Globalization and entrepreneurial entry and exit: Evidence from U.S. households

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Abstract

Using a database on U.S. individuals and households, we examine whether rise in globalization and trade integration of product markets have contributed to the observed decline in US entrepreneurship in trade-exposed sectors. US trade policy that lowered tariffs on China dampens entrepreneurial dynamism through lower entry (especially by incorporated entrepreneurs) and higher exit in exposed sectors but increases entry by highly educated individuals in skill-intensive nontradable industries. The results are robust to secular trends, labor market specialization, local collateral and credit shocks, and long-run bank distress. They are also robust to aggregation at local, state, and national industry levels.

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1 Introduction

Entrepreneurial activity by households is a major component of new business formation and employment generation (Decker et al., 2014). Furthermore, a long-standing literature emphasizes the positive relation of entrepreneurship and technological innovation (Schumpeter, 1942; Aghion and Howitt, 1992), which is a central driver of economic and productivity growth (Solow, 1956; Romer, 1990). However, there is a growing recognition of a decline in entrepreneurship (or the rate of new business formation) by households in the last few decades in the US, which has accelerated after 2000 (Decker et al., 2014; Haltiwanger, 2015). This trend applies across most states and metropolitan regions of the country (Hathaway and Litan, 2014). The causes and consequences of this slowdown in entrepreneurial activity are topics of active debate and investigation.

Using a database on U.S. individuals and households, our paper makes two main points. First, increased import competition driven by the evolution of US trade policy around the turn of this century with respect to China has a significant negative effect on entrepreneurial dynamism—through lower entry and higher exit by entrepreneurial firms—in trade-exposed industries.[1] Second, import competition reallocates entry across sectors; in particular, there is evidence of positive spillover effects on entrepreneurial entry by educated individuals in skill-intensive nontradable industries.

Conceptually, a decision-theoretic entry framework (e.g., Berry and Reiss, 2006) indicates that import competition will ceteris paribus dampen entrepreneurial dynamism in tradable industries.[2] Meanwhile, the literature theoretically (Lucas, 1978; Calvo and Wellisz, 1980) and empirically (Bates, 1990) argues for a positive relation of human capital and business success. Hence, considering entry and sector decision jointly yields the implication that import competition can have *positive* spillover effects on entrepreneurial activity in the nontradable sector because individuals with superior human capital who would otherwise have started a business in the tradable sector favor entry in the nontradable sector. While the impact of trade on reallocation of activity based on plant-level productivity is considered in the literature (Bernard et al., 2006a, 2006b; Lileeva, 2008), the reallocation effects of trade on entrepreneurial entry across tradable and nontradable sectors are relatively unexplored.

We examine the effects of import competition on entrepreneurial dynamism using the micro-level longitudinal Survey of Income and Program Participation (SIPP) data from the US Census Bureau, a rotating panel that tracks individuals (about 60,000 to 80,000 individuals) for up to four years. The panel structure

[1] We frame the discussion in terms of *entrepreneurial* entry and exit (rather than more general business entry or exit) to distinguish net entry at the individual or household level from corporate activity.

[2] This is consistent with the 'imports-as-market-discipline' hypothesis in the international trade literature (Helpman and Krugman, 1989; Levinsohn, 1993).

of the SIPP data allows us to observe individuals' transitions from employment to entrepreneurship and vice versa. A notable beneficial aspect of this database is that we can cleanly identify new firm creation (at the household level) as opposed to confounding this with new establishments set up by existing firms (Decker et al., 2014). Our sample covers panels from 1993 through 2013.

Using import growth directly as a measure of import competition raises endogeneity concerns because of common underlying variables that drive both import growth and business dynamism. Therefore, and similar to the literature, we focus on the evolution of US tariff rates prior to China's accession to the WTO in 2002. Pierce and Schott (2016a) and Handley and Limao (2017) interpret the post-2001 surge in Chinese imports (into US) as stemming from the removal of trade policy uncertainty (TPU) following the conferral of Permanent Normal Trade Relation (PNTR) status to China in 2000, which eliminated the year-by-year renewal of the "Most Favored Nation" (MFN) tariff rates. In contrast, Alessandria et al. (2020) highlight the low levels and time-varying nature of TPU regarding Chinese tariffs; in particular, they find that TPU fell significantly in 1998.

The Pierce and Schott (2016a) and Handley and Limao (2017) perspective suggests a differences-in-differences (DID) approach for estimating the effects of import competition after the PNTR event. Our empirical tests employ industry-specific "NTR Gaps"—the difference between the substantially higher non-NTR rates and the MFN tariff rates (Pierce and Schott, 2016a)—as well as log changes in these tariff gaps (Handley and Limao, 2017). Meanwhile, the results of Alessandria et al. (2020) suggest that effects of trade policy on entrepreneurial entry and exit will build over time as policy changes and their attendant import implications become more credible. We, therefore, also use year-by-year log differences of tariff gaps in a pooled time-series regression setting. We find that these different measures of trade policy changes yield qualitatively similar results.

Our empirical framework also recognizes regional differences in industry composition—in terms of trade exposure—that are likely to affect observed rates of entry and exit. In addition, factor market frictions imply that regional differences in labor and capital market characteristics—such as the skill composition of workforce (Topel, 1994; Autor et al., 2013) and access to credit (Davis and Haltiwanger, 2019)—generate (regional) variations in the effects of import competition on entry and exit. In our baseline tests, we undertake regional aggregation at the Metropolitan Service Area (MSA) level but we check the robustness of our results to state- and (national) industry-level aggregation.

The estimation results provide strong support for the hypothesis that increased import competition contributes significantly to the observed post-2000 acceleration in entrepreneurship decline in trade-exposed

sectors. Business creation is significantly lower in regions with high NTR Gap exposure, other things being equal. This effect is also economically sizeable. For the 2001-2006 period, ceteris paribus, a one-standard-deviation increase in the regional NTR Gap exposure lowers the likelihood of starting a business after 2000 by 9%. Furthermore, trade has especially negative effects on entrepreneurial activity in regions with a higher concentration of manufacturing firms and limited local banking access. The significant negative relation of regional NTR Gap exposure and entrepreneurial entry continues to hold for the 2007-2013 period.

We also find positive spillover effects of import competition on entrepreneurship in nontradable industries. This result holds even when we control for regional and time-varying heterogeneity in sectors through joint MSA×sector and sector×year fixed effects. A one-standard deviation increase in regional NTR Gap exposure increases the likelihood of household business creation in nontradable industries during 2001-2006 by 7%. These spillover effects apply more strongly to entry by highly educated individuals in industries requiring greater levels of skills and education. Thus, consistent with the view that trade induces reallocation of economic activity—across plants, firms, and sectors—our analysis finds that tariff changes for low-wage countries significantly reallocates entry from tradable to nontradable sectors, especially for individuals with higher human capital.

The DID approach has the appealing feature of allowing comparison within regions before and after the policy event, which helps address concerns regarding latent cross-sectional differences across regions. But this approach has well-known limitations in measuring aggregate effects. In particular, employment generation by entrepreneurship is of substantial interest (e.g., Decker et al., 2014). The literature emphasizes that employment generation largely occurs by incorporated entrepreneurial firms rather than unincorporated firms (Levine and Rubinstein, 2017). We find that import competition after 2000 had stronger negative effects on incorporated entry in tradable industries relative to unincorporated activity. Meanwhile, nontradable industries (e.g., services) tend to have lower employment generation per firm compared with high-exposure industries (Choi and Speltzer, 2012). Thus, the observed sectoral reallocation of entry indicates aggregate negative employment effects of import competition following tariff reductions on China. In addition, we find that the regional dispersion of entrepreneurial entry and exit is also altered between 1999 and 2006.

Our database allows us to examine economic performance and exit decisions of entrepreneurs over time. We find that increases import competition not only ceteris paribus reduces entry but also lowers profits of existing firms and accelerates exit from trade-exposed sectors. These effects are also economically significant. For example, increasing regional NTR Gap exposure by one-standard deviation decreases post-PNTR business profits in the tradable sector by 4% and raises the likelihood of ending a business (in this sector) by 6%, after

controlling for business conditions and individual entrepreneur characteristics (and the myriad other controls we employ). These results, along with the annunciated effects on entry, suggest significant dampening effects of trade policy induced import growth on entrepreneurial dynamism in tradable industries.

We undertake a variety of robustness checks on our analysis. We address the concern that underlying changes in the skill composition of the US labor market and other demographic changes can bias our results if these trends have a spurious correlation with regional exposure to tariff gaps. In addition, we control for the possibility of spurious correlation due to variations in local start-up credit access and collateral values, as well as long run trends in credit supply and labor specialization. The significant negative effect of trade policy change on entrepreneurial activity in tradable industries remains robust.

To our knowledge, this is the first study to document (using household data) significant negative effects of import competition—following trade policy changes—on entrepreneurial net entry in tradable industries, accompanied by positive spillover effects on entry in nontradable industries driven by a human capital channel at the individual level. Figure 1 graphically depicts the divergent trajectories of business start-up growth in tradable and nontradable industries after 2000. Our analysis points to negative employment generation effects of trade policy changes in the short to medium run with potentially positive innovation effects in nontradable industries in the longer run.

In the remaining paper, Section specifies the empirical hypotheses and describes the data. Section 3 presents the main empirical results and Section 4 undertakes robustness tests. Section 5 concludes.[3]

2 Empirical hypotheses and data

In this section, we provide a brief conceptual motivation for our empirical tests and then describe our data sources.

2.1 Conceptual framework and hypotheses

As we mentioned already, there will be regional differences in the impact of increased imports (through trade policy changes) on business entry and exit decisions. Conceptually, the effect of imports on business entry and exit in the exposed sector can be summarized at the level of individuals (indexed by i) in regions $m = 1, ...M$, using a decision-theoretic framework in a Cournot-type imperfect competition setting (see the internet Appendix). In any period, each individual i in region m is endowed with (financial and real) wealth

[3] Supplementary materials are available online.

V_{im}, human capital H_{im}, and a unit of labor that is supplied inelastically. At the start of the decision period, individuals are either business owners or not; in the latter case, they can choose to either start a business in the trade-exposed sector T by incurring an entry cost C_m or choose to work at wage $w_m(H_{im})$, which is increasing in human capital. Meanwhile, owners can choose to continue their business operation or exit and work (at $w_m(H_{im})$).

The representative industry in T is an international oligopoly of domestic and foreign firms.[4] The regional profile of domestic competitors is $\mathbf{N}_d = (N_{d1}, ..., N_{dM})$. Trade policy changes through tariff reductions for a foreign country f increases competition via entry of foreign firms N_f. Production costs vary across regions because factor inputs (land, labor, and capital) do not have perfect mobility. Expected profits of entrepreneurs in region m are denoted by the decreasing function $\pi_m(\mathbf{N}_d, N_f)$. As mentioned above, individuals have to bear fixed costs of business entry that may generally be region-specific. For example, collateralization is a significant factor in startup financing (Adelino et al., 2015) and there is significant cross-sectional regional variation in housing prices that is the principal household collateral. Meanwhile, the literature highlights the effect of entrepreneurs' human capital on startup financing access (Baum and Silverman, 2004). But entry costs will also generally be positively related to import competition, which forces domestic entrants to invest in cost-efficient technologies and/or increases profit risk that ceteris paribus raises financing costs. The entry cost function is thus given by $C_m(N_f, H_{im})$, which is increasing in the first argument and decreasing in the second. For convenience, we let the total wealth index relevant for business ownership for individual i be given by $A_{im} \equiv V_{im} + z_m H_{im}$.

Hence, entry will be optimal for i if $A_{im} \geq C_m(N_f, H_{im})$ and

$$\pi_m(N_{d1}, .., N_{dm}, .., N_{dM}, N_f) - C_m(N_f, H_{im}) \geq w_m(H_{im}). \tag{1}$$

Meanwhile, exit will be optimal for a business owner i if, conditional on business liquidation costs L_m,

$$\pi_m(N_{d1}, .., N_{dm}, .., N_{dM}, N_f) < w_m(H_{im}) - L_m. \tag{2}$$

From Equations (1) and (2), we can deduce the following hypotheses.[5] The likelihood of an individual choosing business entry (in a tradable industry) in any region m is ceteris paribus decreasing in the number

[4] For notational ease, we will keep implicit the identification of individual industries in this sector.

[5] These hypotheses are formally derived in the model in the internet Appendix. The Appendix also provides numerical simulations based on parameters calibrated from our data.

of foreign firms N_f in the industry, while the likelihood of exit of an existing firm is non-decreasing in foreign entry. The equilibrium entry likelihood is also non-decreasing in wealth V_{im}, other things being equal. However, the effect of human capital on the likelihood of entry or exit is ambiguous (for the tradable sector) because it improves both the expected net gain and opportunity costs of business ownership.

For simplicity, the entry and exit decisions here are set in a static model where there is (implicitly) a one-shot change in trade policy and its effect on foreign entry. Literally interpreted, this will result in a one-time decline in entry and increase in exit. In a realistic dynamic setting, however, entry and exit costs imply that the effects of import competition will develop (or build) over time as foreign entry becomes more credible. As we mentioned above, there may be underlying long-run trends regarding entry in tradable industries that also need to be taken into account in measuring the effects of import competition on business formation in the exposed sector. Our empirical tests below are informed by these issues.

2.2 Data and Sample Characteristics

We use longitudinal data from the Survey of Income and Program Participation (SIPP) during 1993-2006 as our baseline sample, and check for robustness of the results to extending the sample to 2007-2013. We also use local level industry data from County Business Patterns (CBP) and regional data from the Bureau of Labor Statistics, Corelogic, the FDIC and Bankscope. In addition, we use numerous other data sources to address various identification challenges for our analysis. A list of data sources and variable definitions is provided in Table A.1 and Table A.2 of the internet Appendix.

2.2.1 SIPP panel data

Each SIPP panel tracks 60,000 to 80,000 individuals over a period of up to four years. The SIPP survey is built around a core set of questions on demographic attributes, employment and income, business ownership, profit/loss from business, and business size (number of employees).[6] In particular, each wave includes detailed questions on assets and liabilities, such as the ownership and market value of different types of assets—such as real estate, vehicles, and financial assets (including IRAs and 401Ks)—that are reported annually. We

[6] Each SIPP panel is a multi-stage stratified sample of the US civilian, non-institutionalized population. The longitudinal design of SIPP dictates that all persons of ages 15 and above present as household members at the time of the first interview be part of the survey throughout the entire panel period. To meet this goal, the survey collects information useful in locating persons who move. In addition, field procedures were established that allow for the transfer of sample cases between regional offices. Persons moving within a 100-mile radius of an original sampling area (a county or group of counties) are followed and continue with the usual personal interviews at 4-month intervals. Those moving to a new residence that falls outside the 100-mile radius of any SIPP sampling area are interviewed by telephone. The geographic areas defined by these rules contain more than 95 percent of the US population.

exploit this to compute *Total wealth* for each respondent in our sample, which includes financial assets as well as non-financial assets, such as all real estate holdings (including second homes), vehicles, and private business equity. In addition, we extract information on *Labor income* from gross monthly earnings (before deductions) or (for those paid on an hourly basis) from the regular hourly pay-rate and the number of hours worked. The data also identify if the respondent is currently unemployed (*Unemployed*).

For human capital wealth, we identify various levels of formal education (*High school or less*, *Some college*, and *College or more*). But human capital also involves skill formation. *Routine task-intensity* of occupations is negatively related to skill-specific human capital (Autor and Dorn, 2013). Similarly, higher occupational mobility indicates less commitment to a particular occupation and, hence, lower skill-specific human capital. The data identify a worker's employer, the employer's 3-digit Census Industry Classification (CIC), and the Integrated Public Use Microdata Series (IPUMS) code for the worker's occupation. Building on occupational mobility measures in labor economics (Schniper, 2005), we measure the *Occupational mobility* of the individual's current occupation based on an index of mobility in various occupations (see Table A.2). Finally, to measure financial literacy, we use a binary variable equal to one for individuals in a finance-related occupation (*Financial experience*). There are also additional individual characteristics that may impact the propensity for entrepreneurship—such as age, marital status, race and gender. For instance, the literature highlights the negative relation of age and entrepreneurship for older age groups (Parker, 2009); we use the natural log of the individual's age ($Log(Age)$).

Our baseline analysis covers 1993-2006 because focusing on the pre-Great Recession era aids identification by avoiding the confounding effects of the financial crisis and its aftermath. Hence, the baseline sample of households is drawn from the 1993, 1996, 2001, and 2004 panels. Our analysis is conducted at the individual level and includes only respondents who are 18 or older.[7] To construct our potential entrant sample, we drop respondents who were already self-employed/owned a business in the previous year because we are interested in transition into entrepreneurship. This process results in a baseline potential entrant sample of 317,496 observations. However, to examine whether the observed effects of import competition on entrepreneurial dynamism in exposed sectors were part of transition after China's accession to WTO or were linked to a long-term change, we subsequently extend the sample by including panel data for 2007-2013 (see Section 4.1 below).

Table 1 presents a univariate analysis of the differences in salient personal characteristics between business

[7] There are no mandated upper age limits on business ownership. Corporate laws vary by state, but all states require the principals of a company that incorporates to be 18 years or older (see, https://www.sba.gov/blogs/6-things-you-need-know-about-starting-business-minor). For robustness, we also exclude those aged below 20 or above 64, leading to similar results.

"starter" and "non-starter" subsamples in our baseline sample (1993-2006).[8] The number of entrepreneurs (or starters) is 2% of our sample, which is commensurate with the proportion of self-employed (1%) in the SIPP panels for 1996-2006 examined by Corradin and Popov (2015). A significantly higher number of starters are male, white, and married; these demographic differences are also consistent with other studies of entrepreneurship that use the SIPP data. The mean wealth-related variables are significantly higher for the starter group compared with the non-entrepreneur group. The average total wealth of the former is more than twice that of the latter, while liquid wealth and home equity are 39% and 67% higher, respectively. Notably, the labor income of the starters is also significantly higher than that of non-starters.[9] Thus, there is a positive correlation between total wealth and the propensity to start a business, as is well known in the literature.

In terms of human capital, the business starter group is clearly more educated compared with the non-starter group. The (mean) proportion of individuals with "high school or less" education is significantly higher in the non-starter group, while the proportion of individuals with "at least a college degree" is significantly greater in the starter group. Moreover, business starters have significantly greater experience in business and financial-related fields. There is no significant difference between starters and non-starters in terms of being unemployed, but business starters exhibit significantly lower occupational mobility compared with non-starters. Finally, there is a negative correlation between age and entrepreneurship, which is consistent with the literature.

3 Import competition and business entry and exit

In this section, we specify our empirical test design and present the results on the impact of import competition on business entry and exit in tradable industries.

3.1 Baseline measure of import competition

In our baseline tests we measure the impact of PNTR on Chinese import competition at the industry level through "*NTR Gap*" (Pierce and Schott, 2016a), that is, the difference between the non-NTR tariff rates (NNTR) that would have applied in the event of non-renewal of China's NTR status and the MFN tariff rates. Thus, for industry j:

$$NTR\ Gap_j = NNTR_j - MFN_j \tag{3}$$

[8] The former subsample is comprised of respondents who did not own a business in year t but owned a business in year *t+1,* while the latter involves those who did not own a business in year t and still did not own a business in year *t+1.*

[9] Many recent entrepreneurs in our sample still maintain their jobs in the year that they start the business.

The *NTR Gap* is computed using industry-specific MFN tariff rates (from Feenstra et al., 2002) for 1999, a year before passage of PNTR. Next, as we mentioned above, we expect regional differences in the effects of import competition on entrepreneurial entry and exit because of geographic variations in industry composition and factor markets (labor and capital). We construct regional measures of import competition by weighting NTR Gaps of industries by their establishment share at the MSA level. For MSA m the establishment share of industry j is, $\frac{N_{mj}}{N_m}$, where N_{mj} is the total number of establishments of industry j and N_m is the total number of establishments in the region, and hence

$$NTR\ Gap_m = \sum_j \frac{N_{mj,1993}}{N_{m,1993}} NTRGap_j \tag{4}$$

The regional establishment weights are taken at the start of our sample period.[10] Because these regional establishment weights are computed several years prior to the PNTR event (or the policy change), they also help address concerns of reverse causality.[11]

3.2 Entry

We now examine the relation of regional NTR Gaps to entrepreneurial entry. We start by graphing the relation of the percentage change in the entry rate between the pre-and post-PNTR periods (that is, 1993-2000 and 2001-2006, respectively) and the NTR Gaps across the MSAs (shown in Figure A.3 in the internet Appendix). We observe a negative relationship overall, with a couple of MSAs showing 20% decline in percentage entry rates.

3.2.1 Baseline regression specification

The potential entrant sample consists of repeated cross sections of unique non-business owners who may transition into self-employment from year t to year $t+1$.[12] Taking advantage of the individual-level panel data structure of the SIPP, we use individual fixed effects to control for latent heterogeneity in the propensity to start a new business (Bertrand, 2004).

The baseline DID specification analyzes whether MSAs with higher NTR gaps experience significantly lower household business entry following the trade policy event (grant of PNTR status to China) in 2000.

[10] The construction of regional NTR Gaps is similar to that of Pierce and Schott (2016b) and Greenland et al. (2019).

[11] Figure A.2 in the internet Appendix displays the histogram of the regional NTR Gaps. The distribution is right-skewed, similar to the regional distribution of the NTR Gap based on county-level employment shares in Pierce and Schott (2016b).

[12] We note that the SIPP data are at annual frequency and, hence, entry and exit are also measured at annual intervals.

Specifically, let i be a non-business owner in survey year t, who is located in MSA m. The baseline specification is:

$$\begin{aligned} Entry_{im,t+1} &= \alpha + \gamma Post_t \times NTR\ Gap_m + \mathbf{X}'_{i,t}\boldsymbol{\beta}_1 + \\ & \quad Post_t \times \mathbf{Z}'_{m,1993}\boldsymbol{\beta}_2 + \mathbf{F}'_{m,t}\boldsymbol{\beta}_3 + fixed\ effects + \varepsilon_{im,t}, \end{aligned} \tag{5}$$

where $Entry_{im,t+1}$ is a dummy variable that equals one if individual i becomes self-employed at date $t+1$. The first term on the right-hand side interacts the local and NTR Gap (in Equation (3)) with the post-policy shock years $Post_t$ ($t > 2000$) and, thus, captures the DID effect for the situation at hand. Meanwhile, $\mathbf{X}_{i,t}$ includes a rich set of observable individual-level covariates relating to business entry.[13]

The third term is an interaction of the post-policy dummy variable and a vector of MSA-level characteristics measured at the beginning of our sample period, $\mathbf{Z}_{m,1993}$,[14] which includes initial conditions related to business opportunities, entrepreneurial financing access, and labor market conditions that significantly impact the entry decision according to Equation (1). We use the growth of establishments in the MSA (*Establishment growth*) as the indicator for business opportunities, while percentage of deposits concentrated in local banks (*%Local banks*) is a proxy for access to entrepreneurial financing. We also include appreciation in housing price (*Housing price appreciation*) as a measure of collateral enhancement. The local unemployment rate (*Unemployment rate*) is the indicator for labor market conditions in the MSA. In light of the secular downward trend in US manufacturing, we include the local employment share in this sector (*Manufacturing employment share).* And, following Pierce and Schott (2016b), the vector $\mathbf{F}'_{m,t}$ includes two additional US trade policy-related variables: the phasing out of the Multi-Fiber Arrangement ($MSA\ Exposure_{mt}$) and the average MSA-level MFN rates based on establishment shares. We also include year fixed effects, MSA-level fixed effects, and individual fixed effects.

Section 2.1 predicts that the estimated coefficient $\hat{\gamma}$ (in (5)) will be negative. Furthermore, the coefficient for wealth should be positive. For reasons mentioned earlier, the signs of coefficients for human capital-related covariates, such as formal education, are ambiguous. The effect of being unemployed is also ambiguous since unemployment both reduces wealth and the opportunity cost of starting a business. Similarly, labor market measures related to skill formation also conceptually have an ambiguous impact on entry because they affect

[13] Specifically, we include personal wealth, labor income, employment status, age, occupational mobility, education level as well as respondent's marital status, household wealth, and household size, race, gender, and financial experience (where the last three controls and all other unobserved time-invariant individual characteristics are subsumed by the individual fixed effects).

[14] As a robustness check, we also used the median values from 1983-1992 but found very similar results.

both expected profits and opportunity costs in the same direction.

The estimation results for Equation (5) are presented in Table 2. The first column includes only the DID term, the individual controls $\mathbf{X}'_{i,t}$ and the fixed effects. The second column adds the $Post \times \mathbf{Z}'_{m,1993}$ variables and the last column also includes the two policy variables $\mathbf{F}'_{m,t}$. In all specifications, the estimates of γ are negative and significant at 1% levels. These estimates are also economically significant. For example, the estimate in column 3 implies that, after 2000, a one standard deviation increase in the regional NTR Gap exposure reduces the pre-event entry rate by 9%.[15]

Table 2 also shows that individuals' total wealth has a significant positive effect on the propensity to start a business, other things held fixed. However, controlling for wealth, the individual's labor income or employment status or higher education are not significant. This is consistent with the conceptual ambiguity highlighted above and with the received empirical literature (van der Sluis and van Praag, 2008). In contrast, individuals in occupations with high routine task-intensity or high mobility are significantly less likely to enter. Thus, the negative effect of low skill formation on expected business profits appears to dominate the positive entry incentive due to low earnings in the labor market.[16]

The coefficients of the DID terms relating to the local controls ($Post \times \mathbf{Z}'_{m,1993}$) indicate that local business growth and financing access had a significantly higher (positive) effect on entry after 2000. This is consistent with significant role of regional banks and loan supply on entrepreneurial entry documented in the literature (Davis and Haltiwanger, 2019). In a related vein, entry declined in MSAs with greater employment share in manufacturing after 2000, other things being equal. These results are consistent with the evidence that import competition increased after 2000 for regions with higher concentration of manufacturing (Pierce and Schott, 2016a). The effect of local unemployment rate and housing price appreciation on entry did not significantly change after the policy event, however.

3.2.2 Cross-sectional effects

The unique nature of our dataset allows us to study the relative impact of import competition on population subgroups. We undertake this analysis through the inclusion of interaction terms in the basic DID specification (5). The results are presented in Table 3 (using the specification in column 3 of Table 2).

We find that the negative effect of import exposure on entry is significantly greater on sample subgroups

[15] The average sample entry rate is 2.2%. Hence, increasing the regional NTR Gap exposure by its standard deviation (0.052) has a negative effect on post-event entry of -(0.041*0.052)/0.022.

[16] Although age is not significantly related to entry on average, untabulated results show that $\log(\text{Age})^2$ loads significantly negatively. Thus, the negative relation of age and entrepreneurship operates at high age levels, which is consistent with the literature (Azoulay et al., 2018).

characterized by high educational attainment, higher occupational mobility, and greater routine task-intensity of occupations. The dampening effect on entry is weakened for wealthier individuals and (weakly) for unemployed individuals. These results are consistent with the conceptual framework outlined in above, which implies that import competition will have relatively greater negative impact on the entrepreneurial activity of subgroups that have *either* lower ability to start a business *or* higher opportunity costs of doing so. Consistent with this, the results in Table 3 indicate that individuals are ceteris paribus less likely to start a business if they are less wealthy or work in occupations with greater routine task-intensity or mobility. Meanwhile, employed individuals or highly educated individuals have greater opportunity costs of business entry in general because of higher wages. In addition, individuals with higher educational attainment and/or skill formation may have greater ability to enter nontradable industries—a hypothesis we will pursue further below.

3.2.3 Controlling for labor market trends

As we mentioned above, there is a trend in labor markets of industrialized countries of growth in low-skill, manual and *routine-task intensive* service occupations. In particular, Autor and Dorn (2013) document this trend in the US since 1980. In a similar vein, Firpo et al. (2011) develop an "offshorability" index of occupations, so that there is low labor skill formation for workers in occupations with high values of this index. We have seen in Table 2 that low skill formation in labor markets is negatively related to business start-up propensity. Hence, there is a concern that our results may be driven by the latent labor market trend toward low-skill routine-task intensive service occupations. In Table 4, we therefore analyze the DID effects of NTR Gap exposure while explicitly controlling for additional labor market controls. These labor market controls are computed as MSA-level labor market characteristics at the start of the sample. In these tests, we continue to employ all the controls and fixed effects in column 3 of Table 2.

The negative coefficient on the main DID term ($Post \times NTR\ Gap_m$) remains statistically and economically significant even after we control for local labor market trends. The results also indicate that trade policy did not significantly change the effects of local demographic characteristics—such as the proportions of non-college educated and older age people in the population and female labor participation rate—on entry. However, entry in trade-exposed sectors was significantly lower after 2000 in regions with greater presence of low-skill occupations.

3.3 Entry in tradable and nontradable sectors

The conceptual entry framework of Section 2.1 can be extended to cover the case of entry choice in tradable and nontradable sectors and yield the following hypothesis (see the internet Appendix): The entry likelihood of individuals in the nontradable sector is ceteris paribus non-negatively related to increased import competition (in the tradable sector); in particular, agents with high human capital, who would otherwise have started a business in the tradable sector, will be more likely to enter in the nontradable sector.

To test this reallocation hypothesis, we first divide the tradable sectors into high- and low-exposed sectors, where the former consists of manufacturing while the latter consists of agriculture and mining segments. The other sectors, such as services and finance (see Figure 2 for a full list) comprise the nontradable sector. Then, we interact the $Post_t \times NTR\ Gap_m$ term in Equation (5) with sectoral dummies. Because we are now differentiating the effects of import competition amongst different types of sectors, the concern is that the estimated effects could reflect latent time-varying shocks at the sector level. We therefore use sector×year fixed effects. We also utilize MSA×sector fixed effects to help control for regional variations in sector trends.

Table 5 presents the results. It is evident that the negative impact of the PNTR event on entrepreneurship resides mostly in manufacturing—the sector most exposed to trade. Nevertheless, import competition still has negative effects (at conventional levels of significance) in the low-exposed tradable sector. The results also show, however, that increased import competition after 2000 has a significantly positive impact on entrepreneurship in the nontradable sector, other things being equal. In addition to the fixed effects used in the baseline specification, this result is robust to controlling for latent time-varying sector trends or latent joint regional and sectoral trends. The positive DID spillover effect is also economically significant. A one-standard deviation increase in regional PNTR Gap exposure increases the likelihood of business creation in nontradable sectors by 7%. Thus, we find empirical support for the hypothesis of positive spillover effects of increased import competition on entry in the nontradable sector.

The hypothesized channel for positive effects of import competition on increased entry in nontradable industries is through the (sectoral) entry choice of individuals with superior human capital. Table A.3 in the internet Appendix tests this hypothesis. To avoid confounding effects of the housing and financial market boom in our sample period, we exclude finance, insurance, real estate, and rental and leasing sectors from our sample. We split the rest of the nontradable sectors into skilled and unskilled sectors. The results imply that, relative to the control group of trade-exposed sectors, import competition significantly raises the likelihood of entry in nontradable skill-intensive sectors by the highly educated subgroup. In sum, the analysis supports a

human capital based channel for the reallocation entry following trade policy changes.[17]

3.4 Effects on incorporated and unincorporated business formation

The recent literature on entrepreneurship highlights the distinction between unincorporated and incorporated business formation (Levine and Rubinstein, 2017). Incorporation involves additional costs for business owners but it provides benefits of limited liability and legal identity that facilitate investment in riskier and larger projects. Thus, incorporated entrepreneurship has greater impact on employment generation compared with unincorporated firms (Levine and Rubinstein, 2017).

Our data allow us to distinguish between self-employed who are incorporated from those that are not. In Table 6, we report the results of repeating the tests in Table 5 for incorporated and unincorporated business starters in tradable and nontradable sectors. The analysis indicates that import competition ceteris paribus had significantly greater dampening effect on incorporated entry (relative to unincorporated entry) in the tradable sector. This is consistent with our conceptual framework (Equation (1)) since entry costs should be higher for incorporated entry, other things being equal. Thus, lower expected profits from entry in the high-exposed sector—due to increased import competition—will especially impact the entry incentives for incorporated business starters. Levine and Rubinstein (2017) find that incorporated entrepreneurs tend to be more educated compared with unincorporated self-employed. The negative relation of import competition and incorporated entry seen in Table 6 is, therefore, also consistent with the findings above that more educated entrepreneurs shift attention to entry in the nontradable sector.

However, Table 6 also indicates that the significant positive effects of import competition on entry in nontradable sector occur for unincorporated entrepreneurs. In our data, the proportion of unincorporated firms are significantly higher in the nontradable sector relative to the tradable sector. Furthermore, the average employment size of firms is lower in the service industry compared with manufacturing (Choi and Speltzer, 2012). Therefore, the results in Table 6 collectively suggest a negative relation of import competition and employment generation across tradable and nontradable sectors.

[17] In general, there is significant "industry inertia" in business formation in our overall sample. On average, individuals are 33.8% more likely to start a business in the industry they were employed in the previous period. But this result applies for potential entrants across all education groups, industries, and MSAs. Table 5 indicates, however, that import competition in high NTR Gap regions raises the overall likelihood of entry into skill-intensive nontradable industries by highly educated individuals.

3.5 Profitability and Exit

As indicated in Section 2.1 (Equation (2)), increased import competition would ceteris paribus raise exit rates in tradable industries by lowering expected profits. Indeed, models of business exit in the literature show that exit is negatively related to profits and firm size (Klepper, 1996). But exit may also be induced by reduced current profits if the debt repayment constraint becomes binding. The literature documents higher likelihood of exit for firms with greater debt, other things being equal (Fan and White, 2003). Our data allow us to examine the higher exit hypothesis directly through a DID analysis on the profits/losses and exit rates of existing entrepreneurial firms in tradable industries, while controlling for individual/household characteristics, firm size, and financial leverage (defined as the ratio of total debt to equity).

The first two columns of Table 7 present the analysis for the effects of import competition on net profits of business owners in the trade-exposed sector. The sample here includes only business owners at $t+1$ with non-missing information on their business profit and size at t.[18] Column 1 includes only the DID terms, and column 2 adds the individual/household, firm size and leverage controls. The results indicate that the trade policy event (PNTR) had significantly greater negative effect on the profits of existing firms in the trade-exposed sector relative to the nontradable sector. This effect is also economically significant. A one-standard increase in regional NTR Gap exposure lowers average profits by 4% in the exposed sector relative to the nontradable sector.[19]

The last two columns of Table 7 display the analysis on the effects of increased imports on exit. Our exit sample excludes respondents who were not self-employed/owned a business in the previous year and consists of repeated cross-sections of unique businesses for each year in the sample. positive. In column 3, we only report the estimates of the DID terms, while column 4 includes the other controls. The results indicate a significant increase in the likelihood of ending an existing business in the tradable sector following the PNTR event, other things being equal. This effect is also economically significant. The estimate for the second DID term in column 4 indicates that a one-standard deviation increase in regional NTR Gap exposure raises the likelihood of business exit by 6% in the tradable sector, compared with the nontradable sector.

An issue with the empirical specification for exit employed in Table 7 is that it does not explicitly include forward-looking or "anticipatory" variables relating to expected profits. But note that forward-looking proxies

[18] Note that this sample is smaller than the sample in Table 2 because we include only current business owners.

[19] A concern with this estimation is that we only observe outcomes ex post for those firms that do not exit the sample. This may generate a survivorship bias because businesses started in regions that experienced large low-cost import growth after 2000 are more likely to exit. However, had they remained, these businesses would have been less profitable; hence, their attrition creates a downward bias on the estimates, suggesting that the true effects are even larger than the ones we estimate.

for expected profits would ceteris paribus lower the likelihood of exit. Hence, there would be a downward bias in the estimates of the coefficients (in columns 3 and 4) because of omitted forward looking proxies for expected profits, but there will be an upward bias if the omitted variables are positively correlated with exit.

Overall, our analysis finds significant negative effects of import competition following trade policy changes with a major low-income country (China) on entrepreneurial net entry accompanied by a reallocation of entry from trade-exposed to skill- and education-intensive nontradable industries. These effects also influence the regional dispersion of entry and exit. In particular, the dispersion (standard deviation normalized by the mean) of entry across MSA regions increased from 2.9 in 1999 to 3.2 in 2006, while the regional dispersion of exit decreased from 1.9 to 1.5 during the same time period.

4 Robustness Analysis

In this section we undertake a variety of robustness checks on the results presented in the previous Section.

4.1 Sample extension and alternative aggregation levels

While the MSA-level aggregation we use above (Section 3.1) follows a strand of the literature, another strand focuses on tariff gaps aggregated at the national industry level (e.g., Lileeva, 2008). In a similar vein, even regional integration can be undertaken at the State rather than MSA levels. We examine the effects of different aggregation levels on our results by running the entry and exit regressions (column 3 of Table 2 and column 4 of Table 7, respectively) by using State level establishment weights in Equation (4) and (separately) using NTR Gaps at the industry-level, that is, using Equation (3). For parsimony, we report only the estimate of the DID term in Table 8 (first and third rows). These results are not materially changed from those seen in Tables 2 and 7 in terms of statistical and economic significance.

It is also important to understand whether the observed effects of increased import competition on entry and exit in trade-exposed sectors were part of transition after China's accession to WTO or were linked to a long-term change. Accordingly, we extend our sample period through 2013. We then run the entry and exit regressions (column 3 of Table 2 and column 4 of Table 7, respectively) on the extended sample 1993-2013 (with 437,389 observations). The results, reported in Table 8 (second row), continue to show statistically and economically significant negative effects of US trade policy changes with respect to China in early 2000s on net entry in exposed sectors. Finally, in untabulated results, we find that effect on exit is significantly higher in the tradable sector relative to the nontradable sector in all the exit regressions in Table 8.

4.2 Alternative Trade Policy Measures

An alternative perspective on the impact of trade policy on entry and exit is that import competition should be driven by percentage change in tariffs and not absolute change in tariffs (e.g., Handley and Limao, 2017). We therefore examine the robustness of our results to using the log-difference gap measure

$$LNTR\ Gap_j = \ln(1 + NNTR_j) - \ln(1 + MFN_j), \tag{6}$$

and then constructing the regional measure log-difference measure, $LNTR\ Gap_m$, as in Equation (6). We run the regressions for entry and exit (using the specifications in column 3 of Table 2 and column 4 of Table 7, respectively) by replacing $Post_t \times NTR\ Gap_m$ with $Post_t \times LNTR\ Gap_m$. The results, reported in Table 9 (first row), indicate statistically and economically significant negative effects of import competition on net entrepreneurial entry.

Next, as we mentioned already, the results of Alessandria et al. (2020) suggest that the effects of tariff changes on import competition—and the attendant effects on entry and exit—will build over time as trade policy becomes more credible. Accordingly, we use year-by-year (or time-varying) tariff changes over our sample period computed as

$$LNTR\ Gap_{jt} = \ln(1 + NNTR_{jt}) - \ln(1 + MFN_{jt}). \tag{7}$$

Using $LNTR\ Gap_{jt}$, we construct the corresponding year-by-year regional tariff gap measure

$$LNTR\ Gap_{mt} = \sum_j \frac{N_{mj,1993}}{N_{m,1993}} LNTR\ Gap_{jt}. \tag{8}$$

We then run the regressions for entry and exit (using the specifications in column 3 of Table 2 and column 4 of Table 7, respectively) by replacing $Post_t \times NTR\ Gap_m$ with $LNTR\ Gap_{mt}$. The results are displayed in Table 9 (second row). We continue to see statistically and economically significant negative effects of import competition on entrepreneurial dynamism. Finally, untabulated results indicate that the effect on exit is significantly higher in the tradable sector relative to the nontradable sector in all the exit regressions in Table 8.

4.3 Timing

Our results above indicate that trade-policy change associated with the PNTR significantly increased the expected intensity of import competition for potential US entrepreneurs and ceteris paribus lowered business entry and raised business exit. Thus, we expect that the exposure of regional entry and exit to the NTR Gap should become more significant over time after the PNTR event. This hypothesis can be tested through the regression equation that interacts the time-invariant NTR Gap and regional attributes with an indicator variable for each sample year:

$$\begin{aligned} Entry_{im,t+1} &= \alpha + \gamma_t \mathbf{1}\{year = t\} \times NTR\ Gap_m \times + \mathbf{X}'_{i,t}\boldsymbol{\beta}_1 + \\ \mathbf{1}\{year &= t\} \times \mathbf{Z}'_{m,1993}\boldsymbol{\beta}_2 + \mathbf{F}'_{m,t}\boldsymbol{\beta}_3 + fixed\ effects + \varepsilon_{im,t}, \end{aligned} \tag{9}$$

and similarly for the exit decision. Table 10 displays the results. This analysis indicates that the effect of regional NTR gaps on entry and exit is generally statistically insignificant prior to PNTR but becomes significant—with an increasing magnitude over time—after the PNTR. (Figure A.4 in the Internet Appendix displays the 90-percent confidence interval for the DID coefficients for interactions of NTR Gap with year dummies from Equation (9).) Thus, we find results consistent with the view that the effects of trade policy changes on entrepreneurial entry and exit build over time as the policy becomes more credible.

4.4 Loan supply shocks

The importance of local financing access for entrepreneurial activity is well known. Hence, another identification concern is that our results may incorporate latent negative shocks to local bank financing. To address this, we adopt the approach suggested by Davis and Haltiwanger (2019) and construct local loan supply shocks utilizing data on small business loan activity that banks file in compliance with the Community Re-Investment Act of 1996 (CRA). We estimate the following equation that decomposes the change in local equilibrium credit into local demand and bank supply components:

$$g^{SBL}_{mb,t} = MSA_{m,t} + Bank_{b,t} + \varepsilon_{mb,t}, \tag{10}$$

where $g^{SBL}_{mb,t}$ is the growth rate in the volume of small business lending by bank b in MSA m in year t. The MSA-year fixed effects ($MSA_{m,t}$) control for variations in bank lending due to local economic conditions, while $Bank_{b,t}$ are bank fixed effects that control for latent changes in bank-specific loan supply. The estimated bank

fixed effects, $\widehat{Bank}_{b,t}$, from (10) then capture the national growth of small business lending by the bank-holding company b that are purged of banks' differential exposure to regional variation in demand for small business loans.

Using the Bartik (1991) approach, we then use estimated bank-specific supply shocks (from (10)) to construct a locally exogenous measure of lending supply shocks, $SBL_{m,t} = \sum_b \omega_{mb,t-1}\widehat{Bank}_{b,t}$, where $\omega_{mb,t-1}$ is bank b's market share of small business lending in MSA m in year $t-1$. $SBL_{m,t}$ captures the cross-MSA variation in small business lending by national banks based on the regional distribution of their loans to small enterprises. We re-estimate Equation (5) by including $SBL_{m,t}$ as a covariate. The results, shown in Table A.4 of the internet Appendix, indicate that the effects of import competition on entry remain statistically and economically significant. Moreover, the results imply that the adverse effect of import competition on entry is moderated in regions with easier access to bank finance.

4.5 Home equity

Because our sample period overlaps with the US housing boom, there is a concern that regions with higher NTR Gap exposure may have a spurious correlation with those that experience smaller increases in housing prices (Feng et al., 2019). While we control for housing price appreciation in the baseline tests reported in Table 2, omitting other variables that drive housing prices may bias estimates of γ. We employ multiple identification strategies to address this concern. First, we use a version of the identification strategy suggested by Chetty et al. (2017) and isolate the exogenous variation in home equity and property values. We start by decomposing total wealth as home equity and non-housing wealth and estimating

$$\begin{aligned} Entry_{im,t+1} &= \alpha + \gamma Post_t \times NTR\ Gap_m + \mathbf{X}'_{i,t}\boldsymbol{\beta}_1 \\ &\quad + \delta_1 Property\ value_{im,t} + \delta_2 Home\ equity_{im,t} + \\ &\quad + Post_t \times \mathbf{Z}'_{m,1993}\boldsymbol{\beta}_2 + \mathbf{F}'_{m,t}\boldsymbol{\beta}_2 + fixed\ effects + \varepsilon_{im,t}, \end{aligned} \tag{11}$$

where *Property value* is the property value in the current year for individual i in MSA m, and $Home\ equity$ is the home equity (the difference between the value and outstanding mortgage debt owed against the primary residence) in the current year. Applying the Bartik (1991) approach, we instrument for property value and home equity using variations in the current and the time-of-purchase house price index, respectively, at the *national* level interacted with MSA-level housing supply elasticity.

Second, we extend our baseline specification (5) to control for effects of housing price appreciation at the

household-level and instrument for the growth in local house prices $\left(GHPI_m^{1993\to t}\right)$ by interacting MSA-level supply elasticity with national mortgage rates:

$$\begin{aligned} Entry_{ims,t+1} &= \alpha + \gamma Post_t \times NTR\ Gap_m + \mathbf{X}'_{i,t}\boldsymbol{\beta}_1 \\ &\quad + \delta_1 Owner_{im,t} \times GHPI_m^{1993\to t} + \delta_2 Owner_{im,t} + \delta_3 GHPI_m^{1993\to t} \\ &\quad + Post_t \times \mathbf{Z}'_{m,1993}\boldsymbol{\beta}_2 + \mathbf{F}'_{m,t}\boldsymbol{\beta}_3 + fixed\ effects + \varepsilon_{im,t}, \end{aligned} \tag{12}$$

where $Owner_{im,t}$ is a dummy equal to one (zero) if the individual owns (rents) a house in year t, and $GHPI_m^{1993\to t}$ is the cumulative house-price appreciation in MSA m between 1993 and t. To control for the possible endogeneity in house prices, we adopt the Bartik (1991) approach and instrument for the growth in local house prices $\left(GHPI_m^{1993\to t}\right)$ by interacting MSA-level supply elasticity with *national* mortgage rates.

Finally, we exclude (i) housing boom-driven sectors such as construction, finance, insurance, real estate, and rental and leasing, (ii) individuals living in MSAs with the most inelastic housing supply, and (iii) "sand-states" (Arizona, California, Florida, and Nevada) that saw the largest housing bubbles. The results in Table A.5 of the internet Appendix show that the estimate of the main DID term $Post \times NTR\ Gap_m$ remains negative and significant through our robustness tests.

4.6 Controlling for long run trends

Babina and Berger (2017) show that financial distress during the Great Depression continues to hamper business entry in the long run. The concern then is that the results in Table 2 may incorporate long-run effects of historical shocks to local financing for startups. To address this, we exploit cross-MSA variation in the severity of bank distress during the Great Depression and analyze the long-run impact of bank distress in local banking markets on the trajectory of entrepreneurship (at the MSA-level). We obtain data on distressed banks and deposits during the Great Depression era from Annual Reports of the Comptroller of the Currency and ICPSR. We then use the percentage of distressed deposits in each MSA during the Great Depression $\left(\frac{\text{total deposits at suspended or failed banks between 1930-1933}}{\text{total deposits in the US in 1929}}\right)$ as a long-run pretrend control. The results are displayed in column 1 (for the Great Depression) in Table A.6 of the internet Appendix. Our main result in Table 2 remains robust.

In Table 4, we used prior routine task-intensity employment share as a pretrend control variable. However, Autor and Dorn (2013) show that the trend towards routine-task intensity occupations is evident even in 1950. This raises the concern that these underlying labor market specialization trends may have long-run effects on

local entrepreneurial activity. To address this, we exploit local labor market patterns of industry specialization in routine activities from 1950 using data from Census IPUMS. Similar to Autor and Dorn (2013), we isolate the long-run component of the routine occupation share in a given MSA. Column 2 of Table A.6 shows that the main result in Table 2 remains robust.

5 Summary and conclusions

There is a growing recognition of a decline in entrepreneurship by US households in the last few decades, especially in trade-exposed sectors such as manufacturing, which has accelerated since 2000. Using a panel dataset of individuals and households across the US during 1993-2013, we find that import competition driven by US tariff reductions for China in late 1990s and early 2000s had significant dampening effect on entrepreneurial dynamism— through lower entry (especially by incorporated entrepreneurs) and higher exit— in exposed industries. Furthermore, import competition reallocated entry across sectors because of positive spillover effects on entry in the nontradable sector, especially in skill and education intensive industries. These results are robust to several alternative hypotheses based on secular trends in US entrepreneurship and labor market specialization; local collateral and credit shocks; and long-run bank distress effects. They are also robust to aggregations at local, state, and national industry levels.

With incorporated entrepreneurs being an important engine of job creation, our analysis has nuanced implications for the economy-wide effects of trade shocks on entrepreneurship in the short versus the long run. Lower entry of incorporated entrepreneurial firms in tradable industries may have immediate adverse consequences on employment and individual earnings in the exposed sector. But increased entrepreneurial activity by individuals with superior human capital in skill-intensive nontradable industries may have positive effects on long run innovation and economic growth.

References

Adelino, M., Schoar, A., Severino, F., 2015. House prices, collateral, and self-employment. Journal of Financial Economics 117, 288-306.

Aghion, P., Howitt, P., 1992. A model of growth through creative destruction. Econometrica 60. 323-351.

Alessandria, G., Khan, S., Khederlarian, A., 2020. Taking stock of trade policy uncertainty: Evidence from China's pre-WTO accession. National Bureau of Economic Research Working Paper 25965.

Autor, D., Dorn, D., 2013. The growth of low-skill service jobs and the polarization of the US labor market. American Economic Review 103, 1533-1597.

Autor, D., Dorn, D., Hanson, G., 2013. The China syndrome: Local labor market effects of import competition in the United States. American Economic Review 103, 2121-2168.

Azoulay, P., Jones, B., Kim, J., Miranda, J., 2018. Age and high-growth entrepreneurship. National Bureau of Economic Research Working Paper 24489.

Babina, T., Berger, E., 2017. When finance leaves does enterprise follow? The lasting impact of bank distress on entrepreneurship. Working Paper, Cornell University.
Bartik, J., 1991. Who benefits from state and local economic development policies? Kalamazoo, MI: Upjohn Institute for Employment Research.
Bates, T., 1990. Entrepreneur human capital inputs and small business longevity. Review of Economics and Statistics 72, 551-559.
Baum, J., Silverman, B., 2004. Picking winners or building them? Alliance, intellectual, and human capital as selection criteria in venture financing and performance of biotechnology startups. Journal of Business Venturing 19, 411-436.
Bernard, A., Jensen, J.B., Schott, P., 2006a. Survival of the best fit: Exposure to low-wage countries and the (uneven) growth of US manufacturing plants. Journal of International Economics 68, 219-237.
Bernard, A., Jensen, J.B., Schott, P., 2006b, Trade costs, firms and productivity. Journal of Monetary Economics 53, 917-937.
Berry, S., Reiss, P., 2006. Empirical models of entry and market structure. In: Schmalensee, R., Willig, R. (Eds.), Handbook of Industrial Organization (Vol. 3). North-Holland, Amsterdam, pp. 1845-1886.
Bertrand, M., 2004. From the invisible handshake to the invisible hand? How import competition changes the employment relationship. Journal of Labor Economics 2004, 723-765.
Calvo, G., Wellisz, S., 1980. Technology, entrepreneurs, and firm size. Quarterly Journal of Economics 95, 663-677.
Chetty, R., Sándor, L., Szeidl, A., 2017. The effect of housing on portfolio choice. Journal of Finance 72, 1171-1212.
Choi, E, Speltzer, J., 2012. The declining average size of establishments: Evidence and explanations. Monthly Labor Review, March, 50-65.
Corradin, S., Popov, A., 2015. House prices, home equity borrowing, and entrepreneurship, Review of Financial Studies 28, 2399-2428.
Davis, D., Haltiwanger, J., 2019. Dynamism diminished: The role of housing markets and credit conditions. National Bureau of Economic Research Working Paper 25466.
Decker, R., Haltiwanger, J., Jarmin, R., Miranda, J., 2014. The role of entrepreneurship in US job creation and economic dynamism. Journal of Economic Perspectives 28, 3-24.
Fan, W., White, M., 2003 Personal bankruptcy and the level of entrepreneurial activity. Journal of Law and Economics 46, 543-567.
Feenstra, R., Romalis, J., and Schott, P., 2002. US imports, exports and tariff data, 1989-2001. National Bureau of Economic Research Working Paper 9387.
Feng, X., Jaimovich, N., Rao, K., Terry, S., Vincent, N., 2019. Location, location, location: Industrial structure and the distribution of house price growth. Working Paper, Boston University.
Firpo, S., Fortin, N., Lemieux, T., 2011. Occupational tasks and changes in the wage structure. Working paper, University of British Columbia.
Greenland, A., Lopresti, J., McHenry, P., 2019. Import competition and internal migration. Review of Economics and Statistics 101, 44-59.
Haltiwanger, J., 2015. Top ten signs of declining business dynamism and entrepreneurship in the US, Working Paper. University of Maryland.
Hathaway, I., Litan, R., 2014. Declining business dynamism in the United States: A look at states and metros. Brookings Economic Studies, Brookings Institution, Washington, D.C.
Handley, K., Limao, N., 2017. Policy uncertainty, trade, and welfare: Theory and evidence for China and the United States. American Economic Review 107, 2731-2783.
Helpman, E., Krugman, P., 1989. Trade policy and market structure. MIT Press, Cambridge, MA.
Klepper, S., 1996. Entry, exit, growth, and innovation over the product life cycle. American Economic Review 86, 562-583.
Levine, R., Rubinstein, Y., 2017. Smart and illicit: who becomes an entrepreneur and do they earn more? Quarterly Journal of Economics 132, 963-1018.
Levinsohn, J., 1993. Testing the imports-as-market-discipline hypothesis. Journal of International Economics 35, 1-22.

Lileeva, A., 2008. Trade liberalization and productivity dynamics: Evidence from Canada. Canadian Journal of Economics 41, 360-390.
Lucas, R., 1978. On the size distribution of business firms. Bell Journal of Economics 9, 508-523.
Parker, S., 2009. The economics of entrepreneurship. Cambridge University Press, Cambridge (UK).
Pierce, J., Schott, P., 2016a. The surprisingly swift decline of US manufacturing employment. American Economic Review 106, 1632–1662.
Pierce, J., Schott, P. 2016b. Trade liberalization and mortality: Evidence from US counties, Working paper, Yale University.
Romer, P., 1990. Endogenous technological change. Journal of Political Economy 98, 71-102.
Schniper, L., 2005. Occupational mobility. Monthly Labor Review, Bureau of Labor Statistics (December).
Schumpeter, J., 1942. Creative destruction, Capitalism, socialism and democracy. Harper, New York.
Solow, R., 1956. A contribution to the theory of economic growth. Quarterly Journal of Economics 70, 65-94.
Topel, R., 1994. Regional labor markets and the determinants of wage inequality. American Economic Review 84, 17-22.
van der Sluis, J., van Praag, M., 2008. Education and entrepreneurship selection and performance: A review of the empirical literature. Journal of Economic Surveys 22, 795-841.

Table 1. Summary statistics: SIPP Panel Sample

	Business starters	Non-starters	*p*-value of difference
Female	0.443	0.552	(.000)
Race	0.869	0.825	(.000)
Household size	3.167	2.980	(.105)
Age			
18 to 35 years	0.322	0.277	(.000)
35 to 45 years	0.271	0.202	(.000)
45 to 55 years	0.222	0.185	(.000)
55 to 65 years	0.129	0.134	(.051)
65 and above	0.052	0.201	(.000)
Education			
High school or less	0.341	0.452	(.038)
Some college	0.312	0.296	(.414)
College or more	0.303	0.212	(.006)
Financial experience	0.012	0.008	(.007)
Unemployed	0.036	0.031	(.136)
Occupational mobility	4.282	6.728	(.000)
Labor income	52,472	44,179	(.086)
Total wealth	114,871	61,920	(.000)
Liquid wealth	17,140	12,845	(.000)
Home equity	40,301	27,352	(.000)
Business equity	33,082	0.000	(.000)
Equity in other real estate	9,066	6,282	(.000)
IRA/Keogh/401K accounts	11,190	9,085	(.000)
Equity in vehicles	4,092	2,828	(.000)
No. of observations	6,473	297,191	

The sample includes respondents who are 18 or older in the SIPP for the 1993-1995, 1996-2000, 2001-2003, 2004-2006 waves. *Business starters* are those who transitioned from being unemployed or a wage worker to a business owner. All statistics are means, and all monetary values are in real 1993 dollars. *Female* is a binary variable equal to 1 if the respondent is a female. *18 to 35 years* is a dummy variable equal to 1 if the respondent's age is between 18 and 34 years. *35 to 45 years* is a binary variable equal to 1 if the respondent's age is between 35 and 44 years. *45 to 55 years* is a binary variable equal to 1 if the respondent's age is between 45 and 54 years. *55 to 65 years* is a binary variable equal to 1 if the respondent's age is between 55 and 64 years. *65 years or older* is a binary variable equal to 1 if the respondent's age is at or over 65 years. *High school or less* is a dummy variable equal to 1 if the respondent has finished, at most, high school. *Some college* is a binary variable equal to 1 if the respondent is a college drop-out. *College or more* is a binary variable equal to 1 if the respondent has at least a college degree. *Total wealth* includes personal financial assets as well as all non-financial assets such as real estate (including second homes), vehicles, and private business equity. *Liquid wealth* is defined as the sum of safe assets (such as bonds, checking accounts, and savings accounts) and stockholdings. *Home equity* denotes the difference between the value and total debt owed against the primary residence. *Equity in vehicles*, *Equity in other real estate*, *Business equity* are constructed as the difference between the value and total debt owed against the vehicle, other real estate (other than primary residence such as a second home, a vacation home or undeveloped lot), and business, respectively. *IRA/Keogh/401K accounts* is the market value of IRA/Keogh/401K plans in the person's name. We extract information on *Labor income* from gross earnings (before deductions) received for a given month or from the regular hourly pay rate for those who are paid on an hourly basis and number of hours work at the job. *Race* is 1 for whites and zero for non-whites. *Financial experience* is a binary variable if the respondent holds a business or finance related occupation. *Unemployed* is a binary variable equal to 1 if the respondent's labor force status is unemployed. *Occupational mobility* is the number of individuals employed in two time periods who change occupations divided by the number of individuals employed in both periods calculated at the occupational level.

Table 2. The effect of import competition on business formation

	(1)		(2)		(3)	
	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.
$Post_t \times NTR\ Gap_m$	−0.071***	(.011)	−0.046***	(.014)	−0.041***	(.013)
$\text{Log(Total wealth)}_{it}$	0.036***	(.008)	0.032***	(.008)	0.027***	(.008)
$\text{Log(Labor income)}_{it}$	0.015	(.011)	0.011	(.019)	0.010	(.016)
Unemployed_{it}	0.009	(.007)	0.009	(.007)	0.008	(.011)
Log(Age)_{it}	−0.010	(.014)	−0.011	(.013)	−0.013	(.010)
$\text{Occupational mobility}_{it}$	−0.017**	(.008)	−0.022**	(.009)	−0.019**	(.009)
$\text{Routine task-intensity}_{it}$	−0.022*	(.012)	−0.019*	(.010)	−0.017*	(.010)
Some college_{it}	0.010	(.007)	0.008	(.006)	0.009	(.007)
$\text{College or more}_{it}$	0.016	(.011)	0.014	(.009)	0.013	(.009)
$\text{Post}_t \times \text{Unemployment rate}_m$			0.005	(.003)	0.006	(.004)
$\text{Post}_t \times \text{Establishment growth}_m$			0.019***	(.006)	0.018***	(.007)
$\text{Post}_t \times \%\text{Local banks}_m$			0.011***	(.004)	0.013***	(.004)
$\text{Post}_t \times \text{Housing price appreciation}_m$			−0.006	(.005)	0.008	(.007)
$\text{Post}_t \times \text{Manufacturing employment share}_m$			−0.010**	(.005)	−0.012**	(.006)
MFA exposure_{mt}					−0.009*	(.005)
MFN_{mt}					−0.006	(.004)
Individual f.e.	yes		yes		yes	
MSA f.e.	yes		yes		yes	
Year f.e.	yes		yes		yes	
Household controls	yes		yes		yes	
R-squared	0.526		0.590		0.590	
No. of observations	303,359		303,359		303,359	

This table relates import competition to the entrepreneurial decision of individuals in a difference-in-differences setting. The dependent variable, *Entry,* is a dichotomous variable that takes value one if individual *i* starts a business at time *t* and zero otherwise. Independent variable representing the effect of import penetration is the interaction of the *NTR Gap* and the post-PNTR indicator, *Post*. Individuals who were *already* entrepreneurs are excluded from the entry sample. Additional controls include interactions of the post-PNTR indicator with time-invariant controls using 1993 as the base year. Unreported survey controls include logAge^2, household wealth (which excludes the respondent's personal wealth since it is already accounted for in the covariate "Total wealth"), and household size. Omitted category for education is 'High school or less'. All individual- and MSA-related controls are defined in Table A.1. Respondents who finished at most high school are treated as omitted education category. All regressions include fixed effects as indicated in the table. Sample covers 1993-1995, 1996-2000, 2001-2003, 2004-2006 SIPP waves. Robust standard errors in parentheses are clustered at the MSA level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Table 3. Individual attributes in the cross section

	(1)		(2)	
	Estimate	S.E.	Estimate	S.E.
$Post_t \times NTR\ Gap_m$				
$\times$ Female$_i$	−0.006	(.005)	−0.007	(.005)
$\times$ Race$_i$	−0.001	(.001)	−0.002	(.003)
$\times$ Financial experience$_{it}$	−0.002	(.002)	−0.003	(.002)
$\times$ Log(Total wealth)$_{it}$	0.021***	(.004)	0.019***	(.005)
$\times$ Log(Labor income)$_{it}$	−0.005	(.003)	−0.007	(.005)
$\times$ Unemployed$_{it}$	0.004*	(.002)	0.004*	(.002)
$\times$ Log(Age)$_{it}$	−0.002	(.002)	−0.005	(.003)
$\times$ Occupational mobility$_{it}$	−0.013**	(.006)	−0.015**	(.007)
$\times$ Routine task-intensity$_{it}$	−0.010*	(.004)	−0.009*	(.006)
$\times$ Some college$_{it}$	−0.003	(.002)	−0.005	(.003)
$\times$ College or more$_{it}$	−0.014**	(.006)	−0.012**	(.006)
Individual f.e.	yes		yes	
MSA f.e.	yes		yes	
Year f.e.	yes		yes	
Household controls	no		yes	
R-squared	0.595		0.595	
No. of observations	303,359		303,359	

This table explores cross-sectional differences in a difference-in-differences setting. Independent variable representing the effect of imports, $Post_t \times NTR\ Gap_m$, is interacted with cross-sectional characteristics. The dependent variable, *Entry,* is a dichotomous variable that takes value one if individual *i* starts a business at time *t* and zero otherwise. All regressions include controls from Table 2 (column 3) and fixed effects as indicated in the table, whose coefficients we do not report. Respondents who finished at most high school are treated as omitted education category. Robust standard errors in parentheses are clustered at the MSA level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Table 4. Controlling for local labor market trends

	(1)		(2)	
	Estimate	S.E.	Estimate	S.E.
$Post_t \times NTR\ Gap_m$	−0.028***	(.008)	−0.033***	(.009)
$Post_t \times$ Non-college educated population$_m$	0.008	(.005)	0.010	(.007)
$Post_t \times$ Female labor force participation rate$_m$	−0.005	(.007)	−0.003	(.004)
$Post_t \times$ % Foreign-born in labor force$_m$	0.006	(.004)	0.003	(.002)
$Post_t \times$ % Age > 65+ in population$_m$	−0.003	(.002)	0.001	(.000)
$Post_t \times$ Routine employment share$_m$			−0.011**	(.005)
$Post_t \times$ Offshorability index of occupations$_m$			−0.015**	(.006)
Individual f.e.	yes		yes	
MSA f.e.	yes		yes	
Year f.e.	yes		yes	
Other controls	yes		yes	
R-squared	0.595		0.595	
No. of observations	303,359		303,359	

This table relates import penetration to entrepreneurial decision of individuals in a difference-in-differences setting after controlling for several labor market trends. The dependent variable, *Entry,* is a dichotomous variable that takes value one if individual *i* starts a business at time *t* and zero otherwise. Individuals who were *already* entrepreneurs are excluded from the entry sample. Independent variable representing the effect of import penetration is the interaction of the *NTR Gap* and the post-PNTR indicator, *Post*. Individuals who were *already* entrepreneurs are excluded from the entry sample. Additional controls include interactions of the post-PNTR indicator with time-invariant controls using 1993 as the base year. *Non-college educated individuals* is the number of people over 25 with a high school degree as a proportion of the total population over 25 years old. *% Foreign-born in labor force* is the share of foreign-born in labor force. The foreign born include legally-admitted immigrants, refugees, temporary residents such as student and temporary workers, and undocumented immigrants. *% Age > 65+ in population* is the share of population aged 65 years and older. *Female labor force participation rate* is the share of the female population in the workforce. R*outine employment share* is the fraction of an MSA's employment that falls in routine intensive occupations. *Offshorability index of occupations* is the simple average of the two variables "face-to-face contact" and "on-site job" that Firpo, Fortin, and Lemieux (2011) derive from the US Department of Labor's Occupational Information network database (O*NET). All specifications include controls from Table 2 (column 3) and fixed effects, whose coefficients we do not report. Robust standard errors in parentheses are clustered at the MSA level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Table 5. Differential impact of import exposure on entrepreneurship in tradable and non-tradable sectors

	(1)	(2)	(3)
$Post_t \times NTR\ Gap_m \times$			
1{High-exposed tradable sector}	−0.057***	−0.060***	−0.051**
	(.016)	(.019)	(.024)
1{Low-exposed tradable sector}	−0.019	−0.025**	−0.022*
	(.013)	(.010)	(.013)
1{Non-tradable sector}	0.026*	0.033***	0.030**
	(.015)	(.011)	(.014)
Sector× year f.e.	no	yes	yes
MSA× sector f.e.	yes	no	yes
Individual f.e.	yes	yes	yes
Other controls	yes	yes	yes
R-squared	0.572	0.605	0.655
No. of observations	303,359	303,359	303,359

In a triple-difference setting, this table reports the impact of lower-cost import penetration on the entry of entrepreneurs in high-exposed (manufacturing), low-exposed (mining and agriculture) and non-tradable sectors (all other sectors). The dependent variable, *Entry,* is a dichotomous variable that takes value one if individual *i* starts a business in sector *k* at time *t* and zero otherwise. Individuals who were *already* entrepreneurs are excluded from the entry sample. *Sector× year* fixed effects absorb time-varying region-specific sectoral trends in entrepreneurship. *MSA× sector* fixed effects control for region-sector-specific investment opportunities. All specifications include controls from Table 2 (column 3), labor market controls from Table 4 (column 2), and high-exposed, low-exposed and non-tradable sector indicators and fixed effects, whose coefficients we do not report. Robust standard errors in parentheses are double clustered at the MSA level and sectoral level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Table 6. Incorporated and unincorporated business starters

	(1)	(2)
	Incorporated	Unincorporated
$Post_t \times NTR\ Gap_m \times$		
1{High-exposed tradable sector}	−0.066***	−0.045*
	(.019)	(.026)
1{Low-exposed tradable sector}	−0.030**	−0.019*
	(.014)	(.010)
1{Non-tradable sector}	0.009	0.038***
	(.007)	(.013)
Sector × year f.e.	yes	yes
MSA × sector f.e.	yes	yes
Individual f.e.	yes	yes
Other controls	yes	yes
R-squared	0.534	0.628
No. of observations	63,705	239,652

This table repeats the test in Table 5 for incorporated and unincorporated business starters. The dependent variable, *Entry,* is a dichotomous variable that takes value one if individual *i* starts a business in sector *k* at time *t* and zero otherwise. Individuals who were *already* entrepreneurs are excluded from the entry sample. All specifications include controls from Table 2 (column 3), labor market controls from Table 4 (column 2), and high-exposed, low-exposed and non-tradable sector indicators and fixed effects, whose coefficients we do not report. Robust standard errors in parentheses are double clustered at the MSA level and sectoral level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Table 7. Survival and profitability

	(1)	(2)	(3)	(4)
	Profit/Loss	Profit/Loss	Exit	Exit
$Post_t \times NTR\ Gap_m$	−0.036	−0.033	0.095**	0.087**
	(.028)	(.025)	(.038)	(.044)
$Post_t \times NTR\ Gap_m \times$ Tradable sector	−0.055*	−0.062*	0.073**	0.078**
	(.031)	(.034)	(.029)	(.030)
Business $size_{it}$		0.006		−0.002
		(.005)		(.002)
Business $leverage_{it}$		−0.005*		0.016*
		(.002)		(.008)
$Profit/Loss_{it}$				−0.007
				(.005)
Individual f.e.	yes	yes	yes	yes
MSA f.e.	yes	yes	yes	yes
Year f.e.	yes	yes	yes	yes
Other controls	yes	yes	yes	yes
R-squared	0.374	0.374	0.392	0.392
No. of observations	56,617	56,617	35,376	35,376

This table explores the entrepreneurial outcomes for business owners in our sample. In columns 1 and 2 the dependent variable is the net profit or loss at time *t*, *Profit/Loss,* defined as the difference between gross receipts and expenses (in log-units), and the sample includes all business owners. In columns 3 and 4, the dependent variable, *Exit*, is a dichotomous variable that takes the value of one if entrepreneur *i* ends a business at time *t* and is zero otherwise. Individuals who are not business owners (or entrepreneurs) are excluded from the exit sample. *Business size* is an indicator variable if the business has fewer than 25 employees. *Business leverage* is the ratio of total debt owed against the business to business equity. All specifications include controls from Table 2 (column 3), labor market controls from Table 4 (column 2), and fixed effects, whose coefficients we do not report. Robust standard errors in parentheses are clustered at the MSA level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Table 8 Sample extension and alternative aggregation levels

	(1)		(2)		(3)		(4)	
	Entry		Exit		Entry		Exit	
	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.
1. State-level aggregation	−0.038***	(.015)	0.088***	(.034)				
2. Extended sample	−0.044***	(.014)	0.092***	(.029)				
3. Industry NTR Gaps					−0.037***	(.012)	0.078**	(.039)
Individual f.e.	yes		yes		yes		yes	
MSA f.e.	no		no		yes		yes	
Year f.e.	yes		yes		yes		yes	
State f.e.	yes		yes		no		no	
Other controls	yes		yes		yes		yes	

This table reports the results of additional tests. Row 1 and Row 2 report the sensitivity of business entry and exit decisions to $Post_t \times NTR\ Gap_m$, from regressions similar to those outlined in Tables 2 and 7, but with state-level aggregation in Eq. (4) and an extended sample through 2013. Row 3 uses the industry level exposure measure $Post \times NTR\ Gap_j$. All specifications include controls from Table 2 (column 3) and labor market controls from Table 4 (column 2), whose coefficients we do not report. Clustered robust standard errors are provided in parentheses. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Table 9. Alternative trade policy measures

	(3)		(4)	
	Entry		Exit	
	Estimate	S.E.	Estimate	S.E.
1. Log-differences	−0.035**	(.016)	0.084**	(.034)
2. Time-varying NTR Gaps	−0.031**	(.013)	0.076**	(.038)
Individual f.e.	yes		yes	
MSA f.e.	yes		yes	
Year f.e.	yes		yes	
State f.e.	no		no	
Other controls	yes		yes	

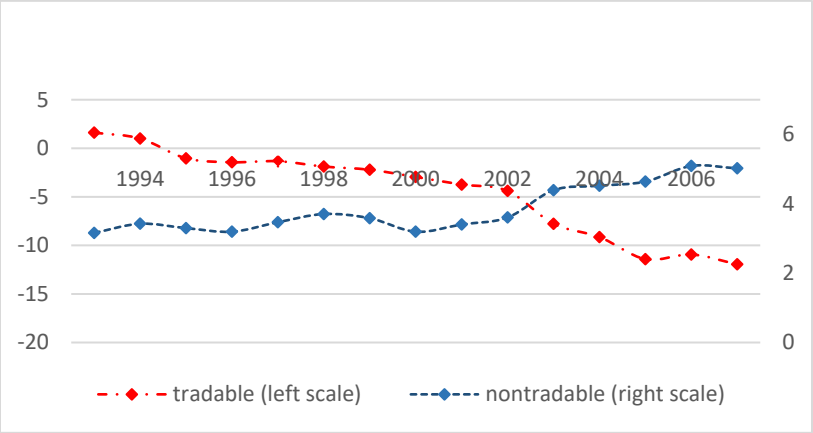
Row 1 reports the sensitivity of business entry and exit decisions to $Post_t \times NTR\ Gap_m$, from regressions similar to those outlined in Tables 2 and 7 but replaces the $NTR\ Gap_j$ in Eq. (4) with $ln(1+NNTR\ Rate_j) - ln(1+MFN_j)$ as defined in Eq. (6). Row 2 time-varying tariff gap measures defined as in Eq. (8). All specifications include controls from Table 2 (column 3) and labor market controls from Table 4 (column 2), whose coefficients we do not report. Clustered robust standard errors are provided in parentheses. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Table 10. Year-by-Year Estimated Effects of NTR Gaps

	(1) Entry	(2) Exit
NTR Gap_m ×		
1{year=1993}	0.0008	0.0018
1{year=1994}	0.0012	0.0260
1{year=1995}	0.0027	–0.0141
1{year=1996}	0.0044	–0.0212
1{year=1997}	0.0038	0.0174
1{year=1998}	0.0025	–0.0046
1{year=1999}	0.0010	0.0059
1{year=2000}	0.0009	0.0023
1{year=2001}	–0.0061	0.0791
1{year=2002}	–0.0175*	0.0688
1{year=2003}	–0.0289**	0.0909**
1{year=2004}	–0.0335***	0.0797***
1{year=2005}	–0.0474***	0.0958**
1{year=2006}	–0.0521***	0.1096***
Individual f.e.	yes	yes
MSA f.e.	yes	yes
Year f.e.	yes	yes
Other controls	yes	yes
Observations	303,359	35,376

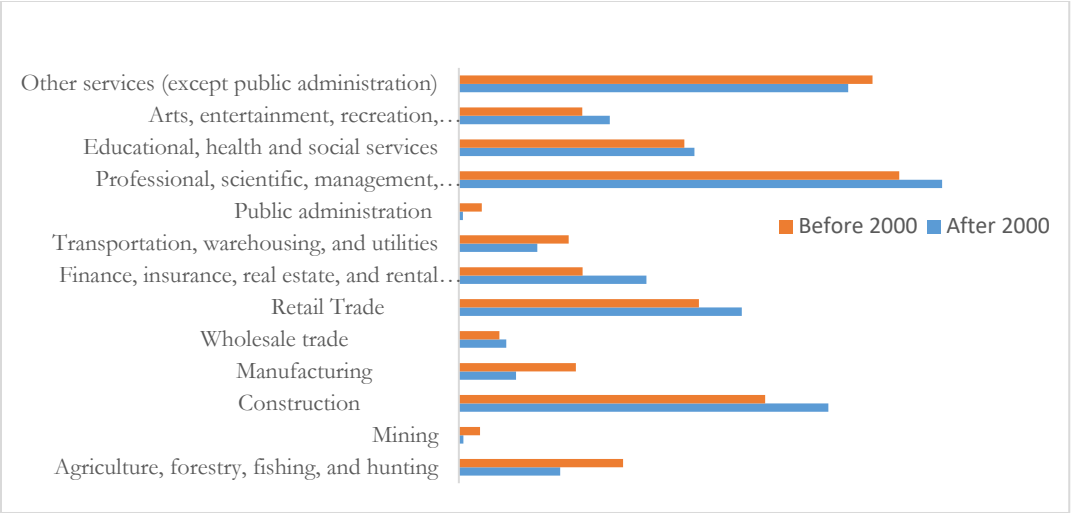
This table analyzes the intertemporal evolution of the effects of trade-policy driven changes in import competition on the business entry/exit decision of individuals. All specifications include controls from Table 2 (column 3), whose coefficients we do not report. Robust standard errors are clustered at the MSA level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Figure 1. US tradable and non-tradable entreprenurship growth rates



This graph displays the business startup (entrepreneurship) growth rates in tradable and non-tradable US industries during our sample period of 1993-2006.

Figure 2. Sectoral distribution of business entry rates



This graph reports sectoral distribution of business entry rates. The sample includes respondents who are 18 or older in the SIPP for the 1993-1995, 1996-2000, 2001-2003, 2004-2006 waves. Respondents who were already entrepreneurs at time *t*-1 are excluded from the entry sample. The sector classification is based on the SIPP data.

Globalization and Entrepreneurial Entry and Exit: Evidence from U.S. Households

Internet Appendix

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Appendix IA. The Model

The Basic Model

We consider a discrete time overlapping generation model with risk-neutral agents. The domestic economy has M regions ($m = 1, .., M$). Each region has a continuum of individuals (indexed by i). Individuals live for two periods. At "birth," individual i in region m is endowed with (financial and real) wealth V_{im} and human capital H_{im}. (It is notationally convenient to take the distribution of capital to be time-invariant.) All individuals are also endowed with one unit of labor that they supply inelastically. In the first period of their lives, individuals choose to either start a business by entering a trade-exposed sector T or to be a worker at a given wage that depends on their human capital.[1] There are fixed costs of entry, however. In the second and final period of their lives, individuals take their earnings from the previous period—profits for entrepreneurs and wages for workers—and consume.[2]

We model a typical domestic tradable industry as an international oligopoly of domestic and foreign firms (Brander and Krugman, 1983; Neary, 2016) that is fully integrated so that the same base price holds internationally. For calibration purposes, it is useful to characterize the equilibrium analytically through the assumption of a linear industry demand curve $P = a - Q$ (where Q is the industry output of the good).

Production costs are assumed to vary across regions. We will denote the constant marginal cost of production—an assumption typically made in the literature—for domestic firms in region m by θ_m and foreign firms by θ_f.[3] All firms in the industry compete in a Cournot fashion, taking as given the production decisions of incumbent firms.

Proposition 1 *Conditional on the regional profile of domestic firms* $\mathbf{N}_d = (N_{d1}, .., N_{dM})$, *with the total number of domestic firms* $N_d \equiv \sum_{k=1}^{M} N_{dk}$, *and* N_f *foreign firms, the equilibrium profits of entrepreneurs in region* m *are:*

$$\pi_m(\mathbf{N}_d, N_f) = \frac{\left[a - \theta_m - \sum_{k=1, k\neq m}^{M} N_k(\theta_m - \theta_k) - N_f(\theta_m - \theta_f)\right]^2}{(N_d + N_f + 1)^2}. \tag{1}$$

[1] For notational ease, we will keep implicit the identification of individual industries in T.

[2] If the earnings are non-positive, then the consumption is set to zero.

[3] For notational simplicity, we assume *intra-group* firm symmetry—that is, domestic firms in a given region are similar to each other, as are foreign firms.

Proof of Proposition 1: Fix the number of domestic firms $\mathbf{N}_d = (N_{d1}, ..., N_{dM})$ and foreign firms N_f. Let q_{im} be the quantity produced by domestic firm i in region $m = 1, ..., M$, when its constant marginal costs are θ_m. Then its profits are:

$$\pi_{im} = (a - Q_{-im} - q_{im})q_{im} - \theta_m q_{im}, \tag{2}$$

where Q_{-im} is the quantity produced by all other firms. The profit function in (2) is clearly strictly concave in q_{im}. Hence, in equilibrium the optimal quantity for i satisfies the condition:

$$a - \theta_m - Q^* - q^*_{im} = 0, m = 1, ...M, \tag{3}$$

where Q^* is the equilibrium total quantity produced by all firms in the industry. Using an analogous argument, the optimal quantity for a foreign firm, q^*_f satisfies

$$a - \theta_f - Q^* - q^*_f = 0. \tag{4}$$

Since all domestic firms in a region m are symmetric, as are the foreign firms, in equilibrium their optimal quantities can be denoted as q^*_m and q^*_f, respectively. Hence,

$$Q^* = N_{dm}q^*_m + N_f q^*_f. \tag{5}$$

Using (5) and symmetric regional domestic and foreign firm outputs in the optimality conditions (3)-(4) yields the $(M + 1) \times 1$ linear system

$$a - \theta_m - \sum_{k=1, k\neq m}^{M} N_{dk}q^*_k - (N_{dm} + 1)q^*_m - N_f q^*_f = 0, \quad m = 1, ...M, \tag{6}$$

$$a - \theta_f - Q^* - (N_f + 1)q^*_f = 0. \tag{7}$$

Solving this system yields

$$q_m^* = \frac{\left[a - \theta_m - \sum_{k=1,k\neq m}^{M} N_{dk}(\theta_m - \theta_k) - N_f(\theta_m - \theta_f)\right]}{(N_d + N_f + 1)}, \tag{8}$$

$$q_f^* = \frac{\left[a - \theta_f + \sum_{k=1}^{M} N_k(\theta_k - \theta_f)\right]}{(N_d + N_f + 1)}. \tag{9}$$

Substituting (8)-(9) in (2) (for $q_{im} = q_m^*$) and simplifying then gives the equilibrium profit function

$$\pi_m(\mathbf{N}_d, N_f) = \frac{\left[a - \theta_m - \sum_{k=1,k\neq m}^{M} N_{dk}(\theta_m - \theta_k) - N_f(\theta_m - \theta_f)\right]^2}{(N_d + N_f + 1)^2}. \tag{10}$$

Q.E.D.

We assume that the market structure, along with the demand and cost parameterizations are common knowledge. Individuals in the young generation in region m then decide to either start a firm or work at an exogenously given wage that is increasing in human capital:

$$w_m(H_{im}) = w_{0m} + w_{1m}H_{im}, \tag{11}$$

where $w_{1m} > 0$. Business entry requires fixed costs that are generally region- and individual-specific. In particular, entry costs will be driven by local conditions due to regional variation in access to startup financing. Individuals' available wealth for entry is thus a positive function of their financial and (collateralizable) real assets (V_{im}) and their human capital (H_{im}). It will be convenient to denote the total wealth index (relevant for business ownership) by $A_{im} \equiv V_{im} + z_m H_{im}$ (where $z_m > 0$ is a region-specific factor that converts a given level of human capital to startup financing units).

Individuals have to bear fixed costs of business entry. Higher education facilitates entry through the managerial ability channel (Bates, 1990) and access to startup financing (Baum and Silverman, 2004). But entry costs will also be positively related to the intensity of lower-cost competition in the industry, which forces domestic entrants to invest in cost-efficient technologies, and/or increases profit risk that ceteris paribus raises financing costs. We write the region-specific entry cost function

as $C_m(N_f, H_{im})$, which is increasing in the first argument and decreasing in the second argument.

For our purposes, it is useful to characterize the entrepreneurship decision in terms of the empirical models of industry entry (Berry and Reiss, 2006). Suppose $\mathbf{N}_{dt} = (N_{d1,t}, ..., N_{dM,t})$ domestic firms and N_{ft} foreign firms have entered during t. We can define the feasible set of entrants in m by $\bar{E}_{mt} = \{i \,|\, A_{im} \geq C_m\}$. And the equilibrium entry set is $E_{mt} \subseteq \bar{E}_{mt}$, such that, for $i \in E_{mt}$,

$$\pi_m(N_{d1,t}, .., N_{dm,t}, .., N_{dM,t}, N_{ft}) - C_m(N_{ft}, H_{im}) \geq w_m(H_{im}). \tag{12}$$

However, for $i \in \bar{E}_{mt} - E_{mt}$,

$$\pi_m(N_{d1,t}, .., N_{dm,t} + 1, .., N_{dM,t}, N_{ft}) - C_m(N_{ft}, H_{im}) < w_m(H_{im}). \tag{13}$$

(1) implies that profits of domestic firms in T (in any region) are negatively related to the number of foreign competitor firms (N_{ft}), other things held fixed. Meanwhile, exit will be optimal for a business owner i if, conditional on business liquidation costs L_m,

$$\pi_m(N_{d1}, .., N_{dm}, .., N_{dM}, N_f) < w_m(H_{im}) - L_m. \tag{14}$$

We can then derive the following implications for the effects of foreign competition and regional business entry and exit.

Proposition 2 *The equilibrium likelihood that an individual will choose business formation in T, in any region m, is ceteris paribus decreasing in the number of foreign firms N_f, but is non-decreasing in the individual's wealth V_{im}. The effect of the individual's human capital (H_{im}) on entry likelihood is generally ambiguous, but it is positive if w_{1m} is sufficiently low. Finally, the equilibrium likelihood of exit of an existing firm is non-decreasing in foreign entry.*

Proof of Proposition 2: Under the assumption that the competitive effect of imports dominates the cost effect, π_m is strictly decreasing in N_{ft}, for every specification of $\mathbf{N}_{dt}$. Now consider two different levels of import competition $N'_{ft} > N_{ft}$, and let $N'_{dm,t}$ and $N_{dm,t}$ be the corresponding equilibrium number of entrants, respectively. Since π_m is strictly decreasing in N_{ft}, then under the assumption of the Proposition it follows that if

$$\pi_m(N_{d1,t}, .., N_{dm,t}, .., N_{dM,t}, N_{ft}) - C_m(N_{ft}, H_{im}) = w_m(H_{im}) \tag{15}$$

for some i, then

$$\pi_m(N_{d1,t},..,N_{dm,t},..,N_{dM,t},N'_{ft}) - C_m(N'_{ft},H_{im}) < w_m(H_{im}). \tag{16}$$

Hence, $N'_{dm,t} < N_{dm,t}$ because π_m is also decreasing in $N_{dm,t}$. Thus, the equilibrium number of entrants is negatively related to N_{ft} in any m (under the annunciated assumption), other things being equal.

Next, consider a situation where $V'_{im} > V_{im}$ for every i, and again let N'_{mt} and N_{mt} be the corresponding equilibrium number of entrants, respectively. Clearly, for each i, and holding fixed H_{im},

$$A'_{im} \equiv V'_{im} + z_m H_{im} > V_{im} + z_m H_{im} \equiv A_{im}. \tag{17}$$

Hence,

$$\bar{E}'_{mt} \equiv \{i \,|\, A'_{im} \geq C_m(N_{ft},H_{im})\} \supset \bar{E}_{mt} \equiv \{i \,|\, A_{im} \geq C_m(N_{ft},H_{im})\} \tag{18}$$

It follows from Eq. (18) that $N'_{mt} \geq N_{mt}$, so that the equilibrium number of entrants is non-negatively related to total wealth, other things being equal. Next, consider a situation where $H'_{im} > H_{im}$ for every i. Because $C_m(\cdot, H_{im})$ is decreasing, it follows that for each i,

$$\pi_m(\mathbf{N}_t,N_{ft}) - C_m(N_{ft},H'_{im}) > \pi_m(\mathbf{N}_t,N_{ft}) - C_m(N_{ft},H_{im}) \tag{19}$$

$$w_{0m} + w_{1m}H'_{im} > w_{0m} + w_{1m}H_{im}. \tag{20}$$

Hence, the relation of H_{im} and N_{mt} is ambiguous. But if w_{1m} is sufficiently low, then $N'_{mt} > N_{mt}$. Finally, the relation of exit and foreign entry follows from Equation (14) given that π_m is decreasing in N_{ft}. Q.E.D.

It is useful to illustrate numerically the role of individual wealth and human capital (highlighted in Proposition 2) for a typical region. To focus on the competitive effects of imports, we set $\theta_f < \theta_m$. Figure A.1 (top) graphically depicts the impact of N_f on equilibrium entry in for three average (regional) wealth levels (low, medium, and high) that are calibrated from the data at \$45,000, \$66,000 and \$90,000, respectively. For this simulation, we set $a_m = 67500$ and $\theta_m = 750$. Ceglowski and Golub (2012) estimate that the relative unit labor cost of the Chinese manufacturing industry during 1998-2006 ranged from 25%-45% of US costs. We therefore set $\theta_f = 0.4\theta_m$. The entry cost function is $C_{im} = (5000)\exp(0.025N_f + \frac{2.5}{H_{im}})$, where H_{im} is fixed at 1.1. For simplicity, the entry

response for m assumes that the only domestic entry is in that region. We then solve for the number of firms N_m, conditional on N_f, that just makes individuals indifferent between entry and labor income of \$24,000 (the average sample labor income of individuals with no more than a high school education).

Under the assumed parameterization, there is a negative relation of equilibrium domestic entry and lower-cost foreign competition. Entry is not optimal when the number of foreign entrants exceeds 86. But for medium (low) wealth individuals, entry costs can not be financed once the number of foreign entrants exceeds 74 (35)

The bottom panel of Figure A.1 examines the role of education. The three main education categories in our data are "High School or less," "Some College", and "College or more. The corresponding sample (annual) average incomes for the three categories are \$24,000, \$34,000 and \$48,000, respectively. Using (1) and the same demand and production cost assumptions as earlier, but higher entry costs, we simulate the optimal number of domestic entrants as a function of N_f for each educational category keeping (while suppressing the wealth constraint). That is, we solve for the optimal domestic entry when the regional educational attainment corresponds to the three educational categories labeled 1, 2, 3 for "High School or Less," "Some College," and "College or More," respectively. The entry cost function is $C_{im} = (12500)\exp(0.1N_f + \frac{2.5}{H_{im}}), i = 1, 2, 3$, where $H_{1m} = 1.1$, $H_{2m} = 1.3$, and $H_{3m} = 2.75$.

For the chosen parameterization, the positive net profit effect of higher education (due to lower entry costs) dominates the negative opportunity cost effect for a given level of import exposure. Notably, because of the theoretically conflicting effects of higher education on entry, the *responsiveness* of entrepreneurial activity to increasing low-cost import-competition — given by the slope of the optimal startup response function — is increasing (in magnitude) with the educational level. For the parameterization at hand, the slopes $\frac{\Delta N_{dm}}{\Delta_{N_f}}$ are -5.6, -5.8, and -6.1 for the "High School or less," "Some College", and "College or more" categories, respectively. More generally, this slope is theoretically ambiguous. Intuitively, as the exposure to lower-cost import competition increases, individuals with the highest educational attainment — and hence highest wage opportunity costs — have the greatest incentives to select the labor market, at the intensive margin.

Extension to Non-tradable Goods

The basic entry model of Section 2 focuses on the effects of lower-cost imports on entrepreneurship in the tradable sector. But the economy also consists of industries producing non-tradable

goods (for example, services) and goods where buyer demand exhibits a low elasticity of substitution for imports from low-cost countries (for example, hi-tech and luxury brand goods). There will be *spillover effects* on entrepreneurial activity in these industries from lower-cost imports in tradable sectors because domestic entrepreneurs can choose which sectors to enter. To develop refutable predictions on these effects, we extend the basic model of Section 2 in a stylized fashion. Each locality m has two sectors: a tradable sector T and a non-tradable industry in sector S. Agents can now choose to start a business in either sector.

Formally, the entry cost is sector-specific and given by $C_m^T(N_{ft}, H_{im})$ and $C_m^S(H_{im})$, where C_m^S is decreasing with H_{im}. The wage function will also be allowed to be sector specific, viz., $w_m^r(H_{im}) = w_{0m}^r + w_{1m}^r H_{im}, r \in \{T, S\}$. Similarly, the per period expected profit function for the tradable sector is denoted by the function $\pi_m^T(\mathbf{N}_d, N_f)$, as derived above. Meanwhile, we allow for positive effects of owners' human capital on business profits in skill-intensive nontradable industries and write the (reduced form) expected profit function in this industry as $\pi_m^S(G_m^S, H_{im})$, where G_m^S is the number of regional active firms in S; this function is strictly decreasing in the first argument and strictly increasing in the second argument.

Since the tradable and nontradable sectors include a diversity of industries, we are agnostic about the relative magnitude of the wage and entry function parameters across the two sectors. We thus derive (intersecting) sets of potential entrants in the two sectors, $\bar{E}_m^r$ in the manner specified in Section 2. Specifically, we denote the total wealth index relevant for business ownership for individual i in sector r as $A_{im}^r \equiv V_{im} + z_m^r H_{im}$, and hence the feasible set of (potential) entrants in that sector is $\bar{E}_m^r = \{i \,|\, A_{im}^r \geq C_m^r\}$.

Building on the analysis in the basic model above, we can derive the following refutable predictions on the determinants of the entry likelihood in the two sectors.

Proposition 3 *The likelihood that individuals will choose to start a new business in the tradable sector is ceteris paribus decreasing in the import competition. But the entry likelihood of individuals is ceteris paribus non-negatively related to such exposure in the nontradable sector. The equilibrium entry likelihood is non-decreasing in wealth V_{im} in both sectors. The effect of human capital on the entry likelihood is generally ambiguous, but it is positive if w_{1m}^r, $r \in \{T, S\}$, are sufficiently low.*

Proof of Proposition 3: For any t, in equilibrium the number of entrants (N_{dmt}, G_{mt}^S) and entrant sets E_{mt}^r, $k \in \{T, S\}$ are characterized in the following fashion. Given any pair $(N_{dm,t}, G_{mt}^S)$ and

conditional on the number of firms in the tradable sector $(\mathbf{N}_{dt}, N_{ft})$, put

$$\Lambda^T_{mt}(\mathbf{N}_{dt}, N_{ft}, H_{im}) \equiv \pi^T_{dm}(\mathbf{N}_{dt}, N_{ft}) - C^T_m(N_{ft}, H_{im}) \tag{21}$$

and analogously define $\Lambda^S_{mt}(G^S_{mt}, H_{im}) \equiv \pi^S_m(G^S_{mt}, H_{im}) - C^S_m(H_{im})$. Then, in equilibrium, for every $i \in E^T_{mt}$,

$$\Lambda^T_{mt}(\mathbf{N}_{dt}, N_{ft}, H_{im}) \geq \max(\Lambda^S_{mt}(G^S_{mt}+1, H_{im}), w^T_m(H_{im}), w^S_m(H_{im})), \tag{22}$$

and for $i \in E^S_{mt}$,

$$\Lambda^S_{mt}(G^S_{mt}, H_{im}) \geq \max(\Lambda^T_{mt}(N_{d1t}, .., N_{dm,t}+1, .., N_{dM,t}, N_{ft}, H_{im}), w^T_m(H_{im}), w^S_m(H_{im})). \tag{23}$$

In addition, for each $i \in \bar{E}^T_{mt} - E^T_{mt}$,

$$\Lambda^T_{mt}(N_{d1,t}, .., N_{dm,t}+1, .., N_{dM,t}, N_{ft}, H_{im}) < \max(\Lambda^S_{mt}(G^{S*}_{mt}+1, H_{im}), w^T_m(H_{im}), w^S_m(H_{im})), \tag{24}$$

and for $i \in \bar{E}^S_{mt} - E^S_{mt}$,

$$\Lambda^S_{mt}(G^{S*}_{mt}+1, H_{im}) < \max(\Lambda^T_{mt}(N_{d1,t}, .., N_{dm,t}+1, .., N_{dM,t}, N_{ft}, H_{im}), w^T_m(H_{im}), w^S_m(H_{im})). \tag{25}$$

Then the arguments for the relation of N^T_{mt} to N_{ft}, V_{im}, and H_{im} are analogous to that given in the proof of Proposition 2 above.

We turn now to the relation of G^S_{mt} to N_{ft}. Again, consider two different levels of import competition $N'_{ft} > N_{ft}$ and let G'^S_{mt} and G^S_{mt} be the corresponding equilibrium number of entrants to the non-tradable sector, respectively. Focus first on the case where the import competition is N_{ft}, and the equilibrium number of entrants in the tradable sector is N^T_{mt}. Without loss of generality, let us order $i \in E^T_{mt}$ in increasing magnitude of $\Lambda^T_{mt}(\mathbf{N}_{dt}, N_{ft}, H_{im})$. Suppose now that N_{ft} increases exogenously to N'_{ft}. Then, $\Lambda^T_{mt}(\mathbf{N}_{dt}, N'_{ft}, H_{im}) < \Lambda^T_{mt}(\mathbf{N}_{dt}, N_{ft}, H_{im})$ for each $i \in E^T_{mt}$. Therefore, there may exist $x = 1, ..., n$, $x \in E^T_{mt}$, such that

$$\Lambda^S_{mt}(G^{S*}_{mt}+1, H_{xm}) > \max(\Lambda^T_{mt}(\mathbf{N}_{dt}, N'_{ft}, H_{xm}), w^T_m(H_{xm}), w^S_m(H_{xm})) \tag{26}$$

Hence, these agent-types x, who would have entered T with foreign competition N_{ft} will enter

sector S with competition $N'_{ft} > N_{ft}$ as long as

$$\Lambda^S_{mt}(G^{S*}_{mt} + 1, H_{xm}) > \max(w^T_m(H_{xm}), w^S_m(H_{xm})). \tag{27}$$

Q.E.D.

References

Bates, T., 1990. Entrepreneur human capital inputs and small business longevity. Review of Economics and Statistics 72, 551-559.

Baum, J., Silverman, B., 2004. Picking winners or building them? Alliance, intellectual, and human capital as selection criteria in venture financing and performance of biotechnology startups. Journal of Business Venturing 19, 411-436.

Berry, S., Reiss, P., 2006. Empirical models of entry and market structure. In: Schmalensee, R., Willig, R. (Eds.), Handbook of Industrial Organization (Vol. 3). North-Holland, Amsterdam, pp. 1845-1886.

Brander, J., Krugman, P., 1989. A 'reciprocal dumping' model of international trade. Journal of International Economics 15, 313-321.

Ceglowski, J., Golub, S., 2012. Does China still have a labor cost advantage?. Global Economy Journal 12(3), 1-30.

Neary, J. P., 2016. International trade in general oligopolistic equilibrium. Review of International Economics, 24, 669-698.

Table A.1 Data sources

Variables	Sources
NTR Gap	Pierce and Schott (2016), USTO and County Business Patterns (CBP)
Individual and household characteristics	Survey of Income and Program Participation (SIPP)
Entrepreneurial entry, exit and profit/loss	SIPP
% Age > 65+ in population	Integrated Public Use Microdata Series (IPUMS) and SIPP
% Foreign-born on labor force	IPUMS and SIPP
% Local banks	Bankscope historical files and the Summary of Deposits (SoD)
Non-college educated population	IPUMS and SIPP
Female labor force participation rate	IPUMS and SIPP
Housing price appreciation	CoreLogic
Labor force participation rate	Bureau of Labor Statistics Archived data and SIPP
Manufacturing employment share	IPUMS
Offshorability index of occupations	Department of Labor's Occupational Information network database (O*NET)
Routine employment share	IPUMS
Unemployment rate	Bureau of Labor Statistics Archived data and SIPP
Housing market instruments	SIPP
Small business lending	FDIC through Community Re-Investment Act of 1996 (CRA)
Labor market specialization in 1950	IPUMS
Bank failures during Great Depression	Annual Reports of the Comptroller of the Currency and ICPSR

Table A.2 Data descriptions

Individual-level variables

Age	respondent's age.
Business equity	difference between the value of the business and total debt owed against the business.
Business leverage	ratio of total debt owed against the business to business equity.
Business size	a binary variable if the business has fewer than 25 employees.
College or more	a binary variable equal to 1 if the respondent has at least a college degree, and 0 otherwise.
Equity in other real estate	difference between the value and total debt owed against the other real estate (including second homes, vacation homes, underdeveloped lots).
Equity in vehicles	difference between the value and total debt owed against the vehicle.
Entry	a binary variable equal to one if an individual living in an MSA and surveyed in year t becomes an entrepreneur at date t+1.
Exit	a binary variable equal to one if a business owner living in an MSA and surveyed in a given year t did not own a business at date t+1.
Female	a binary variable equal to 1 if the respondent is a female, and 0 otherwise.
Financial experience	a binary variable if the respondent holds a degree in finance or has a finance related occupation.
High school or less	a binary variable equal to 1 if the respondent has finished at most high school, and 0 otherwise.
Home equity	difference between the value and total debt owed against the primary residence.
Household size	number of people in the household.
Household wealth	sum of financial assets, real estate, vehicles, and private business equity aggregated for all individuals in the household excluding the respondent since respondent's personal wealth is already accounted for in the variable "Total wealth".
IRA/Keogh/401K accounts	market value of IRA/Keogh/401K plans in the person's name.
Labor income	annual and obtained from gross monthly earnings (before deductions), or, for those paid on hourly basis, from the regular hourly pay-rate and the number of hours worked.
Liquid wealth	sum of safe assets -- such as government securities, munis, corporate bonds, money market deposit accounts, checking accounts, savings accounts, and stockholdings.
Occupational Mobility	occupational mobility of the respondent's current occupation based on an index which is the percentage of people who switch occupations in successive periods relative to the number of people employed in that occupation.
Race	a binary variable equal to 1 if the respondent is white, and 0 otherwise.
Property value	sum of mortgage debt and home equity.
Profit/Loss	difference between gross receipts and expenses (in log-units).
Some college	a binary variable equal to 1 if the respondent is a college drop-out and 0 otherwise.

Table A.2 Data descriptions (Continued)

Some college	a binary variable equal to 1 if the respondent is a college drop-out and 0 otherwise.
Total wealth	sum of personal financial assets, real estate, vehicles, and private business equity.
Unemployed	an indicator variable equal to 1 if the respondent's labor force status is unemployed.

MSA-level variables

$Post_t \times NTR\ Gap_m$	$NTR\ Gap_m$ is the MSA-level measure of the NTR Gap, where industry NTR Gap measures are weighted by the MSA share of business establishments. $Post_t$ is the indicator for years from 2001 forward. Industry NTR Gap is the difference between the observed NTR tariff rates and the potential non-NTR rates in industry j.
% Age > 65+ in $population_m$	fraction of population aged 65 years and older in a given MSA.
% Foreign-born on $labor\ force_m$	MSA-level annual percentage change in mortgage debt.
% $Local\ banks_m$	the local bank share of an MSA, defined as the share of all deposits in an MSA that are held by banks local to that MSA. A local bank is defined as one that has 75% or more deposits concentrated in one MSA.
Female $labor\ force\ participation\ rate_m$	share of the female population in the workforce in a given MSA.
$Housing\ price\ appreciation_m$	percentage change in MSA's housing price index is the weighted index of single-family house prices.
$Labor\ force\ participation\ rate_m$	percentage of MSA population in the labor force.
$Manufacturing\ employment\ share_m$	fraction of labor force in manufacturing sector in a given MSA.
$MFA\ exposure_{mt}$	MSA's exposure to multi-fiber arrangement quota reductions, weighted by the MSA share of business establishments.
$MSA\text{-}level\ supply\ elasticity_m$	(i)geography-based measure of Saiz (2010), and (ii)the regulation-based measure from the Wharton Regulation Index (Gyourko, Saiz, and Summer, 2008).
Non-college $educated\ population_m$	the number of people over 25 with a high school degree as a proportion of the total population over 25 years old.
MFN_{mt}	NTR tariff rates, weighted by the MSA industry share of business establishments.
Offshorability index of $occupations_m$	MSA level offshorability index is equal to the average offshorability score of employment in MSA and year. Offshorability score is simple average of the two variables "face-to-face contact" and "on-site job" that Firpo, Fortin, and Lemieux (2011) derive from the US Department of Labor's Occupational Information network database (O*NET).
Routine $employment\ share_m$	fraction of an MSA's employment that falls in routine intensive occupations.
$Unemployment\ rate_m$	MSA's number of unemployed as a percentage of the labor force.

Table A.3 Education and spillover entrepreneurial effects of import exposure

	College and more		Noncollege	
	(1)	(2)	(1)	(2)
$Post_t \times NTR\ Gap_m \times$				
1{Non-tradable skilled sector}	0.024**	0.019**	−0.007	−0.006
	(.010)	(.008)	(.006)	(.004)
1{Non-tradable unskilled sector}	0.004	0.003	0.015**	0.012*
	(.005)	(.005)	(.008)	(.007)
Sector × year f.e.	yes	yes	yes	yes
MSA × sector f.e.	no	yes	no	yes
Individual f.e.	yes	yes	yes	yes
Other controls	yes	yes	yes	yes
R-squared	0.406	0.440	0.506	0.545
Observations	99,675	99,675	205,084	205,084

In a triple-difference setting, this table tests the hypothesis that the positive spillover effects of low-cost import exposure apply more strongly for highly educated individuals in non-tradable sectors where they have a comparative advantage. The dependent variable, *Entry*, is a dichotomous variable that takes value one if individual i starts a business in sector *k* at time *t* and zero otherwise. We exclude finance, insurance, real estate, rental and leasing sectors from our sample and split the rest of the non-tradable sectors into skilled and unskilled sectors. Non-tradable skilled sectors cover educational, health and social services, professional, scientific, management, administrative management and information sectors. Non-tradable unskilled sectors include all other non-tradable sectors. The control sectors are those exposed to Chinese import penetration: manufacturing, agriculture and mining. Individuals who were already entrepreneurs are excluded from the entry sample. All specifications include controls from Table 2 (column 3), labor market controls from Table 4 (column 2), non-tradable skilled sector, non-tradable unskilled sector indicators and fixed effects, whose coefficients we do not report. *Sector× year* fixed effects absorb time-varying region-specific sectoral trends in entrepreneurship. *MSA× sector* fixed effects control for region-sector-specific investment opportunities. Robust standard errors in parentheses are double clustered at the MSA level and sectoral level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Table A.4 Local small business loan supply (SBL) shocks and business formation

	(1)		(2)	
	Estimate	S.E.	Estimate	S.E.
$Post_t \times NTR\ Gap_m$	−0.028**	(.012)	−0.031**	(.012)
SBL_{mt}	0.010*	(.006)	0.009	(.006)
$Post_t \times NTR\ Gap_M \times SBL_{mt}$			0.005*	(.003)
Individual f.e.	yes		yes	
MSA f.e.	yes		yes	
Year f.e.	yes		yes	
Other controls	yes		yes	
R-squared	0.588		0.588	
Observations	247,346		247,346	

This table tests if access to local finance affects our results. Independent variable representing the effect of import penetration is the interaction of the *NTR Gap* and the post-PNTR indicator, *Post*. The dependent variable, *Entry,* is a dichotomous variable that takes value one if individual *i* starts a business at time *t* and zero otherwise. Individuals who were *already* entrepreneurs are excluded from the entry sample. To construct the local loan supply shocks, we follow the approach of Davis and Haltiwanger (2019). Data on small business loan activity that banks file in compliance with the Community Re-Investment Act of 1996 (CRA) is utilized. We first purge the common demand effects from banks' *national* changes in lending. Specifically, we estimate the following equation that decomposes the change in local (that is, MSA-level) equilibrium credit into local demand and bank supply components:

$$g_{mbt}^{SBL} = MSA_{mt} + Bank_{bt} + \varepsilon_{mbt}$$

where g_{mbt}^{SBL} is the growth rate in the volume of small business lending (SBL) by bank *b* in MSA *m* and year *t*.

The MSA-year fixed effects, $MSA_{m,t}$ control for the variations in bank lending due to local economic conditions. The bank fixed effects $Bank_{b,t}$ capture the *national* growth of small business lending by the bank holding company. Next, to estimate the locally exogenous component of the growth rate in small business lending (*SBL*) for MSA *m*, we construct a Bartik (1991)-type measure given by:

$$SBL_{mt} = \sum_b \omega_{mbt-1} \widehat{Bank}_{bt}$$

where ω is the bank *b*'s share of small business lending in MSA *m* and year *t-1* and $\widehat{Bank}_{bt}$ are the estimated bank fixed effects from the first equation. Column 1 controls for SBL shocks in business entry regressions and column 2 interacts $SBL_{m,t}$ with the import exposure to capture the sensitivity of business entry to additional responsiveness of households to import exposure in areas with easier access to finance relative to those in areas with worse access to bank finance. All specifications include controls from Table 2 (column 3), labor market controls from Table 4 (column 2) and fixed effects, whose coefficients we do not report. Robust standard errors in parentheses are clustered at the MSA level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Table A.5 Controlling for housing market effects

	(1)		(2)
First stage results	Property value (PV)	Home Equity (HE)	GHPI
Current house prices at the national level × MSA supply elasticity	−92.04*** (28.15)	−116.2*** (36.29)	
National house prices in the year of purchase × MSA supply elasticity	40.35** (18.48)	28.16*** (5.135)	
MSA supply elasticity × Nation-wide mortgage			−0.082*** (0.022)
Other controls	yes	yes	yes
First-stage F-statistics	22.35	118.27	76.14

	(1)	(2)	(3)	(4)	(5)
	IV-PVHE	IV-GHPI	Excluding housing boom driven sectors	Excluding MSAs with most inelastic supply	Excluding "sand" states
$Post_t \times NTR\ Gap_m$	-0.030*** (.010)	−0.028** (.013)	−0.027** (.012)	−0.031*** (.011)	−0.035** (.016)
Individual f.e.	yes	yes	yes	yes	yes
MSA f.e.	yes	yes	yes	yes	yes
Year f.e.	yes	yes	yes	yes	yes
Other controls	yes	yes	yes	yes	yes
Observations	303,359	303,359	253,107	276,172	250,124

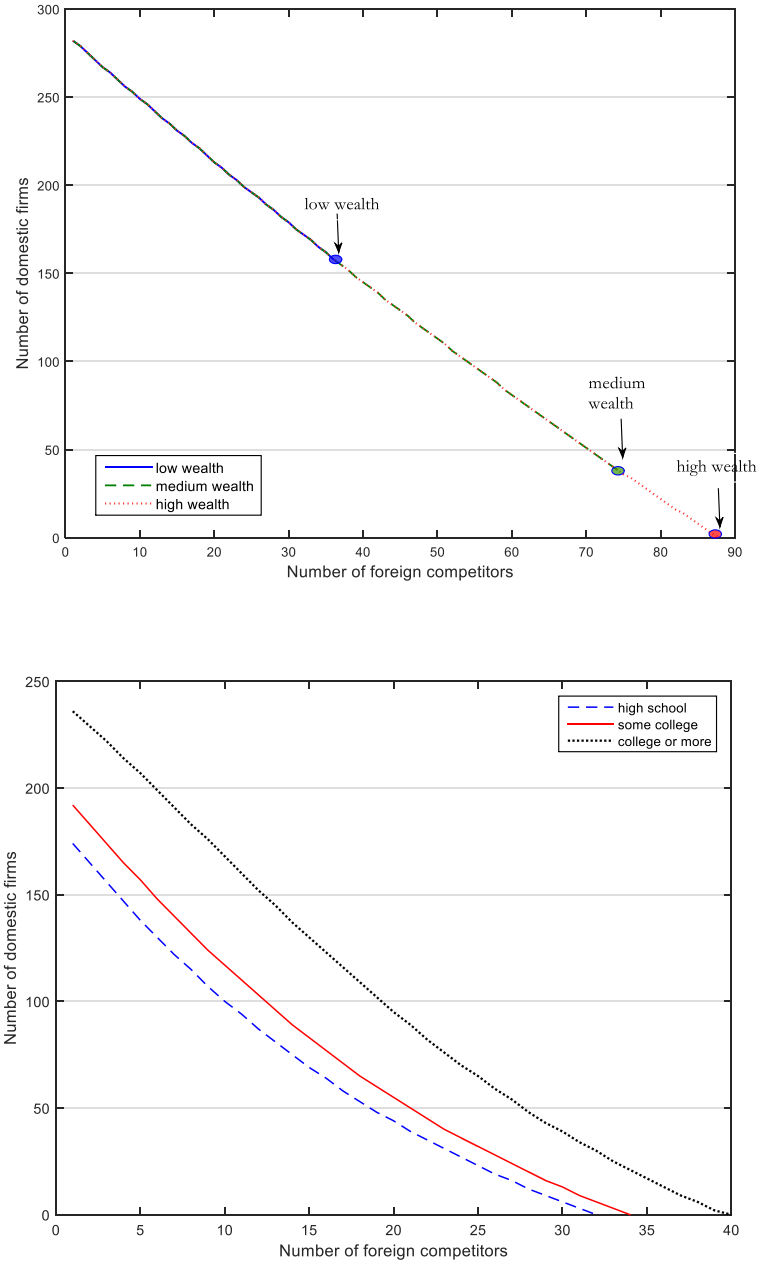
This table relates lower-cost import penetration to the entrepreneurial decision of individuals in a difference-in-differences setting after controlling for housing market effects. Independent variable representing the effect of import penetration is the interaction of the *NTR Gap* and a post-PNTR indicator, *Post*. The dependent variable, *Entry,* is a dichotomous variable that takes value one if individual *i* starts a business at time *t* and zero otherwise. Individuals who were *already* entrepreneurs are excluded from the entry sample. In column 1, the variation in respondents' "Property value" and "Home equity" (in Eq. (10)) are instrumented using variation in *Current house prices at the national level* × *MSA supply elasticity* and *National house prices in the year of purchase* ×*MSA supply elasticity*. In column 2, the MSA-level housing price growth ("GHPI" in Eq. (11)) is instrumented with *MSA supply elasticity* × *Nation-wide mortgage rates*. In columns 3–5 we exclude (i) housing boom-driven sectors such as construction, finance, insurance, real estate, and rental and leasing, (ii) individuals living in MSAs with most inelastic housing supply, (iii) "sand-states" that saw the largest housing bubbles. All specifications include controls from Table 2 (column 3), labor market controls from Table 4 (column 2) and fixed effects, whose coefficients we do not report. Robust standard errors in parentheses are clustered at the MSA level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Table A.6 Long-term trends in entrepreneurship: Bank distress and specialization in labor markets

	(1) Local Bank distress Great Depression (1930-1933)		(2) Specialization in labor markets (Industry structure in 1950)	
	Estimate	S.E.	Estimate	S.E.
$Post_t \times NTR\ Gap_m$	−0.026***	(.009)	−0.025**	(.012)
$Post_t \times$ Bank $distress_{M,1930\text{-}1933}$	−0.005	(.003)		
$Post_t \times NTR\ Gap_m \times$ Bank $distress_{m,1930\text{-}1933}$	−0.009	(.006)		
$Post_t \times$ Routine employment $share_{m,1950}$			−0.007	(.004)
$Post_t \times NTR\ Gap_m \times$ Routine employment $share_{m,1950}$			−0.011*	(.006)
Individual f.e.	yes		yes	
MSA f.e.	yes		yes	
Year f.e.	yes		yes	
Other controls	yes		yes	
R-squared	0.599		0.590	
Observations	303,359		303,359	

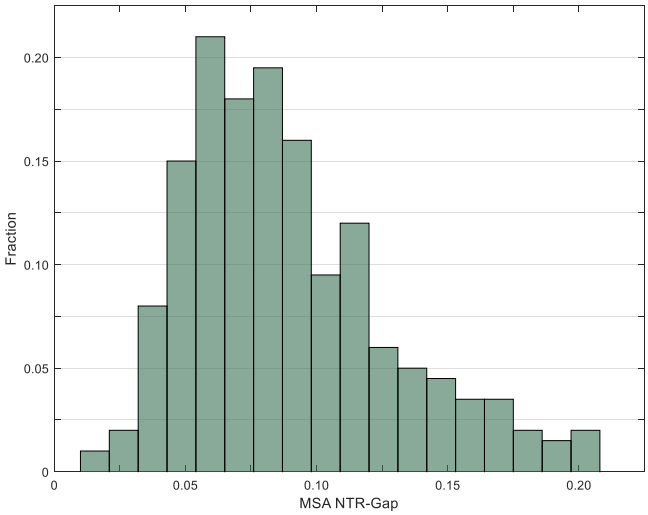
This table addresses the concern that $Post_t \times NTR\ Gap_m$ may in part incorporate the effects of *long-run* trends of past shocks to financing access and labor market specialization. Independent variable representing the effect of import penetration is the interaction of the *NTR Gap* and the post-PNTR indicator, *Post*. The dependent variable, *Entry,* is a dichotomous variable that takes value one if individual *i* starts a business at time *t* and zero otherwise. Individuals who were *already* entrepreneurs are excluded from the entry sample. In column 1, we exploit cross-MSA variation in the severity of bank distress around the Great Depression to understand the extent to which bank distress in a local banking market impacted the trajectory of entrepreneurship in the long-run. The intensity of bank distress in each MSA is measured as the total deposits in suspended or failed state banks from 1930 through 1933 divided by the total deposits at state banks in existence in 1929. Data on distressed banks and deposits during Great Depression era is obtained from Annual Reports Comptroller of the Currency and ICPSR. In column 2, we exploit local labor market patterns of industry specialization in routine activities evident in 1950 using data from Census IPUMS. Routine employment share in each MSA is instrumented by the local industry mix in 1950 and the occupational structure of industries nationally in 1950. All specifications include controls from Table 2 (column 3), labor market controls from Table 4 (column 4) and fixed effects, whose coefficients we do not report. Robust standard errors in parentheses are clustered at the MSA level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Figure A.1 Optimal response of domestic business entrants exposed to foreign entry: Effects of wealth and education



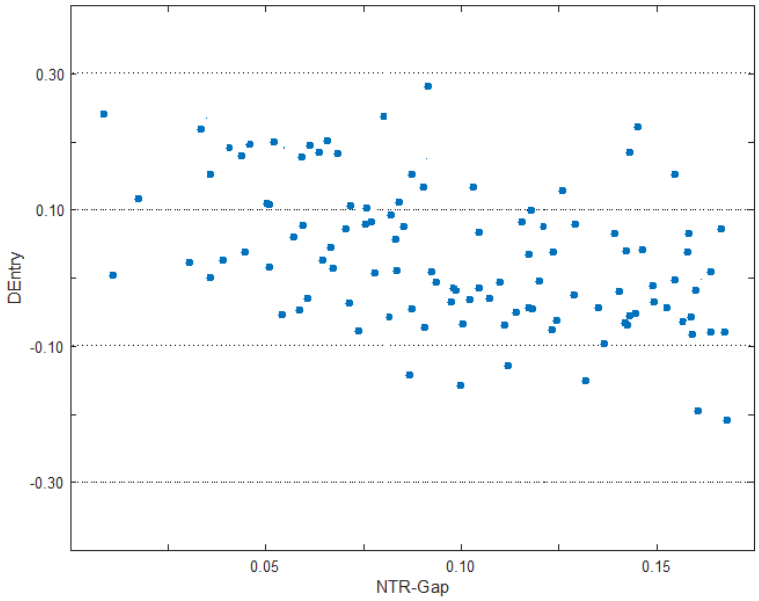
The top panel depicts the impact of individual wealth on the optimal response of domestic business entrants in tradable industries to low-cost foreign competition. Entry costs become a binding constraint for entrepreneurship selection by low and medium level wealth individuals for sufficiently high number of lower-cost foreign competitors. The bottom panel depicts the effect of individual education level on the optimal response of domestic business entrants to foreign competition. Increasing exposure to lower-cost foreign competition has the greatest (negative) effect on the marginal entry propensity of individuals with highest educational attainment.

Figure A.2 Distribution of regional NTR Gap



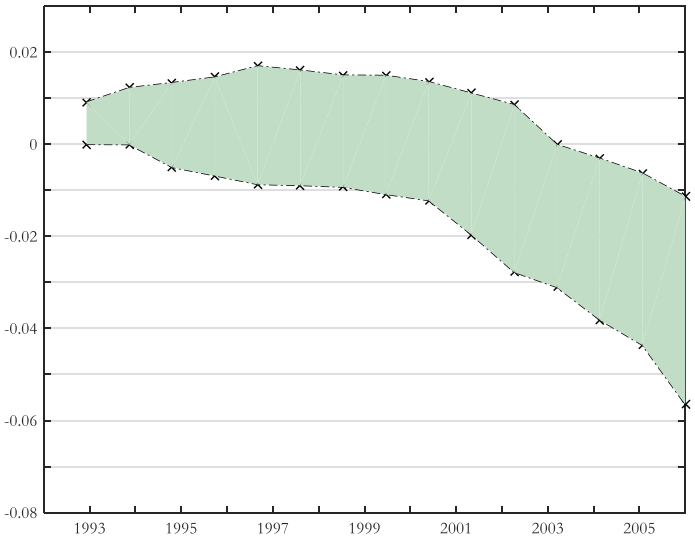
This figure displays the histogram regional NTR Gaps. The distribution is right-skewed.

Figure A.3 Geographic dispersion of NTR Gap



This figure plots average percentage change in geographic entry rates between the pre-and post-PNTR periods (that is, 1993-2000 and 2001-2006, respectively).

Figure A.4. Confidence interval for estimated entry coefficients for NTR Gap×year dummies



This figure displays the 90-percent confidence interval for the difference-in-differences coefficients for interactions of NTR Gap with year dummies from Equation (9) in the text.