Import Competition and Household Debt*

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ABSTRACT

We analyze the effect of import competition on household balance sheets using individual data on consumer finances. We exploit variation in local industry exposure to foreign competition to study households' response to the income shock triggered by China's accession to the WTO. 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 around 20% of the cross-regional variation in household leverage growth between 1999 and 2007. The effects are driven by home equity extraction and concentrated in areas with strong house price growth, and are reversed after the housing market crash. 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.

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 Chinese imports to the U.S. in the decade before the crisis, together with a strong decline in aggregate employment in manufacturing sectors.

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

Figure 2 illustrates our main finding. We trace out both changes in local labor market outcomes and the growth in total household debt across regions with high and low exposure to import competition, relative to their 1999 level.

While debt increases by more than 100% in both groups between 1999 and 2007, it grows by an additional 20 percentage points for areas with high exposure to import competition, which experienced larger growth in the number of unemployed workers and weaker income growth over the same 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. We measure the exposure of an industry to import competition with the physical shipping costs (SC) obtained from import data.[3] SC strongly predict an increase in import penetration and its adverse effects on 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 from 1999 to 2007.

Then, we 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 2 to 4 percentage point increase in aggregate household debt, which amounts to between 12% and 24% of the cross-CZ variation in household debt growth from 1999 to 2007. We obtain similar results when we consider debt-to-income ratios and check that our results are robust to using alternative measures of industry exposure to Chinese competition provided in the literature and alternative methods of computing

[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.

[3] The industry-level shipping costs are computed from trade data as the markup of Cost-Insurance-Freight over the price paid by the importer; see Bernard et al. (2006b) and Barrot et al. (2017) for other examples of the use of SC to account for exposure to imports.

shipping costs. Most of the increase in household debt is driven by mortgages, the largest category of household borrowing. Using individual micro-data from the CCP, we 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. Importantly, we show that most of the effect is coming from the intensive margin, specifically, from growing mortgage balances rather than new mortgages. We further show that the increase in leverage is due to households extracting equity from their homes in response to the income shock triggered by import competition.

The extent to which households can extract equity via a mortgage product is highly related to local house price dynamics. We show in Figure 3, house prices soared in the 1999-2007 period, allowing households to borrow against the appreciating value of their homes. We test this formally and show that the response of household debt growth and equity extraction to import competition is concentrated in areas that experienced high price appreciation over the period. We also show that when house prices dropped in the wake of the Great Recession, the relation between import competition and household debt vanishes despite continuing Chinese import growth. In this subsequent period, we show that households in most affected areas that levered up experience a higher probability of a drop in credit score, of mortgages becoming delinquent, and of foreclosure. Taken together, we find that when house prices allow it, equity extraction serves as an important, albeit risky, channel for consumption smoothing in response to adverse labor income shocks.

We confirm our main findings using the Panel Study of Income Dynamics (PSID), a longitudinal survey that collects both labor outcomes and household debt, thus allowing us to directly connect them at the individual level, albeit in a smaller sample. We also show that our results are consistent with the Permanent Income Hypothesis (PIH). The textbook version of the life-cycle consumer theory predicts agents smooth consumption using debt when income shocks are transitory (Friedman, 1957). We first find that household debt responds less than one-for-one to the drop in income, consistent with the PIH. We then show that the increase in leverage is associated with shocks perceived as transitory rather than permanent. Although the displacement effect of import penetration has been long-lasting in hindsight, at the time it could have been perceived as transitory initially, leading affected workers to borrow to smooth consumption.[4] We use individual expectations data from the Health and Retirement Study (HRS) survey and show that households in affected areas systematically underestimate the persistence of unemployment spells caused by import competition.

The main contribution of this paper is to empirically document the insurance role of mortgage markets. 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 themselves against

[4]It could also be that credit demand is driven by ratchet effects in consumption, whereby affected households increase their credit demand 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.

[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).

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). A few studies have estimated the credit card debt response to income shocks,[7] or automobile debt.[8] Related to these papers, ours is among the first to focus broadly on household 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. (2016a) and Adelino et al. (2016b) present evidence consistent with an expectations-based view where both home buyers and lenders believed home values would increase, but experienced defaults when prices dropped. Building on these findings, we document that part of the rise in credit from 1999 to 2007 in regions with exposure to trade is the consequence of higher credit demand associated with adverse labor market shocks. We also illustrate the idea in Rajan (2011) and Kumhof et al. (2015) that the rise in inequality is a long-run determinant of leverage.[9] 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 (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 smooth 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).

In the remainder of the paper, we discuss our empirical strategy (Section I), we present the results (Section II) and discuss their interpretation (Section III). Section IV concludes.

[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).

[9] Coibion et al. (2014) measure inequality directly and find that it hurts the availability of credit.

I. 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.

A. 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.[10] The CCP tracks individuals over time at a quarterly frequency and collects data on their debt holdings, payment history, credit scores, and geographic location. Debt holdings are broken down into mortgages, junior liens such as home equity lines of credit, auto loans, credit card debt, as well as other types of loans.[11] The CCP also includes information on the status of the loan being 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, poverty rate, and percent urban. Second, the CCP does not allow us to directly measure home equity extraction, i.e., 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 its large coverage of over 90% of all mortgages. For each application, HMDA collects location, loan amount (but not the interest rate), loan type (refinancing or home purchase), 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 Zone (CZ) level according to the location of the purchased property. We thus observe in each year from 1991 to 2011 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, to control for prior trends in our specification presented below.

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

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

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

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 (See Appendix B for a detailed description of the sample construction).

Finally, to account for 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 since 1980.

B. 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 to measure local 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.

B.1. Shipping costs

To account for 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 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.[12] SC are a structural characteristic rooted in the type of output produced by any given industry.[13] 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.[14]

We verify that SC are widely dispersed across industries, that they are persistent, and 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 in 1998 represent 4.2% of the price of shipments on average, with a 1^{st} percentile of 0.6% and a 99^{th} percentile of

[12]The data is available at sompks4.github.io/sub_data.html.

[13]The main limitation of SC is that it does not take into account unobserved costs of shipping — for instance, time to ship (Hummels and Schaur, 2013) or information barriers and contract enforcement costs, holding costs for the goods in transit, inventory costs due buffering, 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).

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

20%.[15] The distribution of SC is stable over time: the average SC in 2007 accounts for 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 predictive 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 $R^2 = 0.62$.

B.2. Import competition

Chinese import growth accounts for the bulk of import penetration in the U.S. over the 2000s. Appendix Figure IA.1 presents 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 1999 and 2007. Decomposing this increase across countries of origin, we find that high-income countries' contribution to this change is virtually zero.[16] 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 contemporary 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% between 1998 and 2007 — with productivity growth in manufacturing reaching 13.4% per year. This acceleration can be tied to a series of political decisions in the late nineties that stimulated the exit of the least productive incumbents. In 1995, the Chinese government reduced its commitment to stable employment in the State sector, allowing the least efficient state-owned firms to exit. In 1997, the 15th Congress of the Chinese Communist party legalized the development of private enterprises. Finally, the lead-up to China's accession to WTO in 2001 was associated with tariff cuts and a broadening of trade rights.[17]

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 tercile, 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 1999 and 2007, Chinese import penetration increased by 6, 4,

[15] The distribution of SC across 3-digit NAICS codes industries is presented in Appendix Table IA.I.

[16] 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.

[17] Additionally, the end of the Multifibre Arrangement (MFA) textile and clothing quotas in 2002 and 2005 fueled the surge of Chinese exports even further.

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. in the 2000s.

C. Effects of shipping costs on import competition and income

We next formally document the causal effect of SC on import penetration and labor market outcomes at the commuting-zone level.

C.1. Commuting zone exposure

Throughout the paper, we consider Commuting Zones (CZs) as the main geographical unit of analysis. Developed by Tolbert and Sizer (1996) using county-level commuting data from the 1990 Census data, CZs are defined as 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 a commuting zone indexed by 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:

$$\text{SC}_J = \sum_h \ell_J^h \theta_h \tag{I.1}$$

We find substantial heterogeneity in employment-weighted shipping costs across CZs. As shown in Table I, the average SC across CZs is 5.0%, with a median of 4.4% and a standard deviation of 2.3%. Figure 5 presents the distribution of SC for each CZ across the U.S. territory.

C.2. Shipping costs and import competition

We confirm that SC are indeed a good proxy for CZ-level exposure to import competition, even after controlling for sector-level characteristics. In Table II, 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 1999 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:

$$Y_J = \beta \ \text{SC}_J + \delta' \mathbf{X}_J + u_J, \tag{I.2}$$

where Y_J is the 1999-07 change in Chinese imports, and net Chinese imports, and $\mathbf{X}_J$ a vector of controls measured at the commuting zone level including total employment, the share of manufacturing employment, both from the County Business Patterns (CBP), and total income obtained from the Internal Revenue Service (IRS);

all of these control variables are measured as of 1998. We also control for the logarithm of total debt in 1999 (using data from the CCP), the 1991-1999 change in loan originations, and the 1991-1999 change in net Chinese import penetration, as well as quintiles of the change in house prices between 1999 and 2007 and State fixed effects in some specifications.[18] All 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, in the most conservative specification, one standard deviation increase in SC leads to a 0.7 percentage point decrease in import penetration from China between 1999 and 2007 — which amounts to 22% of the cross-sectional standard deviation of import penetration. The effects are similar when we consider net import penetration. Since we control for net import growth from 1991 to 1999, this variable would absorb most of the effect if SC were spuriously correlated with declining industries.

If low SC areas are subject to greater import competition, one would expect their output to drop over the period. In Appendix Table IA.II, we consider the effect of SC on the 1999-2007 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 II. We find that a one standard deviation increase in SC is associated with a 1.0 and a 2.1 percentage point higher value-added and output growth, respectively, which amounts to 27% and 38% 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.

C.3. Shipping costs and income

We now turn to the effect of import competition on employment and income. We consider the effect of SC on labor market outcomes measured at the CZ level. In columns 1 to 4 of Table III, we examine changes in the number of unemployed aggregated at the CZ level from county-level data of Bureau of Labor Statistics. In columns 5 to 8, we estimate the effect of cumulative income losses measured using income data from the IRS described above. Using the same cross-sectional estimation equation (I.2), we show that a decrease in SC leads to higher unemployment and lower income. The effect on employment is substantial: an increase in the exposure to import competition through a one standard deviation decrease in SC leads to a 12% increase in the number of unemployed (with estimates ranging from 5% to 20% across specifications). The effect on income is also statistically and economically significant. One standard deviation change in import exposure translates to a drop in income of 6% over the period, which amounts to around 15% of its cross-CZ standard deviation. Moreover, given the average baseline level of income in 1999 of $37,500 across CZs, in dollar terms, this decline corresponds to a cumulative income loss of around $2,100 between 2000 and 2007.

[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. For CZs overlapping across several states, we consider the State with the largest share of each CZ's population.

C.4. 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.

A first identification threat is 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. Reassuringly, we check and find in column 3 of Appendix Table IA.II 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 from all countries. The fact that we only see an increase in net imports from China over the period (see Online Figure IA.1), and that this coincides with the surge in Chinese productivity growth and its entry into the WTO largely mitigates this concern.

Last, one might be worried that house prices are endogenous to SC, and that their effect on household debt might be spurious. As we show in Appendix Table IA.XI, SC does not correlate with the growth in house prices over the period. This largely mitigates the concern that the higher debt growth in low SC areas might be driven by a higher house price growth caused by import competition. This does not necessarily mean that the effect of SC on household debt needs to be the same in high and low price growth areas, therefore we include quintiles of house price growth fixed effects in our specifications.

C.5. Alternative measures of the exposure to import competition

Earlier work has used alternative instruments for exposure to import competition. In particular, Autor et al. (2013) (ADH) instrument for growth in Chinese imports to the United States using the contemporaneous composition and growth of Chinese imports in eight other high-income countries.[19] They show that rising imports between 1990 and 2007 caused higher unemployment, lower labor force participation, and reduced wages in local labor markets that are home to import-competing manufacturing industries. However, Autor et al. (2013) focuses on the overall 1990-2007 period, and the

[19] Australia, Denmark, Finland, Germany, Japan, New Zealand, Spain, and Switzerland.

instrument lacks power in the 2000-2007 period. Our paper is specifically centered on the 2000-2007 period during which household debt grew significantly in the U.S. In this sub-period, ADH's instrument is only weakly related to the growth in unemployment, income, or welfare benefits. Since our purpose is to tie household debt growth and Chinese import competition through its effect on the labor market between 1999 and 2007, therefore, we use SC. That being said, we find in Appendix Section C that SC and ADH yield comparable magnitudes for explaining the cross-sectional variation in the change in income between 1999 and 2007.

Two other prominent studies use alternative proxies for import competition: (i) the normal trade relations (NTR) gap, namely, the difference between the non-NTR rates applied to non-market economies and the NTR tariff rates in Pierce and Schott (2016), and (ii) the change in industry-level Chinese import exposure over the 1999-2007 period in Acemoglu et al. (2016). Again, we show in Appendix Section C that these instruments yield estimates for the effect of import competition on income that are comparable to our own.

II. Results

We now turn to our empirical analysis: the sensitivity of household debt growth to import competition. First, we investigate the role of import competition for household debt growth in 1999-2007 at the commuting zone level. Then, we zoom in to the individual level and analyze the role of house price dynamics.

A. Household debt at the commuting-zone level

A.1. Baseline findings

We estimate a similar cross-sectional specification as (I.2) with household debt growth as the dependent variable:

$$\Delta D_J = \beta \ \mathrm{SC}_J + \delta' \mathbf{X}_J + u_J, \tag{II.1}$$

We first consider the log-change in total debt over the 1999-2007 period in Panel A of Table IV. In columns 1 to 3, the coefficients are highly statistically significant and are only mildly affected by the introduction of controls. When we introduce State fixed effects (in column 4), the coefficient goes down by one-third but remains statistically significant. One standard deviation increase in SC is associated with a 2 to 4 percentage point lower debt growth over the period, which amounts to between 12 and 24% of the cross-sectional standard deviation of the log change in total debt over the sample period. The economic magnitude is significant: given the average level of debt across CZ in 1999 of $23,500, one standard deviation drop in SC translates into an increase in total debt from $470 to $950.

A concern with debt growth is that it could be mechanically driven by changes 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 across specifications. Their magnitudes are similar to those obtained for the response of total debt.

To directly estimate the effect of Chinese import penetration on household debt growth, we perform a formal instrumental variable (IV) analysis, where the 1999-2007 change in net Chinese import penetration is instrumented with SC, and present the results in Appendix Table IA.III. The results presented in columns 1 to 4 indicate that an increase by one percentage point in Chinese net imports leads to a 4 to 7 percentage point higher household debt growth. This confirms that the strong relationship we document between SC and household debt is directly tied to import competition.

We then break down total debt into its various components. In Table V, 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). In 1999, the average household balance sheet was composed of 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 than other categories. For credit card debt and auto debt, the coefficient is also negative, but not statistically significant. We conclude that most of the cross-sectional variation in overall debt growth is explained by differences in mortgage borrowing.

A.2. Robustness of the results

We present a series of robustness tests for these findings in the Appendix. In Appendix Table IA.IV we use the weight-to-value ratio instead of shipping costs to proxy for CZ exposure to import competition and find similar results. In Panel A of Table IA.V, we consider different measures of exposure to import competition from the literature such as 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. The results confirm that household debt increases in areas with higher exposure to import competition.[20]

Panel B of Table IA.V presents several variations of our baseline specification. We start by controlling for the percentage of employment in routine occupations and the average offshorability index of occupations defined at the CZ level and available on David Dorn's website (column 1). We next introduce industry controls (column 2).[21] We then compute 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 exclude the computer industry from the computation of SC in column 4, and California from the sample in column 5. We then include 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 — rather than by adult population.

Our baseline estimate of the effect of SC on household debt is 1.4, with a standard error of 0.4. This corresponds to a range from 14% to 26% around our baseline finding

[20]The relationship between the Autor et al. (2013) (ADH) instrument and household debt growth is positive yet statistically insignificant. However, this does not come as a surprise given that ADH has no predictive power for labor market outcomes over the 2000-2007 sub-period.

[21]Those include 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.

that the standard deviation of SC explains 20% of the cross-sectional standard deviation of household debt. The estimates in Panel B of Table IA.V account for 9% to 26% of the cross-sectional variation in household debt depending on the specification and therefore fall within this range.

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 from 1991 to 1999. We show in Appendix Table IA.VI that the coefficient on SC — although slightly weaker — remains statistically significant.

We finally check whether business debt responds to import competition. In Table IA.VII 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 specific to households. Using the Quarterly Workforce Indicators (QWI) data, we also fail to find any relationship between SC and the employment share of start-up businesses, which suggests that household debt is not used to start new businesses.

Taken together, these results indicate that Chinese import growth in the 2000s significantly affected household debt, primarily via mortgages.

B. Household debt at the individual level

Next, we zoom in at the individual level to better control for demographics and borrower risk profiles, as well as to identify the channels through which import penetration affects household debt.

B.1. Baseline findings

The CCP is instrumental to study 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, individuals' age and credit score, other demographics at the zip code level, and house prices at the most granular level available from CoreLogic. Fourth, the granularity of the CCP allows us to consider heterogeneity in households' response to import competition (see Section III).

We merge the individual-level data from the CCP with shipping costs data at the level of commuting zones. We run the following cross-sectional OLS specification at the individual level:

$$\Delta D_{i,J} = \beta \ \mathrm{SC}_J + \delta' \mathbf{X}_J + \gamma' \mathbf{Z}_i + u_{i,J}, \tag{II.2}$$

where $\Delta D_{i,J}$ is the 1999-07 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.[22] We restrict the sample to individuals who do not move from the CZ where they lived in 1999.[23]

We present the results in Table VI. In Panel A, we consider the change in the log of total debt plus one.[24] Across specifications, the coefficient on SC is negative, significant, and similar to the results we found at the CZ level, which confirms that the increase in debt is significantly higher in CZs where industries are more exposed 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 CZs with low exposure to import competition experience lower growth in their debt-to-income ratio.

We next consider the intensive and extensive margins of household debt growth. In Table VII, we separately analyze the effect of SC exposure on the propensity to take out a new loan at any point in time between 1999 and 2007 (Panel A), and on the 1999-2007 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 likely reason for this is that these borrowers might refinance their debt. We discuss this next.

B.2. 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 response of household debt 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 VIII. In Panel A, the coefficients are negative and highly statistically significant. One standard deviation increase in SC is associated with a 0.4 percentage point increase in the propensity to extract home equity. In Panel B, where we consider the log of the extracted amount plus one, a one standard deviation increase in SC is associate with an increase by 5 percentage points. Altogether, these findings indicate that import competition is associated with both a higher propensity to extract home equity and higher extracted amounts.

To complement these findings, 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 Appendix Table IA.VIII. Across specifications, we find that the demand for refinancing is higher in areas with higher exposure to import competition (columns 3 and 4). The surge in demand for refinancing contrasts with the demand for home purchases, which shows no significant differences across areas (columns 1 and 2). We find similar effects

[22]Some controls, for instance, income, are defined at the zip code level. Formally they are included in $\mathbf{Z}_i$.

[23]In unreported regressions, we find similar results when we include both movers and non-movers.

[24]So that it includes both growths at the intensive and at the extensive margin.

when we focus on originations rather than applications (Appendix Table IA.IX), and when we focus on denial rates (Appendix Table IA.X), which are higher for refinancing loans in areas with greater exposure to import competition. We further confirm that the increase in mortgage debt is not related to the construction of new housing using the Building Permit Survey: Appendix Table IA.XI shows no significant variation in the growth of new permits or in construction employment in more exposed areas.

These results suggest that Chinese import growth after its accession to the WTO led to a sharp increase in household debt through home equity extraction. This points to the role of rising house prices in the first half of the 2000s in explaining our findings, which is what we explore next.

C. The role of house prices

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. The sharp increase in house prices between 1999 and 2007 illustrated in Figure 3 might therefore play an important role in the relationship between import competition and household debt that we find in the data.[25]

To check whether this is the case, we go back to our CZ-level sample and double sort CZs into the top (low exposure) and bottom (high exposure) quintiles of SC, and into the top and bottom half of house price appreciation between 1999 and 2007 as measured by CoreLogic. Figure 6 presents the cumulative 1999-2007 household debt and DTI growth in each subsample. In CZs that experienced low house price appreciation, total debt and DTI growth are only marginally larger in low SC (more exposed) areas. In contrast, CZs that experienced high house price appreciation display strong differences across high and low exposure areas: total debt and DTI growth are much larger in CZs exposed to import competition.

We next formally test these differences in the individual-level CCP dataset. We split our individual-level sample into areas with high versus low house price appreciation, and estimate OLS regressions of the change in log debt, DTI, the extract flag, and the log of the extracted amount plus one, on our measure of exposure to import competition in each subsample. Panel A of Table IX shows that the increase in household debt is concentrated in areas with high house price appreciation. In particular, there is no effect of SC on either DTI or home equity extraction in areas with low house price appreciation. We test for the difference between the coefficients in each sample and confirm that it is statistically significant at conventional levels.

We next replicate this analysis by splitting areas based on the instrumented elasticity of housing supply obtained from Saiz (2010), instead of the house price appreciation itself. We find similar results: the effect of SC on household debt is concentrated in low housing supply elasticity areas, and equity extraction is insensitive to SC in high elasticity areas. These findings confirm that the rise of import competition led to a sharp increase in household debt through home equity extraction, due to the rise in house prices over the period 1999-2007. In what follows, we discuss whether the drop in house prices in the wake of the financial crisis illustrated in Figure 3 might have

[25]Note that SC and house price growth in the 2000s are not correlated, as evidenced in Appendix Table IA.XI.

prevented households to borrow against the value of their homes.

D. Evidence from before 1999 and after 2007

D.1. Pre-1999 period

We first explore the relationship between SC and household debt in the 1990s. As evidenced in Panel A of Figure 1, the household debt-to-income ratio grows only moderately in this period, before increasing sharply in the 2000s. In Appendix Table IA.XII, we replicate the specifications from Table II in the 1991-1999 sub-period. More precisely, we run CZ-level cross-sectional regressions of the 1991-1999 change in Chinese import penetration on SC measured in 1990. In Panel A, we find that the effect of SC on Chinese import penetration is negative and significant, but the coefficients are weaker than those obtained in Table II for the 1999-2007 sub-period. Furthermore, the effect of SC on net Chinese import penetration is insignificant, which suggests that the negative effect of SC on exports to China offsets their positive effect on imports from China in the 1990s.

In Appendix Table IA.XIV, we go one step further and run our baseline CZ-level specification for each year between 1991 and 1999. We fail to find any relationship between SC and net Chinese import penetration, unemployment, and income. The main reason for this may be that Chinese import growth was overall much weaker in the 1990s than in the 2000s, after China's accession to WTO. Panel B of Figure 1 presents aggregate Chinese imports to the U.S., in 2011 dollars. While imports grew by almost $300bn from 1999 to 2007, they grew by only $100bn between 1991 and 1999.

A potential solution might be to use an alternative instrument, such as Autor et al. (2013), for changes in Chinese import penetration in the 1990s. However, as shown in Appendix Table IA.XIII when we replicate their specifications separately for the 1990s, the instrument is unable to predict unemployment and income. All coefficients but one are insignificant, and most of them have the wrong sign; therefore, we cannot use the ADH instrument in the pre-2000 period. This lack of employment response to Chinese import growth in the 1990s is consistent with the evidence presented in Figure 1 that shows that manufacturing employment was relatively stable in the 1990s.

It could be the case that workers experiencing income losses in the 1990s smoothed the shock by extracting equity from their home, this cannot be captured in cross-sectional CZ-level specifications using our instrument or ADH due to the lack of power. Yet we have reasons to think that the mechanism we outline in the paper is unlikely to have substantial aggregate effects, due to house price dynamics. The house price increase in the 1990-1999 period was not as strong as it was in the 2000-2007 period. Figure 3 presents the evolution of the Case-Shiller price index since 1991. Accounting for inflation (with the GDP deflator), we find that real house prices were almost flat during the 1990s while they rose by 55% between 2000 and 2007.

Despite the weakness of the relationship between SC and labor market outcomes in the 1990s, we check whether shipping costs have any predictive power on household debt in the 1990s. Since the CCP starts in 1999, we rely on HMDA data and use the change in the log number of loan applications and originations between 1991 and 1999 as proxies for changes in household debt. We present the results in Panels D and E

of Table IA.XIV. As expected, we fail to find any effect of shipping cost on household debt in the cross-section of CZs throughout the 1990s.

D.2. Post-2007 period

We finally explore what happens post-2007. As evidenced in Panel A of Figure 1, the household debt-to-income ratio drops sharply in the wake of the financial crisis. In Appendix Table IA.XV, we run our baseline CZ-level specification for each year between 1999 and 2011. We find that the relationship between SC and labor market outcomes still operates post- 2007: as shown in the last column of Table A.14, net Chinese import competition keeps building up faster in low SC areas, and the negative impact on income remains strong. However, household debt levels off and declines after 2007. This is likely the result of the drop in house prices illustrated in Figure 3 that makes it harder for households to borrow against their homes, and that confirms that house prices play an important role in explaining our baseline findings.

To understand the consequences of the increase in household debt for low-SC borrowers in the wake of the financial crisis, we estimate the effect of import competition exposure on the change in credit scores, as well as on the probability of mortgage delinquencies and foreclosure during the Great Recession from 2007 to 2011 in the individual-level CCP data. In Table X, we find that exposure to import competition has negative significant effects on individual credit scores (columns 1 and 2), on the probability that mortgages become delinquent, and on foreclosures. In Appendix Table IA.XVI, we find that the decrease in credit scores and the increase in delinquencies and foreclosures between 2007 and 2011 in low SC areas are larger in areas with low housing supply elasticity. Thus, CZs where we find the largest increase in debt and equity extraction – those with high exposure to import competition and a larger increase in house prices over the period 1999-2007 – also experience the worse outcomes in the wake of the financial crisis.

E. Evidence from the Panel Study of Income Dynamics

A limitation of the CCP is that we assign treatment to individuals based on the industry composition of the CZ where they live rather than on their industry itself. As a result, the effects we detect may be unrelated to the labor outcomes in specific industries affected by import competition. While the sample size is relatively small relative to the CCP, the PSID panel allows us to compute SC at the level of each individual's reported industry, rather than estimating their exposure using CZ-level SC. We provide details on the construction of the PSID panel in Appendix B and report summary statistics in Appendix Table IA.XVII.

In Panel A of Table XI, we confirm our earlier findings that higher exposure to import competition leads to higher unemployment, lower labor income, and higher household leverage. One standard deviation increase in SC leads to a 12% decline in income growth in the 1999-2007 period. This decline translates into a cumulative loss of $21,000 from 1999 to 2007. Debt increases by 33% in response to a one standard deviation increase in SC. This corresponds to an increase in debt balances from $8,600 to $15,500.[26]

[26]In Appendix Table IA.XVIII, we perform 2SLS specifications and confirm that trade-related income

In Panel B, we decompose the effect across various types of debt and confirm that the increase in debt is driven by mortgage debt and, to a smaller extent, credit card balances. In contrast, import competition leads to lower auto debt, consistent with the idea that this durable consumption did not increase with the drop in income.

We also construct the measure of equity extraction of Bhutta and Keys (2016) (as in section B.2 above) in the PSID. In Appendix Table IA.XIX we confirm that higher exposure to import competition leads to higher equity extraction (columns 1 to 3). In column 5, we show that the non-instrumented relationship between income and equity extraction is positive: household leverage typically increases with income. However, once income growth is instrumented with SC, the coefficient flips and becomes negative: households who experience a negative income shock tend to borrow more in response.

Altogether, not only do these findings confirm those obtained in the CCP sample, but they also provide direct evidence that the household debt response to import competition goes through individual-level exposure to the associated labor income shock.

III. Understanding the Channel

A. Permanent income hypothesis

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 go back to the textbook formulation of the permanent income hypothesis with quadratic utility in Appendix A. If labor follows an AR(1) process of the form $y_{t+1} = \bar{y} + \rho(y_t - \bar{y}) + \varepsilon_{t+1}$, under quadratic utility the change in borrowing is given by:

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

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-for-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 B.2 and Table VIII) underscore the importance of collateral.

In summary, the permanent income hypothesis delivers two main insights for our purpose: the debt should increase one-for-one with the drop in income, especially if

shocks have induced households to borrow.

households have collateral to borrow against, but only if the shock is perceived as being transitory. We provide evidence along those lines in what follows.

B. *Magnitude of consumption smoothing*

We start by comparing the response of income and debt to import competition. In Section C.3, we use the CCP sample to show that a standard deviation decrease in SC translates into a cumulative income loss of around $2,100 between 1999 and 2007. In Table IV, we find that the same standard deviation decrease in SC corresponds to an increase in debt between 2% and 4%, depending on the specification. Given that the average level of debt across CZ in 1999 is $23,500, the effect of a standard deviation drop in SC leads to a dollar increase in total debt of between $470 and $950. The debt response is sizeable but smaller than the drop in income, consistent with the PIH.

In Section E, we use the PSID and find that a one standard deviation decrease in SC translates into a 12% decline in income growth and a 33% increase in debt over the period. This translates into a cumulative loss of $18,000 in income, and into an increase of $8,500 in debt.[27] The relative magnitude of the increase in debt with respect to the cumulative drop in income is in line with our estimates at the CZ-level, and fits into the standard response predicted by the PIH.[28]

Finally, we provide direct evidence of consumption smoothing. Using the PSID panel and its data on consumption, we show that household consumption does not respond to import competition, despite a significant drop in income. As shown in Appendix Table IA.XX, the effect of SC on consumption is small and statistically insignificant, consistent with our findings that households use debt to offset the drop in income they experience.

C. *Permanent versus transitory shocks*

According to the PIH, debt should only increase if the shock is considered transitory. 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 should be the case that households who increase borrowing the most are those that are indeed hit by a transitory shock because they can easily find another

[27]For this computation, we use the same baseline income and debt level in 1999 (from the IRS and the CCP) as in our analysis at the CZ-level, respectively $37,500 and $23,500. These statistics are similar to the 1999 income and debt level of the median household in the PSID, see Online Appendix Table IA.XVII. We compute the cumulative loss in income as $\sum_{t=1}^{t=8}(\exp(0.015 \times t) - 1) \times 23,500$ where 0.015=0.12/8 is the annualized decline in income growth estimated in the PSID.

[28]The dollar values for respectively the estimated drop in income, and increase in debt, are higher in the PSID, than for the analysis at the CZ level. However, in the PSID, we directly link households to the SC of their industry of occupation across manufacturing industries only, whereas our analysis at the CZ level aggregates all households who reside in a given CZ. Accounting for the share of non-exposed households (in non-manufacturing industries), the dollar values for the estimated drop in income, and increase in debt, are around $2,800 and $1,350 respectively, in line with our estimates at the CZ level.

job. We test whether the increase in debt is stronger for higher income and more educated workers. In Figure 7 we present the point estimates and confidence intervals of cross-sectional regressions of the change in the debt-to-income ratio from 1999Q4 to 2007Q4 on our proxy for import competition, at the individual level. The specifications are similar to column 10 of Table VI and are run separately across deciles of individual age (a), individual credit score (b), income of a ZIP code (c), and the share of the population with at least college education in a ZIP code (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 debt growth 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 explain the household debt response to Chinese import growth. Workers that are permanently excluded from the labor market may have anticipated the shock to be transitory. 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 the realized and the 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 outcomes. 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 8, 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 XII confirms that this holds in CZ-level cross-sectional regressions after including the full set of controls of our baseline specification.[29] Hence, households exposed to import competition might be taking more debt because they expect the shock to be more transitory than it ended up being.[30]

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

[30]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 show 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

IV. Conclusion

We analyze the effect of import competition on household balance sheets using individual data on consumer finances. We exploit variation in local industry exposure to foreign competition to study households' response to the income shock triggered by China's accession to the WTO. 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 around 20% of the cross-regional variation in household leverage growth between 1999 and 2007. The effects are driven by home equity extraction and concentrated in areas with strong house price growth. 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.

While there are conditions during the early 2000s that facilitated household borrowing, this is not a circumstance specific to our natural experiment nor does it imply that there are not broader economic lessons regarding household borrowing or financial stability. In particular, is is important to uncover the microeconomic conditions that contribute to households' credit cycles and thereby induce business cycles. Not only do households use the mortgage market to smooth consumption in response to income shocks, but we illustrate the severe consequences if their expectations turn out to be wrong. Our results also suggest that financial stability policies such as unemployment insurance, or mortgage market regulations (e.g. LTV limits), could mitigate future crises.

marginal propensity to save out of permanent shocks is significantly different from zero. We leave a proper quantification of this channel to future research.

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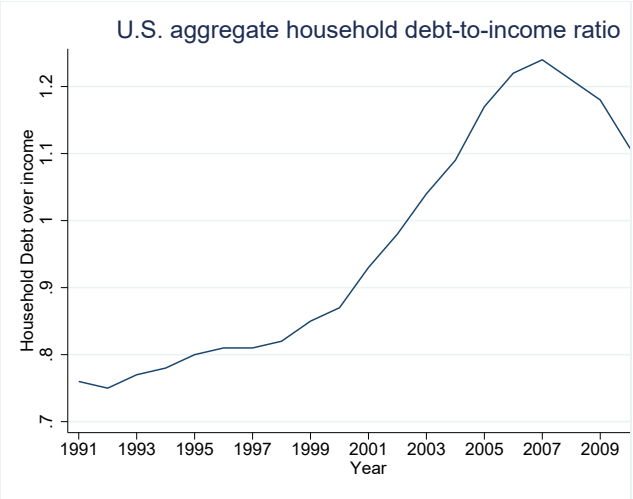
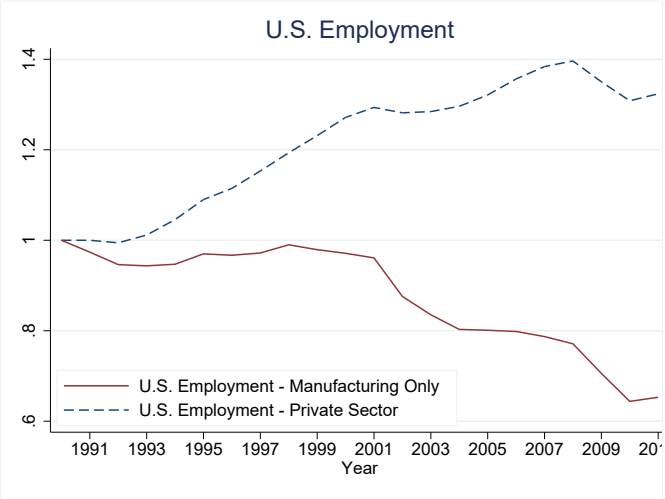
Figures

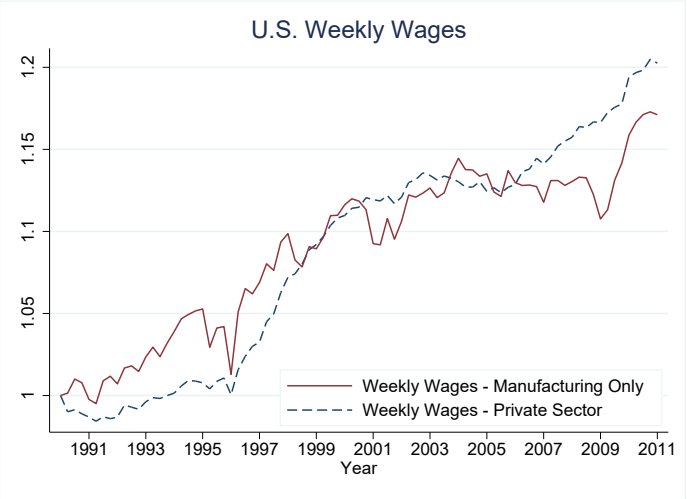


Panel A. Debt-to-income ratio

Panel B. Chinese imports



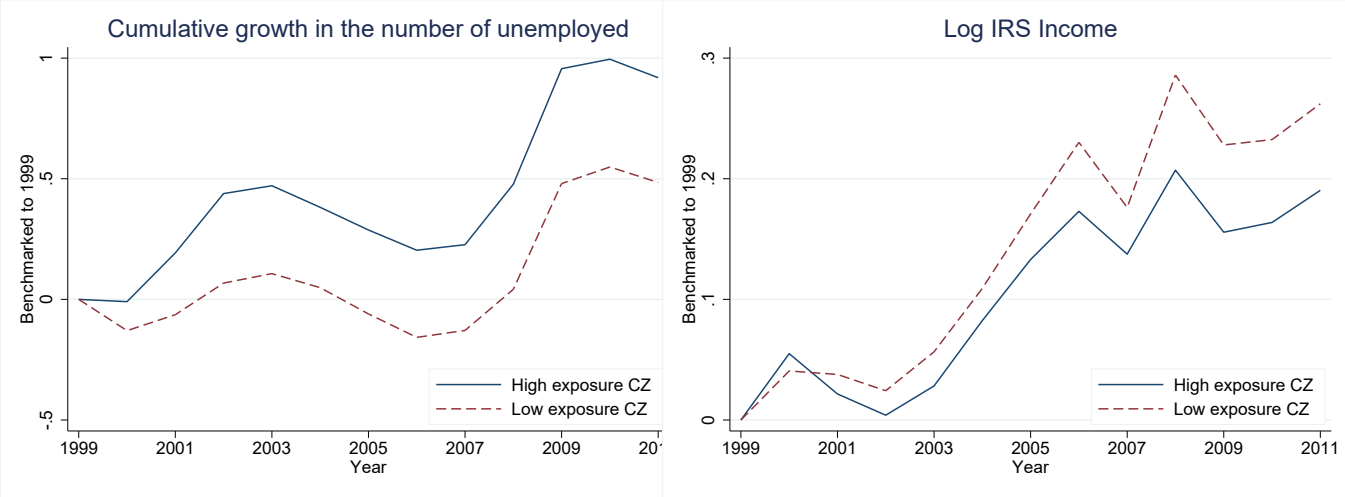
Panel C. Employment



Panel D. Weekly Wages

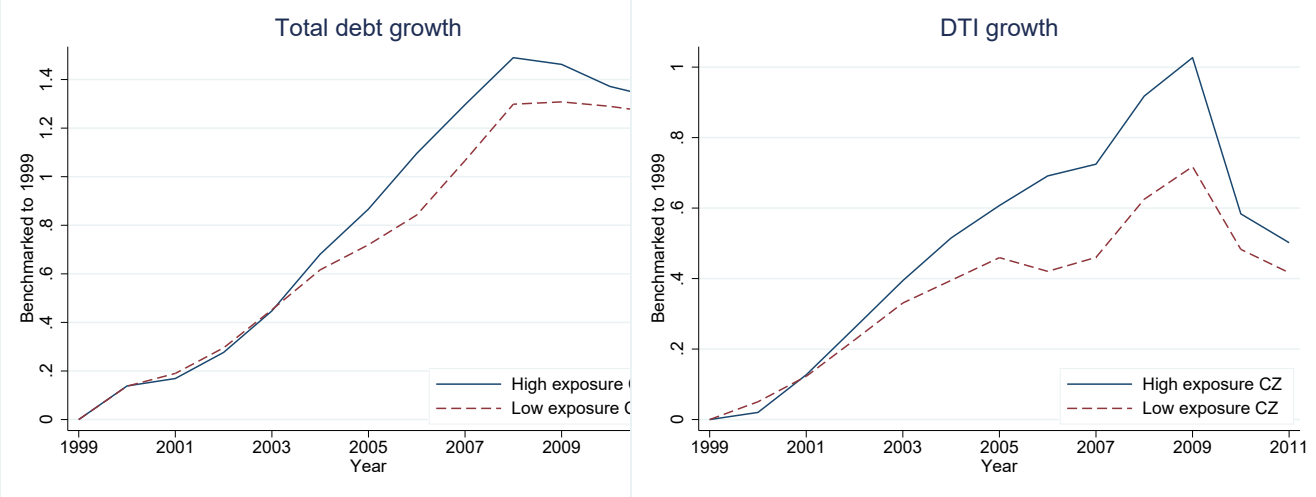
Figure 1. Aggregate U.S. Household Debt-to-Income Ratio, Chinese Net Imports to the U.S., Manufacturing Employment and Weekly Wages

Note: This figure presents the time series of U.S. aggregate household debt-to-income ratio from 1991 to 2011 (panel A) obtained from the Enhanced Financial Accounts maintained by the Federal Reserve Board, real Chinese imports to the U.S. over the same period (panel B), total employment for the U.S. private sector and manufacturing sectors only both normalized to 1 in 1990 (panel C), and weekly wages for the U.S. private sector and manufacturing sectors only both normalized to 1 in 1990 (panel D).



Panel A. Unemployed Workers

Panel B. Income



Panel C. Debt

Panel D. Debt-to-income

Figure 2. Labor Market Outcomes and Household Debt Across High and Low Exposure Areas

Note: This figure presents the log change in unemployed workers (Panel A), the log change in income (Panel B), cumulative debt growth (Panel C), and debt-to-income (Panel D) 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.

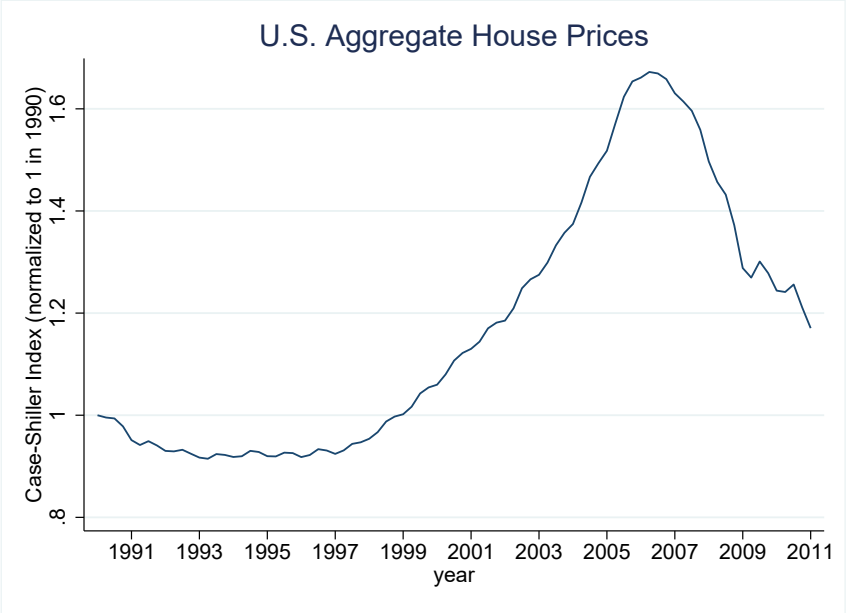
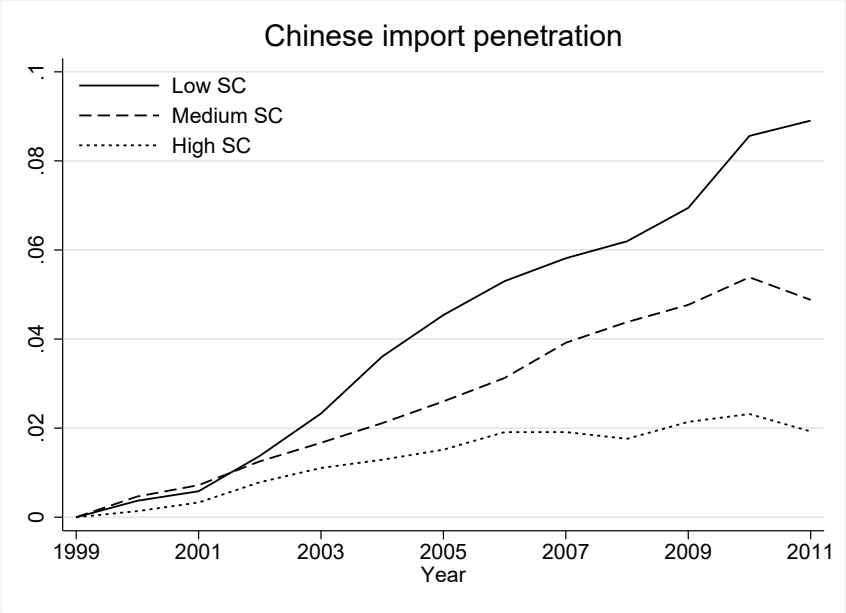


Figure 3. U.S. Aggregate House Prices

Note: The figure shows the national Case-Shiller index deflated by the GDP price index, normalized to 1 in 1990.

Panel A. Cumulative change in Chinese import penetration



Panel B. Cumulative change in Chinese net import penetration

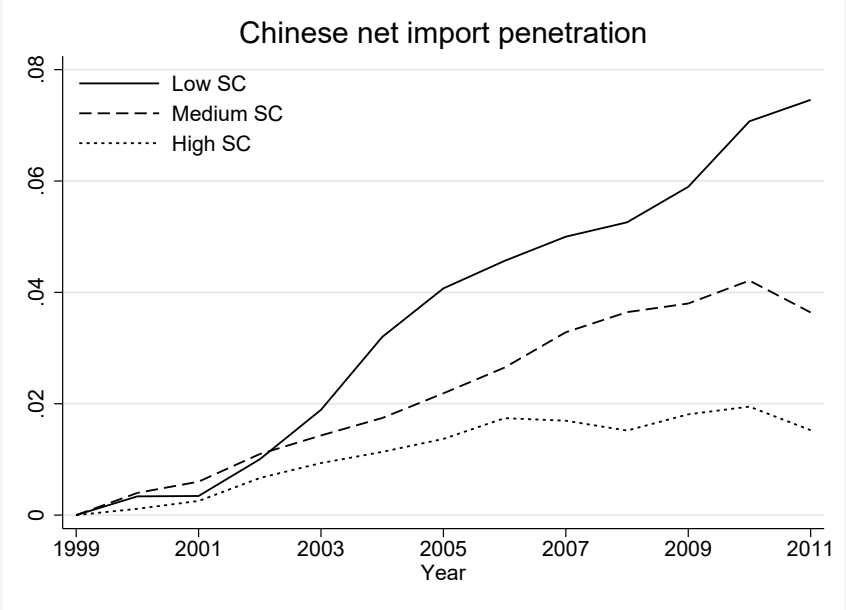


Figure 4. Change in Chine Import Penetration

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.

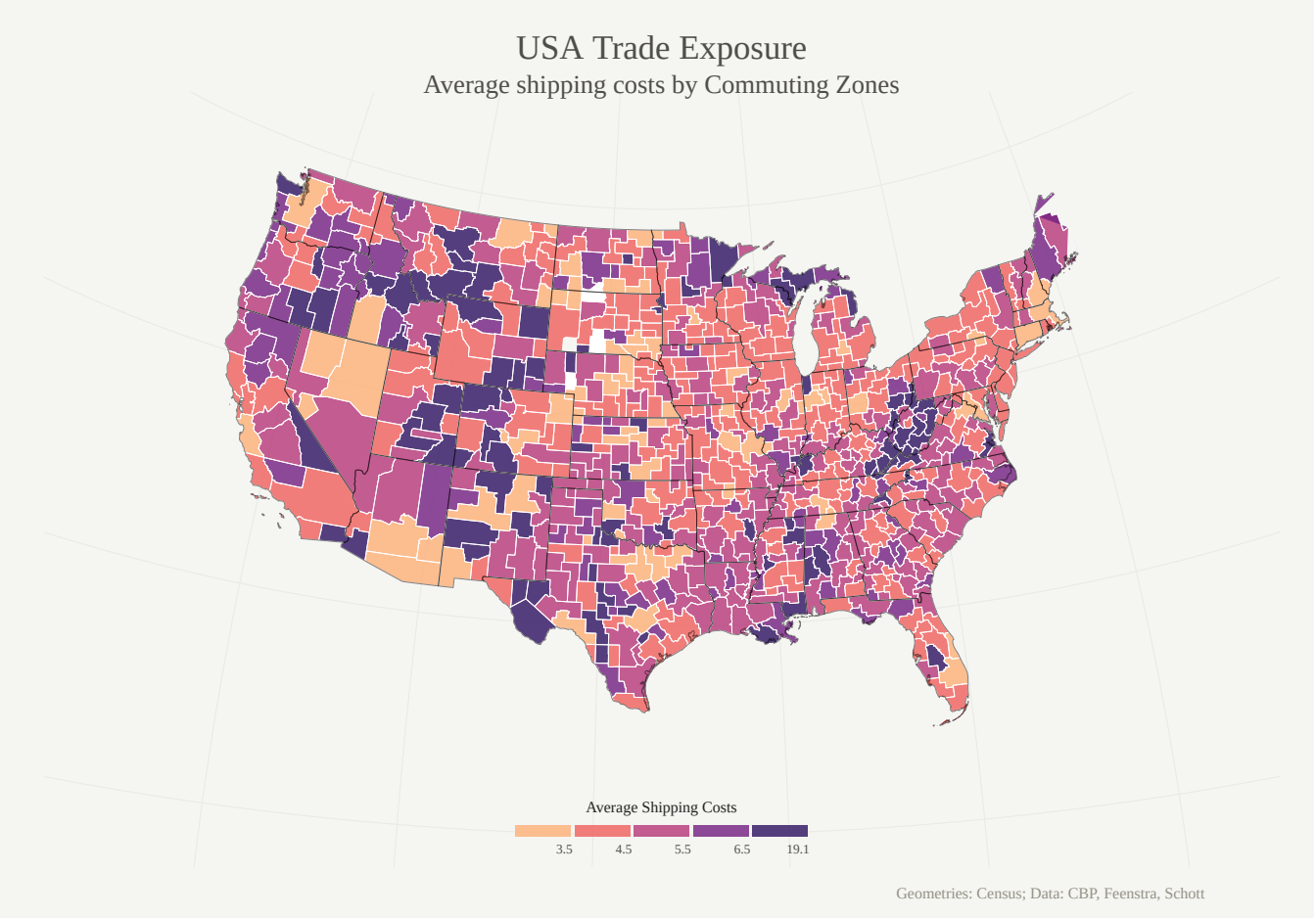


Figure 5. Average Shipping Costs by Commuting Zones

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.

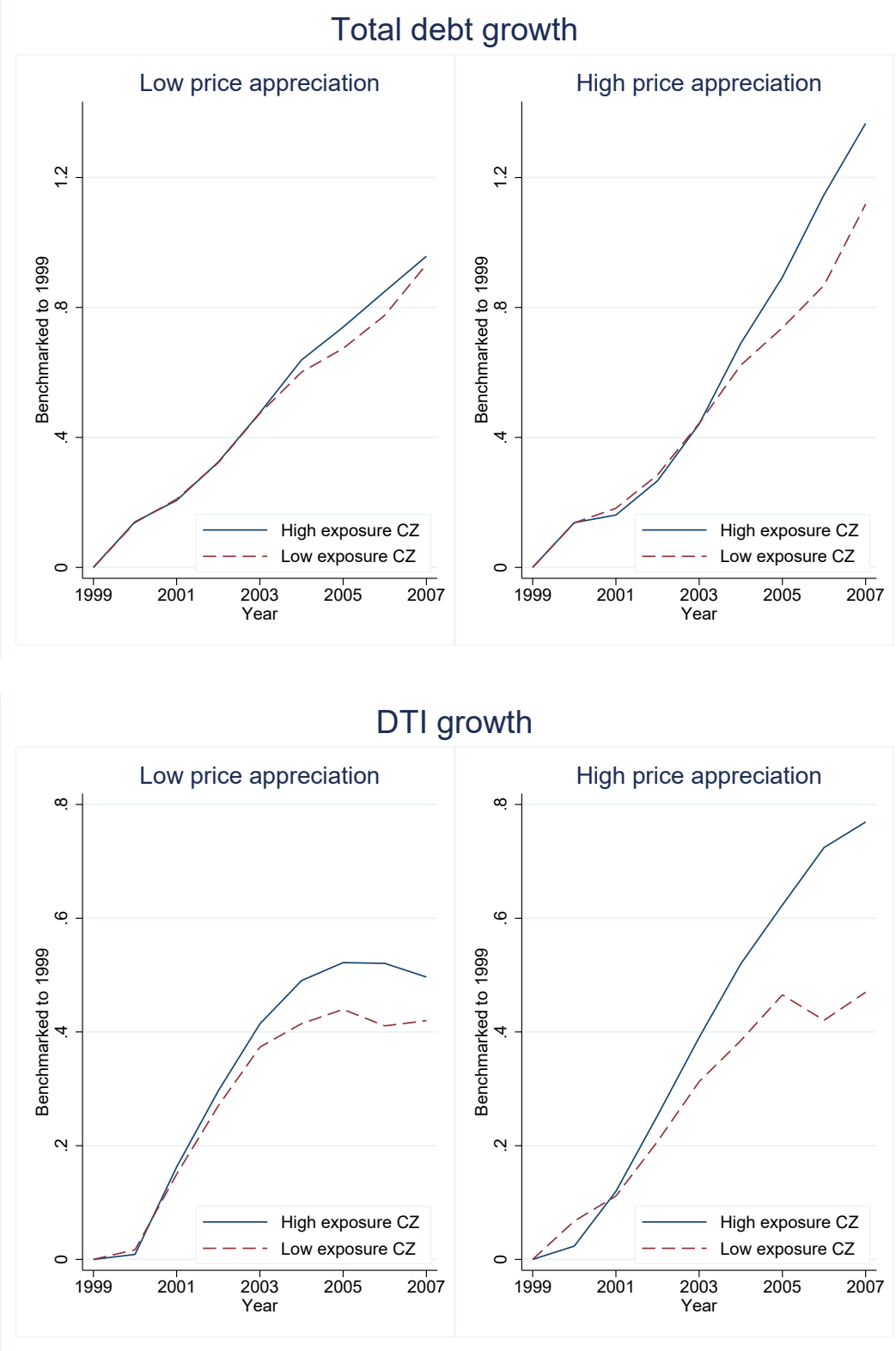
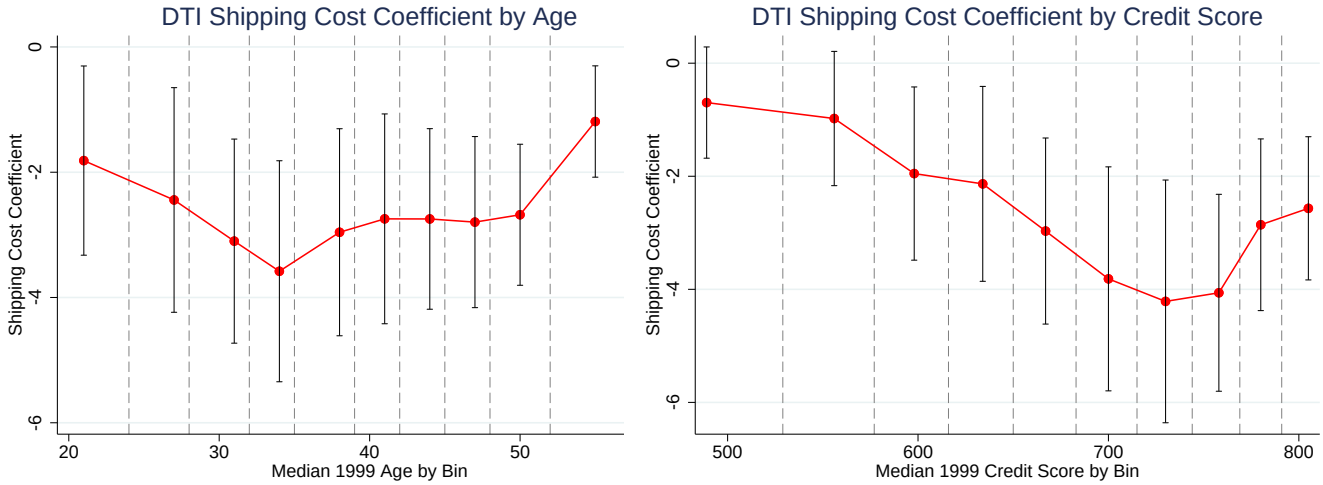
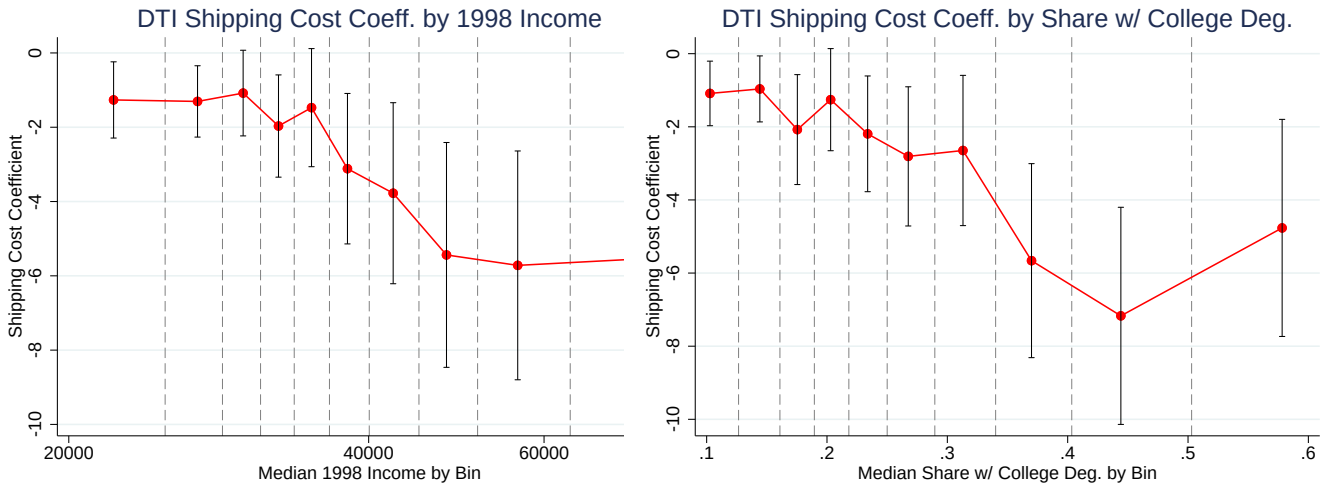


Figure 6. Household Debt Across High and Low Exposure Areas Interacted with House Price Appreciation

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.



(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 7. 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 1999Q4 to 2007Q4 on shipping costs, our proxy for import competition, at the individual level. The specifications are similar to column (10) of Table VI 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).

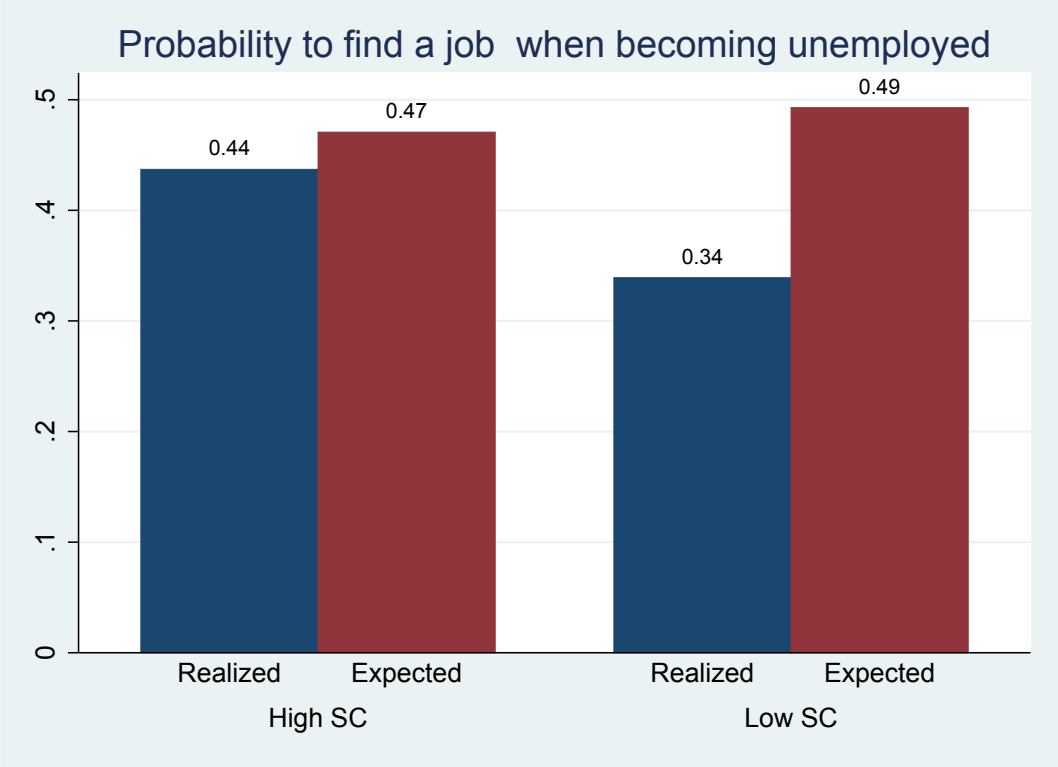


Figure 8. Realized and Expected Duration of Unemployment Spells

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 I. Summary Statistics

	Observations	Mean	Median	Std. dev.
Panel A: CZ Level				
Shipping costs	732	0.050	0.044	0.023
Δ_{99-07} CH Import Penetration	732	0.037	0.033	0.030
Δ_{99-07} Net CH Import Penetration	732	0.032	0.028	0.029
Δ_{91-99} CH Import Penetration	732	0.012	0.009	0.014
Log Debt	732	3.080	3.060	0.407
Log Income	732	3.559	3.549	0.203
DTI	732	0.613	0.594	0.167
Δ_{99-07} log Debt	732	0.656	0.641	0.168
Δ_{99-07} DTI	732	0.427	0.402	0.209
Δ_{99-07} Log Unemployed	732	0.066	0.095	0.366
$\sum$ IRS Income 2000-2007/IRS Income 1999	732	8.800	8.739	0.418
$\Delta_{99,07}$ log All Mortgage	732	0.813	0.795	0.273
Δ_{99-07} log HELOC	732	1.593	1.645	1.167
Δ_{99-07} log Credit Card Debt	732	0.345	0.347	0.152
Δ_{99-07} log Auto Debt	732	0.735	0.736	0.239
Δ_{99-07} HPI	732	0.412	0.368	0.181
Δ_{91-99} HMDA loan origination	732	2.996	2.702	1.839
Δ_{99-07} Log Loan Applications (Home Purchase)	732	-0.150	-0.101	0.390
Δ_{99-07} Log Loan Applications (Refinancing)	732	0.225	0.222	0.307
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_{99-07} Log(Debt + 1)	5,098,995	0.638	0.414	4.414
Δ_{99-07} Log(Debt)	4,010,038	0.825	0.575	2.350
Δ_{99-07} DTI	5,020,862	0.694	0.029	2.077
Extract Flag	3,043,037	0.474	0.000	0.499
Extract Value	3,043,037	45552	0.000	119086
Δ_{07-11} Credit Score	4,630,796	9.059	10.000	67.456
Mtg. Delinq.$_{07-11}$	4,630,796	0.115	0.000	0.319
Foreclosure$_{07-11}$	4,630,796	0.039	0.000	0.194
Shipping Costs	5,098,995	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 732 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 1999 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 2000 and 2007, inclusive.

Table II. Shipping Costs and Chinese Import Penetration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Δ_{99-07} CH Imp. Penetration				Δ_{99-07} Net CH Imp. Penetration			
Shipping costs	-0.519***	-0.224***	-0.233***	-0.280***	-0.453***	-0.205**	-0.209***	-0.255***
	(0.138)	(0.080)	(0.077)	(0.073)	(0.113)	(0.077)	(0.075)	(0.072)
Log Employment		-0.001	-0.001	-0.001		0.001	0.001	0.001
		(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)
Employment in Manufacturing (%)		0.059***	0.067***	0.075***		0.044***	0.052***	0.054***
		(0.021)	(0.021)	(0.021)		(0.015)	(0.015)	(0.015)
Log Income		-0.033**	-0.031**	-0.019		-0.033*	-0.031*	-0.026
		(0.015)	(0.015)	(0.018)		(0.017)	(0.016)	(0.022)
Log Debt		0.002	-0.001	0.008		0.002	-0.000	0.007
		(0.006)	(0.008)	(0.009)		(0.007)	(0.008)	(0.008)
Δ_{91-99} HMDA loan origination		-0.002*	-0.001	-0.001		-0.001	-0.001	-0.001
		(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)
Δ_{91-99} Net CH Import Penetration		0.827***	0.801***	0.775***		0.736***	0.719***	0.724***
		(0.205)	(0.212)	(0.220)		(0.180)	(0.184)	(0.214)
Census controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Quintiles HP Growth	No	No	Yes	Yes	No	No	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
State FE	No	No	No	Yes	No	No	No	Yes
Observations	732	732	732	732	732	732	732	732
R^2	0.093	0.397	0.404	0.525	0.081	0.347	0.353	0.477
Magnitude SC	-0.012	-0.005	-0.005	-0.007	-0.011	-0.005	-0.005	-0.006
% dep. var. cross-CZ s.d.	-0.410	-0.177	-0.184	-0.221	-0.361	-0.163	-0.167	-0.203

Note: This table presents cross-sectional regressions of the change in Chinese Import Penetration (and Net Chinese Import Penetration) between 1999 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 1999 and 2007 are from the most granular index available from CoreLogic. Δ_{91-99} HMDA 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, 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. Clustered standard errors at the state level are reported in parentheses. *, ** and *** means statistically different from zero at 10%, 5% and 1% level of significance.

Table III. Import Competition and Labor Market Outcomes, CZ Level

Panel A: Unemployment	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Δ_{99-07} Log Unemployed				$\sum$ IRS Income 2000-2007/IRS Income 1999			
Shipping costs	-8.704***	-5.365***	-5.276***	-2.044**	7.457***	2.540**	2.649**	2.292**
	(1.669)	(1.392)	(1.170)	(0.887)	(1.702)	(1.205)	(1.167)	(1.137)
Log Employment		0.007	0.000	-0.005		-0.037	-0.031	-0.012
		(0.028)	(0.022)	(0.018)		(0.026)	(0.024)	(0.020)
Employment in Manufacturing (%)		0.036	-0.441	-0.541**		-2.006***	-1.690***	-1.439***
		(0.366)	(0.325)	(0.239)		(0.339)	(0.371)	(0.340)
Log Income		-0.271	-0.287	-0.063		-1.382***	-1.382***	-1.432***
		(0.324)	(0.257)	(0.225)		(0.330)	(0.281)	(0.337)
Log Debt		0.277*	0.460***	0.393***		0.349**	0.256*	0.460***
		(0.161)	(0.158)	(0.095)		(0.144)	(0.146)	(0.157)
Δ_{91-99} HMDA loan origination		0.007	-0.009	0.006		-0.046***	-0.034**	-0.019
		(0.023)	(0.021)	(0.019)		(0.017)	(0.017)	(0.013)
Δ_{91-99} Net CH Import Penetration		0.679	2.060	1.566**		1.279	0.488	-1.091
		(1.916)	(1.587)	(0.740)		(2.135)	(2.383)	(1.204)
Census controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Quintiles HP Growth	No	No	Yes	Yes	No	No	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
State FE	No	No	No	Yes	No	No	No	Yes
Observations	732	732	732	732	732	732	732	732
R^2	0.115	0.388	0.483	0.777	0.094	0.452	0.500	0.691
Magnitude SC	-0.204	-0.126	-0.124	-0.048	0.175	0.059	0.062	0.054
% dep. var. cross-CZ s.d.	-0.557	-0.343	-0.337	-0.131	0.417	0.142	0.148	0.128

Note: This table presents cross-sectional regressions of the change in the log number of unemployed workers from 1999 to 2007 in Panel A (respectively cumulative income in Panel B) on shipping costs at the commuting zone level. 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 1999 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. Δ_{91-99} HMDA 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, 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. Clustered standard errors at the state level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table IV. Import Competition and Household Debt Growth, CZ Level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: Δ_{99-07} Log Debt				Panel B: Δ_{99-07} DTI			
Shipping costs	-1.726***	-1.595***	-1.430***	-0.892**	-5.792***	-2.431***	-2.093***	-1.193**
	(0.521)	(0.510)	(0.390)	(0.424)	(1.824)	(0.742)	(0.589)	(0.467)
Log Employment		-0.014	-0.010	-0.003		-0.009	-0.003	0.005
		(0.014)	(0.012)	(0.011)		(0.033)	(0.028)	(0.017)
Employment in Manufacturing (%)		-0.723***	-0.416***	-0.541***		-0.348	0.002	-0.353**
		(0.196)	(0.135)	(0.126)		(0.293)	(0.226)	(0.146)
Log Income		-0.106	-0.083	0.150		0.285	0.165	0.089
		(0.140)	(0.082)	(0.102)		(0.264)	(0.195)	(0.141)
Log Debt		0.210**	0.093	-0.096*				
		(0.093)	(0.075)	(0.050)				
DTI						1.073***	0.884***	0.313***
						(0.157)	(0.122)	(0.090)
Δ_{91-99} HMDA loan origination		0.012	0.020*	0.015**		0.012	0.021	0.022***
		(0.012)	(0.010)	(0.006)		(0.019)	(0.016)	(0.007)
Δ_{91-99} Net CH Import Penetration		-0.234	-0.704	0.465		-0.492	-0.946	0.758
		(0.469)	(0.499)	(0.435)		(0.752)	(0.701)	(0.484)
Census controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Quintiles HP Growth	No	No	Yes	Yes	No	No	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
State FE	No	No	No	Yes	No	No	No	Yes
Observations	732	732	732	732	732	732	732	732
R^2	0.026	0.367	0.513	0.764	0.078	0.672	0.731	0.906
Magnitude SC	-0.040	-0.037	-0.033	-0.021	-0.136	-0.048	-0.041	-0.026
% dep. var. cross-CZ s.d.	-0.241	-0.222	-0.200	-0.124	-0.650	-0.273	-0.235	-0.134

Note: This table presents cross-sectional regressions of debt growth from 1999Q4 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 1999 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. Δ_{91-99} HMDA 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, 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. Clustered standard errors at the state level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

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

	(1)	(2)	(3)	(4)	(5)
	Δ_{99-07} Log debt				
	All Mortgages	Mortgage Loans	HELOC	Credit Card	Auto
Shipping costs	-1.896***	-2.004***	-4.468*	-0.234	-1.496
	(0.534)	(0.537)	(2.561)	(0.306)	(1.031)
Log Employment	-0.014	-0.022	-0.041	0.004	-0.032
	(0.015)	(0.016)	(0.060)	(0.007)	(0.024)
Employment in Manufacturing (%)	-0.519***	-0.499***	-1.976***	-0.090	-0.858***
	(0.169)	(0.163)	(0.698)	(0.082)	(0.266)
Log Income	-0.066	-0.097	0.269	-0.095	-0.445*
	(0.104)	(0.098)	(0.609)	(0.085)	(0.260)
Log Debt	0.108	0.079	0.391	0.053	0.152
	(0.095)	(0.100)	(0.357)	(0.040)	(0.097)
Δ_{91-99} HMDA loan origination	0.043***	0.045***	0.112***	0.003	-0.004
	(0.013)	(0.013)	(0.041)	(0.005)	(0.016)
Δ_{91-99} Net CH Import Penetration	-0.676	-0.715	-0.738	0.364	-0.939
	(0.645)	(0.717)	(2.708)	(0.394)	(1.248)
Census controls	Yes	Yes	Yes	Yes	Yes
Quintiles HP Growth	Yes	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.
Observations	732	732	732	732	732
R^2	0.398	0.393	0.156	0.392	0.312
Magnitude SC	-0.044	-0.047	-0.105	-0.005	-0.035
% dep. var. cross-CZ s.d.	-0.163	-0.157	-0.090	-0.036	-0.147

Note: This table presents cross-sectional regressions of debt growth from 1999Q4 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 1999 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. Δ_{91-99} HMDA 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, 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. Clustered standard errors at the state level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table VI. Import Competition and Household Debt Growth, Individual Level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Panel A: Δ_{99-07} Log (Debt+1)					Panel B: Δ_{99-07} DTI				
Shipping Costs	-1.900**	-2.414***	-1.612**	-1.783**	-1.638**	-3.361***	-1.946***	-2.091***	-2.208***	-2.033***
	(0.899)	(0.742)	(0.750)	(0.739)	(0.738)	(0.745)	(0.617)	(0.649)	(0.643)	(0.634)
Log Employment		0.006	0.004	-0.004	-0.004		0.024***	0.023***	0.018*	0.017*
		(0.007)	(0.009)	(0.009)	(0.008)		(0.009)	(0.009)	(0.009)	(0.009)
Employment in Manufacturing (%)		-0.851***	-1.234***	-1.199***	-1.137***		-0.550***	-0.645***	-0.636***	-0.496***
		(0.139)	(0.155)	(0.149)	(0.149)		(0.151)	(0.152)	(0.150)	(0.132)
Log Income		-0.289***	0.110***	0.165***	0.158***		-0.007	-0.082***	-0.052*	-0.067**
		(0.026)	(0.026)	(0.028)	(0.027)		(0.034)	(0.031)	(0.030)	(0.029)
Log (Debt+1)			-0.604***	-0.619***	-0.619***					
			(0.002)	(0.003)	(0.003)					
DTI								-0.199***	-0.207***	-0.207***
								(0.015)	(0.017)	(0.017)
Δ_{91-99} HMDA Loan Origination		0.018**	0.001	-0.008	-0.012		0.033***	0.032***	0.026***	0.019***
		(0.009)	(0.009)	(0.009)	(0.009)		(0.007)	(0.008)	(0.007)	(0.006)
Δ_{91-99} Net CH Import Penetration		2.084	2.810*	2.425	2.315		4.109**	4.760**	4.542**	4.279**
		(1.468)	(1.583)	(1.547)	(1.455)		(1.863)	(1.896)	(1.841)	(1.709)
Credit Score			0.007***					0.001***		
			(0.000)					(0.000)		
Age			-0.053***					-0.031***		
			(0.001)					(0.001)		
Quintiles HP Growth	No	No	No	No	Yes	No	No	No	No	Yes
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	5,098,995	5,098,995	5,098,995	5,098,995	5,098,995	5,020,862	5,020,862	5,020,862	5,020,862	5,020,862
R^2	0.002	0.003	0.283	0.294	0.294	0.014	0.015	0.074	0.093	0.093

Note: This table presents cross-sectional regressions of debt growth from 1999Q4 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 1999 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, poverty rate, and percent urban, all drawn from the 2000 census. 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 VII. Import Competition and Household Debt Growth by Debt Type, Individual Level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Panel A: Extensive margin (Debt dummy$_{07}$)					Panel B: Intensive margin (Δ_{99-07} Log Debt)				
Shipping Costs	-0.186*	0.069	0.112	0.095	0.086	-1.986***	-2.020***	-2.629***	-2.739***	-2.518***
	(0.097)	(0.099)	(0.097)	(0.094)	(0.096)	(0.624)	(0.517)	(0.542)	(0.550)	(0.515)
Log Employment		0.002	-0.000	-0.001	-0.001		0.030***	0.030***	0.026***	0.025***
		(0.002)	(0.002)	(0.002)	(0.002)		(0.006)	(0.006)	(0.006)	(0.006)
Employment in Manufacturing (%)		-0.027	-0.033	-0.030	-0.041*		-0.571***	-0.733***	-0.730***	-0.579***
		(0.024)	(0.025)	(0.024)	(0.023)		(0.125)	(0.129)	(0.130)	(0.103)
Log Income		-0.014***	-0.008**	-0.003	-0.002		-0.268***	-0.419***	-0.390***	-0.406***
		(0.003)	(0.003)	(0.004)	(0.003)		(0.029)	(0.038)	(0.036)	(0.033)
Log (Debt+1)			-0.004***	-0.005***	-0.005***					
			(0.000)	(0.000)	(0.000)					
DTI								-0.335***	-0.328***	-0.329***
								(0.027)	(0.028)	(0.028)
Δ_{91-99} HMDA Loan Origination		-0.002*	-0.004***	-0.004***	-0.004***		0.026***	0.022***	0.019**	0.011**
		(0.001)	(0.001)	(0.001)	(0.001)		(0.007)	(0.007)	(0.007)	(0.005)
Δ_{91-99} Net CH Import Penetration		0.123	0.056	0.018	0.018		1.955	3.179**	3.097**	2.962**
		(0.191)	(0.201)	(0.198)	(0.197)		(1.289)	(1.329)	(1.276)	(1.169)
Credit Score			0.001***					0.001***		
			(0.000)					(0.000)		
Age			-0.006***					-0.049***		
			(0.000)					(0.001)		
Quintiles HP Growth	No	No	No	No	Yes	No	No	No	No	Yes
Risk Bins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age Bins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,098,995	5,098,995	5,098,995	5,098,995	5,098,995	4,010,038	4,010,038	4,010,038	4,010,038	4,010,038
R^2						0.004	0.006	0.140	0.152	0.152
Pseudo R^2	0.001	0.004	0.019	0.025	0.025					

Note: This table presents cross-sectional regressions of debt growth from 1999Q4 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 1999Q4 to 2007Q4, without adding 1 to zero balances, so that individuals with zero balances in 1999Q4 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, 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 VIII. Import Competition and Home Equity Extraction, Individual Level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Panel A: Extract Flag					Panel B: Log(Extract Amount + 1)				
Shipping Costs	-1.329***	-0.453***	-0.426***	-0.447***	-0.416***	-18.412***	-6.320***	-5.165***	-5.465***	-4.987***
	(0.179)	(0.159)	(0.156)	(0.152)	(0.149)	(2.220)	(1.828)	(1.782)	(1.739)	(1.707)
Log Employment		0.004**	0.004**	0.004*	0.003*		0.073***	0.044*	0.040	0.038
		(0.002)	(0.002)	(0.002)	(0.002)		(0.024)	(0.023)	(0.024)	(0.023)
Employment in Manufacturing (%)		-0.124***	-0.117***	-0.112***	-0.089***		-1.804***	-1.655***	-1.613***	-1.272***
		(0.032)	(0.032)	(0.031)	(0.029)		(0.396)	(0.387)	(0.386)	(0.350)
Log Income		0.039***	0.023***	0.029***	0.026***		0.641***	0.979***	1.016***	0.977***
		(0.006)	(0.005)	(0.005)	(0.005)		(0.069)	(0.072)	(0.071)	(0.071)
Log (Debt+1)			0.023***	0.021***	0.021***					
			(0.001)	(0.000)	(0.000)					
DTI								0.373***	0.349***	0.348***
								(0.039)	(0.036)	(0.036)
Δ_{91-99} HMDA Loan Origination		-0.004***	-0.004**	-0.005***	-0.006***		-0.015	-0.023	-0.031*	-0.049***
		(0.002)	(0.002)	(0.002)	(0.002)		(0.021)	(0.019)	(0.019)	(0.017)
Δ_{91-99} Net CH Import Penetration		0.545	0.494	0.482	0.426		8.304**	6.009	5.985	5.246
		(0.342)	(0.340)	(0.331)	(0.313)		(4.207)	(4.026)	(3.936)	(3.669)
Credit Score			0.000					-0.000		
			(0.000)					(0.000)		
Age			-0.001***					-0.005***		
			(0.000)					(0.001)		
Quintiles HP Growth	No	No	No	No	Yes	No	No	No	No	Yes
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	3,043,037	3,043,037	3,043,037	3,043,037	3,043,037	3,043,037	3,043,037	3,043,037	3,043,037	3,043,037
R^2						0.030	0.038	0.057	0.072	0.072
Pseudo R^2	0.017	0.021	0.033	0.043	0.044					

Note: This table presents cross-sectional regressions of proxies for home equity extraction from 1999Q4 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 2000 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. 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, 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 IX. Import Competition and Household Debt: Interaction with House Prices

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: House Price Appreciation							
	Δ Log (debt)		Δ DTI		Extract Flag		Log(Extract Value + 1)	
	Low	High	Low	High	Low	High	Low	High
Shipping Costs	-1.654***	-3.908***	-0.447	-5.259***	-0.161	-0.968***	-1.924	-13.383***
	(0.390)	(0.986)	(0.357)	(1.301)	(0.129)	(0.234)	(1.439)	(2.956)
Risk Bins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age Bins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CZ controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,040,044	1,969,994	2,673,472	2,347,435	1,577,907	1,465,130	1,577,907	1,465,130
R^2	0.369	0.357	0.067	0.069	0.057	0.047	0.065	0.057
P-value (High-Low)		0.031		0.000		0.004		0.001
	Panel B: Housing Supply Elasticity							
	Δ Log (debt)		Δ DTI		Extract Flag		Log(Extract Value + 1)	
	Low	High	Low	High	Low	High	Low	High
Shipping Costs	-8.666***	-4.245***	-9.938***	-3.147**	-1.418***	0.136	-22.749***	-0.864
	(2.244)	(1.170)	(2.141)	(1.411)	(0.367)	(0.364)	(4.974)	(4.465)
Risk Bins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age Bins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CZ controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,448,863	1,450,131	1,720,550	1,734,660	1,068,658	1,142,785	1,068,662	1,142,785
R^2	0.355	0.376	0.070	0.073	0.044	0.063	0.052	0.073
P-value (High-Low)		0.080		0.009		0.003		0.001

Note: This table presents cross-sectional regressions of debt growth and home equity extraction from 1999Q4 to 2007Q4 on shipping costs, at the individual level. The specifications are the same as in respectively column (9) of Table VII, column (9) of Table VI, column (4) of Table VIII, and column (9) of Table VIII , and are performed separately for areas with low (that is, below median) and high (above median) house price appreciation over the period 1999-2007 in Panel A, and separately for areas with low (that is, below median) and high (above median) housing supply elasticity in Panel B. The elasticity of housing supply is obtained from Saiz 2010. Standard errors are clustered at the commuting zone level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively. We present the p-value for the difference in Shipping costs between low and high house price appreciation in Panel A, and between low and high housing supply in Panel B.

Table X. Import Competition, Delinquencies and Foreclosures (2007-2011)

	(1) Δ Credit Score	(2) Bottom Credit Δ Decile	(3) Mortgage Delinquency	(4) Foreclosure
Shipping Costs	19.590**	-0.098**	-0.244***	-0.281***
	(8.797)	(0.047)	(0.078)	(0.075)
Log Employment	-0.583***	0.003***	0.002**	0.001*
	(0.100)	(0.001)	(0.001)	(0.001)
Employment in Manufacturing (%)	4.659***	-0.022***	-0.063***	-0.050***
	(1.453)	(0.008)	(0.019)	(0.015)
Log Income	-1.010***	0.006***	0.011***	0.007***
	(0.351)	(0.002)	(0.003)	(0.002)
Log (Debt+1)	-0.479***	0.002***	0.009***	0.002***
	(0.046)	(0.000)	(0.000)	(0.000)
Δ_{91-99} HMDA Loan Origination	-0.147	0.001	-0.002***	-0.002**
	(0.110)	(0.001)	(0.001)	(0.001)
Δ_{91-99} Net CH Import Penetration	-21.882	0.251**	0.161	0.022
	(18.054)	(0.109)	(0.197)	(0.148)
Quintiles HP Growth	Yes	Yes	Yes	Yes
Risk Bins	Yes	Yes	Yes	Yes
Age Bins	Yes	Yes	Yes	Yes
Census controls	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Observations	4,630,796	4,630,796	4,630,796	4,630,796
R^2	0.019			
Pseudo R^2		0.041	0.101	0.098

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 2007Q4 and 2011Q4. Logit markginal effects are reported. The analysis is restricted to individuals appearing in Equifax in 2007Q4 and 2011Q4. 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, 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 XI. PSID: Import Competition, Labor Market Outcomes and Debt Growth

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A. Employment, Income, and Debt: Change in 1999-2007							
	Unemployment		Income		DTI		Debt	
Shipping Costs	−0.52	−0.50	4.00***	4.00***	−6.78**	−8.35**	−10.63**	−11.56**
	(0.32)	(0.38)	(1.20)	(1.31)	(2.85)	(3.46)	(4.59)	(5.07)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	No	Yes	No	Yes	No	Yes
Observations	722	722	723	723	723	723	723	723
R^2	0.0425	0.0818	0.197	0.234	0.116	0.154	0.218	0.26
	Panel B. Types of Debt: Change in 1999-2007							
	Debt		Mortgage		Credit Card		Auto Loans	
Shipping Costs	−10.63**	−11.56**	−7.46**	−8.16**	−2.13**	−2.66***	0.22	0.15
	(4.59)	(5.07)	(3.26)	(4.04)	(0.84)	(1.00)	(0.19)	(0.22)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	No	Yes	No	Yes	No	Yes
Observations	723	723	644	644	683	683	602	602
R^2	0.218	0.26	0.113	0.166	0.0402	0.0851	0.052	0.102

Note: This table presents reduced form regression of both labor outcomes and debt variables on the shipping costs of the industry of occupation of individuals in the PSID. Individual unemployment is the number of unemployment spells experienced between 1999 and 2007 across the five biennial surveys. We measure the percent change in income over the sample period from all individual labor income revenues. The change in debt-to-income is the difference between the ratio of total debt to income in 2007 and in 1999. The change in debt represents the percent change in the total value of all debt between 1999 and 2007. Panel B decomposes the percent change in debt across different categories from the PSID, mortgages, credit card, and auto loans. Individual level controls are the log of labor income, the log of the value of all debt, debt-to-income ratios and the number of individuals in the household at the beginning of the period in 1999; we also include education, race, gender, and marital status fixed effects. Clustered standard errors at the state level are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table XII. Realized and Expected Duration of Unemployment Spells

	(1)	(2)	(3)
	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, 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

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:

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

Appendix B. PSID Data Construction

We follow Blundell et al. (2008) to construct the PSID panel. The full PSID sample from 1969 to 2017 has 827,384 observations, including 20,516 observations in 1999. After imposing the filters from Blundell et al. (2008) for geography (non missing), keeping only household heads that have been head for at least two years, and with age between 20 and 65, we have 225,324 observations over the sample, including 5,411 observations in 1999. For our analysis, we need the industry of occupation from the PSID; After matching the PSID Census industry codes to SIC industries, we end up with a sample of 948 observations, 723 of which are available both in 1999 and 2007.

Appendix C. Comparison to the Literature

In what follows, we compare the magnitudes of our estimates on income with those of Autor et al. (2013) (ADH), Pierce and Schott (2016) and Acemoglu et al. (2016). Summary statistics are presented in Table C.1 to ease exposition.

We start by plugging SC in ADH's main specification. In Panel A of Table C.2, we replicate ADH's analysis in the 2000-2007 sub-period using SC as the instrument for Chinese import growth instead of their own. The dependent variable is the ten-year equivalent percentage change in average and median annual household income or wage per working-age adult (in %pts).[31] In columns (1) and (2), we find that a one percentage point decrease in SC is associated with 0.47% and 0.67% decline in average income and wages, respectively. Given the interquartile range of SC across commuting zones (1.6%), this translates into a drop by 0.75% and 1.1% in income and wages. Furthermore, given the cross-sectional standard deviation of the percent change in income is 10.8%, a one standard deviation change in SC (2.3%), accounts for 10% to 14% of the cross-CZ variation in income and wages, respectively ($2.3\% \times [0.47, 0.66]/10.8\%$).

Comparison with Autor et al. (2013). In Table 9 of Autor et al. (2013), a $1000 increase in import penetration per worker is associated with a 10-year equivalent reduction in income by 1.5% and with a 2.15% reduction in wages. Given the interquartile range across CZ of $2000 per worker, this translates into a drop by 3% in average income and by 4.3% in average wages. In Panel B of Table C.2, we replicate ADH's analysis of the effect of import competition on income and wages for the 2000-2007 sub-period, which is the focus of our paper. The effect of import growth on income and wages is not statistically significant in this sub-period. Yet for an increase in import of $2000 per worker (the interquartile range across CZ), the point estimates suggest a decline by 1% to 1.7% in average income and wages respectively, and by 1.1% to 1.8% in median income and wages respectively. Furthermore, given the cross-sectional standard deviation of income growth (10.8%) a one standard deviation increase in their instrument (3.02%) explains $0.54 \times 3.02/10.8 = 15\%$ of the cross-CZ variation in income growth in the 2000-2007 sub-period. These estimates are very much in line with our findings in Panel A using SC.

Comparison with Pierce and Schott (2016). In Panel A of Table C.3, we replace ADH's instrument with Pierce and Schott (2016)'s instrument, the NTR gap, which we aggregate at the CZ level to make it comparable to SC and the ADH instrument. The interquartile range of the NTR gap is 0.06. Moving from the 25th to the 75th percentile of the NTR gap thus leads to a drop by 1.68% and 2.5% ($0.06 \times [28, 42]$) in average income and wages. The effects on median income and wages are smaller and boil down to a drop by $19 \times 0.06 = 1.14\%$ in median income, and $34 \times 0.06 = 2\%$ in median wages. Furthermore, a one standard deviation increase in NTR (0.05) accounts for 13% and 20% of the cross-CZ variation in average income and wages ($0.05 \times [-28.1, -42.5]/10.8$). These estimates are in line with the estimates from Table C.2, Panel A.

[31] All replication material can be found here: doi.org/10.1257/aer.103.6.2121

Comparison with Acemoglu et al. (2016). In Panel B of Table C.3, we replace ADH's instrument with the industry-level change in import competition from Acemoglu et al. (2016), which we aggregate at the CZ level to make it comparable to SC and the ADH instrument. The estimates are not statistically different from zero, except for average wages (column 2). The interquartile range of the instrument is 1.2, such that moving from the 25th to the 75th percentile leads to a percent reduction in average income and wages by 0.8% to 1.9% ($1.2 \times [0.7, 1.5] \simeq [0.8, 1.9]$). Furthermore, a one standard deviation increase in the instrument (1.06) accounts for $1.06 \times 0.7/10.8 = 7\%$ of the cross-CZ variation in average income and $1.06 \times 1.6/10.8 = 15\%$ of the cross-CZ variation in average wages. This in line with the predictive power of SC for income and wage growth.

We conclude that the magnitude of the effect of SC on income is comparable with the extant literature.

Table C.1. Summary Statistics

	N	Mean	Std. Dev.	25th pct.	Median	75th pct.
Import Exposure						
Shipping Costs						
	715	0.0492	0.0233	0.0375	0.0441	0.053
NTR Gap: Pierce and Schott (2015)						
	715	0.256	0.0514	0.229	0.264	0.29
Acemoglu, Autor, Dorn, Hanson and Price (2016)						
	715	1.07	1.06	0.333	0.776	1.5
(Δ imports from China to US)/worker (in 1000s of $): Autor, Dorn and Hanson (2013)						
Full Sample	1,444	1.91	2.58	0.434	1.18	2.49
1990-2000	722	1.18	1.78	0.261	0.746	1.41
2000-2007	722	2.64	3.02	0.879	1.94	3.44
Percent Change in Total Income (10-year equivalent change)						
Full Sample	1,444	11.8	12.4	1.9	12.6	20.8
1990-2000	722	19.8	7.84	15.3	19.6	24.1
2000-2007	722	3.73	10.8	-3.29	1.9	8.91
Percent Change in Wages-Salary (10-year equivalent change)						
Full Sample	1,444	12.9	12.6	3.51	12.9	21.4
1990-2000	722	20.6	9.26	14.9	19.9	25.7
2000-2007	722	5.32	10.8	-2.07	4.11	11

Note: Table C.1 presents summary statistics at the commuting zone of our measure of import exposure, SC, and the measures of import exposure found in ADH, Pierce and Schott (2016), and Acemoglu et al. (2016). We also report statistics for the average change in income by commuting zone across both the 1990-2000 and the 2000-2007 period. The change in income for the 2000-2007 is adjusted to be comparable with a 10-year income change. Shipping Costs are calculated using industry shares and the shipping costs of industries in 1998.

Table C.2. Change in Household Income and Wages, 2000-2007, Comparison with Autor, Dorn, Hanson (2013)

	(1)	(2)	(3)	(4)
	Panel A. Shipping Cost Instrument			
	Average HH income/adult		Median HH income/adult	
	Total	Wage-salary	Total	Wage-salary
Shipping Costs	47.303*	66.730***	52.930**	59.050*
	(24.766)	(24.467)	(25.587)	(32.060)
Observations	715	715	715	715
R^2	0.47	0.59	0.52	0.54
	Panel B. Import Penetration — ADH Instrument			
	Average HH income/adult		Median HH income/adult	
	Total	Wage-salary	Total	Wage-salary
	(1)	(2)	(3)	(4)
(Δ imports from China	−0.537	−0.862	−0.575	−0.934*
to US) / worker	(0.461)	(0.547)	(0.451)	(0.554)
Observations	722	722	722	722
R^2	0.44	0.56	0.50	0.50

Note: Table C.2 presents regression of the change in household income on both Shipping Costs (Panel A) and instrumented imports from China (Panel B). The dependent variable is the ten-year equivalent percentage change in average and median annual household income per working-age adult (in %pts). Per capita household income is defined as the sum of individual incomes of all working-age household members (age 16–64), divided by the number of household members of that age group. Total income comprises wage and salary income; self-employment, business, and investment income; social security and welfare income; and income from other nonspecified sources. All regressions include the following CZ-level control taken at the beginning of the period (in 1999): the percentage of employment in manufacturing, the percentage of college-educated population, the percentage of foreign-born population, the percentage of employment among women, the percentage of employment in routine occupations, the average offshorability index of occupations, and census division dummies. Details of the construction of these variables can be found in Autor et al. (2013). Models are weighted by start of period CZ share of national population. Robust standard errors in parentheses are clustered on state. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

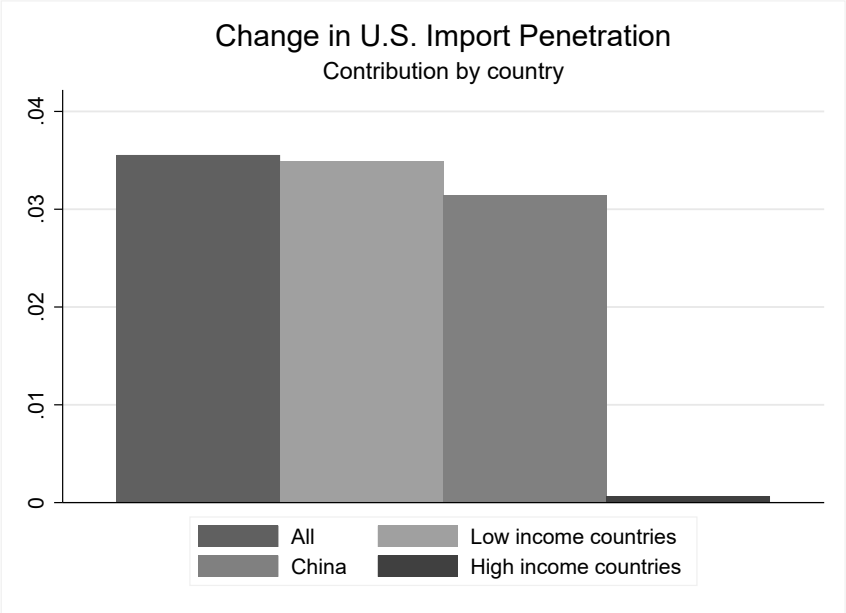
Table C.3. Change in Household Income and Wages, 2000-2007, Comparison with Pierce and Schott (2015) and Acemoglu, Autor, Dorn, Hanson and Price (2016)

	(1)	(2)	(3)	(4)
	Panel A. Pierce and Schott (2015)			
	Average HH income/adult		Median HH income/adult	
	Total	Wage-salary	Total	Wage-salary
NTR Gap	−28.123*	−42.514**	−19.370	−33.845*
	(14.898)	(16.480)	(13.779)	(18.011)
Observations	715	715	715	715
R^2	0.47	0.59	0.52	0.54
	Panel B. Acemoglu, Autor, Dorn, Hanson and Price (2016)			
	Average HH income/adult		Median HH income/adult	
	Total	Wage-salary	Total	Wage-salary
(Δ imports from China to US) / initial absorption	−0.709	−1.566*	−0.833	−1.436
	(0.726)	(0.843)	(0.779)	(0.922)
Observations	715	715	715	715
R^2	0.47	0.59	0.52	0.54

Note: Table C.3 presents regression of the change in household income on both the NTR Gap from Pierce and Schott (2016) (Panel A) and imports from China from Acemoglu et al. (2016) (Panel B). The dependent variable is the ten-year equivalent percentage change in average and median annual household income per working-age adult (in %pts). Per capita household income is defined as the sum of individual incomes of all working-age household members (age 16–64), divided by the number of household members of that age group. Total income comprises wage and salary income; self-employment, business, and investment income; social security and welfare income; and income from other nonspecified sources. All regressions include the following CZ-level control taken at the beginning of the period (in 1999): the percentage of employment in manufacturing, the percentage of college-educated population, the percentage of foreign-born population, the percentage of employment amont women, the percentage of employment in routine occupations, the average offshorability index of occupations, and census division dummies. Details of the construction of these variables can be found in Autor et al. (2013). Models are weighted by start of period CZ share of national population. Robust standard errors in parentheses are clustered on state. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Appendix D. Internet Appendix

Panel A. Contribution to imports



Panel B. Contribution to net imports

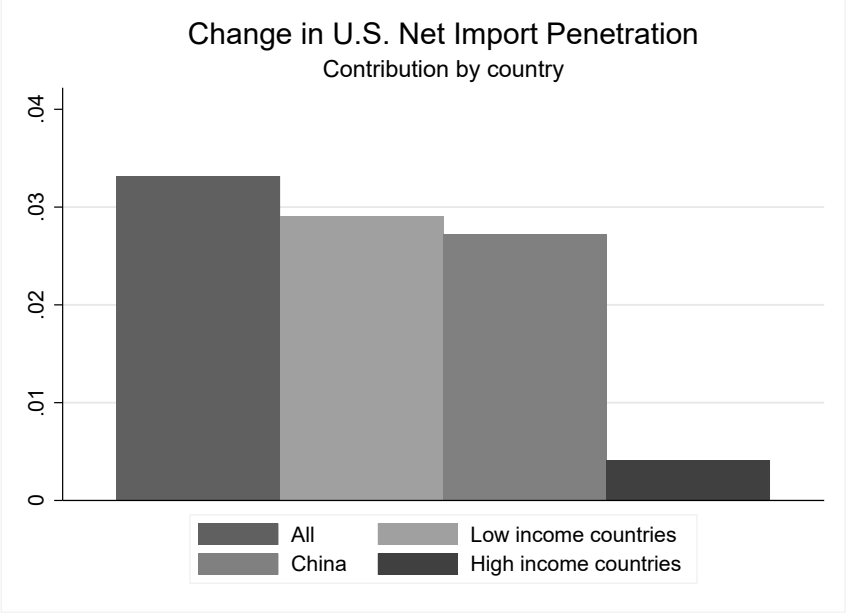


Figure IA.1. Contribution to U.S. Import and Net Import Penetration by Country
Note: This figure presents the change in U.S. import penetration (panel A) and net import penetration (panel B) from 1999 to 2007. Import penetration is measured as the ratio of imports to U.S. expenditures themselves measured 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.

Table IA.I. Distribution of Shipping Costs Across Industries

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	Non-metallic Mineral Product Manufacturing	0.088

Note: 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.

Table IA.II. Import Competition, Output and Productivity, CZ Level

	(1) Δ_{99-07} Value Added	(2) Δ_{99-07} Output	(3) Δ_{99-07} TFP
Shipping costs	0.407***	0.899***	0.343
	(0.094)	(0.238)	(0.563)
Shipments	-0.147***	-0.507***	-0.694*
	(0.045)	(0.136)	(0.383)
Value Added	0.011	0.221**	0.945***
	(0.037)	(0.099)	(0.307)
TFP	0.071	-0.043	6.274***
	(0.053)	(0.130)	(0.527)
Log Employment	-0.005	-0.005	-0.028***
	(0.003)	(0.006)	(0.009)
Employment in Manufacturing (%)	-0.059***	-0.050	-0.165
	(0.021)	(0.048)	(0.109)
Log Income	-0.028	-0.033	0.078
	(0.018)	(0.050)	(0.106)
Log Debt	0.005	-0.016	-0.024
	(0.007)	(0.016)	(0.041)
Δ_{91-99} HMDA loan origination	-0.000	-0.003	-0.008
	(0.002)	(0.004)	(0.006)
Δ_{91-99} Net CH Import Penetration	-0.294***	-0.507**	0.540
	(0.089)	(0.238)	(0.484)
Census controls	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.
Observations	732	732	732
R^2	0.362	0.359	0.752
Magnitude SC	0.010	0.021	0.008
% dep. var. cross-CZ s.d.	0.275	0.384	0.052

Note: This table presents the results of cross-sectional regressions on the change in value added, domestic shipments, and TFP, between 1999 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. Value added and domestic shipments are both 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, 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 1999 and 2007 are from the most granular index available from CoreLogic. Δ_{91-99} HMDA 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, 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. Clustered standard errors at the state level are reported in parentheses. *, ** and *** means statistically different from zero at 10%, 5% and 1% level of significance.

Table IA.III. Import Competition and Household Debt Growth, IV specifications

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: Δ_{99-07} Log debt				Panel B: Δ_{99-07} DTI			
Δ_{99-07} Net CH $\widehat{\text{Import}}$ Penetration	3.811***	7.795**	6.845**	4.095**	12.787***	11.762**	9.949**	4.778***
	(1.003)	(3.326)	(2.930)	(1.728)	(2.925)	(5.136)	(4.482)	(1.516)
Log Employment		-0.019	-0.016	-0.012		-0.016	-0.011	0.004
		(0.018)	(0.015)	(0.015)		(0.037)	(0.033)	(0.017)
Employment in Manufacturing (%)		-1.066***	-0.768***	-0.887***		-0.864**	-0.501	-0.619***
		(0.284)	(0.262)	(0.249)		(0.429)	(0.401)	(0.212)
Log Income		0.153	0.129	0.308*		0.633*	0.462	0.167
		(0.189)	(0.161)	(0.167)		(0.333)	(0.282)	(0.160)
DTI						1.012***	0.862***	0.233**
						(0.164)	(0.177)	(0.109)
Δ_{91-99} HMDA loan origination		0.021	0.027*	0.025***		0.026	0.030	0.028***
		(0.017)	(0.015)	(0.008)		(0.028)	(0.024)	(0.008)
Δ_{91-99} Net CH Import Penetration		-5.969**	-5.625**	-2.338*		-9.165**	-8.111**	-2.658*
		(2.726)	(2.252)	(1.383)		(4.389)	(3.558)	(1.456)
Census controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
Quintiles HP Growth	No	No	Yes	Yes	No	No	Yes	Yes
State FE	No	No	No	Yes	No	No	No	Yes
Observations	732	732	732	732	732	732	732	732
First-stage F statistic	16.19	7.04	7.84	12.09	16.19	7.22	7.94	12.25

Note: This table presents 2SLS cross-sectional regressions of debt growth from 1999Q4 to 2007Q4 on (the change in) net 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 1999 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. Δ_{91-99} HMDA 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, poverty rate, and percent urban, measured at the CZ level. Regressions are weighted by adult population in each CZ as of 2000. Clustered standard errors at the state level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table IA.IV. Alternative Proxy for Import Competition, Weight-to-Value Ratio

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: Δ_{99-07} Log debt				Panel B: Δ_{99-07} DTI			
Weight-to-value Ratio	-0.005	-0.009***	-0.009***	-0.006**	-0.018**	-0.011***	-0.009***	-0.005*
	(0.003)	(0.003)	(0.002)	(0.002)	(0.008)	(0.003)	(0.003)	(0.003)
Log Employment		-0.014	-0.010	-0.003		0.000	0.004	0.009
		(0.014)	(0.012)	(0.011)		(0.024)	(0.021)	(0.015)
Employment in Manufacturing (%)		-0.698***	-0.397***	-0.521***		-0.397	-0.048	-0.334**
		(0.182)	(0.126)	(0.118)		(0.249)	(0.192)	(0.137)
Log Income		-0.093	-0.071	0.157		-0.582***	-0.549***	-0.188
		(0.141)	(0.082)	(0.101)		(0.174)	(0.136)	(0.141)
Log Debt		0.211**	0.094	-0.095*		0.809***	0.672***	0.285***
		(0.091)	(0.075)	(0.051)		(0.130)	(0.106)	(0.055)
Δ_{91-99} HMDA loan origination		0.013	0.022**	0.016**		0.013	0.022	0.024***
		(0.012)	(0.010)	(0.006)		(0.017)	(0.014)	(0.007)
Δ_{91-99} Net CH Import Penetration		-0.307	-0.783	0.461		-0.958	-1.291*	0.624
		(0.470)	(0.497)	(0.436)		(0.721)	(0.726)	(0.499)
Census controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
State FE	No	No	No	Yes	No	No	No	Yes
Quintiles HP Growth	No	No	Yes	Yes	No	No	Yes	Yes
Observations	732	732	732	732	732	732	732	732
R^2	0.013	0.409	0.520	0.773	0.033	0.585	0.649	0.873
Magnitude WVR	-0.032	-0.063	-0.059	-0.037	-0.120	-0.070	-0.061	-0.034
% dep. var. cross-CZ s.d.	-0.193	-0.374	-0.354	-0.223	-0.574	-0.337	-0.295	-0.161

Note: This table presents cross-sectional regressions of debt growth from 1999Q4 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 1999 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. Δ_{91-99} HMDA 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, poverty rate, and percent urban, measured at the CZ level. Regressions are weighted by adult population in each CZ as of 2000. Magnitude WVR is the effect of a one standard deviation increase in the weight-to-value ratio on the dependent variable. Clustered standard errors at the state level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table IA.V. Import Competition and Household Debt Growth, Robustness

Panel A:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Alternative Proxies for Import Competition								
NTR Gap	0.470**								
	(0.186)								
(Instr.) Δ imports from China		0.0034							
to US/worker (ADH)		(0.0039)							
(Instr.) CZ import exposure, 1999-2007			0.030**						
(Acemoglu et al. (2016))			(0.013)						
Gravity residual				0.050*					
				(0.021)					
Emp share of textile					0.800**				
					(0.384)				
CZ controls	Yes	Yes	Yes	Yes	Yes				
Census controls	Yes	Yes	Yes	Yes	Yes				
Weights	Pop.	Pop.	Pop.	Pop.	Pop.				
Observations	732	715	715	732	732				
R^2	0.361	0.405	0.416	0.370	0.362				
Magnitude Proxy Imp. Comp.	0.025	0.0039	0.032	0.032	0.014				
% dep. var. cross-CZ s.d.	0.147	0.051	0.190	0.192	0.086				

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	-1.271***	-1.669***	-1.481***	-1.153**	-1.585***	-1.664***	-0.799*	-0.926	-0.644**
	(0.425)	(0.467)	(0.330)	(0.442)	(0.523)	(0.514)	(0.439)	(0.733)	(0.306)
Employment in Routine Occupations	-0.003								
	(0.005)								
Average Offshorability of Occupations	-0.023								
	(0.045)								
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	732	730	732	714	732	732	732	732
R^2	0.414	0.369	0.377	0.361	0.320	0.450	0.569	0.361	0.164
Magnitude SC	-0.030	-0.039	-0.044	-0.027	-0.037	-0.039	-0.019	-0.023	-0.015
% dep. var. cross-CZ s.d.	-0.177	-0.233	-0.264	-0.160	-0.221	-0.232	-0.111	-0.137	-0.090

Note: Panel A of this table presents the results of cross-sectional regressions of the log change in total debt from 1999Q4 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 Autor et al. (2013) (ADH) instrument for the change in CZ's average import exposure over the period 2000-2007, (iii) the Acemoglu et al. (2016) instrument for the change in CZ's average import exposure over the period 1999-2007, (iv) the residual of gravity regressions, and (v) and the share of textile in total employment, all measured at the commuting zone level. Panel B presents alternative specification of our baseline regression. 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 net 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, 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. Clustered standard errors at the state level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table IA.VI. Import Competition and Household Debt Growth, Controlling for Local Betas

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: Δ_{99-07} Log debt				Panel B: Δ_{99-07} DTI			
Shipping costs	-0.465	-1.088**	-1.144***	-0.771*	-2.777***	-1.584***	-1.580***	-0.960**
	(0.432)	(0.435)	(0.364)	(0.414)	(0.920)	(0.591)	(0.519)	(0.440)
Log Employment		-0.024	-0.017	-0.005		-0.024	-0.014	0.003
		(0.015)	(0.013)	(0.012)		(0.034)	(0.030)	(0.017)
Employment in Manufacturing (%)		-0.676***	-0.411***	-0.531***		-0.280	0.008	-0.338**
		(0.183)	(0.133)	(0.127)		(0.271)	(0.219)	(0.145)
Log Income		-0.103	-0.082	0.141		0.206	0.127	0.043
		(0.138)	(0.086)	(0.100)		(0.258)	(0.198)	(0.139)
Log Debt		0.164**	0.074	-0.108**				
		(0.081)	(0.071)	(0.048)				
DTI						0.968***	0.834***	0.267***
						(0.138)	(0.115)	(0.089)
Δ_{91-99} HMDA loan origination		0.010	0.019*	0.013**		0.009	0.019	0.019***
		(0.011)	(0.010)	(0.006)		(0.018)	(0.016)	(0.006)
Δ_{91-99} Net CH Import Penetration		-0.593	-0.941**	0.431		-1.105	-1.372*	0.706
		(0.484)	(0.466)	(0.424)		(0.824)	(0.732)	(0.455)
Beta $_{91-99}$	0.062***	0.051***	0.033***	0.015*	0.148***	0.081***	0.057***	0.031***
	(0.015)	(0.010)	(0.008)	(0.008)	(0.053)	(0.017)	(0.012)	(0.010)
Census controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
Quintiles HP Growth	No	No	Yes	Yes	No	No	Yes	Yes
State FE	No	No	No	Yes	No	No	No	Yes
Observations	732	732	732	732	732	732	732	
R^2	0.147	0.448	0.541	0.775	0.260	0.599	0.661	0.883
Magnitude SC	-0.011	-0.025	-0.027	-0.018	-0.065	-0.037	-0.037	-0.022
% dep. var. cross-CZ s.d.	-0.065	-0.152	-0.160	-0.108	-0.311	-0.178	-0.177	-0.108

Note: This table presents cross-sectional regressions of debt growth from 1999Q4 to 2007Q4 on shipping costs, at the commuting zone level, in which we control for local betas, Beta_{91-99}. 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 1999 and 2007 are from the most granular index available from CoreLogic. Net CH Import Penetration is defined as net U.S. imports from China normalized by U.S. expenditures measured as domestic shipments plus net imports. Δ_{91-99} HMDA 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, 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. Clustered standard errors at the state level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table IA.VII. Import Competition and Corporate Debt

	(1) Δ_{99-07} Log Corp. Debt	(2)	(3)	(4)
		% New Firms $_{99-07}$		
		All	Retail	Food & Accom.
Shipping costs	1.208	-0.321	-0.051	0.020
	(8.484)	(0.607)	(0.064)	(0.105)
Log Employment	0.256	-0.015**	-0.001	-0.004***
	(0.193)	(0.006)	(0.001)	(0.001)
Employment in Manufacturing (%)	1.119	-0.420***	-0.041***	-0.064**
	(2.281)	(0.110)	(0.013)	(0.025)
Log Income	6.747***	-0.045	0.001	-0.004
	(1.997)	(0.055)	(0.006)	(0.012)
Log Debt	-2.704**	0.108**	0.012**	0.016*
	(1.011)	(0.047)	(0.005)	(0.009)
Δ_{91-99} HMDA loan origination	-0.040	-0.007	-0.001	-0.002
	(0.112)	(0.007)	(0.001)	(0.001)
Δ_{91-99} Net CH Import Penetration	32.645***	-0.628	-0.008	0.066
	(9.167)	(0.519)	(0.057)	(0.092)
Census controls	Yes	Yes	Yes	Yes
Decile	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.
Observations	732	732	732	732
R^2	0.315	0.322	0.195	0.271

Note: This table presents the results of cross-sectional regressions of the growth in small business loans from 1999 to 2007, and of job creation from startups between 1999 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 1999-2007 (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 1999 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. Δ_{91-99} HMDA 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, poverty rate, and percent urban, measured at the CZ level. Regressions are weighted by adult population in each CZ as of 2000. Clustered standard errors at the state level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table IA.VIII. Import Competition and Loan Applications, CZ Level

	(1)	(2)	(3)	(4)
	Δ_{99-07} Log Loan Applications			
	Home Purchase		Refinancing	
	(1) Number (#)	(2) Value ($)	(3) Number (#)	(4) Value ($)
Shipping costs	-0.769	-1.240	-2.868***	-4.041**
	(0.947)	(1.197)	(1.044)	(1.626)
Denial rate	-1.422***	-0.902*	-0.212	0.563
	(0.316)	(0.449)	(0.404)	(0.568)
Log average applicant income	-0.479*	-0.131	-0.621**	-0.489
	(0.259)	(0.273)	(0.255)	(0.309)
Log average loan amount	0.463*	0.591**	0.397*	0.445*
	(0.265)	(0.273)	(0.217)	(0.228)
Log application volume	-0.347***	-0.275***	-0.396***	-0.393***
	(0.057)	(0.097)	(0.069)	(0.097)
Subprime Borrowers (%)	2.982***	2.602***	0.957*	0.240
	(0.475)	(0.683)	(0.530)	(0.612)
CZ controls	Yes	Yes	Yes	Yes
Census controls	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop
Observations	732	732	732	732
R^2	-0.047	-0.074	-0.225	-0.243
Magnitude SC	-0.018	-0.029	-0.067	-0.095
% dep. var. cross-CZ s.d.	0.080	0.109	0.267	0.266

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 1999 to 2007 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. The share of subprime borrowers, taken from the FRBNY CCP/Equifax Data, is measured in 1999 at the CZ level. CZ controls include log employment, the share of employment in manufacturing, log income, the change in net 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, 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. Clustered standard errors at the state level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table IA.IX. Import Competition and Loan Origination, CZ Level

	(1)	(2)	(3)	(4)
	Δ_{99-07} Log Originated Loans			
	Home Purchase		Refinancing	
	(1) Number (#)	(2) Value ($)	(3) Number (#)	(4) Value ($)
Shipping costs	-0.663	-0.845	-2.271*	-3.311*
	(1.164)	(1.228)	(1.246)	(1.731)
Denial rate	-0.144	0.187	0.962	1.438*
	(0.302)	(0.393)	(0.579)	(0.740)
Log average applicant income	-0.608**	-0.302	-0.639**	-0.522
	(0.263)	(0.275)	(0.292)	(0.333)
Log average loan amount	0.430	0.509*	0.507**	0.557**
	(0.270)	(0.266)	(0.252)	(0.253)
Log application volume	-0.384***	-0.307***	-0.383***	-0.396***
	(0.069)	(0.090)	(0.099)	(0.125)
Subprime Borrowers (%)	3.392***	2.817***	0.205	-0.173
	(0.595)	(0.670)	(0.683)	(0.732)
CZ controls	Yes	Yes	Yes	Yes
Census controls	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.
Observations	732	732	732	732
R^2	0.487	0.403	0.430	0.503
Magnitude SC	-0.016	-0.020	-0.053	-0.078
% dep. var. cross-CZ s.d.	-0.050	-0.054	-0.153	-0.175

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 1999 to 2007 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. The share of subprime borrowers, taken from the FRBNY CCP/Equifax Data, is measured in 1999 at the CZ level. CZ controls include log employment, the share of employment in manufacturing, log income, the change in net 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, 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. Clustered standard errors at the state level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table IA.X. Shipping Cost and Denial Rates, CZ Level

	(1)	(2)	(3)	(4)
	Denials Rate (99-07)			
	Home Purchase		Refinancing	
	Number (#)	Value weighted ($)	Number (#)	Value weighted ($)
Shipping costs	0.000	-0.104	-0.396**	-0.361**
	(0.160)	(0.158)	(0.171)	(0.172)
Denial rate	0.619***	0.550***	0.547***	0.574***
	(0.059)	(0.058)	(0.081)	(0.082)
Log average applicant income	0.080**	0.064*	-0.020	-0.006
	(0.034)	(0.036)	(0.030)	(0.029)
Log average loan amount	-0.050**	-0.039	-0.030	-0.033
	(0.025)	(0.026)	(0.028)	(0.025)
Log application volume	-0.001	0.007	-0.023**	-0.016
	(0.009)	(0.008)	(0.011)	(0.011)
Subprime Borrowers (%)	0.214**	0.243***	0.413***	0.317***
	(0.086)	(0.083)	(0.090)	(0.086)
CZ controls	Yes	Yes	Yes	Yes
Census controls	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.
Observations	732	732	732	732
R^2	0.885	0.837	0.797	0.773
Magnitude SC	-0.000	-0.002	-0.008	-0.007
% dep. var. cross-CZ s.d.	-0.001	-0.020	-0.094	-0.086

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 1999 to 2007 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. The share of subprime borrowers, taken from the FRBNY CCP/Equifax Data, is measured in 1999 at the CZ level. CZ controls include log employment, the share of employment in manufacturing, log income, the change in net 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, 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. Clustered standard errors at the state level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table IA.XI. Import Competition and Housing Markets

	(1) Δ_{99-07} HPI	(2) Δ_{99-07} Log Buildings	(3) Δ_{99-07} Log Units	(4) Δ_{99-07} Log Constr. Emp.
Shipping costs	-0.266	2.384	2.285	-0.835
	(0.941)	(2.068)	(2.504)	(0.693)
Log Employment	0.001	-0.063	-0.011	-0.045**
	(0.025)	(0.046)	(0.053)	(0.023)
Employment in Manufacturing (%)	-1.123***	-0.154	-0.640	-1.052***
	(0.327)	(0.469)	(0.720)	(0.268)
Log Income	-0.166	-0.587	0.376	-0.330
	(0.363)	(0.563)	(0.748)	(0.245)
Log Debt	0.344**	-0.303	-0.560**	0.318***
	(0.132)	(0.256)	(0.223)	(0.069)
Δ_{91-99} HMDA loan origination	-0.033**	-0.044	-0.024	-0.032**
	(0.015)	(0.033)	(0.044)	(0.014)
Δ_{91-99} Net CH Import Penetration	1.650	-3.499	0.525	-1.030
	(1.280)	(3.000)	(3.401)	(1.129)
Census controls	Yes	Yes	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.
Observations	732	693	693	698
R^2	0.533	0.323	0.272	0.343

Note: This table presents the results of cross-sectional regressions of house prices, residential building permit growth, and construction employment from 1999Q4 to 2007Q4, on shipping costs at the commuting zone level. Changes in house prices between 1999 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. Δ_{91-99} HMDA 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, poverty rate, and percent urban, measured at the CZ level. Regressions are weighted by adult population in each CZ as of 2000. Clustered standard errors at the state level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table IA.XII. Shipping Costs and Chinese Import Penetration, 1991-1999

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Δ_{91-99} CH Imp. Penetration				Δ_{91-99} Net CH Imp. Penetration			
Shipping costs (90)	-0.040**	-0.053**	-0.059**	-0.039	-0.014	-0.031	-0.038	-0.018
	(0.019)	(0.025)	(0.024)	(0.027)	(0.020)	(0.024)	(0.023)	(0.026)
Log Income (90)		0.002	0.002	-0.002		0.001	0.001	-0.004
		(0.005)	(0.005)	(0.006)		(0.005)	(0.005)	(0.006)
Log Employment (90)		0.000	0.000	0.000		0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)		(0.001)	(0.000)	(0.000)
Employment in Manufacturing (90)		-0.004	-0.003	-0.005		-0.007	-0.007	-0.008
		(0.007)	(0.007)	(0.007)		(0.007)	(0.007)	(0.007)
$\Delta_{89,90}$ Net CH Import Penetration		0.920***	0.907***	0.837***		0.964***	0.953***	0.855***
		(0.133)	(0.131)	(0.144)		(0.141)	(0.137)	(0.150)
Census controls (90)	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Quintiles HP (91-99) Growth	No	No	Yes	Yes	No	No	Yes	Yes
Weights	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.	Pop.
State FE	No	No	No	Yes	No	No	No	Yes
Observations	732	732	732	732	732	732	732	732
R^2	0.009	0.365	0.375	0.481	0.001	0.371	0.380	0.489

Note: This table presents cross-sectional regressions of the change in Chinese Import Penetration (and Net Chinese Import Penetration) and shipping costs between 1991 and 1999, 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. Census controls are CZ-level variables for the vacancy rate, percent white, percent black, share of the population without high school education, share with high school diploma only, poverty rate, and percent urban, all measured in 1990. Regressions are weighted by adult population in each CZ. Standard errors clustered at the state level are reported in parentheses. *, ** and *** means statistically different from zero at 10%, 5% and 1% level of significance.

Table IA.XIII. ADH Table 5: Evidence in subsamples

	Unemp Pop counts	Unemp Pop changes	NILF	SSDI receipt	Av Income % change	Median Income % change
			Panel A: Full period			
Δ imports from China	4.921***	0.221***	2.058*	1.466***	-1.476***	-1.732***
to US/worker	(1.128)	(0.058)	(1.080)	(0.557)	(0.364)	(0.381)
Observations	1444	1444	1444	1444	1444	1444
R^2	0.415	0.404	0.458	0.320	0.685	0.526
			Panel B: 2000-2007			
Δ imports from China	3.087*	0.109	0.709	0.606	-0.537	-0.575
to US/worker	(1.725)	(0.099)	(1.019)	(0.630)	(0.452)	(0.442)
Observations	722	722	722	722	722	722
R^2	0.444	0.503	0.439	0.476	0.443	0.497
			Panel C: 1990-2000			
Δ imports from China	-0.741	-0.052	1.398	2.049**	0.890	0.864
to US/worker	(1.944)	(0.088)	(1.109)	(0.849)	(0.696)	(0.639)
Observations	722	722	722	722	722	722
R^2	0.470	0.433	0.670	0.498	0.428	0.637

Note: Panel A of This Table reproduces the 2-SLS specifications presented in Autor et al. (2013), Table 5 (for employment status) and Table 9 (for income). Panel B of This Table presents the same specifications for the second period only (2000-2007), while Panel C of this table presents the same specifications for the first period only (1990-2000).

Table IA.XIV. Import Competition: Long-differences relative to 1991

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: Net CH Import Penetration							
	Δ_{91-92}	Δ_{91-93}	Δ_{91-94}	Δ_{91-95}	Δ_{91-96}	Δ_{91-97}	Δ_{91-98}	Δ_{91-99}
SC 90	0.018***	0.019	0.005	-0.015	0.000	-0.009	0.002	-0.031
	(0.006)	(0.013)	(0.012)	(0.013)	(0.015)	(0.017)	(0.020)	(0.024)
	Panel B: Log Unemployed							
	Δ_{91-92}	Δ_{91-93}	Δ_{91-94}	Δ_{91-95}	Δ_{91-96}	Δ_{91-97}	Δ_{91-98}	Δ_{91-99}
SC 90	0.391	0.489	0.222	0.631	0.703	0.614	0.864	0.957
	(0.291)	(0.475)	(0.524)	(0.562)	(0.593)	(0.736)	(0.754)	(0.804)
	Panel C: Cum Income / Income 91							
	Δ_{91-92}	Δ_{91-93}	Δ_{91-94}	Δ_{91-95}	Δ_{91-96}	Δ_{91-97}	Δ_{91-98}	Δ_{91-99}
SC 90	-1.700	-2.007	-2.175	-2.325	-2.434	-2.406	-2.392	-2.903
	(1.523)	(1.797)	(2.037)	(2.292)	(2.562)	(2.872)	(3.205)	(3.588)
	Panel D: Log Loan Origination (Home Purchase+Refinancing)							
	Δ_{91-92}	Δ_{91-93}	Δ_{91-94}	Δ_{91-95}	Δ_{91-96}	Δ_{91-97}	Δ_{91-98}	Δ_{91-99}
SC 90	-0.362	1.055	0.136	0.599	-0.089	0.712	0.270	0.054
	(1.766)	(2.203)	(2.184)	(2.136)	(1.987)	(2.232)	(2.246)	(2.082)
	Panel E: Log Loan Applications (Home Purchase+Refinancing)							
	Δ_{91-92}	Δ_{91-93}	Δ_{91-94}	Δ_{91-95}	Δ_{91-96}	Δ_{91-97}	Δ_{91-98}	Δ_{91-99}
SC 90	0.562	1.574	0.857	1.106	0.741	1.408	0.648	0.663
	(2.013)	(2.368)	(2.406)	(2.271)	(2.160)	(2.214)	(2.204)	(2.059)

Note: This table presents cross-sectional yearly regressions of the change in net Chinese import penetration, the log number of unemployed workers, cumulative income scaled by income in 1991, the log number of loan origination, and the log number of loan applications, on shipping costs at the commuting zone level between 1991 and every year from 1992 to 1999. Shipping cost is measured in 1990 at the CZ level. Each regression controls for log income, log employment, the share of employment in manufacturing, all measured in 1990, the change in net import penetration between 1989 and 1990, as well as census variables measured in 1990. Census controls are CZ-level variables for the vacancy rate, percent white, percent black, share of the population without high school education, share with high school diploma only, poverty rate, and percent urban. Regressions are weighted by adult population in each CZ. Clustered standard errors at the state level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table IA.XV. Import Competition: Long-differences relative to 1999 and 2007

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Panel A. Delta Net Chinese Import Penetration													
	Δ_{99-00}	Δ_{99-01}	Δ_{99-02}	Δ_{99-03}	Δ_{99-04}	Δ_{99-05}	Δ_{99-06}	Δ_{99-07}	Δ_{99-08}	Δ_{99-09}	Δ_{99-10}	Δ_{99-11}	Δ_{07-11}
SC	-0.029***	-0.017*	-0.100	-0.074**	-0.157***	-0.202***	-0.180***	-0.205**	-0.212**	-0.333***	-0.446***	-0.525***	-0.320**
	(0.009)	(0.010)	(0.069)	(0.034)	(0.052)	(0.062)	(0.067)	(0.077)	(0.094)	(0.114)	(0.139)	(0.164)	(0.107)
Panel B. Delta Log Unemployed													
	Δ_{99-00}	Δ_{99-01}	Δ_{99-02}	Δ_{99-03}	Δ_{99-04}	Δ_{99-05}	Δ_{99-06}	Δ_{99-07}	Δ_{99-08}	Δ_{99-09}	Δ_{99-10}	Δ_{99-11}	Δ_{07-11}
SC	-2.080**	-3.480***	-3.961***	-3.885***	-4.225***	-6.695**	-7.315**	-5.365***	-6.589***	-6.136***	-5.650***	-5.641***	-0.277
	(0.830)	(1.094)	(1.204)	(1.191)	(1.231)	(3.126)	(3.457)	(1.392)	(1.543)	(1.546)	(1.473)	(1.379)	(0.758)
Panel C. Cum Income / Income 99													
	Δ_{99-00}	Δ_{99-01}	Δ_{99-02}	Δ_{99-03}	Δ_{99-04}	Δ_{99-05}	Δ_{99-06}	Δ_{99-07}	Δ_{99-08}	Δ_{99-09}	Δ_{99-10}	Δ_{99-11}	Δ_{07-11}
SC	-0.017	0.258	0.630**	1.071**	1.434**	1.744**	2.311**	2.540**	3.725**	5.157***	6.033***	7.222***	4.681**
	(0.085)	(0.189)	(0.312)	(0.449)	(0.585)	(0.744)	(0.954)	(1.205)	(1.522)	(1.826)	(2.139)	(2.491)	(1.424)
Panel D. Delta Log Debt													
	Δ_{99-00}	Δ_{99-01}	Δ_{99-02}	Δ_{99-03}	Δ_{99-04}	Δ_{99-05}	Δ_{99-06}	Δ_{99-07}	Δ_{99-08}	Δ_{99-09}	Δ_{99-10}	Δ_{99-11}	Δ_{07-11}
SC	0.139	-0.283	-0.648**	-0.495*	-0.755**	-1.678***	-1.462***	-1.595***	-1.380***	-1.143**	-0.781*	-0.662	0.933*
	(0.267)	(0.211)	(0.247)	(0.263)	(0.294)	(0.519)	(0.488)	(0.510)	(0.512)	(0.466)	(0.442)	(0.436)	(0.383)
Panel E. Delta Log Loan Applications (Home Purchase)													
	Δ_{99-00}	Δ_{99-01}	Δ_{99-02}	Δ_{99-03}	Δ_{99-04}	Δ_{99-05}	Δ_{99-06}	Δ_{99-07}	Δ_{99-08}	Δ_{99-09}	Δ_{99-10}	Δ_{99-11}	Δ_{07-11}
SC	-0.084	0.260	0.309	0.157	-0.640	-1.306	-1.341	-0.769	-0.657	-1.451	-0.812	-0.268	0.502
	(0.381)	(0.502)	(0.509)	(0.625)	(0.774)	(0.875)	(1.121)	(0.947)	(1.015)	(0.985)	(0.881)	(0.788)	(0.724)
Panel F. Delta Log Loan Applications (Refinancing)													
	Δ_{99-00}	Δ_{99-01}	Δ_{99-02}	Δ_{99-03}	Δ_{99-04}	Δ_{99-05}	Δ_{99-06}	Δ_{99-07}	Δ_{99-08}	Δ_{99-09}	Δ_{99-10}	Δ_{99-11}	Δ_{07-11}
SC	-0.339	-1.752***	-1.911***	-2.122***	-1.893**	-3.544***	-3.969***	-2.868***	-0.641	1.204	0.768	0.346	3.213*
	(0.489)	(0.561)	(0.602)	(0.653)	(0.872)	(1.008)	(1.175)	(1.044)	(1.174)	(1.260)	(1.310)	(1.265)	(1.340)

Note: This table presents cross-sectional yearly regressions of the change in net Chinese import penetration, the log number of unemployed workers, cumulative income scaled by income in 1999, the log number of loan applications, on shipping costs at the commuting zone level between 1999 and every year from 2000 to 2011. The last column reports differences between year 2007 and year 2011 for each outcome variable. Shipping cost is measured in 1998 at the CZ level. Each regression controls for log income, log employment, the share of employment in manufacturing, measured in 1998, log total debt in 1999, the change in the dollar value of loan origination between 1991 and 199, the change in net import penetration between 1991 and 1999, as well as census variables measured in 2000. Census controls are CZ-level variables for the vacancy rate, percent white, percent black, share of the population without high school education, share with high school diploma only, poverty rate, and percent urban. Regressions are weighted by adult population in each CZ. Clustered standard errors at the state level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table IA.XVI. Import Competition, Delinquencies and Foreclosures (2007-2011): Interaction with House Prices

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: House Price Appreciation between 1999 and 2007							
	Δ Credit Score		Bottom Credit Δ Decile		Mortgage Delinquency		Foreclosure	
	Low	High	Low	High	Low	High	Low	High
Shipping Costs	11.760	34.496**	-0.020	-0.198**	-0.096**	-0.379***	-0.076***	-0.320***
	(9.429)	(15.838)	(0.036)	(0.077)	(0.047)	(0.121)	(0.025)	(0.096)
Risk Bins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age Bins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CZ controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,371,170	2,259,626	2,371,170	2,259,626	2,371,170	2,259,626	2,371,170	2,259,626
R-squared	0.017	0.018	0.019	0.028	0.060	0.063	0.022	0.033
P-value (High-Low)		0.202		0.032		0.028		0.014
	Panel B: Housing Supply Elasticity							
	Δ Credit Score		Bottom Credit Δ Decile		Mortgage Delinquency		Foreclosure	
	Low	High	Low	High	Low	High	Low	High
Shipping Costs	159.496***	26.743	-0.570***	-0.144	-0.393**	-0.237	-0.390**	-0.251**
	(41.833)	(29.588)	(0.167)	(0.116)	(0.186)	(0.171)	(0.182)	(0.102)
Risk Bins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age Bins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CZ controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,735,458	1,754,931	1,735,458	1,754,931	1,735,458	1,754,931	1,735,458	1,754,931
R-squared	0.017	0.020	0.028	0.023	0.060	0.067	0.029	0.033
P-value (High-Low)		0.010		0.037		0.535		0.504

Note: This table presents cross-sectional regressions of mortgages delinquencies and foreclosures from 2007Q4 to 2011Q4 on shipping costs, at the individual level. The specifications are the same as in Table X, and are performed separately for areas with low (that is, below median) and high (above median) house price appreciation over the period 1999-2007 in Panel A, and separately for areas with low (that is, below median) and high (above median) housing supply elasticity in Panel B. The elasticity of housing supply is obtained from Saiz 2010. Standard errors are clustered at the commuting zone level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively. We present the p-value for the difference in Shipping costs between low and high house price appreciation in Panel A, and between low and high housing supply in Panel B.

Table IA.XVII. PSID: Summary Statistics

	Observations	Mean	Median	Std. dev.
Panel A: Level in 1999				
Shipping Costs	723	0.050	0.045	0.033
House value	723	147,606	65,000	828,494
Income (head)	723	39,347	32,100	32,966
Unemployment status	723	0.001	—	—
Total debt	723	47,657	26,000	62,114
Debt-to-income ratio	723	0.840	0.550	1.123
Food expenditures	723	7,952	6,500	6,122
Panel B: Growth rate 1999-2007				
Income (head)	723	−0.106	0.204	1.483
Unemployment status	723	0.102	—	—
Total debt	723	0.077	0.134	4.038
Debt-to-income ratio	723	0.107	0.000	0.620
Food expenditures	723	−0.019	0.151	2.229

Note: This table presents the summary statistics of the final PSID sample. Panel A shows the level of variables at the beginning of our sample; Panel B shows the growth rate between 1999 and 2007.

Table IA.XVIII. PSID: Import Competition, Labor Market Outcomes and Debt Growth, IV Specifications

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: Effect of Import Exposure on Debt (change 1999-2007)							
	OLS on Debt				IV on Debt (SC as instrument)			
Regressor:	Inc. Growth		Unemp. Spell		Inc. Growth		Unemp. Spell	
Coefficient	0.12***	0.14***	-0.45***	-0.61***	-1.12*	-1.24	9.97	10.85
	(0.01)	(0.04)	(0.07)	(0.20)	(0.64)	(0.80)	(6.11)	(7.45)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	No	Yes	No	Yes
F-statistic (1st stage)					10.9	9.39	5.26	6.67
Observations	3532	701	3787	723	701	701	723	723
R^2	0.271	0.264	0.264	0.256	-1.7	-1.82	-3.78	-4.08
	Panel B: Effect of Import Exposure on DTI (change 1999-2007)							
	OLS on DTI				IV on DTI (SC as instrument)			
Regressor:	Inc. Growth		Unemp. Spell		Inc. Growth		Unemp. Spell	
Coefficient	-0.01***	-0.01*	0.03**	0.10**	-0.11	-0.15	1.19	1.58
	(0.00)	(0.00)	(0.02)	(0.04)	(0.08)	(0.11)	(0.86)	(1.20)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	No	Yes	No	Yes
F-statistic (1st stage)					23.5	11	27	22.6
Observations	3532	701	3787	723	701	701	723	723
R^2	0.237	0.245	0.231	0.243	-0.34	-0.662	-1.63	-2.84

Note: Table IA.XVIII presents regressions of the percent change in debt and the change in debt-to-income ratio (DTI) over the 1999 to 2007 period on labor outcomes. In columns (1) and (2) we present the OLS regression of debt and DTI on the percent change in total labor income over the sample period. In column (3) and (4) we present the OLS regression of debt and DTI (respectively in panel C and D) on unemployment, where unemployment is defined as the number of unemployment spells experienced between 1999 and 2007 across the five biennial surveys. Columns (1) and (3) include all observations in 1999, while column (2) and (4) only consider the sample where we have a valid shipping cost for the household head occupation. Columns (5) to (8) present the two-stage least squares estimate of the change in debt and dti on both the change in income and unemployment, where income and unemployment are instrumented by the shipping costs of occupation in 1999. Individual level controls are the log of labor income, the log of the value of all debt, debt-to-income ratios and the number of individuals in the household at the beginning of the period in 1999; we also include education, race, gender, and marital status fixed effects. Clustered standard errors at the state level are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table IA.XIX. PSID: Import Competition and Equity Extraction

	(1)	(2)	(3)	(4)	(5)
	OLS				IV
Shipping Costs	−11.052**	−10.558**	−7.512		
	(4.787)	(5.322)	(4.921)		
Income Growth				0.038	
				(0.041)	
Income Growth					−0.947
(instrumented by SC)					(0.629)
Individual Controls	N	Y	Y	Y	Y
State FE	Y	N	Y	Y	Y
Observations	723	723	723	701	701
R^2	0.06	0.07	0.03	0.07	−0.71

Note: Table IA.XIX presents regressions of the percent change in equity extraction on shipping costs (columns 1 to 3), income growth (columnt 4) and income growth instrumented by shipping costs (column 5). In columns (1) and (2) we present the OLS regression of debt and DTI on the percent change in total labor income over the sample period. Equity extraction is measured in the PSID as in Bhutta and Keys (2016), that is an increase of more than 5% in mortgage balances for non-movers. Individual level controls are the log of labor income, the log of the value of all debt, debt-to-income ratios and the number of individuals in the household at the beginning of the period in 1999; we also include education, race, gender, and marital status fixed effects. Clustered standard errors at the state level are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table IA.XX. PSID: Import Competition and Consumption

	(1)	(2)	(3)	(4)
	Growth in Expenditure 1999-2007			
Shipping Costs	−1.17	−1.09	−0.694	0.181
	(1.77)	(1.52)	(1.79)	(1.75)
Individual controls	No	No	Yes	Yes
Individual fixed effects	No	Yes	No	Yes
State FE	Yes	No	Yes	Yes
Observations	699	699	699	699
R^2	0.0786	0.106	0.1	0.183

Note: Table IA.XX presents reduced form regression of the percent change from 1999 to 2007 in consumption in the PSID. Clustered standard errors at the state level are presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.