	-0.185***	-0.185***
		(0.000)	(0.000)	(0.000)		(0.003)	(0.003)	(0.003)
DTI		0.000	0.000	0.000		-0.052***	-0.050***	-0.050***
		(0.001)	(0.001)	(0.001)		(0.006)	(0.006)	(0.006)
$\Delta_{91,99}$ Log Loan Origination	-0.002	-0.003**	-0.004***	-0.004***	0.022***	0.013**	0.011*	0.009*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.007)	(0.006)	(0.006)	(0.005)
$\Delta_{91,99}$ CH Import Penetration	0.121	0.039	0.017	0.017	0.442	0.734	0.720	0.719
	(0.163)	(0.169)	(0.168)	(0.168)	(0.969)	(0.839)	(0.815)	(0.807)
Credit Score		0.000***				0.000***		
		(0.000)				(0.000)		
Age		-0.006***				-0.036***		
		(0.000)				(0.001)		
Risk Bins	No	No	Yes	Yes	No	No	Yes	Yes
Age Bins	No	No	Yes	Yes	No	No	Yes	Yes
Census	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,128,389	5,128,389	5,128,389	5,128,389	4,113,069	4,113,069	4,113,069	4,113,069
R-Squared					0.006	0.113	0.118	0.118
Psuedo R-Squared	0.004	0.014	0.016	0.016				
# of 1s	2,804,779	2,804,779	2,804,779	2,804,779				

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), we run logistic regressions at the individual level in which the dependent variable is an indicator for having a positive debt balance in 2007Q4. Logit marginal coefficients are reported. For intensive margin analysis (Panel B), 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 2000Q4 or 2007Q4 are excluded from this regression specification. Individual level data comes from the FRBNY CCP/Equifax Data, while shipping costs, along with employment and the share of employment in Manufacturing, 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 of the population without high school education, 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 8
Individual-level Analysis using the PSID

	Panel A: change 1999-2007					
	Unemployed (2007)		ΔLog(Labor Inc.+1)		ΔDTI	
Shipping Costs	-0.86*	-0.96*	14.02***	17.99***	-9.71**	-10.95**
	(0.48)	(0.55)	(4.55)	(5.35)	(3.98)	(4.86)
Individual level controls	Yes	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	No	Yes	No	Yes
Observations	597	597	597	597	597	597
R^2	0.116	0.159	0.198	0.239	0.060	0.110
	Panel B: split of ΔDTI					
	Mortgage		Credit Card		Auto	
Shipping Costs	-11.43**	-12.10**	-2.29*	-2.51	0.82**	0.76*
	(5.11)	(5.84)	(1.37)	(1.60)	(0.35)	(0.39)
Individual level controls	Yes	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	No	Yes	No	Yes
Observations	562	562	562	562	501	501
R^2	0.058	0.114	0.052	0.104	0.054	0.131
	Panel C: Instrumental Variable					
	Unemployed (2007)		ΔLog(labor inc.+1)		ΔDTI	
$\Delta_{00,07}$ Net CH Import Penetration	1.66*	2.06*	-26.95***	-38.64***	18.66**	23.51**
	(0.95)	(1.20)	(10.24)	(14.92)	(8.43)	(11.58)
Individual level controls	Yes	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	No	Yes	No	Yes
Observations	597	597	597	597	597	597

Note: This table presents cross-sectional regressions of unemployment, income and debt-to-income 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. Individual level 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. Regressions in columns (2), (4) and (6) include state fixed effects. Robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 9

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***	-1.415***	0.068	-6.422***	-23.445***	-1.838
	(0.147)	(0.453)	(0.381)	(1.709)	(6.308)	(4.475)
$\Delta_{00,07}$ HPI	0.060***			0.864***		
	(0.012)			(0.151)		
Log Employment	0.002	-0.003	-0.001	0.040	-0.023	-0.026
	(0.002)	(0.004)	(0.003)	(0.027)	(0.054)	(0.036)
Employment in Manufacturing (%)	-0.103***	-0.344***	-0.086*	-1.557***	-4.614***	-1.692***
	(0.032)	(0.059)	(0.047)	(0.396)	(0.728)	(0.590)
Log Income	0.033***	0.018***	0.033***	0.584***	0.384***	0.552***
	(0.005)	(0.006)	(0.005)	(0.054)	(0.075)	(0.051)
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)
$\Delta_{91,99}$ Log Loan Origination	-0.005***	0.003	-0.009*	-0.029*	0.128	-0.076
	(0.002)	(0.022)	(0.004)	(0.018)	(0.291)	(0.048)
$\Delta_{91,99}$ CH Import Penetration	0.431	2.020***	-0.411	6.773	26.365***	-4.440
	(0.333)	(0.623)	(1.000)	(4.175)	(7.493)	(11.079)
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 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 Employment in Manufacturing 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 of the population without high school education, 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 10
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)
$\Delta_{00,07}$ 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)
Employment in Manufacturing (%)	-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)
$\Delta_{91,99}$ Log 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 2007Q4, or between 2007Q4 and 2011Q4, both inclusive. The analysis is restricted to individuals appearing in Equifax in 2000Q4, 2007Q4, and the relevant end period (either 2007Q4 or 2011Q4) for a given regression. Individual level data comes from the FRBNY CCP/Equifax Data, while shipping costs, along with employment and Employment in Manufacturing (%) 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 of the population without high school education, 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 11
Import Competition and Loan Applications, CZ Level

	$\Delta_{2000-07}$ Log Loan Applications			
	Home Purchase		Refinancing	
	(1) Number (#)	(2) Value ($)	(3) Number (#)	(4) Value ($)
Shipping Costs	-0.907	-0.730	-3.166***	-3.968***
	(0.975)	(1.036)	(1.067)	(1.076)
Denial Rate	-0.071	-0.452**	-1.903***	-2.283***
	(0.240)	(0.223)	(0.241)	(0.280)
Log Average Applicant Income	-0.354*	-0.397**	-0.908***	-0.986***
	(0.208)	(0.186)	(0.181)	(0.197)
Log Average Loan Amount	0.124	-0.028	0.453**	0.418**
	(0.217)	(0.191)	(0.223)	(0.189)
Log Application Volume	-0.240***	-0.105**	-0.236***	-0.179***
	(0.051)	(0.051)	(0.075)	(0.056)
CZ controls	Yes	Yes	Yes	Yes
Census controls	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop
Observations	734	734	734	734
R^2	0.328	0.555	0.659	0.808
Magnitude SC	-0.021	-0.017	-0.074	-0.093
% dep. var. cross-CZ s.d.	0.057	0.044	0.224	0.215

Note: This table presents cross-sectional regressions of growth in loan applications separately for home purchase loans in columns (1) and (2), and refinancing loans in columns (3) and (4), 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 in columns (1) and (3), and in the total dollar value of loan applications in columns (2) and (4). Denial rates, log average applicant income, log average loan amount, and log application volume are drawn from HMDA and measured in 1999 at the CZ level. CZ controls include log employment, the share of employment in manufacturing, log income, the change in Chinese import penetration between 1991 and 1999, and the log change in the total dollar value of loan origination between 1991 and 1999. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share of the population without high school education, 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. Magnitude SC is the effect of a one standard deviation increase in Shipping Costs on the dependent variable. Robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 12
Realized and Expected Duration of Unemployment Spells

	Probability to Exit Unemployment After Becoming Unemployed		
	Expected	Realized	Error (Expected-Realized)
Shipping Costs	-0.58	9.68*	-10.26*
	(1.54)	(5.31)	(5.51)
CZ controls	Yes	Yes	Yes
Census controls	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.
Observations	106	106	106
R^2	0.314	0.186	0.214

Note: This table presents the results of CZ-level cross-sectional regressions of the realized and expected probability of moving out of unemployment on shipping costs, at the CZ level. 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?". "Expected" is the average perceived probability to find a job after becoming unemployed, computed across participants in the HRS waves of 2000, 2002 and 2004. "Realized" is 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. Information from the County Business Patterns datasets on the structure of employment across 6-digit NAICS industries by CZs is used to compute Shipping costs at the CZ level. CZ controls include log employment, the share of employment in manufacturing, log income, the change in Chinese import penetration between 1991 and 1999, and the log change in the total dollar value of loan origination between 1991 and 1999. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share of the population without high school education, 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.

Appendix

A Consumption Response to Income Shocks

We start solving a simple model of consumption insurance. We assume an agent maximizes lifetime expected utility:

$$U_0 = \sum_{h=0}^{\infty} \beta^h u(c_h),$$

subject to the following budget constraint:

$$b_t + c_t \leq R^{-1} b_{t+1} + y_t,$$

where b_t is the agents' demand for a riskless bond with price R^{-1} and y_t the labor income process.

To fix ideas, we assume $\beta = R^{-1}$ and that utility is quadratic and follows $u(c_t) = -(c_t - \gamma)^2/2$. Under these assumptions the Euler equation is $c_t = \mathbf{E}_t c_{t+1}$. Given a boundary condition we are able to solve for the level of borrowing given current borrowing as follows:

$$b_{t+1} = b_t + (\beta^{-1} - 1) \sum_{k=0}^{\infty} \beta^k \mathbf{E}_t y_{t+k} - \beta^{-1} y_t$$

Now given that income follows an AR(1) process of the form:

$$y_{t+1} = \bar{y} + \rho(y_t - \bar{y}) + \varepsilon_{t+1},$$

we are able to solve for the future level of borrowing using the law of iterated expectations:

$$b_{t+1} = b_t - \frac{1-\rho}{1-\beta\rho} (y_t - \bar{y}).$$

B Appendix Tables

Table A.1
Distribution of Shipping Costs Across Industries

This table presents the average shipping costs in our sample at the 3-digit NAICS codes industry level of aggregation. Shipping costs are measured in 1998 as the % difference of the Cost-Insurance-Freight value with the Free-on-Board value of imports.

3-digit NAICS code	Description	Shipping costs
334	Computer and Electronic Product Manufacturing	0.015
336	Transportation Equipment Manufacturing	0.017
333	Machinery Manufacturing	0.025
335	Electrical Equipment, Appliance, and Component Manufacturing	0.028
325	Chemical Manufacturing	0.032
332	Fabricated Metal Product Manufacturing	0.036
315	Apparel Manufacturing	0.037
313	Textile Mills	0.041
316	Leather and Allied Product Manufacturing	0.042
323	Printing and Related Support Activities	0.045
314	Textile Product Mills	0.048
322	Paper Manufacturing	0.049
331	Primary Metal Manufacturing	0.049
326	Plastics and Rubber Products Manufacturing	0.050
311	Food Manufacturing	0.058
312	Beverage and Tobacco Product Manufacturing	0.059
321	Wood Product Manufacturing	0.060
337	Furniture and Related Product Manufacturing	0.071
324	Petroleum and Coal Products Manufacturing	0.087
327	Nonmetallic Mineral Product Manufacturing	0.088

Table A.2
Import Competition, Output and Productivity, CZ Level

	Δ_{00-07} Value Added	Δ_{00-07} Output	Δ_{00-07} TFP
Shipping Costs	0.318***	0.618***	0.288
	(0.069)	(0.133)	(0.462)
Value Added	-0.088***	0.096	0.465
	(0.026)	(0.065)	(0.308)
Shipments	0.055***	-0.193**	-0.348
	(0.020)	(0.083)	(0.379)
TFP	0.029	-0.123*	5.415***
	(0.023)	(0.074)	(0.606)
$\Delta_{00,07}$ HPI	0.009**	-0.015*	-0.047
	(0.004)	(0.009)	(0.040)
Log Employment	-0.003	0.013*	0.000
	(0.003)	(0.007)	(0.033)
Employment in Manufacturing (%)	-0.038***	-0.074**	-0.164
	(0.015)	(0.031)	(0.145)
Log Income	-0.027**	-0.023	0.059
	(0.012)	(0.024)	(0.066)
Log Debt	0.001	-0.015**	-0.015
	(0.003)	(0.007)	(0.035)
$\Delta_{91,99}$ Log Loan Origination	-0.001	-0.003**	-0.009
	(0.001)	(0.001)	(0.006)
$\Delta_{91,99}$ CH Import Penetration	-0.319***	-0.798***	-0.280
	(0.093)	(0.222)	(0.732)
Census controls	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.
Observations	734	734	734
R^2	0.351	0.390	0.718
Magnitude SC	0.007	0.014	0.007
% dep. var. cross-CZ s.d.	0.291	0.497	0.049

Note: This table presents the results of cross-sectional regressions on the change in value added, domestic shipments, and TFP, between 2000 to 2007 on shipping costs, at the CZ level. Data on value added, output (domestic shipments), and TFP are from the NBER-CES Manufacturing Industry Database. Changes in value added and domestic shipments are both normalized by U.S. expenditures measured as domestic shipments plus net imports as of 2000. Information from the County Business Patterns datasets on the structure of employment across 6-digit NAICS industries by CZs is used to compute Shipping costs, value added, TFP and domestic shipments at the CZ level, as well as Log Employment and the share of employment in Manufacturing at the CZ level. Log Income is drawn from IRS data. Log Debt is based on the aggregation of individual data from FRBNY CCP/Equifax. Changes in house prices between 2000 and 2007 are from the most granular index available from CoreLogic. $\Delta_{91,99}$ Log Loan Origination is the log change in the total dollar value of loan origination between 1991 and 1999, drawn from HMDA data. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share of the population without high school education, share with high school diploma only, unemployment rate, poverty rate, and percent urban, measured at the CZ level. Regressions are weighted by adult population in each CZ as of 2000. Magnitude SC is the effect of a one standard deviation increase in Shipping Costs on the dependent variable. Robust standard errors are reported in parentheses. *, ** and *** means statistically different from zero at 10%, 5% and 1% level of significance.

Table A.3
Import Competition and Labor Market Outcomes, CZ Level

Panel A: Unemployment	$\Delta_{2000-07}$ Log # Unemployed			$\Delta_{2000-07}$ Unemployment Rate		
Shipping Costs	-5.723***	-3.076***	-3.016***	-0.220***	-0.086**	-0.083**
	(1.254)	(1.076)	(1.010)	(0.052)	(0.041)	(0.036)
$\Delta_{00,07}$ HPI			-0.509***			-0.029***
			(0.071)			(0.005)
Log Employment		-0.030	-0.172***		0.001	-0.007***
		(0.060)	(0.051)		(0.003)	(0.003)
Employment in Manufacturing (%)		0.264	-0.164		0.039***	0.015*
		(0.230)	(0.210)		(0.010)	(0.008)
Log Income		-0.053	-0.088		0.004	0.001
		(0.207)	(0.166)		(0.008)	(0.006)
Log Debt		0.056	0.204***		0.001	0.009***
		(0.061)	(0.049)		(0.003)	(0.003)
$\Delta_{91,99}$ Log Loan Origination		0.003	-0.008		0.001	-0.000
		(0.014)	(0.011)		(0.001)	(0.000)
$\Delta_{91,99}$ CH Import Penetration		1.251	2.913**		0.069	0.163**
		(1.773)	(1.420)		(0.093)	(0.066)
Census controls	No	Yes	Yes	No	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
Observations	734	734	734	734	734	734
R^2	0.092	0.355	0.490	0.063	0.378	0.576
Magnitude SC	-0.134	-0.072	-0.071	-0.005	-0.002	-0.002
% dep. var. cross-CZ s.d.	0.539	0.290	0.284	0.431	0.169	0.163

Panel B: Income	Average Annual Income Growth			Median Annual Income Growth		
Shipping Costs	0.141***	0.063**	0.061**	0.096***	0.082***	0.081***
	(0.035)	(0.031)	(0.026)	(0.035)	(0.029)	(0.024)
$\Delta_{00,07}$ HPI			0.020***			0.021***
			(0.002)			(0.002)
Log Employment		-0.004*	0.002		-0.006***	-0.000
		(0.002)	(0.002)		(0.002)	(0.001)
Employment in Manufacturing (%)		-0.045***	-0.028***		-0.043***	-0.025***
		(0.008)	(0.005)		(0.006)	(0.005)
Log Income		-0.001	0.000		-0.011*	-0.010**
		(0.008)	(0.005)		(0.006)	(0.004)
Log Debt		0.003	-0.003		0.005**	-0.001
		(0.002)	(0.002)		(0.002)	(0.001)
$\Delta\_91,99$ HMDA loan origination		-0.000	0.000		-0.000	0.000
		(0.001)	(0.000)		(0.000)	(0.000)
$\Delta\_91,99$ CH Import Penetration		0.071	0.004		0.063	-0.005
		(0.059)	(0.038)		(0.057)	(0.039)
Census controls	No	Yes	Yes	No	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
Observations	715	715	715	715	715	715
R^2	0.051	0.370	0.572	0.024	0.420	0.640
Magnitude SC	0.003	0.001	0.001	0.002	0.002	0.002
% dep. var. cross-CZ s.d.	0.306	0.136	0.133	0.235	0.202	0.199

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. Information from the County Business Patterns datasets on the structure of employment across 6-digit NAICS industries by CZs is used to compute Shipping costs at the CZ level, as well as Log Employment and the share of employment in Manufacturing at the CZ level. Log Income is drawn from IRS data. Log Debt is based on the aggregation of individual data from FRBNY CCP/Equifax. Changes in house prices between 2000 and 2007 are from the most granular index available from CoreLogic. CH Import Penetration is defined as U.S. imports from China normalized by U.S. expenditures measured as domestic shipments plus net imports. $\Delta_{91,99}$ Log Loan Origination is the log change in the total dollar value of loan origination between 1991 and 1999, drawn from HMDA data. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share of the population without high school education, share with high school diploma only, unemployment rate, poverty rate, and percent urban, measured at the CZ level. Regressions are weighted by adult population in each CZ as of 2000. Magnitude SC is the effect of a one standard deviation increase in Shipping Costs on the dependent variable. Robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table A.4

Alternative Proxy for Import Competition, Weight-to-Value Ratio

	Panel A: $\Delta_{2000-07}$ Log debt			Panel B: $\Delta_{2000-07}$ DTI		
Weight-to-value Ratio	-0.012***	-0.017***	-0.018***	-0.030***	-0.022***	-0.022***
	(0.004)	(0.004)	(0.004)	(0.010)	(0.008)	(0.008)
$\Delta_{00,07}$ HPI			0.309***			0.143
			(0.045)			(0.103)
Log Employment		-0.251***	-0.165***		-0.796***	-0.756***
		(0.050)	(0.046)		(0.093)	(0.104)
Employment in Manufacturing (%)		-0.903***	-0.646***		-0.399	-0.279
		(0.153)	(0.145)		(0.354)	(0.349)
Log Income		0.089	0.111		-0.500*	-0.489*
		(0.108)	(0.111)		(0.267)	(0.282)
Log Debt		0.235***	0.145***		0.828***	0.787***
		(0.049)	(0.045)		(0.094)	(0.104)
$\Delta_{91,99}$ Log Loan Origination		0.007	0.014*		0.010	0.013
		(0.009)	(0.008)		(0.019)	(0.020)
$\Delta_{91,99}$ CH Import Penetration		0.674	-0.346		0.103	-0.371
		(1.123)	(0.987)		(2.463)	(2.483)
Census controls	No	Yes	Yes	No	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop. .
Observations	734	734	734	734	734	734
R^2	0.015	0.485	0.573	0.021	0.545	0.550
Magnitude WVR	-0.064	-0.088	-0.091	-0.156	-0.114	-0.116
% dep. var. cross-CZ s.d.	0.328	0.449	0.463	0.483	0.353	0.357

Note: This table presents cross-sectional regressions of debt growth from 2000Q4 to 2007Q4 on the weight-to-value ratio, an alternative proxy for import competition at the commuting zone level. We consider the log change in debt in Panel A, and the change in debt to income ratio (DTI) in Panel B. Information from the County Business Patterns datasets on the structure of employment across 6-digit NAICS industries by CZs is used to compute the weight-to-value ratio at the CZ level, as well as Log Employment and the share of employment in Manufacturing at the CZ level. Log Income is drawn from IRS data. Log Debt is based on the aggregation of individual data from FRBNY CCP/Equifax. Changes in house prices between 2000 and 2007 are from the most granular index available from CoreLogic. CH Import Penetration is defined as U.S. imports from China normalized by U.S. expenditures measured as domestic shipments plus net imports. $\Delta_{91,99}$ Log Loan Origination is the log change in the total dollar value of loan origination between 1991 and 1999, drawn from HMDA data. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share of the population without high school education, share with high school diploma only, unemployment rate, poverty rate, and percent urban, measured at the CZ level. Regressions are weighted by adult population in each CZ as of 2000. Magnitude SC is the effect of a one standard deviation increase in Shipping Costs on the dependent variable. Robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table A.5
Import Competition and Loan Origination, CZ Level

	$\Delta_{2000-07}$ Log Originated Loans			
	Home Purchase		Refinancing	
	(1) Number (#)	(2) Value ($)	(3) Number (#)	(4) Value ($)
Shipping Costs	-0.686	-0.749	-2.804**	-3.150***
	(0.801)	(0.799)	(1.096)	(1.081)
Denial Rate	-0.264	-0.572***	-1.334***	-1.689***
	(0.210)	(0.183)	(0.275)	(0.301)
Log Average Applicant Income	-0.890***	-0.916***	-1.007***	-1.058***
	(0.179)	(0.165)	(0.202)	(0.203)
Log Average Loan Amount	0.168	0.266**	0.504**	0.494**
	(0.166)	(0.133)	(0.225)	(0.194)
Log Application Volume	-0.046	0.001	-0.193***	-0.168***
	(0.035)	(0.034)	(0.074)	(0.056)
CZ controls	Yes	Yes	Yes	Yes
Census controls	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.
Observations	734	734	734	734
R^2	0.554	0.770	0.711	0.822
Magnitude SC	-0.016	-0.018	-0.066	-0.074
% dep. var. cross-CZ s.d.	0.051	0.044	0.170	0.148

Note: This table presents cross-sectional regressions of growth in loan origination separately for home purchase loans in columns (1) and (2), and refinancing loans in columns (3) and (4), from 2000Q4 to 2007Q4 on shipping costs, at the commuting zone level. Growth in loan origination is measured as the log change in the number of originated loans in columns (1) and (3), and in the total dollar value of originated loans in columns (2) and (4). Denial rates, log average applicant income, log average loan amount, and log application volume are drawn from HMDA and measured in 1999 at the CZ level. CZ controls include log employment, the share of employment in manufacturing, log income, the change in Chinese import penetration between 1991 and 1999, and the log change in the total dollar value of loan origination between 1991 and 1999. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share of the population without high school education, 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. Magnitude SC is the effect of a one standard deviation increase in Shipping Costs on the dependent variable. Robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table A.6

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	169.130***	31.034	-0.701***	-0.150	-0.489***	-0.292	-0.652***	-0.288**
	(44.394)	(31.512)	(0.186)	(0.134)	(0.183)	(0.200)	(0.201)	(0.130)
Log Employment	-0.972	0.514**	0.004	-0.001	0.002	-0.000	0.002	0.002*
	(0.622)	(0.244)	(0.003)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Employment in Manufacturing (%)	12.128**	14.516***	-0.064***	-0.049***	-0.088***	-0.092***	-0.085***	-0.043***
	(5.403)	(3.620)	(0.023)	(0.018)	(0.021)	(0.025)	(0.020)	(0.017)
Log Income	-1.406**	-1.198***	0.008***	0.005**	0.017***	0.011***	0.008***	0.007***
	(0.620)	(0.428)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)
Log Debt +1	-0.752***	-0.420***	0.002***	0.001***	0.010***	0.009***	0.003***	0.002***
	(0.087)	(0.049)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$\Delta_{91,99}$ Log Loan Origination	2.609	-0.231	-0.010	0.000	-0.002	-0.000	0.003	-0.000
	(3.122)	(0.339)	(0.012)	(0.001)	(0.012)	(0.002)	(0.007)	(0.001)
$\Delta_{91,99}$ CH Import Penetration	-221.057**	91.686	1.184***	-0.260	1.188***	-0.506	0.681***	-0.130
	(90.424)	(71.095)	(0.314)	(0.272)	(0.253)	(0.446)	(0.178)	(0.273)
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 Employment in Manufacturing (%) 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 of the population without high school education, 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 A.7
Shipping Cost and Denial Rates, CZ Level

	Denials Rate (2000-07)			
	Home Purchase		Refinancing	
	Number (#)	Value weighted ($)	Number (#)	Value weighted ($)
Shipping Costs	0.239	0.091	-0.287**	-0.231*
	(0.179)	(0.181)	(0.121)	(0.119)
Denial Rate	0.336***	0.409***	0.469***	0.582***
	(0.027)	(0.026)	(0.039)	(0.038)
Log Average Applicant Income	0.056**	0.073***	-0.091***	-0.073***
	(0.024)	(0.020)	(0.022)	(0.022)
Log Average Loan Amount	0.040**	0.054***	0.043*	0.025
	(0.020)	(0.014)	(0.024)	(0.024)
Log Application Volume	-0.002	-0.006	-0.044***	-0.036***
	(0.005)	(0.004)	(0.006)	(0.006)
CZ controls	Yes	Yes	Yes	Yes
Census controls	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.
Observations	734	734	734	734
R^2	0.822	0.799	0.837	0.829
Magnitude SC	0.006	0.002	-0.007	-0.005
% dep. var. cross-CZ s.d.	0.061	0.025	-0.084	-0.067

Note: This table presents cross-sectional regressions of denials rate on loan applications between 2000 and 2007 separately for home purchase loans in columns (1) and (2), and refinancing loans in columns (3) and (4), from 2000Q4 to 2007Q4 on shipping costs, at the commuting zone level. The control variables Denial rates, log average applicant income, log average loan amount, and log application volume are drawn from HMDA and measured in 1999 at the CZ level. CZ controls include log employment, the share of employment in manufacturing, log income, the change in Chinese import penetration between 1991 and 1999, and the log change in the total dollar value of loan origination between 1991 and 1999. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share of the population without high school education, 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. Magnitude SC is the effect of a one standard deviation increase in Shipping Costs on the dependent variable. Robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table A.8
Import Competition and Housing Markets

	Δ_{00-07} HPI		Δ_{00-07} Log Buildings	Δ_{00-07} Log Units
Shipping Costs	-1.295	0.119	1.984	2.277
	(1.222)	(0.793)	(1.783)	(2.092)
$\Delta_{00,07}$ HPI			0.599**	0.908***
			(0.278)	(0.299)
Log Employment		-0.280***	0.350*	0.611***
		(0.074)	(0.202)	(0.207)
Employment in Manufacturing (%)		-0.841***	0.518	0.314
		(0.206)	(0.437)	(0.449)
Log Income		-0.070	-0.257	0.531
		(0.215)	(0.285)	(0.367)
Log Debt		0.290***	-0.432**	-0.687***
		(0.077)	(0.212)	(0.219)
$\Delta_{91,99}$ Log Loan Origination		-0.022	-0.006	0.012
		(0.014)	(0.023)	(0.026)
$\Delta_{91,99}$ CH Import Penetration		3.266*	-5.973	-2.768
		(1.817)	(3.689)	(3.552)
Census controls	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.
Observations	734	734	694	694
R^2	0.004	0.502	0.386	0.356

Note: This table presents the results of cross-sectional regressions of house prices and residential building permit growth from 2000Q4 to 2007Q4, on shipping costs at the commuting zone level. Changes in house prices between 2000 and 2007 are from the most granular index available from CoreLogic. We measure growth in residential housing in two ways: as the log change in buildings and as the log change in units, both drawn from the Census Building Permits Survey (BPS). Information from the County Business Patterns datasets on the structure of employment across 6-digit NAICS industries by CZs is used to compute Shipping costs at the CZ level, as well as Log Employment and the share of employment in Manufacturing at the CZ level. Log Income is drawn from IRS data. Log Debt is based on the aggregation of individual data from FRBNY CCP/Equifax. CH Import Penetration is defined as U.S. imports from China normalized by U.S. expenditures measured as domestic shipments plus net imports. $\Delta_{91,99}$ Log Loan Origination is the log change in the total dollar value of loan origination between 1991 and 1999, drawn from HMDA data. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share of the population without high school education, share with high school diploma only, unemployment rate, poverty rate, and percent urban, measured at the CZ 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 A.9
Import Competition and Corporate Debt

	Δ_{00-07} Log Corporate Debt			% New Firms $_{00-07}$		
				All	Retail	Food & Accom.
Shipping Costs	-1.723	-0.050	-0.097	0.343	0.030	0.089
	(1.579)	(1.093)	(1.099)	(0.366)	(0.037)	(0.067)
$\Delta_{00,07}$ HPI			0.394***	0.009	0.003*	0.002
			(0.089)	(0.017)	(0.002)	(0.004)
Log Employment		-0.420***	-0.310***	-0.128***	-0.011***	-0.021***
		(0.084)	(0.083)	(0.014)	(0.002)	(0.003)
Employment in Manufacturing (%)		-1.466***	-1.134***	-0.182***	-0.011**	-0.037*
		(0.267)	(0.258)	(0.055)	(0.006)	(0.019)
Log Income		-0.443*	-0.415*	-0.013	0.005	-0.000
		(0.233)	(0.249)	(0.049)	(0.004)	(0.011)
Log Debt		0.424***	0.310***	0.119***	0.011***	0.018***
		(0.083)	(0.085)	(0.016)	(0.002)	(0.003)
$\Delta_{91,99}$ Log Loan Origination		0.019	0.027*	-0.001	0.000	-0.001
		(0.015)	(0.015)	(0.005)	(0.001)	(0.001)
$\Delta_{91,99}$ CH Import Penetration		-1.979	-3.266*	-0.545	0.017	0.060
		(1.741)	(1.680)	(0.562)	(0.058)	(0.126)
Census controls	No	Yes	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
Observations	734	734	734	669	669	669
R^2	0.004	0.410	0.448	0.411	0.289	0.339

Note: This table presents the results of cross-sectional regressions of the growth in small business loans from 2000 to 2007, and of job creation from startups between 2000 and 2007, on shipping costs at the commuting zone level. Small business loans are drawn from Community Reinvestment Act (CRA) data. Job creation from startups at the CZ level is approximated by the number of job creation in firms of age 0 or 1 over the period 2000-2006 (respectively the number of job creation in firms of age 0 or 1 in the retail sector – that is, in 2-digit NAICS codes 44, 45; and in food and accomodation sectors – that is, 2-digit NAICS code 72), normalized by total employment in the CZ as of 1999. The data is drawn from the U.S. Census Quarterly Workforce Indicators (QWI). Changes in house prices between 2000 and 2007 are from the most granular index available from CoreLogic. We measure growth in residential housing in two ways: as the log change in buildings and as the log change in units. Information from the County Business Patterns datasets on the structure of employment across 6-digit NAICS industries by CZs is used to compute Shipping costs at the CZ level, as well as Log Employment and the share of employment in Manufacturing at the CZ level. Log Income is drawn from IRS data. Log Debt is based on the aggregation of individual data from FRBNY CCP/Equifax. CH Import Penetration is defined as U.S. imports from China normalized by U.S. expenditures measured as domestic shipments plus net imports. $\Delta_{91,99}$ Log Loan Origination is the log change in the total dollar value of loan origination between 1991 and 1999, drawn from HMDA data. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share of the population without high school education, share with high school diploma only, unemployment rate, poverty rate, and percent urban, measured at the CZ 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 A.10
Import Competition and Household Debt Growth, Robustness

Panel A:	Alternative Proxies for Import Competition			
NTR Gap	0.329**			
	(0.143)			
(Instr.) CZ import exposure, 1999-2007		0.022**		
		(0.011)		
Gravity Residual			0.043**	
			(0.020)	
Emp Share of Textile				0.786**
				(0.314)
CZ controls	Yes	Yes	Yes	Yes
Census controls	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.
Observations	734	715	734	734
R^2	0.470	0.503	0.469	0.468
Magnitude Proxy Imp. Comp.	0.029	0.024	0.026	0.014
% dep. var. cross-CZ s.d.	0.148	0.120	0.130	0.072

Panel B:	Alternative Specifications for SC								
	Routine & Outsourcing controls	Industry controls	SC based on CH imp.	SC excl. Comp. equip.	Excluding California	Coastal region dummy	CA/FL/ NE/AZ dummy	SC+tariffs	Weighted by tradable emp. share
Shipping Costs	-2.271***	-2.497***	-0.887**	-1.570**	-2.285***	-2.541***	-1.911***	-1.603**	-1.085***
	(0.619)	(0.591)	(0.364)	(0.630)	(0.625)	(0.626)	(0.555)	(0.678)	(0.381)
Employment in Routine Occupations	-0.012*								
	(0.006)								
Average Offshorability of Occupations	0.039								
	(0.047)								
CZ controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Trad. Emp.
Observations	715	734	731	734	716	734	734	734	734
R^2	0.519	0.492	0.469	0.470	0.451	0.532	0.617	0.474	0.243
Magnitude SC	-0.053	-0.058	-0.027	-0.032	-0.053	-0.059	-0.045	-0.036	-0.025
% dep. var. cross-CZ s.d.	0.270	0.297	0.139	-0.161	0.272	0.302	0.227	0.184	0.129

Note: Panel A of this table presents the results of cross-sectional regressions of the log change in total debt from 2000Q4 to 2007Q4 on alternative proxies for import competition, at the commuting zone level. The coefficient of interest estimates differential exposure to import competition, as proxied by (i) the NTR gap, namely, the difference between the non-NTR (normal trade relations) rates applied to non-market economies, and the NTR tariff rates (Pierce and Schott, 2016), (ii) the Acemoglu et al. (2016) instrument for the change in CZ's average import exposure over the period 1999-2007, (iii) the residual of gravity regressions, and (iv) and the share of textile in total employment, all measured at the commuting zone level. Panel B presents alternative specification of our main regression in column (3) of Table 3. In column (1), we add the percentage of employment in routine occupations and the average offshorability index of occupations defined at the commuting zone level and available on David Dorn's website as additional controls. In column (2), we add industry controls in our baseline specification, namely value added over total output, payroll over total output, TFP and TFP growth, all computed at the CZ level using 1998 employment shares as weights. In column (3), we reestimate SC exposure using only Chinese imports. We reestimate our baseline regression excluding respectively the computer industry from the computation of SC at the CZ level in column (4), and California from the sample in column (5). We reestimate our baseline regression after including a dummy for coastal regions in column (6), and a dummy for California, Florida, Nevada and Arizona in column (7). In column (8), we add industry level tariffs to SC in our measure of exposure to import competition. In column (9), we weight regressions by the employment share of tradable industries. CZ controls include log employment, the share of employment in manufacturing, log income, the change in Chinese import penetration between 1991 and 1999, and the log change in the total dollar value of loan origination between 1991 and 1999. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share of the population without high school education, 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. Magnitude SC is the effect of a one standard deviation increase in Shipping Costs on the dependent variable. Robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table A.11

Import Competition and Household Debt Growth, Controlling for Local Betas

	Panel A: $\Delta_{2000-07}$ Log debt			Panel B: $\Delta_{2000-07}$ DTI		
Shipping Costs	-1.605***	-2.192***	-2.295***	-3.097**	-3.074***	-3.092***
	(0.617)	(0.571)	(0.565)	(1.293)	(1.173)	(1.184)
$\Delta_{00,07}$ HPI			0.299***			0.155*
			(0.045)			(0.087)
Log Employment		-0.219***	-0.141***		-0.072***	-0.069***
		(0.049)	(0.045)		(0.023)	(0.025)
Employment in Manufacturing (%)		-0.908***	-0.660***		-0.841***	-0.691**
		(0.151)	(0.138)		(0.291)	(0.289)
Log Income		0.060	0.083		0.266	0.240
		(0.105)	(0.107)		(0.224)	(0.226)
Log Debt		0.192***	0.113**			
		(0.048)	(0.045)			
DTI					0.647***	0.619***
					(0.078)	(0.083)
$\Delta_{91,99}$ Log Loan Origination		0.003	0.010		-0.001	0.003
		(0.008)	(0.008)		(0.018)	(0.019)
$\Delta_{91,99}$ CH Import Penetration		0.333	-0.544		-1.185	-1.626
		(1.074)	(0.928)		(2.107)	(2.127)
$\text{Beta}_{91,99}$	0.077***	0.042***	0.034***	0.191***	0.135***	0.129***
	(0.016)	(0.012)	(0.011)	(0.047)	(0.024)	(0.024)
Census controls	No	Yes	Yes	No	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
Observations	734	734	734	734	734	734
R^2	0.134	0.498	0.580	0.177	0.585	0.591
Magnitude SC	-0.038	-0.051	-0.054	-0.072	-0.072	-0.072
% dep. var. cross-CZ s.d.	0.191	0.261	0.273	0.224	0.222	0.223

Note: This table presents cross-sectional regressions of debt growth from 2000Q4 to 2007Q4 on shipping costs, at the commuting zone level, in which we control for local betas, $\text{Beta}_{91,99}$. $\text{Beta}_{91,99}$ is defined as the coefficient β of the following OLS regression estimated at the yearly frequency over the period 1991-1999: $\text{EMPGr}_{CZ,t} = \beta_{CZ} \cdot \text{EMPGr,US}_t + \alpha_{CZ} + u_t$, where $\text{EMPGr}_{CZ,t}$ is employment growth in commuting zone CZ and year t and EMPGr,US_t is the growth rate of U.S. employment between year t and year $t-1$. We consider the log change in debt in Panel A, and the change in debt to income ratio (DTI) in Panel B. Information from the County Business Patterns datasets on the structure of employment across 6-digit NAICS industries by CZs is used to compute Shipping costs at the CZ level, as well as Log Employment and the share of employment in Manufacturing at the CZ level. Log Income is drawn from IRS data. Log Debt is based on the aggregation of individual data from FRBNY CCP/Equifax. Changes in house prices between 2000 and 2007 are from the most granular index available from CoreLogic. CH Import Penetration is defined as U.S. imports from China normalized by U.S. expenditures measured as domestic shipments plus net imports. $\Delta_{91,99}$ Log Loan Origination is the log change in the total dollar value of loan origination between 1991 and 1999, drawn from HMDA data. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share of the population without high school education, share with high school diploma only, unemployment rate, poverty rate, and percent urban, measured at the CZ level. Regressions are weighted by adult population in each CZ as of 2000. Magnitude SC is the effect of a one standard deviation increase in Shipping Costs on the dependent variable. Robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table A.12
Import Competition and Unemployment Insurance

	Δ_{00-07} Log Unemp.		Income growth$_{00-07}$		Δ_{00-07} Log Debt		Δ_{00-07} DTI	
	2000 Unemployment Benefit Amount							
	(1) High	(2) Low	(3) High	(4) Low	(5) High	(6) Low	(7) High	(8) Low
Shipping Costs	-2.759**	-3.095**	0.654*	0.733**	-1.481*	-3.387***	-2.595	-3.529**
	(1.217)	(1.324)	(0.383)	(0.297)	(0.866)	(0.927)	(1.953)	(1.599)
CZ controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
Observations	367	367	352	363	367	367	367	367
R^2	0.419	0.384	0.498	0.445	0.500	0.504	0.512	0.583

Note: This table presents the results of cross-sectional regressions of the the log change in the number of unemployed workers (columns (1) and (2)), average household income growth (columns (3) and (4)), the log change in debt (columns (5) and (6)), and the change in debt to income ratio (columns (7) and (8)) at the commuting zone level. Regressions are run separately in U.S. states with 2000 weekly minimum unemployment benefit amount above ("high") and below ("low") the sample median. The generosity of each state's UI benefits is from the United States Department of Labor's publication "Significant Provisions of State UI Laws". Information from the County Business Patterns datasets on the structure of employment across 6-digit NAICS industries by CZs is used to compute Shipping costs at the CZ level, as well as Log Employment and the share of employment in Manufacturing at the CZ level. Log Income is drawn from IRS data. Log Debt is based on the aggregation of individual data from FRBNY CCP/Equifax. Changes in house prices between 2000 and 2007 are from the most granular index available from CoreLogic. CH Import Penetration is defined as U.S. imports from China normalized by U.S. expenditures measured as domestic shipments plus net imports. $\Delta_{91,99}$ Log Loan Origination is the log change in the total dollar value of loan origination between 1991 and 1999, drawn from HMDA data. Census controls are drawn from the 2000 Census, and include the vacancy rate, percent white, percent black, share of the population without high school education, share with high school diploma only, unemployment rate, poverty rate, and percent urban, measured at the CZ 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.