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Small Business Growth and Failure during the Great Recession: The Role of House Prices, Race and Gender[*]

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Abstract

A growing literature provides evidence of the underperformance of minority-owned businesses and also shows that young and small businesses were disproportionately impacted during the Great Recession. This strand of the literature also finds evidence of a housing collateral channel: businesses, particularly small businesses, rely on home equity as a source of business funding. Using 2002-2011 data from the Longitudinal Business Database linked to the 2002 and 2007 Survey of Business Owners, this paper adds to the literature by exploring whether (through a collateral channel) the rise in home prices over the early 2000's and their subsequent fall associated with the Great Recession had differential impacts on business performance across owner race, ethnicity and gender.

We find that the employment growth rate of minority-owned firms, particularly black and Hispanic-owned firms, is more sensitive to changes in house prices than is that of their non-minority-owned counterparts. Similarly, the results from our logit and linear probability model estimations show that black and Hispanic-owned firms have a higher risk of failure and are more sensitive to changes in house prices . In contrast, our findings on ownership by gender indicate that there is no difference across male and female-owned businesses in employment growth, exit rates or sensitivity to house price changes. Overall, these findings may help improve our understanding of the relationship between economic downturns and minority-owned business performance.

We are cautious not to over interpret these results though, and recognize that our analysis is descriptive in nature and that further work is needed to make causal interpretations. However, finding differential impacts for groups known to be more dependent on home equity, having a rich set of controls in our model specification, and obtaining results that are robust to sensitivity analyses as well as consistent with other findings in the literature makes us sympathetic to the collateral channel interpretation.

Keywords: Entrepreneurship, small business outcomes, collateral channel, housing, race, gender, Great Recession.

JEL Classification: J15, L26, M13

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I. Introduction

We explore whether the rise and fall in home prices associated with the Great Recession had differential impacts on business performance across owner race, ethnicity and gender. We are motivated by several broad findings in the literature. First, there is a long literature documenting the underperformance of minority and women owned businesses (see Fairlie and Robb 2008 for an overview). Much of this literature focuses on the lack of business capital available to minority and women owned businesses as a primary driver of the observed underperformance of these businesses. Second, recent papers by Fort et. al. (2013), Adelino, Schoar and Severino (2012 and 2015) and Kleiner (2015) demonstrate that young and small businesses were disproportionately impacted during the Great Recession. The papers are consistent with a collateral channel impact of the run up in housing prices and subsequent subprime crisis where small and young businesses became severely credit constrained after housing prices fell.[1] The collateral channel view is based on the evidence[2] that firms, and particularly small firms, rely on home equity as a source of business funding. Most importantly for our paper is that most minority-owned firms are small. For instance, in 2007, 82 percent of minority-owned firms had less than 10 employees, and 92 percent had less than 20 employees.[3] Finally, analysis of foreclosures shows that they fell disproportionately on urban minority neighborhoods (see Geradi and Willen 2009, and Rugh and Massey 2010), and that losses in home equity were larger for minority households (e.g., Kochhar et al. 2011) in the Great Recession.

Taken together, these findings suggest that minority and perhaps women-owned businesses may have been particularly hard hit during the Great Recession if owners of such business were more impacted by declines in house prices - either because they were more dependent on home equity as a means to provide capital to their businesses and/or they saw larger declines in the value of their homes. Using data from the Census Bureau's 2002 and 2007 Survey of Business Owners linked (SBO) to 2002-2011 Longitudinal Business Database (LBD)

[1]Mian and Sufi (2011) find no evidence of a collateral channel and argue that the subprime crisis impacted the real economy via aggregate demand.
[2] For instance, see 2014 Federal Reserve Bank of New York 'Small Business Credit Survey' findings https://www.newyorkfed.org/medialibrary/interactives/spring2014/spring2014/pdf/full-report.pdf.
[3] See 2007 SBO published table: http://www.census.gov/library/publications/2007/econ/2007-sbo-businesses.html.

data, we explore whether the rise and fall in home prices associated with the Great Recession had differential impacts on business performance across owner race, ethnicity and gender. Specifically, we compare two performance measure (firm employment growth and exit rates) across business owner characteristics to examine whether changes in house prices, measured for the 100 largest MSAs, had differential impacts.

We caution that our analysis is descriptive and acknowledge that further work is needed to make causal interpretations. However, we perform robustness checks aimed to address two different issues that affect our analysis. One (and a difficult to completely eliminate) concern is that house price appreciation rates may be proxies for or endogenous to local consumer demand rather than/in addition to measuring the availability of business capital. To address this concern we follow the literature (Milan and Sufi (2014), Adelino et al. (2015)) and divide our firms according to whether they are in tradable or non-tradable sectors using the definitions developed by Hlatchwayo and Spence (2014).[4] The intuition behind this approach is that firms in tradable sectors such as manufacturing are less vulnerable to/reliant on local demand than are firms in non-tradable sectors - which are closely tied to local customers and much more sensitive to local demand shocks. A second concern emanates from the fact that much of our key variation in home prices is MSA level while our analysis is firm-level. This means that our standard errors, though clustered, may be artificially deflated and hence our coefficients may be artificially significant.

Our results are consistent with a collateral channel for changes in house prices for our sample of linked SBO-LBD firms. Consistent with the notion that minority owned businesses are more impacted by home equity as a source of business capital, employment growth and exit rates for African American and Hispanic-owned firms are more sensitive to changes in home prices than those for white-owned firms. Interestingly, we do not find similar results for female owned firms. These results are robust to our sensitivity analyses.

The paper proceeds as follows. We first review the literature on the performance of women and minority-owned firms and on the role of house prices for young and small

[4] We also experimented with several permutations of the tradable sector to check for sensitivity. The results below use the following tradable sectors: Agriculture, Manufacturing, Mining, Transportation & Warehousing, Finance & Insurance, Information, Professional Services

businesses. We next describe our data and empirical approach. We then discuss our findings and conclude with thoughts about further research.

II. Background

There is a large literature documenting that within any given geographic region, business characteristics and outcomes vary considerably across the entrepreneurs' personal demographic characteristics. Robb and Fairlie (2006) show that black-owned firms have lower sales, profits, and probability of having employees and are more likely to close than are white or Asian-owned businesses. Robb and Fairlie (2007) show that Asian-owned businesses are less likely to close, more likely to have higher profits and be bigger than white-owned firms. Fairlie (2008) argues that immigrant businesses make big contributions to the U.S. economy. Jarmin and Krizan (2010) find the black and women owned firms are slightly less likely than white and male owned firms to export whereas Hispanic and Asian owned firms are more likely to export that non-Hispanic and white owned businesses. Jarmin et al. (2014) find that black and Hispanic-owned firms have lower employment growth and higher exit rates than their non-minority counterparts.

These cross-group differences in firm performance are generally thought to arise from differences across the groups in prior work experience, family business backgrounds, and availability of capital. Fairlie and Robb (2007) report that more than half of the white business owners had another family member who was already self-employed when they started their own business while compared to only a third for black owners. In fact, they point to a long history of studies showing that weak family ties and networking opportunities put potential black entrepreneurs at a disadvantage compared to their white (and Asian) counterparts.[5] Moreover, Fairlie and Robb (2007) show that white-owned businesses often get passed-down to future generations. By contrast, Asian entrepreneurs may be slightly less likely than their white counterparts to have had a self-employed family member, and key factors of their relative success are higher levels of human and start-up capital (Robb and Fairlie 2007).

Differences in the availability of start-up capital are also a contributing factor to why women-owned businesses are less successful than male-owned businesses (Fairlie and Robb 2008) - although systematic differences in firm and owner characteristics have been found to

[5] See for example Hout and Rosen (2000), and Fairlie (1999).

explain large parts of the observed differences in lending patterns (Robb and Wilken 2002). For example, Robb and Wilken (2002) found that woman-owned firms are younger, smaller and more likely to be engaged in retail trade. Nonetheless, new studies continue to document a disparity in the amount of start-up capital that men and women can raise and in the sources of the debt they incur (Coleman and Robb 2008).

The age of the potential entrepreneur can also affect business entry and success. It is also an important factor in both the likelihood of starting a business as well as a predictor of the business' success. For example, Kim (2007) studies the incidence of self-employment over a person's life cycle and finds that self-employment probabilities increase with age (and education). Several studies have examined the interaction of owner age with business performance with mixed results. Harhoff, Stahl, and Woywode (1998) show that voluntary liquidation increases with age but business insolvency does not, suggesting that retirement is an important factor in the decision of older entrepreneurs to close their business. Headd (2003) found that businesses owned by younger people are more likely to close – but also more likely to be profitable at the time of closure. Similarly, Van Praag (2003) found that the older an entrepreneur is when they start a business, the longer the business will survive, but that there is a negative correlation between the owner's age and the profitability of the business when it shuts down.

There is substantial evidence indicating that foreclosures fell disproportionately on urban minority neighborhoods (see Geradi and Willen 2009, and Rugh and Massey 2010) and that losses in home equity were larger for minority households (e.g., Kochhar et al. 2011) during the Great Recession. There is less direct evidence on how much minority and women-owned businesses use home equity compared to their non-minority and male counterparts. Nevertheless, there is mounting indirect evidence suggesting that minority and women-owned businesses use home equity as a source of financing at higher rates. For instance, estimates from the 2007 SBO[6] shows that a higher percent of minority and women-owned employer businesses use personal/family home equity loans as sources of start-up and expansion financing compared to their white-owned counterparts. Using the Kauffman firm survey, Robb (2013) finds that black and Hispanic-owned businesses use owner's equity at a higher rate relative to white-owned firm.

[6] Authors' own calculations.

However, the survey does not differentiate between home-equity related financing and other types of formal/bank financing, nor does it differentiate among sources of owner's equity. Furthermore, small firms tend to rely on home equity as a source of business funding (2014 Federal Reserve Bank of New York), and most minority-owned firms are small.

Recent papers have analyzed the impact of the Great Recession on young and small business with an emphasis on the role of house prices.[7] For example, Fort et al. (2013) find that young businesses especially exhibit more sensitivity to cyclical fluctuations. Moreover, they find that during the great recession the differentials in growth rates between young small business and larger more mature business was stronger in areas strongly impacted by declines in housing prices even after controlling for state level economic conditions. Adelino et al. (2015) finds that small firms in areas with larger increases in home prices have stronger employment growth than larger firms in the same areas and industries.

III. Data

We use several sources of data for our analysis: the 2002 and 2007 Survey of Business Owners (SBO), the Longitudinal Business Database (LBD), MSA-level house price data from the Federal Housing Finance Agency (FHFA), and county-level annual unemployment rate data from the Bureau of Labor Statistics (BLS). The SBO is a comprehensive, regularly collected survey of the demographic and economic characteristics of business owners. It is a firm-level survey and its sample frame includes all nonfarm businesses with annual receipts of one thousand dollars or more. We use the SBO to get information on key demographic characteristics of the business owners (namely, race, Hispanic origin, gender, age and educational level), and on whether the business has more than one owner. The SBO is conducted as part of the quinquennial Economic Census every 5 years, in years ending in a "2" or a "7". We use data from the 2002 and the 2007 SBOs.

Our other main data set, the Longitudinal Business Database (LBD),[8] is a longitudinal annual database covering all U.S. establishments and firms in the non-farm business sector from 1976 to 2011 and includes information about payroll, employment, detailed location, detailed

[7] See, for instance, Adelino, Schoar and Severino (2012 and 2015), Kleiner (2015) and Fort et al. (2013).
[8] See Jarmin and Miranda (2002) for information on the creation and development of the LBD.

industry, and ownership structure. We link the SBO files to the LBD using a firm-level identifier common to both files. Once the SBO is linked to the LBD, we can look forward and backward to obtain longitudinal information such as the age, size, industry or location of the firm, and also calculate performance measures such as employment growth and firm exit or failure.

Approximately 2.3 million firms were sampled in each of the 2002 and 2007 SBO survey years.[9] Our sample consists of employer businesses for which an owner (or owners) is identified.[10] Therefore, sole proprietors and partnerships are included in our sample while public corporations and non-profit organizations are not. We also exclude businesses where all demographic characteristics of the owner (i.e., race, Hispanic origin, gender, age and education) are missing.[11] We then link these businesses to the LBD resulting in a total of 1,641,506 SBO employer firms with information spanning from 2002 to 2011. Our final analytic sample consists of 1,036,325 employer firms located in the top 100 MSAs, for which we have MSA-level house price data from the FHFA.[12]

Because we use observations from two different SBO years and consider only employer firms, our analysis uses unweighted data.[13] Table 1 shows distributions of business owner's demographics and firm characteristics for our sample, and compares them to those available from the 2002 and 2007 SBO weighted samples. For firms that were sampled in both the 2002 and 2007 SBOs and that may have undergone an ownership change, we use the 2002 SBO race, Hispanic origin, sex, education, and owner age values for year 2002, the 2007 values for year 2007 and beyond, and for the intermediate years, we randomly assign one or the other value with a 50 percent probability.[14] For firms in either the 2002 or 2007 SBO (but not both), we assume these characteristics remain unchanged over the 2002-2011 period. Since the owner characteristics are allowed to change over time whenever the data is available, Table 1 shows

[9] The samples include weights used to obtain business population totals of roughly 7 million firms. Also, some firms are sampled in both the 2002 and 2007 SBOs.
[10] Non-employer businesses are excluded from our sample since one of our business performance measures is employment growth. Further research will examine the likelihood of becoming an employer business across business owner characteristics during the Great Recession.
[11] Note, though, that we allow for a given demographic characteristic to have missing values. These are represented by a missing-value category under each demographic characteristic.
[12] The Federal Housing Finance Agency uses sales price data to estimate the house price index.
[13] In prior versions, we conducted our analysis using only the 2002 SBO. As a robustness check, we employed unweighted as well as weighted data, including propensity score weighting. The results obtained were qualitatively the same.
[14] Approximately 11 percent of our sample is in both the 2002 and 2007 SBOs.

owners' demographics at the two SBO survey years (2002 and 2007). Note that owners' demographic characteristics differences between the weighted SBO and our analytic sample of the same year are small and most of them are within 1 or 2 percentage points of each other. Regarding firm characteristics, note that our sample tends to be skewed towards smaller firms.

IV. Methodology

Our two business performance measures are firm employment growth and exit rates. Since the LBD provides longitudinal data on SBO firms, our SBO-LBD linked data allows us to examine annual firm exit rates as well as compute changes in firm employment, whether it is from adding or losing workers or completely shutting-down. Furthermore, we are able to examine business performance differentials across owner characteristics before and during the Great Recession, and how those differentials may vary with changes in house prices (at the MSA level).

While we include a rich set of controls that capture business conditions and firm characteristics, and perform robustness checks aimed to address house price and local demand endogeneity, we caution against inferring a causal chain from changing house prices to business performance. That said, knowing that capital constraints vary systematically across firms, finding differential impacts of housing prices changes by the demographic characteristics of the firm owner would be suggestive of a collateral channel for at least some classes of firms.

To explore how changes in house prices may impact firms differentially by owner characteristics, we estimate the model below, which interacts the demographics of interest (owner's race, Hispanic origin and gender) with HP_{jt}, the (annual) percentage change in the MSA-level house price index between (t-*1*) and t.

$$Y_{it} = \alpha + \beta_1 \mathrm{HP}_{jt} + \beta_1 Race_i + \beta_2 Race*HP_{jt} + \beta_3 Hisp_i + \beta_4 Hisp_i*HP_{jt} + \beta_5 Sex_i + \beta_6 Sex_i*HP_{jt} + \beta_7 Age_i + \beta_8 Edu_i + \beta_9 Multiowner_i + \beta_{10} FAge_{it} + \beta_{11} FSize_{it} + \beta_{12} Multiunit_{it} + \beta_{13} Sector_{it} + \beta_{14} Unemp_{jt} + State_{it} + Year + State_{it} *Year + \varepsilon_{it} \quad \textbf{(1)}$$

In our business exit analysis, Y_{it} is a 1/0 binary variable that equals 1 if the business exits at year t, and equals 0 otherwise.[15] A firm is considered to exit at year t if it has positive

[15] Firms that survive up to our last time period (2011) are treated as right-censored observations.

employment in *t-1* and zero employment at *t*. In our employment growth analysis, Y_{it} stands for firm *i*'s employment growth at time *t*, and specifically, is measured as:

$$Y_{it} = \frac{x_{it} - x_{it-1}}{(x_{it} + x_{it-1})/2}$$

This employment growth rate measure is standard in the labor market flows literature since it offers some important advantages relative to log changes and growth rates calculated on initial employment. For instance, it accommodates firm exits,[16] and yields measures that are bounded and symmetric about zero. In addition, it is identical to log changes up to a second-order Taylor Series expansion. See Davis, Haltiwanger and Schuh (1996) for further details.

Race, Hisp, Gender, Age, and *Education* are categorical variables representing business owner's characteristics.[17] Please note that *Gender* includes an 'equal' category for multi-owner businesses that are equally owned by women and men (often spouses). The demographics of interest (race, Hispanic origin and gender) are interacted with HP_{jt} to explore whether performance gap differentials across demographic groups vary with changes in MSA home prices. For employment growth, positive coefficients on the interaction and HP_{jt} terms would be consistent with the collateral channel view. That is, decreases in house prices (i.e., downturn) would be associated with lower firm employment growth, and being a woman or minority-owned firm would "magnify" that effect. In contrast, for firm exit, negative coefficients on the interaction and HP_{jt} terms would mean that decreases in house prices (i.e., downturn) would be associated with a higher probability of exit, and being a woman or minority-owned firm would add to that effect.

FirmAge, FirmSize, Multiowner, Multiunit and *Sector* are categorical variables representing firm characteristics. Although firm age and size are standard control variables in many reduced form models of business performance, they have not been widely applied in the literature in the owner characteristic literature. We are able to include these variables because we link the SBO

[16] In fact, it accommodates firm entry and exit as well as surviving firms.

[17] Coefficients and results are not reported for the Native Hawaiian/Pacific Islander and Alaska Native groups because their cell sizes are too small to yield any reliable estimates. Missing values for a particular demographic characteristic are grouped into a 'missing' category under that characteristic and included in the regressions. Their coefficients are not reported.

to the LBD. Prior studies that relied on the SBO alone did not have this information available to them and could not include these controls.

Unemp is the change in county-level annual unemployment rate, and is included to control for local demand conditions. *Year* and *State* are respectively dummies for state and year. These and their interaction are included to control for time trends, fixed state-level conditions and time-varying state-levels conditions that may also affect our two business performance measures.

The probability of firm exit model is estimated using both a linear probability model (LPM) and a logistic regression. The LPM is our starting point and generally gives reasonable estimates of average effects. The estimated LPM coefficients also give us direct and easy to interpret estimates of the relationship between the probability of firm exit and the overall interaction of demographic characteristics and house price changes. However, to explore non-linear effects for a range of house price changes by demographic group, we employ a (non-linear) logit regression. Our employment growth regression is estimated using OLS.[18]

V. Results

Before moving to our regression results, we begin by showing simple trends in employment growth and exit rates. Firm births are an important dimension that we would like to examine, but the frequency and nature of SBO sampling makes this difficult. That is, because we focus on SBO cases in order to observe owner characteristics, births in our sample are clumped in the SBO survey years. If not accounted for, these "spikes" in births distort employment growth and exit rate estimates as younger firms tend to have systematically different growth and exit patterns compared to older firms. For this reason, we include just continuing firms in our descriptive graphs on the evolution of firm employment growth and adjust our estimates using age-adjusted employment weights from the LBD (see Figures 1 through 3).[19]

Figures 1 through 4 show the evolution of employment growth (for continuing firms) and exit rates. These use our sample of 2002/2007 SBO firms linked to the LBD for the 100 largest MSAs - for which we have data on annual housing price changes. Per the discussion above, we

[18] Standard errors are clustered at the MSA level in all of our estimations.

[19] The weights are calculated using the LBD's sum of employment for firms in a given age category. Specifically: $(EMP_{ct} + EMP_{c(t-1)})/2$, where EMP is the sum of employment of firms in age category *c* in year *t*, and the firm age categories are 0, 1-4, 5-10 and 11+ years.

link these firms to the LBD, which allows us to obtain annual observations on employment growth and exit rates for the SBO firms that are sampled in 2002 and/or 2007.

Figure 1 compares the mean, 10^{th} and 90^{th} percentiles for annual firm employment growth rates across owner race (Panels A, B and C) for continuing firms. The trends in panel A for white-owned firms very closely mimic the overall trends as they comprise approximately 90 percent of the firms in our sample. Several features of the trends depicted are worth noting. First, the impact of the recession is visible with the drop in mean growth rates in the 2008-2010 period. We also see, similar to Decker et al. (2015), a downward trend in the growth rates of the fastest growing 90^{th} percentile of firms over the entire 2003-2011 period we examine here, but no such general decline for the slowest growing (shrinking) firms. Decker et al. (2015) use the entire universe of LBD firms and we focus on the subset sampled in the SBO, which are smaller businesses. This accounts for both the lack of positive skewness (i.e., larger 90-50 than 50-10 differentials where the 50^{th} percentile of firm growth rates is essentially zero) and the smaller decline in dispersion (i.e., 90-10 differential) over the 2003-2011 period compared to their findings. Turning now to the same statistics for black and Asian-owned firms, we find that compared to their white-owned counterparts, black-owned firms exhibit more dispersion in employment growth rates while Asian-owned firms exhibit slightly more dispersion. Note also that the dispersion between black and white-owned firms is exacerbated by the recession, and not so much when comparing Asian and white-owned firms.

Figures 2 and 3 look at the distributions of firm employment growth rates by owner ethnicity and gender respectively. The employment growth trend for Non-Hispanic firms (Figure 2, Panel A) closely resembles that of white-owned firms since there is a large overlap between the two groups, and Non-Hispanic firms make up the majority of firms in our sample. Hence, non-Hispanic owned firms exhibit the same trend characteristics of those observed in white-owned firms. Analogously to black and Asian-owned firms, firms owned by Hispanics show more dispersion in employment growth rates than non-Hispanic owned firms. We also find that this dispersion gets larger during the downturn.

By contrast, we find that employment growth trends for male and female-owned firms are similar (see Figure 3). Their employment growth dispersion is not large and they both exhibit a

downward trend in the growth rates of the fastest growing 90th percentile of firms over our period of analysis, but no such general decline for the slowest growing firms.

We examine trends in firm exit rates in Figure 4. Just as with our employment growth calculations, the nature of our linked SBO-LBD sample requires us to make several adjustments to compute valid exit rates. First, we omit 2007 SBO firms from exit rate computations prior to 2008 as they bias exit rates downward since, by definition, they survive at least through 2007. In addition, and analogously to our employment growth estimation, we age-adjust exit rates to smooth the spikes near 2003 and 2008 due to SBO sampling and corresponding incoming births. The results in Figure 4 show marked increases in exit rates for all firms during the Great Recession. Notably, Hispanic- and Black-owned firms appear to be differentially impacted compared to white- and Asian-owned firms. Female-owned firms also appear to be impacted more than male-owned firm during the recession, but not as dramatically as black- and Hispanic-owned firms.

Finally, since our main objective is to explore the differential impact of changes in house prices on the outcomes of firms by the race, ethnicity and gender of the owner(s), Figure 5, Panel A, broadly describes the evolution of the distribution of annual average house price changes over the 100 MSAs used in our analysis. This shows both the run-up and collapse of house prices over the decade. Meanwhile Panel B in Figure 5 shows the variation of house price changes within MSAs for a group of MSAs that experienced large fluctuations in house price changes (Graph B1) as well as for MSAs with more moderate ones (Graph B2). Importantly, figures in Panel A and B show the cross as well as within MSA heterogeneity in house prices changes that will provide important variation to our analysis.

Panel C of Figure 5 provides some initial intuition for our model results. It shows the house price and employment growth rates of Miami and Chicago. These two MSAs had very different house price appreciation rates during our sample period. Miami's annual house price changes ranged from roughly 25% to -35% while Chicago's was more stable, varying between 10% to -10%. However, both MSAs also experienced a (relatively) steep decline during the housing crisis. Note also that both MSA's employment growth rates fall roughly parallel to their respective house price appreciation rates.

A. Role of Changes in House Prices by Owner Race

The results from our firm employment growth and firm exit regressions (both logistic and LPM) are included in Tables A-1 and A-2 in the Appendix. Note that our findings are consistent with those in the literature for variables such as firm size and age, and owner's age and education. To better focus on the main parameters of interest and better visualize interaction effects (from our non-linear logit estimation), we display the relationship of house price changes with owner's characteristics in Figures 6 through 8.

Panel A in Figure 6 shows the relationship of employment growth rates to the annual change in MSA level house prices by owner race.[20] First, we find that employment growth is positively associated with changes in house prices at the MSA level – which is consistent with a collateral channel for small businesses. As pointed out earlier, this is after controlling for a rich set of business cycle, industry effects and observable firm characteristics.

Next, and more interesting for the main focus of this paper, is that black and Asian-owned firm employment growth is more sensitive to changes in house prices than white-owned businesses. Asian firms are roughly twice as sensitive, and black-owned firms are roughly four times as sensitive compared to their white counterparts. Thus, whether it is that black business owners were more dependent on housing equity and/or that they saw larger declines in the values of their homes, our results show the collateral channel is particularly important for them.

Similarly, in Figure 6, Panel B we show the relationship of firm exit rates and changes in house price changes from our logit estimation. As expected, we see that the probability of exit declines with more robust growth in home prices. Here, we find little significant difference between white and Asian owned firms. However, black-owned firm have a higher risk of failure and are also more sensitive to changes in house prices, suggesting that collateral channel is a particularly important source of business capital for them.

B. Role of Changes in House Prices by Owner Ethnicity and Gender

Figure 7 shows results by owner ethnicity. We find that employment growth rates for Hispanic-owned businesses are approximately four times more sensitive to changes in house

[20] Ninety percent confidence intervals are shown as well.

prices than non-Hispanic owned firms. Also, exit rates for Hispanic-owned businesses decline faster as house price growth increases than do those for non-Hispanic firms. Thus, the collateral channel appears to be relatively more important for Hispanic business owner - as it does for African American business owners.

We report the results by gender in Figure 8. For both employment growth and exit rates, we find no difference in the sensitivity of female and male owned businesses to changes in house prices. We do, however, find that businesses in the "equal" owner category are more sensitive. This finding deserves more attention. In fact, if what we are observing in Figures 6-8 is indeed the result of a collateral channel, the result for the equal category may suggest interesting interactions between capital constraints and owner household structure on small business performance.

C. Robustness Checks

We perform robustness checks aimed to address two different issues that affect our analysis. One emanates from the fact that much of our key variation in home prices is MSA level while our analysis is firm-level. The other is that house price appreciation rates may be proxies for or endogenous to local consumer demand rather than/in addition to measuring the availability of business capital.

While our final analytic sample consists of 1,036,325 employer firms and spans up to 9 years, giving us over 7 million individual observations, our house price variable comes from the FHFA and varies at the MSA level. Furthermore, it covers only the 100 biggest MSAs in the country. A reasonable concern then is that our standard errors, though clustered, reflect the large number of firms while much of our key variation is at the MSA level and for a relatively small number of MSAs. It may be that our coefficients are artificially significant.

To address this concern, our first robustness check aggregates the data into MSA/owner characteristic cells and re-run our key regressions at the cell-level, with far fewer observations (roughly 14,000, but varies according to cell definitions). For example, to obtain the employment growth regression results displayed in Figure 9 we created cells by averaging the employment growth rates of firms by MSA/race/Hispanic origin/sex/year. We then ran a weighted regression, where the weights were the total employment in the cell. To obtain the exit rate results in Panel B of Figure 9, we employed the same methodology, but here the dependent

variable is the proportion of exits in the cell. This makes Figure 9 results roughly comparable to the firm-based models from Figure 6 (Panels A and B).[21]

Figure 9 compares three groups in particular: white/non-Hispanic/male, black/non-Hispanic/male and Asian/non-Hispanic/male-owned firms. As with the models from Figure 6, the key variables of interest (race, sex, Hispanic origin, and house price change) were statistically significant. Panels A and B of Figure 9 mirror the results obtained in Figure 6. Consider for example Panel A of the two figures. In both cases, black and Asian-owned business employment growth is more sensitive to changes in house prices than white-owned businesses. Also, the growth rates for Asian-owned businesses are slightly lower than that for white-owned businesses and above the black-owned level at the lowest end of the house price appreciation index, but quickly rises above both white and black-owned growth rates at the mid to upper appreciation rates. Also, as in Figure 6, the black-owned growth rates are lower than those of other businesses – but only when house price appreciation rates are negative. The rise above white-owned growth rates when house price appreciation rates are positive and eventually match the growth rates of Asian-owned firms. We also find exit rate results similar to those from the firm-level analysis. Panel B of Figure 9 shows that there is little significant difference between white and Asian owned firms. However, black-owned firm have a higher risk of failure and are also more sensitive to changes in house prices. Table A-3 in the Appendix contains the regression coefficients and significance statistics from this analysis.

A second, and difficult to completely eliminate concern is that house price appreciation rates may be proxies for local consumer demand more than or in addition to measuring the availability of business capital. To address this concern we follow the literature (Milan and Sufi (2014), Adelino et al. (2015)) and divide our firms according to whether they are in tradable or non-tradable sectors using the definitions developed by Hlatchwayo and Spence (2014).[22] The intuition behind this approach is that firms in tradable sectors (e.g., manufacturing) are less vulnerable/reliant on local demand than are firms in non-tradable sectors - which are closely tied to local customers and much more sensitive to local demand shocks. Because firms in tradable

[21] We performed similar checks by owner sex and Hispanic origin alone and found similar results to those discussed.
[22] We also experimented with several permutations of the tradable sector to check for sensitivity. The results below use the following tradable sectors: Agriculture, Manufacturing, Mining, Transportation & Warehousing, Finance & Insurance, Information, Professional Services

sectors are less dependent on local demand, we would expect the results presented in Figure 6 to hold if the collateral channel is at play.

A representative example of these results for the tradable sectors is displayed in Figure 10, Panels A and B. Both panels closely replicate the patterns from the complete data from Figure 6. This result makes us more confident that we are observing the effect of house prices changes on firm employment growth and exit – rather than the effect of changes in local demand. Table A-4 in the Appendix contains the regression coefficients and significance statistics from this analysis.

D. Discussion

We are cautious not to over interpret these results. While we admit a better identification strategy is preferred in order to identify causal relationships, we are sympathetic to the collateral channel interpretation for a few reasons. First, our cell-based and tradable sectors sensitivity analyses show that our results are robust to those checks. Second, we included a rich set of controls that should absorb geographic, industry and temporal variation in demand conditions. Further, finding differential impacts for groups known to be more dependent on home equity (see Robb 2013, and Kleiner 2015) gives us some confidence that we are observing the collateral channel. Third, our core as well as sensitivity analysis results conform to several finding in the literature such as Adelino, Schoar, and Severino (2015) and Fort et al. (2013).

VI. Conclusions

Motivated by both the literature documenting the underperformance of minority-owned businesses as well as recent papers demonstrating that young and small businesses were disproportionately impacted during the Great Recession, we explore whether the rise and fall in home prices associated with the Great Recession had differential impacts on business performance across owner race, ethnicity and gender.

We find that, overall, employment growth is positively associated and firm exit negatively associated with changes in house prices at the MSA level – consistent with a collateral channel for small businesses. Most interestingly for the focus of our paper, we find that employment growth of minority-owned firms is more sensitive to changes in house prices

than their non-minority counterparts, particularly for black and Hispanic-owned firms. Our results from our logit and LPM estimations also show that the probability of exit of black and Hispanic-owned firms declines with more robust growth in house prices. By contrast, our findings on gender differences indicate that for both employment growth and exit rates, there is no difference in the sensitivity of female and male owned businesses to changes in house prices. However, we do find that businesses in the "equal" owner category are more sensitive. If this is the result of a collateral channel effect, this finding for the equal category may suggest interesting household impacts on business performance.

Taken as a whole, these results indicate that the collateral channel influence seems to play a larger role in the business outcomes of black and Hispanic-owned firms – whether it is because they are more dependent on housing equity and/or because they saw larger declines in the values of their homes during the downturn.

Our results are robust to two separate sensitivity analyses and are in line with other findings in the collateral channel literature. Nevertheless, we are cautious not to over interpret these findings, and recognize that our analysis is descriptive in nature and that further work is needed to make causal interpretations.

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Tables

Table 1: Summary Statistics of Business Owner & Firm Characteristics

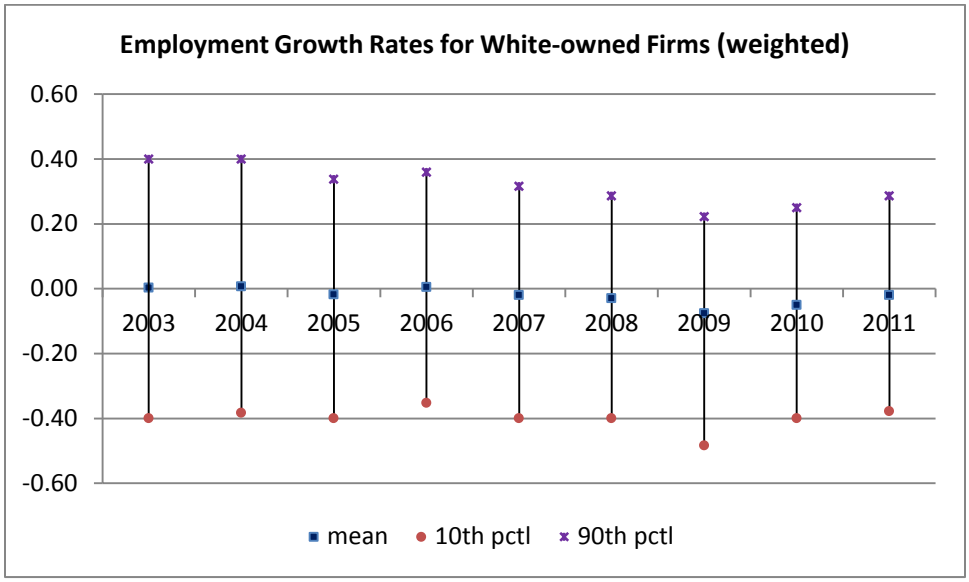
	2002 SBO Weighted	2007SBO Weighted	SBO-LBD Unweighted (as of 2002)	SBO-LBD Unweighted (as of 2007)
Hispanic Origin				
Non-Hispanic	96.4	94.6	95.8	94.9
Hispanic	3.6	4.6	3.4	4.0
Missing		0.9	0.8	1.1
Race				
White	91.4	89.5	90.2	88.9
Black	1.7	1.9	2.4	2.6
Asian	5.8	7.2	5.6	6.5
AIAN-NHPI/Other	0.5	0.5	0.5	0.5
Missing	0.5	0.9	1.4	1.5
Gender				
Female	16.8	16.7	15.5	15.8
Equal	13.4	19.7	13.1	16.2
Male	69.7	63.6	70.7	67.5
Missing	0.1		0.7	0.5
Owner's Age				
Below 25	0.2	0.2	0.2	0.1
25 to 54	45.1	41.3	43.3	40.0
55 plus	26.2	34.5	29.8	35.5
Missing	28.5	24.1	26.8	24.4
Education				
Some high school	2.9	1.9	2.2	2.0
High school grad	14.2	11.9	12.2	11.6
Some college	20.0	19.6	19.0	18.9
BA or BS	18.6	23.1	21.7	23.8
Post college	16.2	19.5	18.5	20.2
Missing	28.1	23.9	26.4	23.6
Firm Size (employees)				
0-9			66.9	66.1
10-49			24.6	24.6
50-249			7.3	7.9
>=250			1.2	1.4
Firm Age (years)				
0-4			36.8	22.4
5-9			19.4	24.0
>=10			43.9	53.6
Multi-owner firm			44.1	47.0
Multi-establishment firm			7.5	5.7
N (unweighted)	1,551,768	1,221,001	850,195	857,755

Sources: 2002/07 SBO and LBD.

Figures

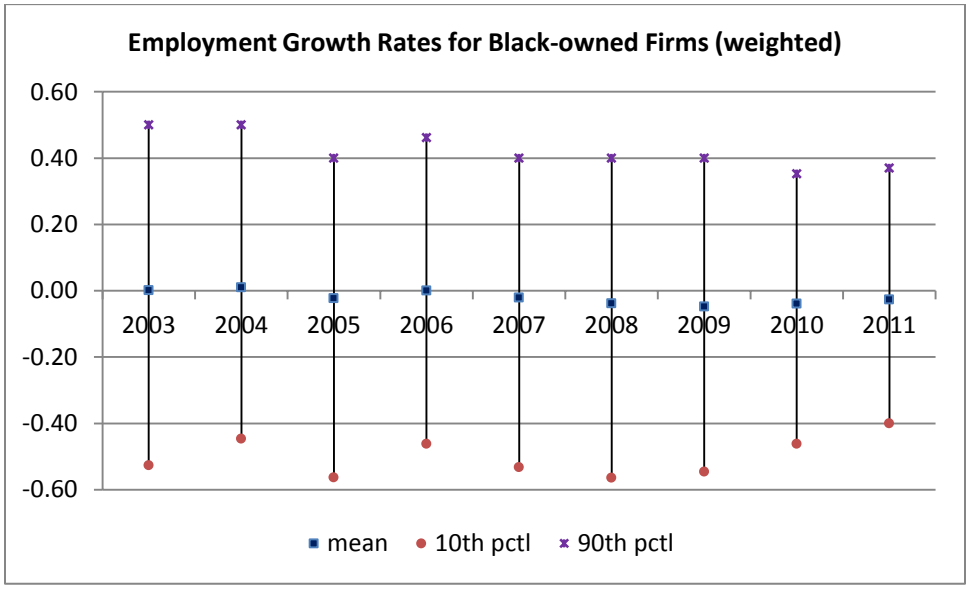
Figure 1. Mean, 10th and 90th Percentiles of Annual Employment Growth Rates by Owner's Race

Panel A



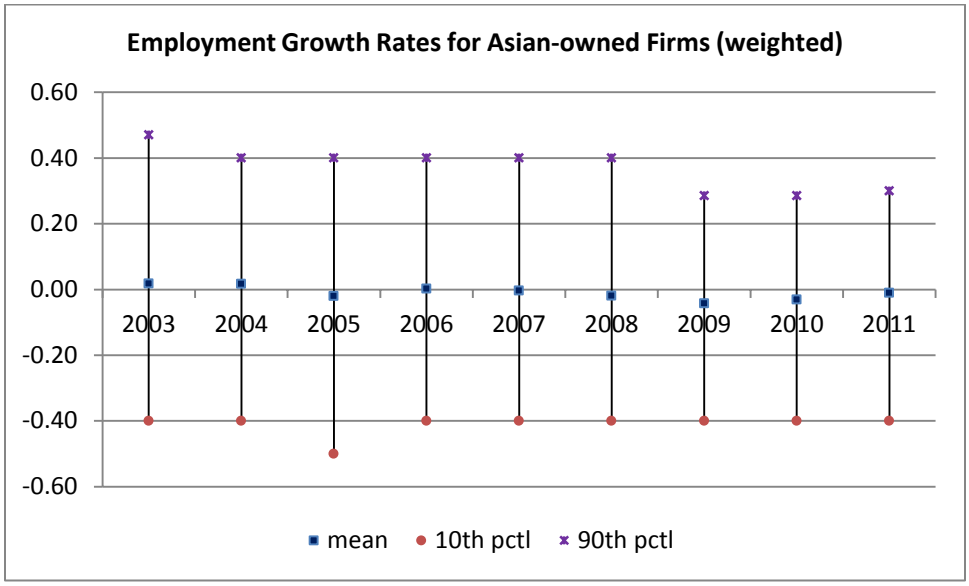
Notes: Sample includes continuing firms only. The weights are calculated using the LBD's sum of employment for firms in a given age category, where the firm age categories are 0, 1-4, 5-10 and 11+ years.

Panel B



Notes: Sample includes continuing firms only. The weights are calculated using the LBD's sum of employment for firms in a given age category, where the firm age categories are 0, 1-4, 5-10 and 11+ years.

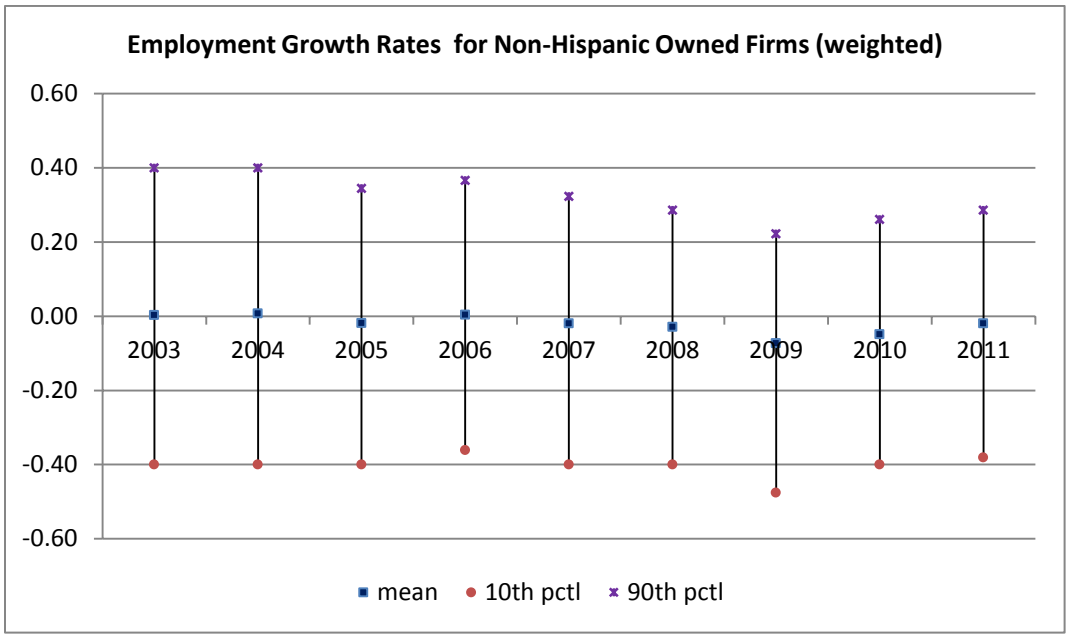
Panel C



Notes: Sample includes continuing firms only. The weights are calculated using the LBD's sum of employment for firms in a given age category, where the firm age categories are 0, 1-4, 5-10 and 11+ years.

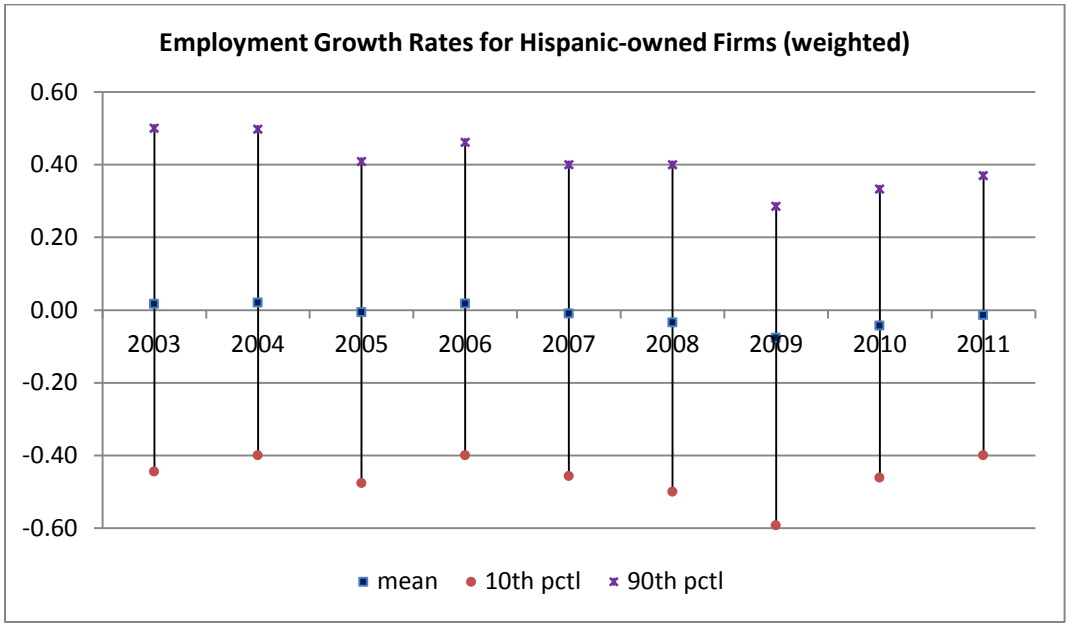
Figure 2. Mean, 10th and 90th Percentiles of Annual Employment Growth Rates by Owner's Hispanic Origin

Panel A



Notes: Sample includes continuing firms only. The weights are calculated using the LBD's sum of employment for firms in a given age category, where the firm age categories are 0, 1-4, 5-10 and 11+ years.

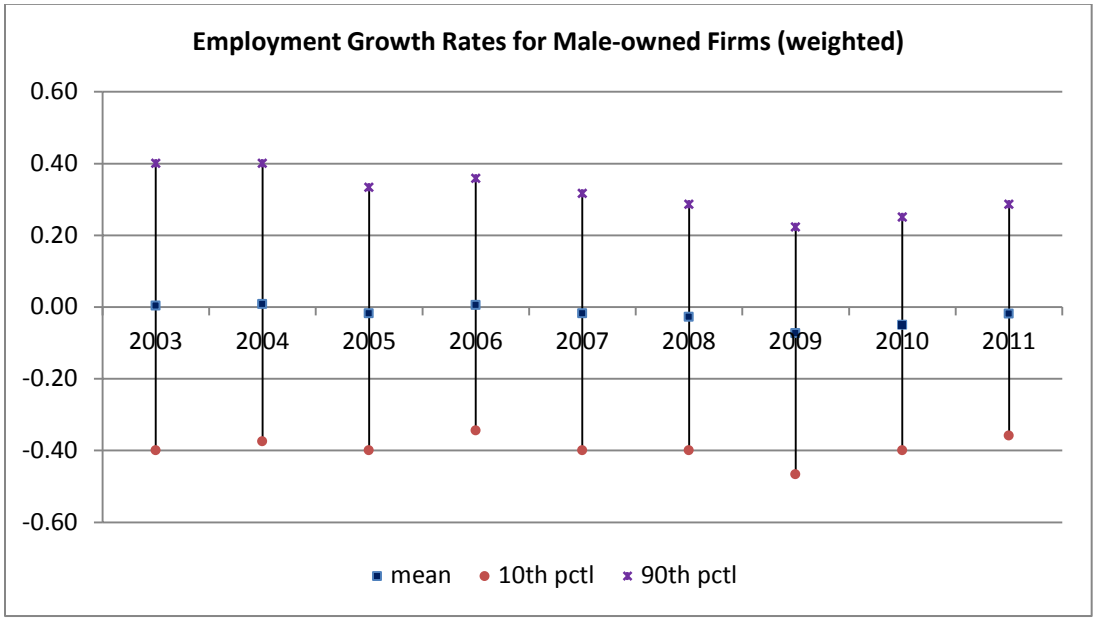
Panel B



Notes: Sample includes continuing firms only. The weights are calculated using the LBD's sum of employment for firms in a given age category, where the firm age categories are 0, 1-4, 5-10 and 11+ years.

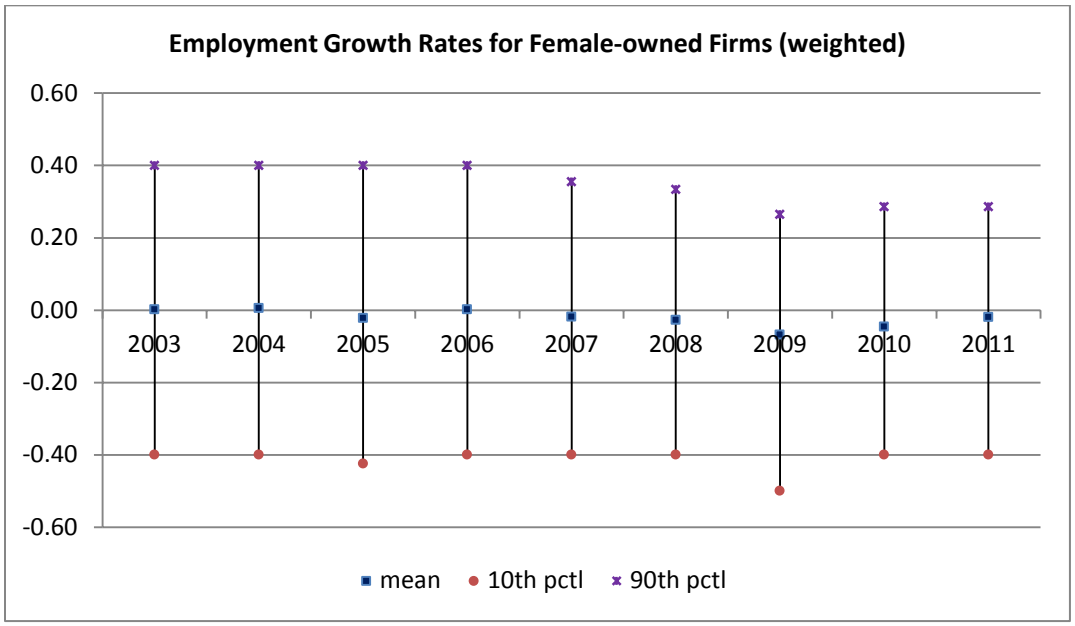
Figure 3. Mean, 10th and 90th Percentiles of Annual Employment Growth Rates by Owner's Gender

Panel A



Notes: Sample includes continuing firms only. The weights are calculated using the LBD's sum of employment for firms in a given age category, where the firm age categories are 0, 1-4, 5-10 and 11+ years.

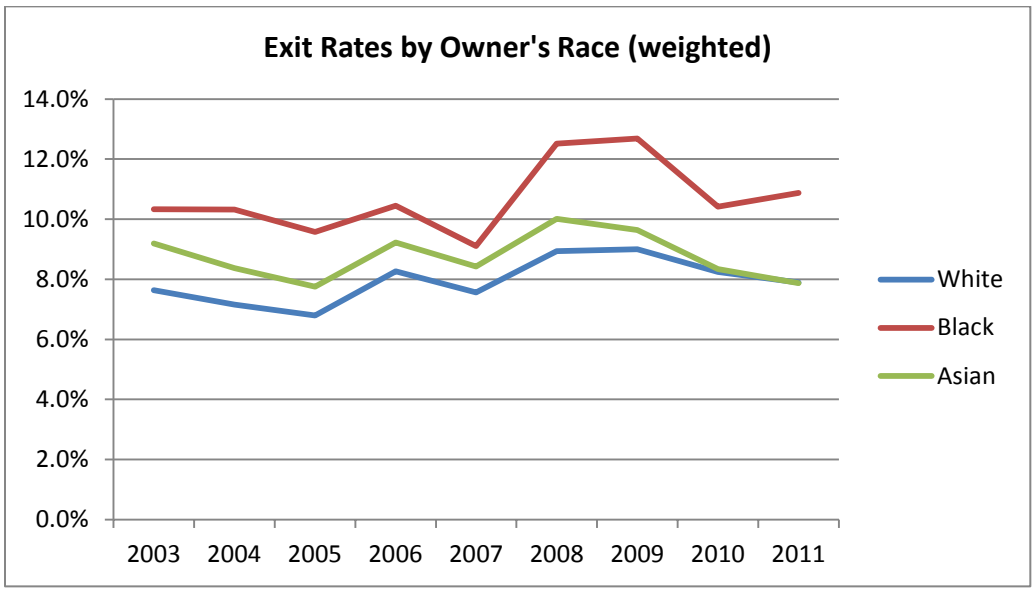
Panel B



Notes: Sample includes continuing firms only. The weights are calculated using the LBD's sum of employment for firms in a given age category, where the firm age categories are 0, 1-4, 5-10 and 11+ years.

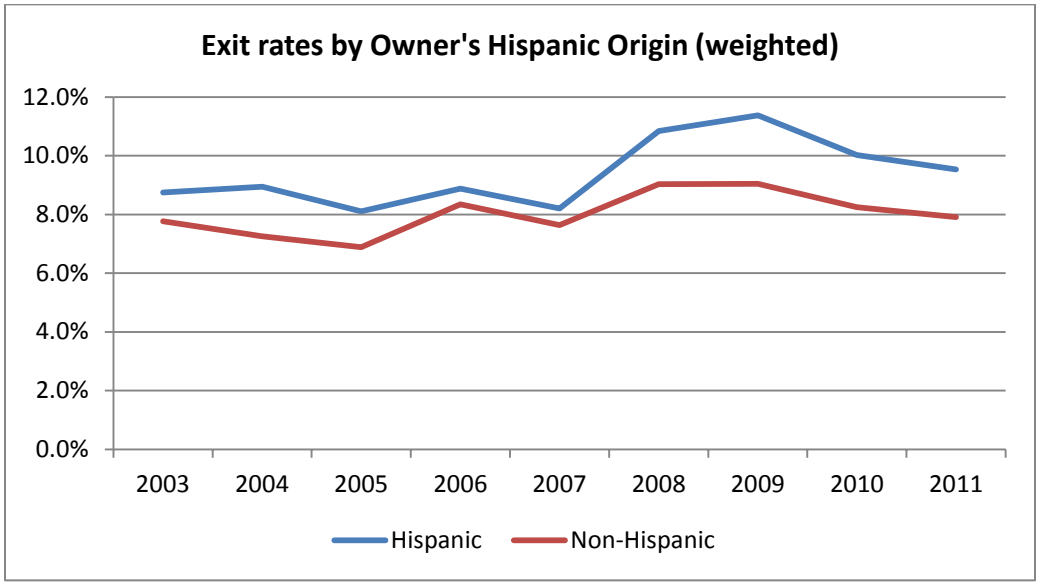
Figure 4. Firm Exit Rates by Owner's Demographic & Year

Panel A



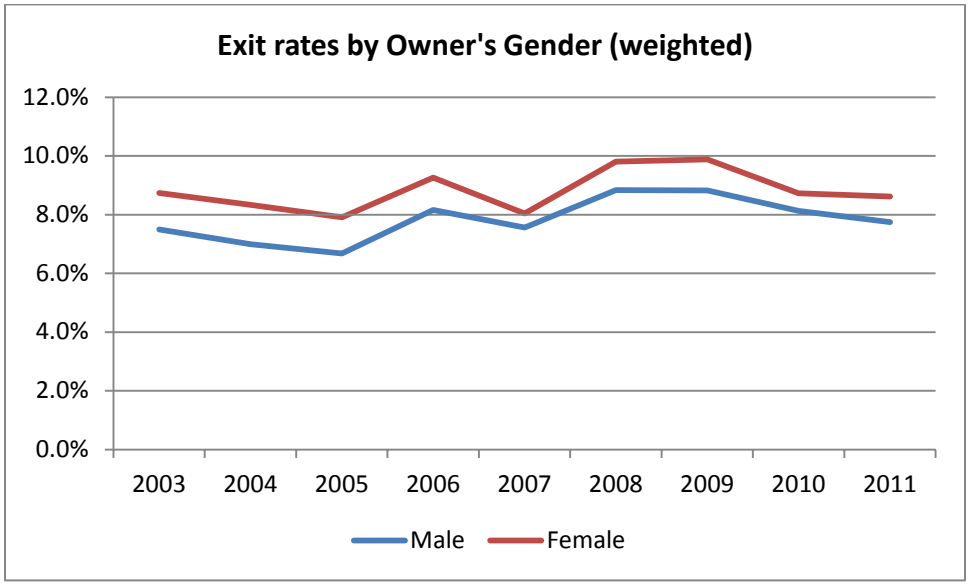
Notes: Sample excludes 2007 SBO firms from exit rate computations prior to 2008 as they bias exit rates downward because they survive at least through 2007 by definition. The weights are calculated using the LBD's sum of employment for firms in a given age category, where the firm age categories are 0, 1-4, 5-10 and 11+ years.

Panel B



Notes: Sample excludes 2007 SBO firms from exit rate computations prior to 2008 as they bias exit rates downward because they survive at least through 2007 by definition. The weights are calculated using the LBD's sum of employment for firms in a given age category, where the firm age categories are 0, 1-4, 5-10 and 11+ years.

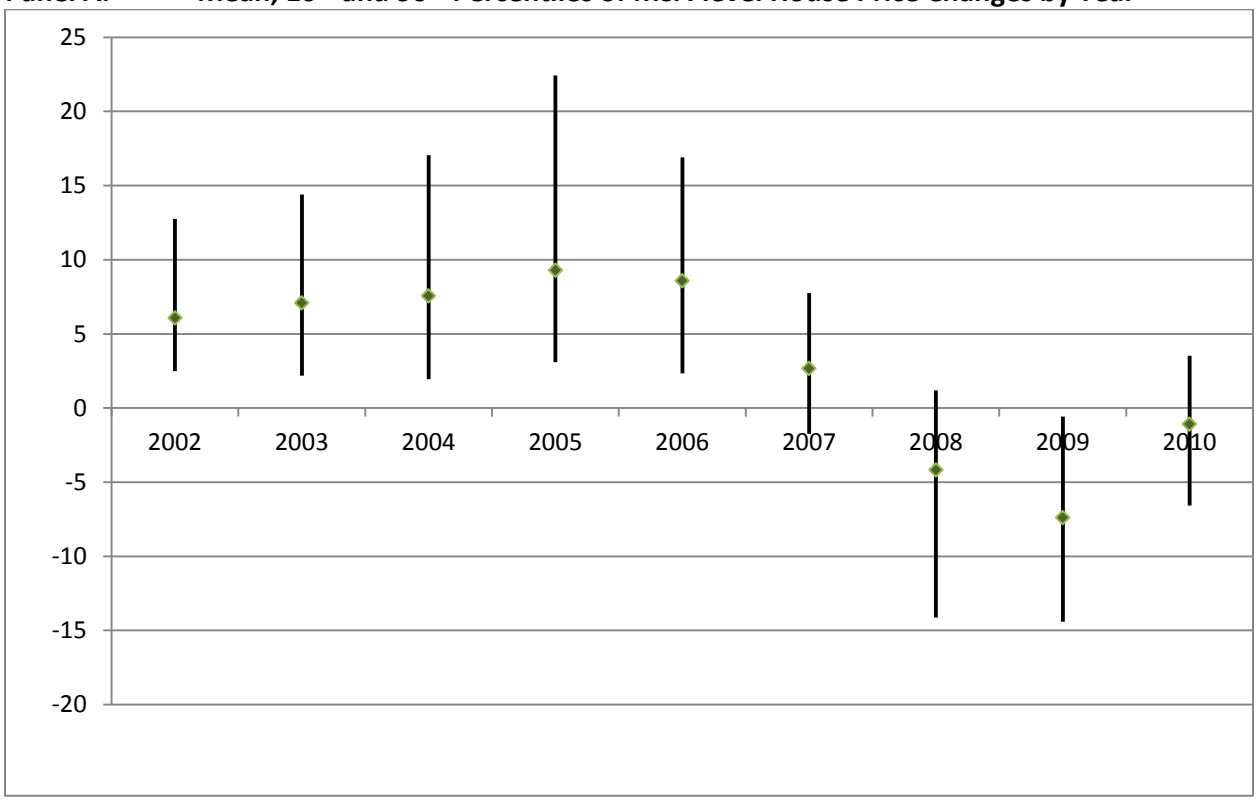
Panel C



Notes: Sample excludes 2007 SBO firms from exit rate computations prior to 2008 as they bias exit rates downward because they survive at least through 2007 by definition. The weights are calculated using the LBD's sum of employment for firms in a given age category, where the firm age categories are 0, 1-4, 5-10 and 11+ years.

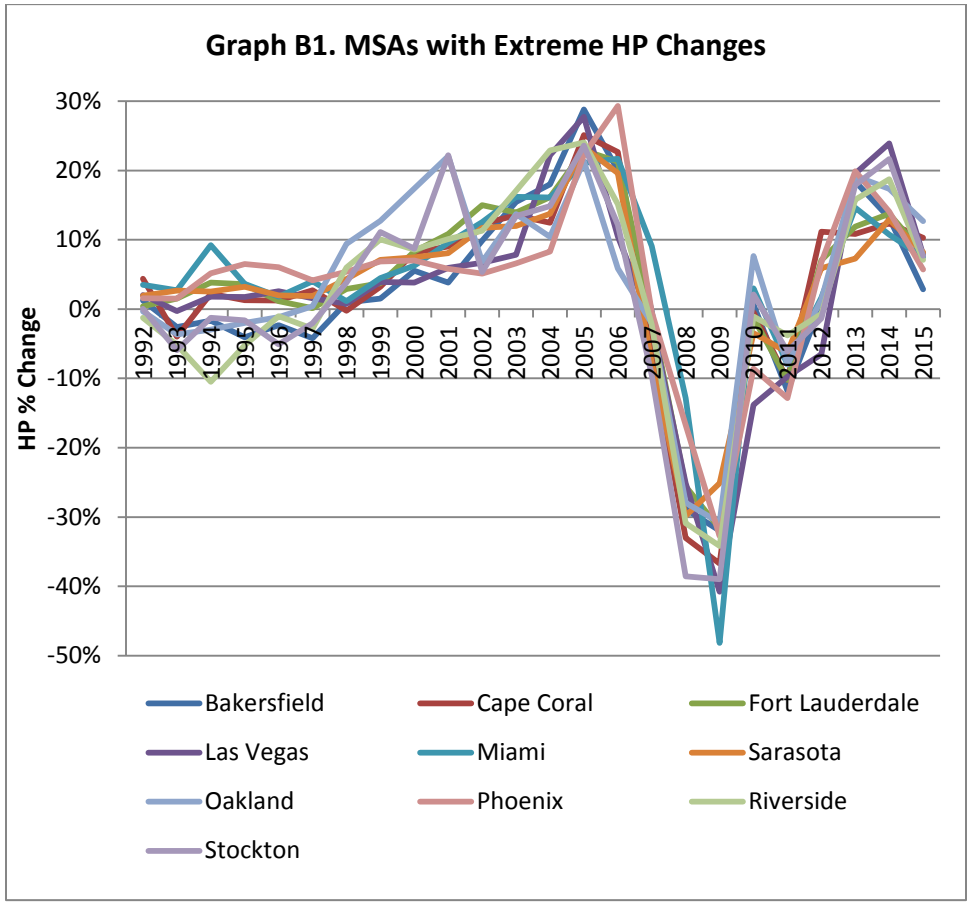
Figure 5. House Price and Employment Variation Across MSAs

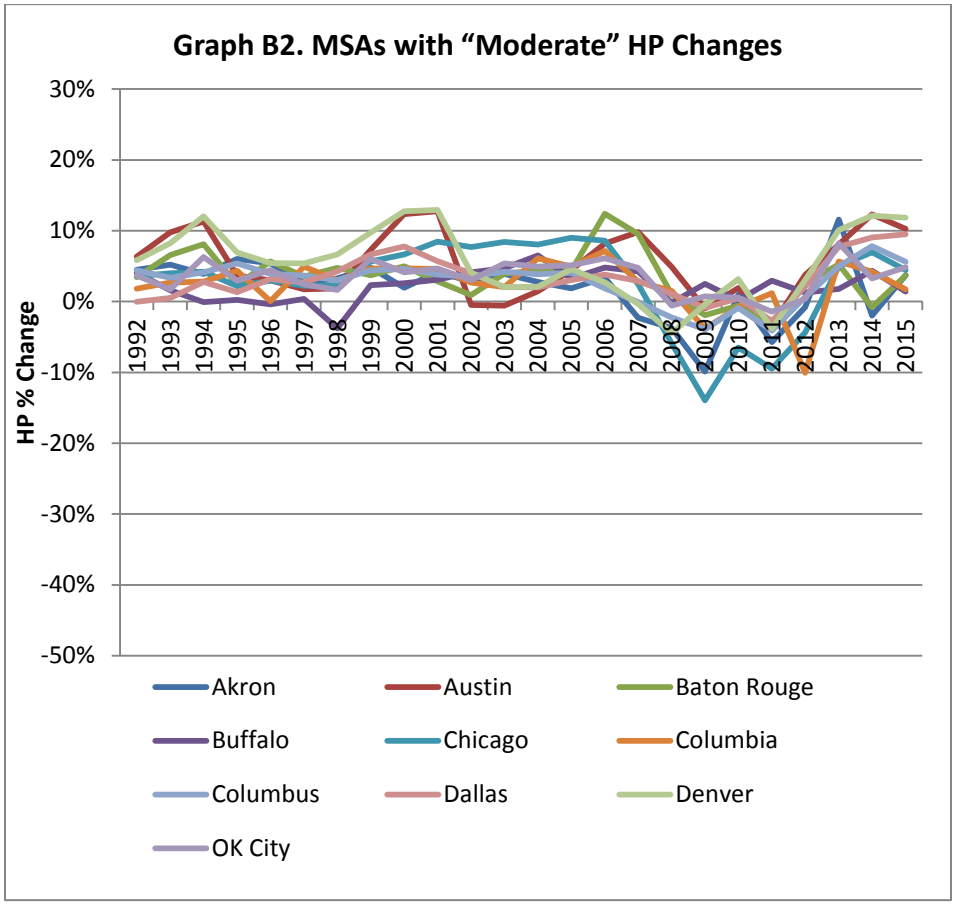
Panel A: Mean, 10th and 90th Percentiles of MSA-level House Price Changes by Year



Source: Federal Housing Finance Agency.

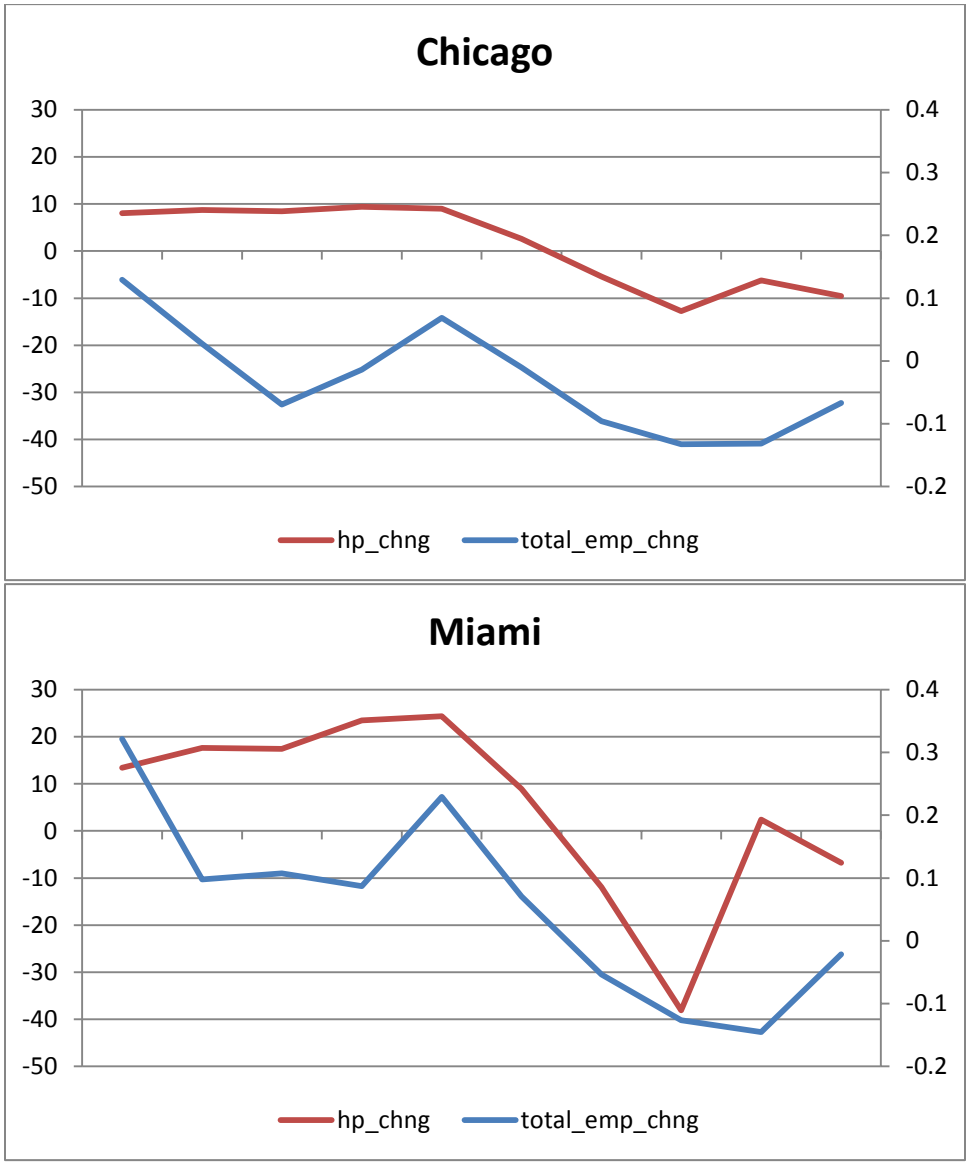
Panel B. Paths of Selected MSA House Price Changes – Within MSA Home Price Variation





Source: Federal Housing Finance Agency.

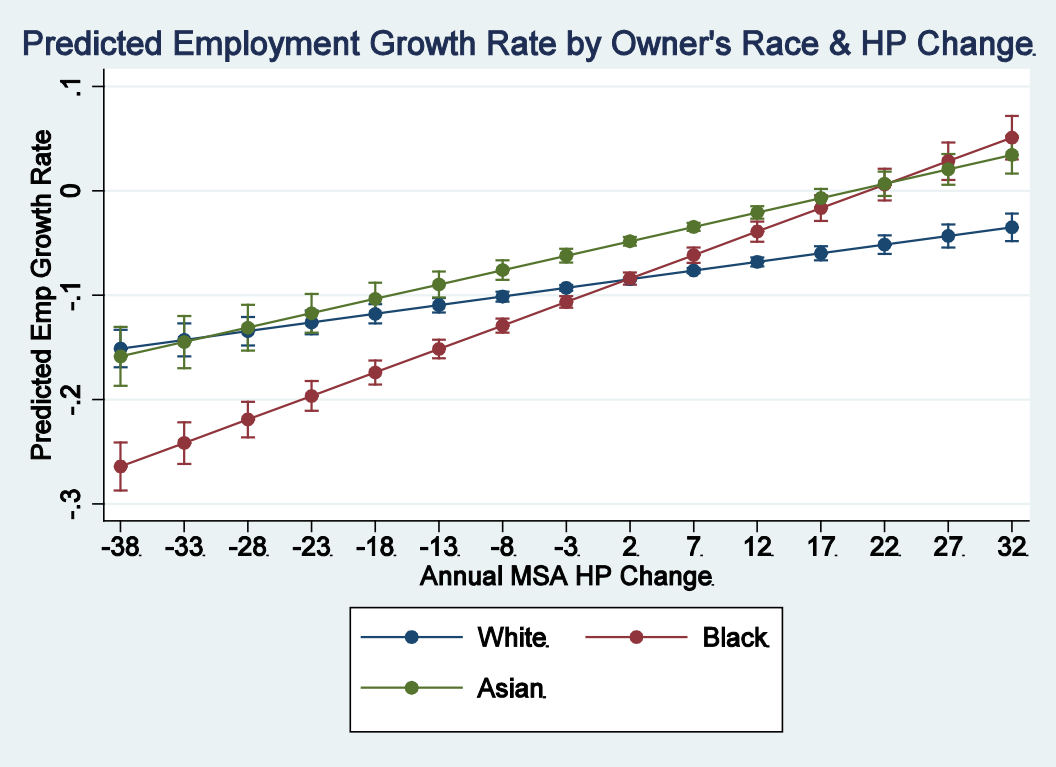
Panel C: Example Correlations of Employment and HP Growth Rates



Sources: MSA home prices from the Federal Housing Finance Agency and employment changes from own authors' calculations using the LBD.

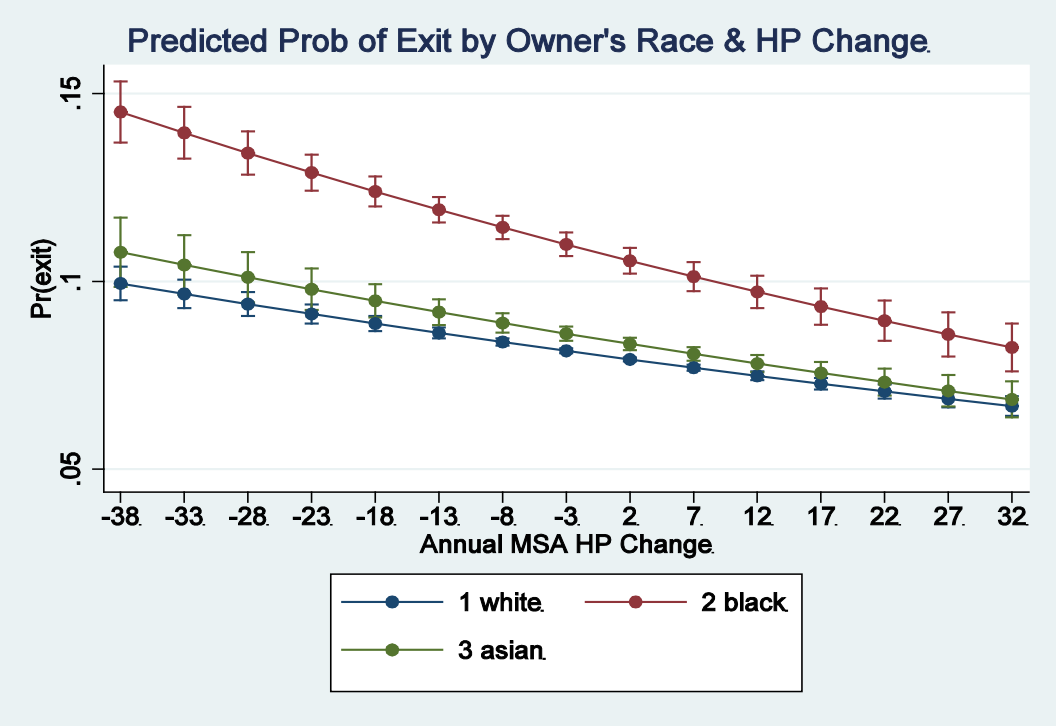
Figure 6. Employment Growth Rate Regression & Firm Exit Logit Results by Owner's Race

Panel A. Relationship between House Price Changes & Firm Employment Growth



Sources: 2002/07 SBO and LBD.
Notes: Standard errors are clustered at the MSA level. Ninety percent confidence intervals are shown.

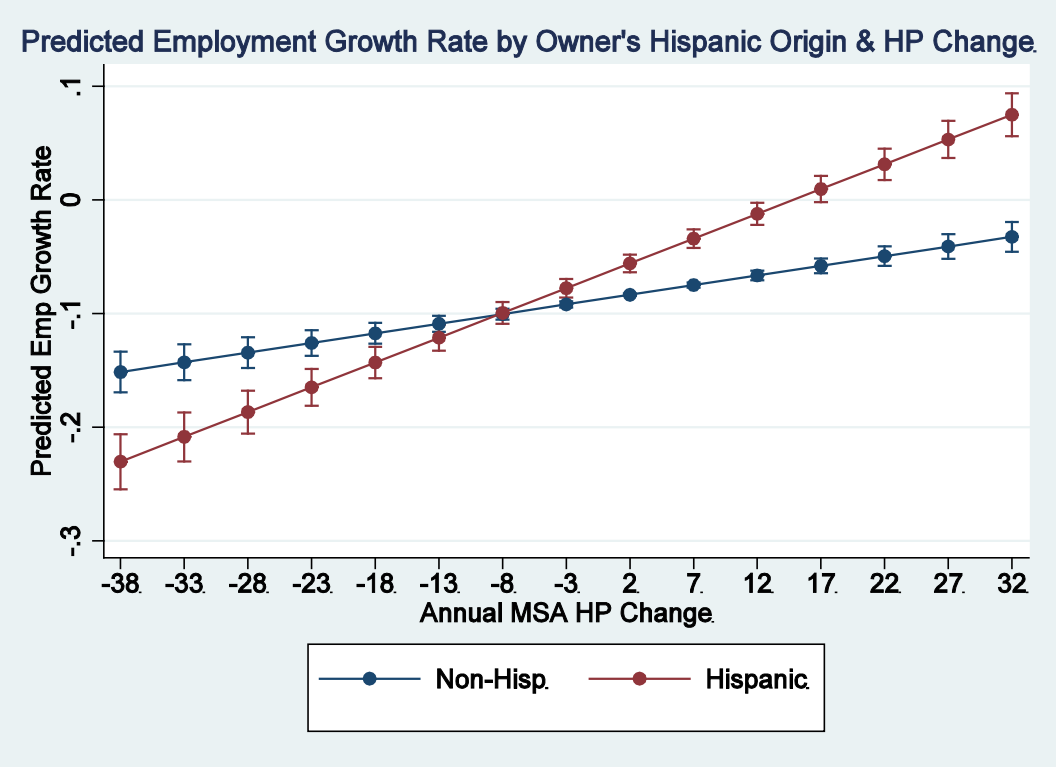
Panel B. Relationship between House Price Changes & Firm Exit



Sources: 2002/07 SBO and LBD. Notes: Standard errors are clustered at the MSA level. Ninety percent confidence intervals are shown.

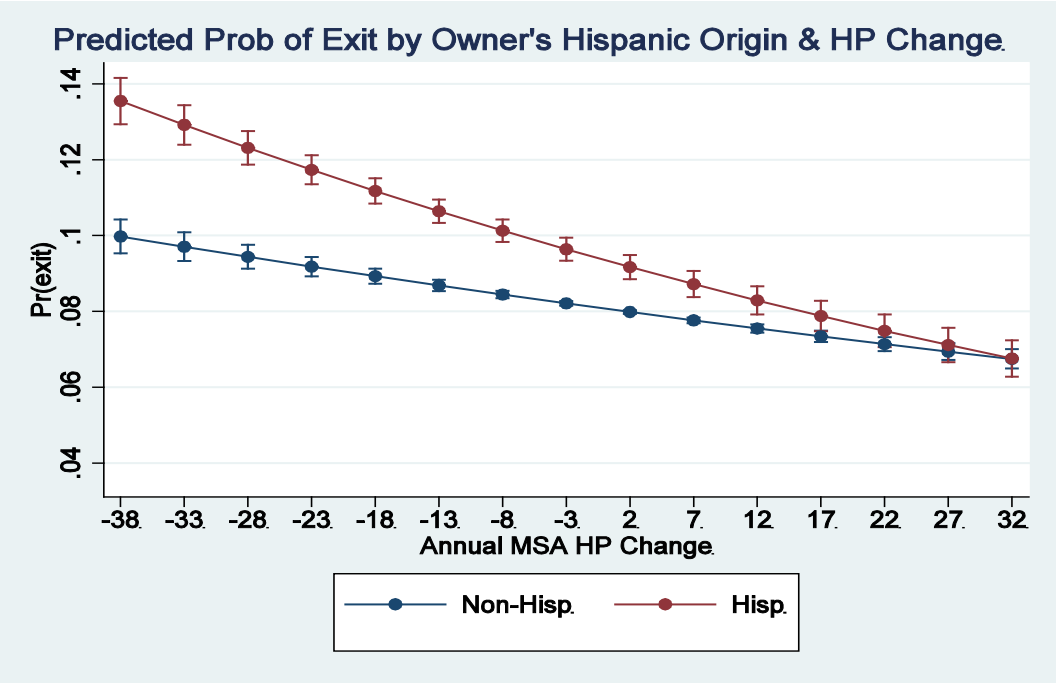
Figure 7. Employment Growth Rate Regression & Firm Exit Logit Results by Owner's Hispanic Origin

Panel A. Relationship between House Price Changes & Firm Employment Growth by Hispanic Origin



Sources: 2002/07 SBO and LBD. Notes: Standard errors are clustered at the MSA level. Ninety percent confidence intervals are shown.

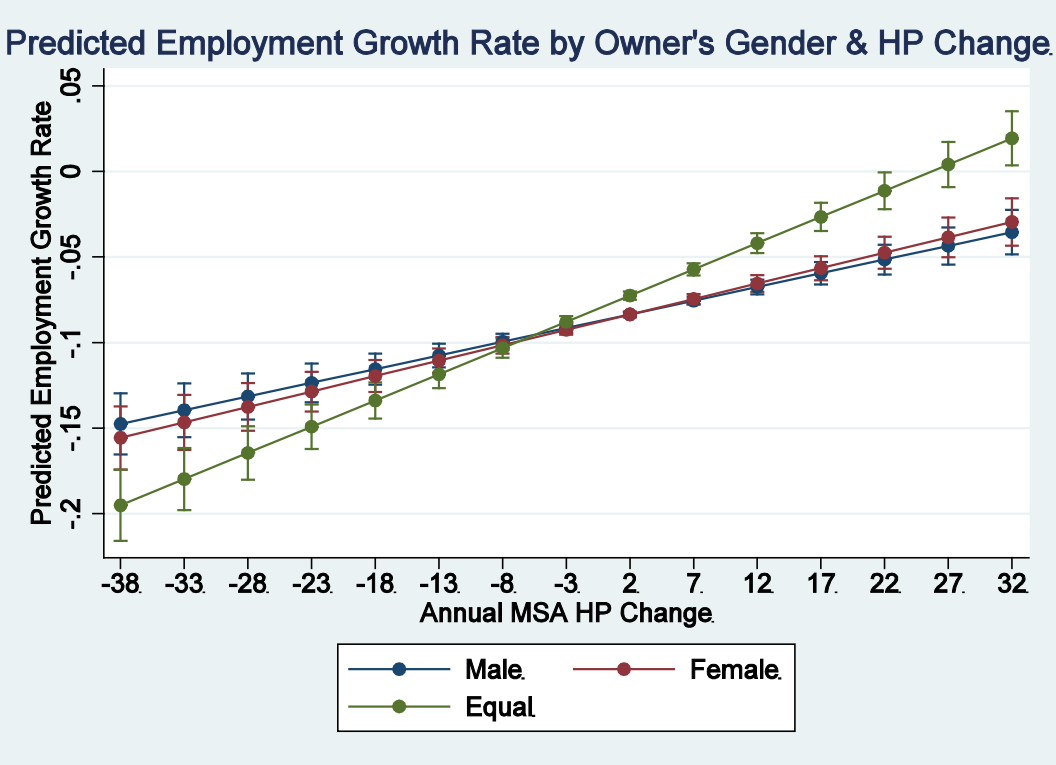
Panel B. Relationship between House Price Changes & Firm Exit by Hispanic Origin



Sources: 2002/07 SBO and LBD. Notes: Standard errors are clustered at the MSA level. Ninety percent confidence intervals are shown.

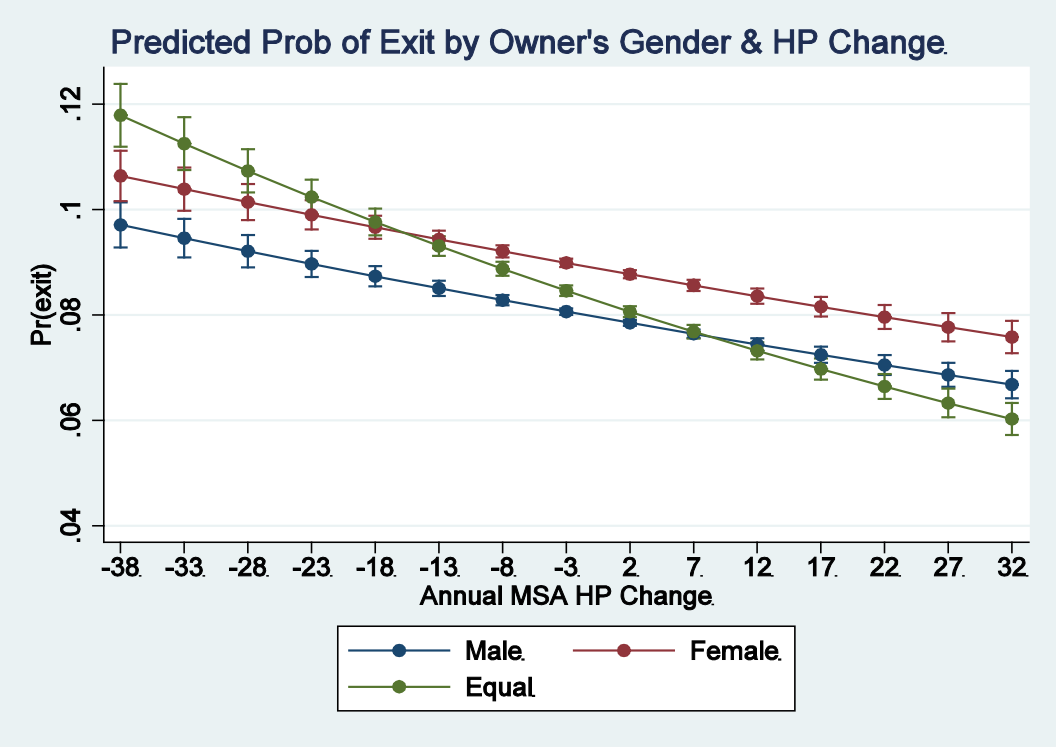
Figure 8. Employment Growth Rate Regression & Firm Exit Logit Results by Owner's Gender

Panel A. Relationship between House Price Changes & Firm Employment Growth by Gender



Sources: 2002/07 SBO and LBD. Notes: Standard errors are clustered at the MSA level. Ninety percent confidence intervals are shown.

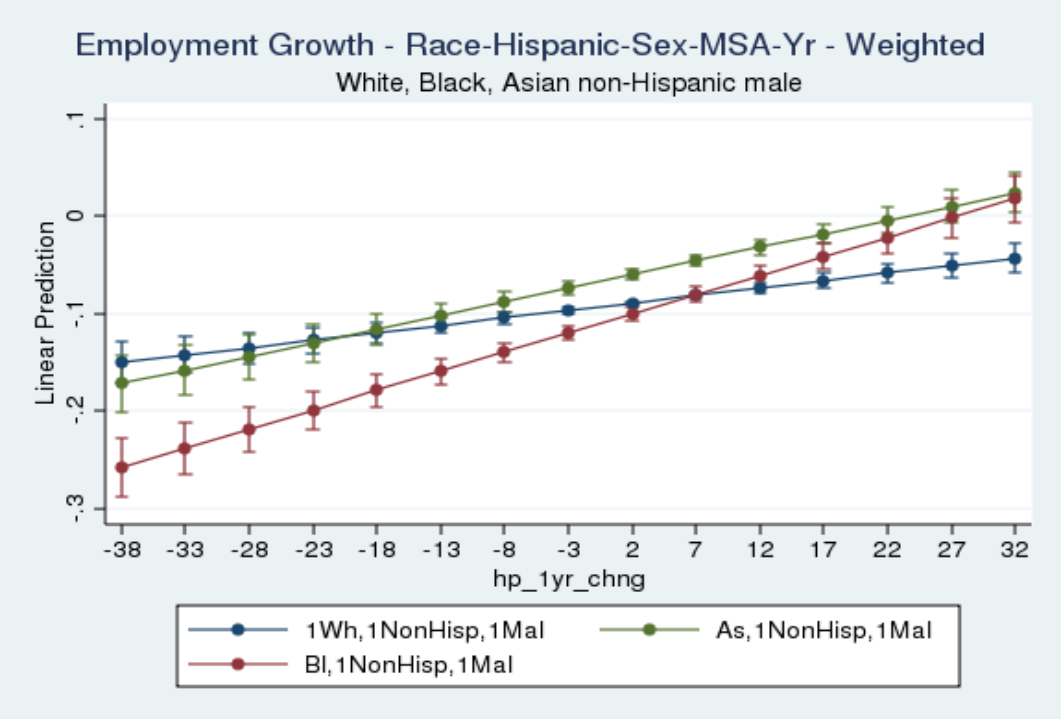
Panel B. Relationship between House Price Changes & Firm Exit by Gender



Sources: 2002/07 SBO and LBD. Notes: Standard errors are clustered at the MSA level. Ninety percent confidence intervals are shown.

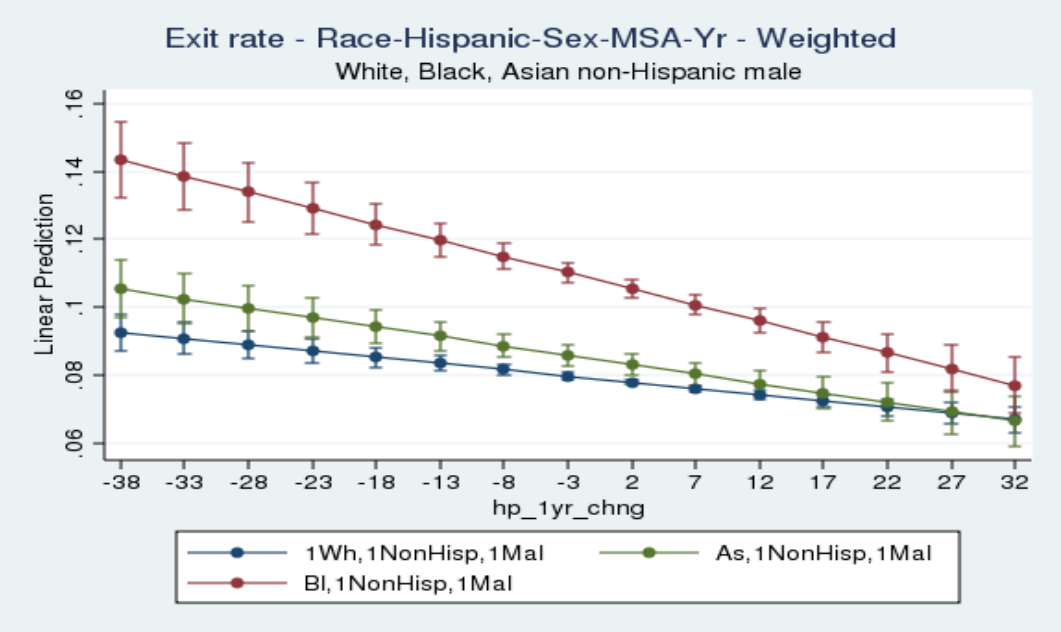
Figure 9. Employment Growth Rate Regression & Firm Exit Logit Results by Owner's Race

Panel A. Relationship between MSA House Price Changes & Cell-based Mean Employment Growth*



* Mean employment growth is calculated at the race- Hispanic origin-gender-MSA-year level. Weights are calculated using the cell's total employment. Ninety percent confidence intervals shown.

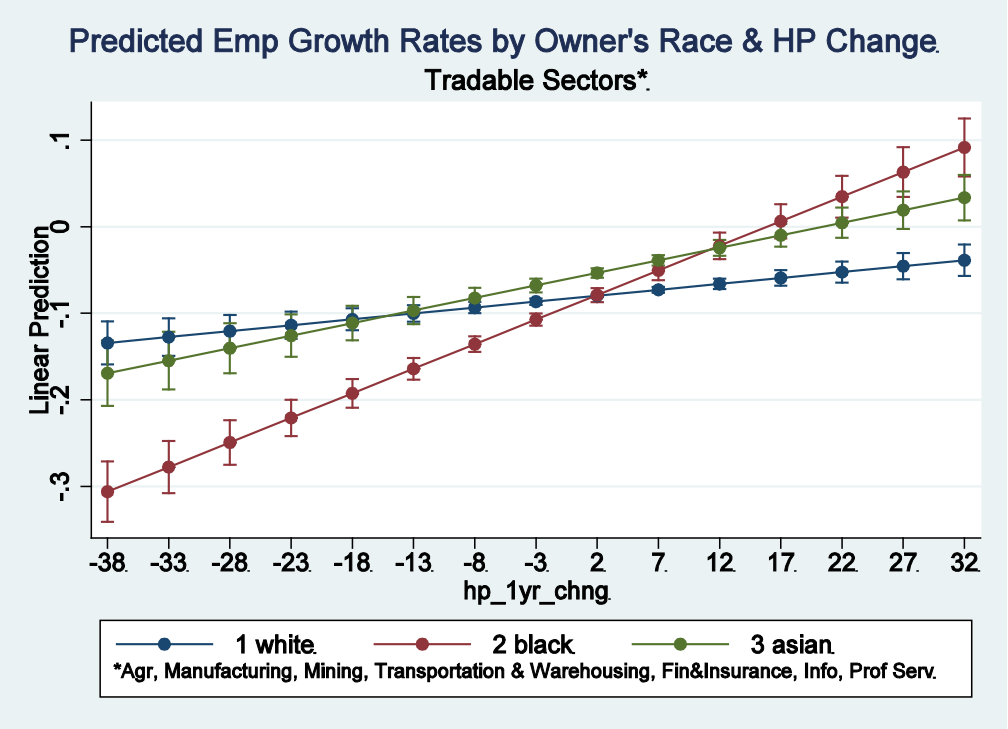
Panel B. Relationship between House Price Changes & Cell-based Exit Rate



* Cell exit rates or proportion of exits are calculated at the race- Hispanic origin-gender-MSA-year level. Weights are calculated using the cell's total employment. Ninety percent confidence intervals shown.

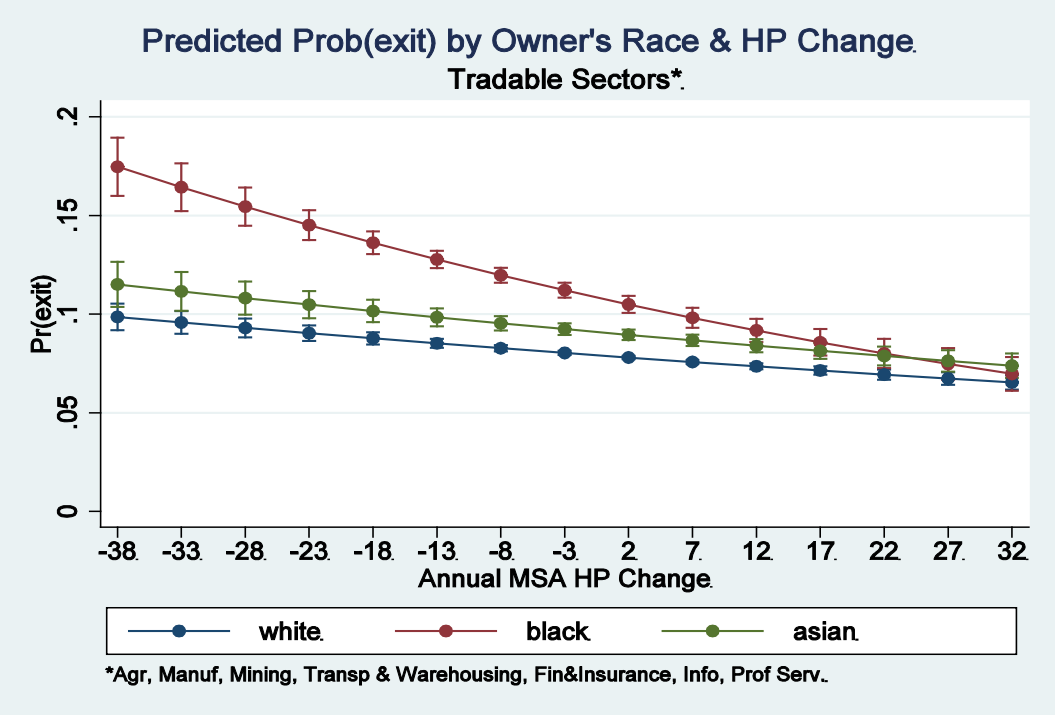
Figure 10. Tradable Sectors - Employment Growth Rate Regression & Firm Exit Logit Results by Owner's Race

Panel A. Relationship between House Price Changes & Firm Employment Growth



Sources: 2002/07 SBO and LBD. Notes: Standard errors are clustered at the MSA level. Ninety percent confidence intervals are shown.

Panel B. Relationship between House Price Changes & Firm Exit



Sources: 2002/07 SBO and LBD. Notes: Standard errors are clustered at the MSA level. Ninety percent confidence intervals are shown.

Appendix

Table A-1: Employment Growth Regression Results

	All Firms			
	Coefficient	Std. Err.	t	P>|t|
Annual MSA HP Change	0.001	0.0002	6.04	0.000
Hispanic Origin				
Non-Hispanic	0.000	(base)		
Hispanic	0.021	0.004	5.93	0.000
Missing	0.049	0.005	10.34	0.000
Hispanic*HP Change	0.003	0.0002	13.50	0.000
Missing*HP Change	0.006	0.0004	13.90	0.000
Race				
White	0.000	(base)		
Black	-0.010	0.003	-3.54	0.001
Asian	0.031	0.003	11.12	0.000
AIAN/NHPI	0.004	0.005	0.82	0.416
Missing	0.006	0.003	2.18	0.032
Black*HP Change	0.003	0.0002	12.05	0.000
Asian*HP Change	0.001	0.0003	4.12	0.000
AIAN/NHPI*HP Change	0.001	0.0004	3.33	0.001
Missing*HP Change	0.002	0.0003	8.36	0.000
Gender				
Male	0.000	(base)		
Female	-0.005	0.001	-6.70	0.000
Equal	0.009	0.001	8.10	0.000
Missing	-0.067	0.006	-11.24	0.000
Female*HP Change	0.000	0.0001	0.78	0.438
Equal*HP Change	0.001	0.0001	9.64	0.000
Missing*HP Change	-0.008	0.001	-13.52	0.000
Owner's Age				
25 to 54 yrs	0.000	(base)		
< 25 yrs	0.018	0.008	2.11	0.037
>= 55 yrs	-0.028	0.001	-37.48	0.000
Missing	-0.052	0.002	-30.74	0.000

Table A-1 (cont'd): Employment Growth Regression Results

	All Firms			
	Coefficient	Std. Err.	t	P>|t|
Owner's Education				
BA or BS	0.000	(base)		
Some High School	-0.039	0.003	-12.85	0.000
High School Grad	-0.021	0.002	-13.55	0.000
Some college	-0.015	0.001	-15.40	0.000
Post BA/BS	0.010	0.001	9.78	0.000
Missing	-0.053	0.002	-24.36	0.000
Multi-owner Firm	0.007	0.001	7.74	0.000
Multi-unit Firm	-0.088	0.001	-59.44	0.000
Firm Size (employees)				
0-9	0.000	(base)		
10-49	0.089	0.001	89.24	0.000
50-249	0.131	0.002	85.04	0.000
>=250	0.196	0.003	77.63	0.000
Firm Age				
>=10 yrs	0.000	(base)		
0-4 yrs	0.178	0.002	89.62	0.000
5-9 yrs	-0.028	0.001	-38.03	0.000
Unemployment Rate Change (cnty level)	0.000	0.002	0.02	0.987
N	7,119,270			
Adjusted R-squared	0.0339			

Sources: 2002 & 2007 SBO and LBD.

Table A-2: Probability of Exit Results - Logit & Linear Probability Estimates

	Logit				Linear Probability			
	Coefficient	Std. Err.	z	P>|z|	Coefficient	Std. Err.	t	P>|t|
Annual MSA HP Change	-0.006	0.001	-8.11	0.00	-0.0004	0.0001	-6.76	0.00
Hispanic Origin								
Non-Hispanic	0	(base)			0	(base)		
Hispanic	-0.063	0.016	-3.83	0.00	-0.003	0.001	-2.10	0.04
Missing	-0.235	0.024	-9.69	0.00	-0.012	0.002	-7.20	0.00
Hispanic*HP Change	-0.005	0.001	-9.67	0.00	-0.001	0.00005	-12.46	0.00
Missing*HP Change	-0.018	0.001	-12.36	0.00	-0.001	0.00011	-9.99	0.00
Race								
White	0.000	(base)			0.000	(base)		
Black	0.157	0.018	8.57	0.00	0.015	0.001	10.34	0.00
Asian	-0.113	0.012	-9.47	0.00	-0.009	0.001	-9.05	0.00
AIAN-NHPI	0.059	0.025	2.38	0.02	0.005	0.002	2.35	0.02
Missing	-0.003	0.013	-0.27	0.79	0.001	0.001	0.89	0.37
Black*HP Change	-0.003	0.001	-3.32	0.00	-0.001	0.0001	-8.41	0.00
Asian*HP Change	-0.001	0.001	-0.95	0.34	-0.0001	0.0001	-1.53	0.13
AIAN/NHPI*HP Change	-0.001	0.002	-0.45	0.65	-0.0003	0.0002	-1.69	0.09
Missing*HP Change	-0.003	0.001	-2.40	0.02	-0.0003	0.0001	-3.42	0.00
Gender								
Male	0.000	(base)			0.000	(base)		
Female	0.051	0.004	12.04	0.00	0.004	0.0003	11.07	0.00
Equal (male-female)	0.027	0.007	4.02	0.00	0.001	0.0005	2.97	0.00
Missing	0.343	0.031	11.06	0.00	0.018	0.0022	7.85	0.00
Female*HP Change	0.001	0.000	1.88	0.06	-0.0001	0.0000	-2.30	0.02
Equal*HP Change	-0.004	0.000	-9.15	0.00	-0.0004	0.0000	-10.35	0.00
Missing*HP Change	0.013	0.002	6.15	0.00	0.001	0.0002	7.29	0.00
Owner's Age								
25 to 54 yrs	0.000	(base)			0.000	(base)		
< 25 yrs	0.127	0.036	3.59	0.00	0.012	0.003	3.56	0.00
>= 55 yrs	0.087	0.006	14.33	0.00	0.007	0.000	17.95	0.00
Missing	0.298	0.009	31.79	0.00	0.025	0.001	37.57	0.00

Table A-2 (cont'd): Probability of Exit Results - Logit & Linear Probability Estimates

	Logit				Linear Probability			
	Coefficient	Std. Err.	z	P>|z|	Coefficient	Std. Err.	t	P>|t|
Owner's Education								
BA or BS	0.000	(base)			0.000	(base)		
Some High School	0.244	0.013	19.12	0.00	0.016	0.001	16.79	0.00
High School Graduate	0.106	0.007	15.36	0.00	0.006	0.0005	12.52	0.00
Some college	0.081	0.005	15.22	0.00	0.004	0.0004	12.04	0.00
Post BA/BS	-0.080	0.007	-11.43	0.00	-0.004	0.0004	-9.84	0.00
Missing	0.337	0.010	33.18	0.00	0.027	0.001	31.62	0.00
Firm Size (employees)								
0-9	0.000	(base)			0.000	(base)		
10-49	-0.772	0.009	-83.28	0.00	-0.047	0.0004	-108.49	0.00
50-249	-0.767	0.015	-52.75	0.00	-0.047	0.001	-61.12	0.00
>=250	-1.048	0.027	-39.38	0.00	-0.062	0.001	-52.52	0.00
Firm Age								
>=10 yrs	0.000	(base)			0.000	(base)		
0-4 yrs	0.745	0.008	97.54	0.00	0.059	0.001	77.90	0.00
5-9 yrs	0.362	0.005	67.76	0.00	0.025	0.0004	60.82	0.00
Multi-owner Firm	-0.125	0.005	-25.41	0.00	-0.008	0.0003	-26.03	0.00
Multi-unit Firm	0.458	0.013	35.53	0.00	0.026	0.001	39.48	0.00
Unemployment Rate Change (cnty level)	-0.026	0.008	-3.43	0.00	-0.002	0.001	-2.71	0.01
N	7,119,270				7,119,270			
Pseudo Rsq/Adj Rsq	0.0555				0.03080			

Sources: 2002 & 2007 SBO and LBD.

Notes: Estimation includes controls for industry, year, state and state-year interactions. Estimates on the AIAN/NHPI race category are not reliable due to small cell size.

Table A-3: Cell-based Employment Growth and Exit Rates Regression Results

Dependent variable	Mean Employment Growth				Mean Exit Rate			
	Coefficient	Std. Err.	t	P>|t|	Coefficient	Std. Err.	t	P>|t|
Annual MSA HP Chng	0.002	0.0003	6.05	0.000	-0.0004	0.0001	-6.01	0.000
Cells								
Wh,NonHisp,Mal	(base)							
Wh,NonHisp,Equ	0.004	0.001	2.69	0.008	0.004	0.000	8.52	0.000
Wh,NonHisp,Fem	-0.005	0.001	-4.41	0.000	0.008	0.000	17.12	0.000
Wh,Hisp,Mal	0.017	0.004	4.66	0.000	0.013	0.001	8.95	0.000
Wh,Hisp,Equ	0.043	0.007	6.52	0.000	0.008	0.002	3.25	0.002
Wh,Hisp,Fem	0.022	0.005	4.08	0.000	0.016	0.002	7.27	0.000
As,NonHisp,Mal	0.033	0.003	11.62	0.000	0.005	0.001	3.31	0.001
As,NonHisp,Equ	0.052	0.004	13.68	0.000	-0.003	0.002	-1.97	0.051
As,NonHisp,Fem	0.042	0.004	10.59	0.000	0.010	0.002	6.42	0.000
As,Hisp,Mal	0.019	0.019	0.98	0.331	0.013	0.005	2.64	0.010
As,Hisp,Equ	-0.270	0.007	-36.94	0.000	0.135	0.001	114.65	0.000
As,Hisp,Fem	0.019	0.016	1.23	0.222	0.020	0.004	4.88	0.000
Bl,NonHisp,Mal	-0.014	0.004	-3.87	0.000	0.029	0.001	21.61	0.000
Bl,NonHisp,Equ	0.014	0.008	1.73	0.086	0.024	0.005	4.91	0.000
Bl,NonHisp,Fem	0.001	0.007	0.15	0.880	0.034	0.002	13.77	0.000
Bl,Hisp,Mal	0.069	0.007	10.19	0.000	0.009	0.003	3.13	0.002
Bl,Hisp,Equ	0.081	0.006	12.96	0.000	-0.011	0.003	-3.5	0.001
Bl,Hisp,Fem	0.059	0.013	4.55	0.000	0.030	0.012	2.42	0.017
Cell* Annual MSA HP Chng								
Wh,NonHisp,Equ	0.001	0.000	8.76	0.000	0.000	0.000	-9.02	0.000
Wh,NonHisp,Fem	0.000	0.000	0.74	0.464	0.000	0.000	-0.62	0.536
Wh,Hisp,Mal	0.003	0.000	10.46	0.000	-0.001	0.000	-9.07	0.000
Wh,Hisp,Equ	0.004	0.000	11.36	0.000	-0.001	0.000	-8.17	0.000
Wh,Hisp,Fem	0.003	0.000	6.6	0.000	-0.001	0.000	-4.54	0.000
As,NonHisp,Mal	0.001	0.000	4.17	0.000	0.000	0.000	-1.98	0.050
As,NonHisp,Equ	0.002	0.000	5.7	0.000	0.000	0.000	-3.45	0.001
As,NonHisp,Fem	0.002	0.000	5.44	0.000	0.000	0.000	-3.31	0.001
As,Hisp,Mal	0.005	0.001	7.31	0.000	-0.001	0.000	-3.64	0.000
As,Hisp,Fem	-0.001	0.001	-1.25	0.214	-0.001	0.000	-7.49	0.000
Bl,NonHisp,Mal	0.002	0.000	8.42	0.000	-0.001	0.000	-4.7	0.000
Bl,NonHisp,Equ	0.004	0.001	6.02	0.000	-0.001	0.000	-3.28	0.001
Bl,NonHisp,Fem	0.003	0.000	9.64	0.000	0.000	0.000	-2.71	0.008
Bl,Hisp,Mal	0.006	0.003	1.83	0.070	-0.001	0.000	-3.41	0.001
Bl,Hisp,Equ	0.015	0.000	56.8	0.000	-0.003	0.000	-44.26	0.000
Bl,Hisp,Fem	0.007	0.003	1.92	0.057	-0.002	0.001	-2.94	0.004

Sources: 2002 & 2007 SBO and LBD.

Table A-4: Employment Growth and Exit Probability Regression Results for Tradable Sectors*

Dependent Variable	Employment Growth				Exit			
	Coeff	Clustered SE**	t	P>|t|	Coeff	Clustered SE**	t	P>|t|
Annual MSA HP Change	0.0009	0.0003	3.24	0.002	-0.006	0.001	-5.56	0.000
Hispanic Origin								
Non-Hispanic	(base)				(base)			
Hispanic	0.018	0.004	4.46	0.000	-0.046	0.021	-2.14	0.032
Hispanic*HP Change	0.003	0.000	10.89	0.000	-0.005	0.001	-7.11	0.000
Race								
White	(base)				(base)			
Black	-0.009	0.004	-2.41	0.018	0.101	0.023	4.39	0.000
Asian	0.015	0.003	5.69	0.000	-0.009	0.016	-0.55	0.582
Black*HP Change	0.004	0.000	13.01	0.000	-0.009	0.001	-6.41	0.000
Asian*HP Change	0.002	0.000	4.66	0.000	-0.001	0.001	-0.73	0.467
Gender								
Male	(base)				(base)			
Female	-0.003	0.001	-2.43	0.017	0.047	0.008	5.91	0.000
Equal	0.01	0.002	6.23	0.000	0.033	0.011	2.99	0.003
Female*HP Change	0.001	0.000	3.38	0.001	-0.001	0.001	-1.90	0.058
Equal*HP Change	0.002	0.000	9.15	0.000	-0.005	0.001	-6.14	0.000
N		2,395,977				2,395,977		
Adj-Rsq/Pseudo R-sq		0.033				0.0519		

* Tradable Sectors: Agriculture, Manufacturing, Mining, Transportation & Warehousing, Finance&Insurance, Information, Professional Services.

** SE clustered at the MSA level.

Sources: 2002 & 2007 SBO and LBD.
Note: Regressions include controls for business owner education and age, whether the firm has multiple owners or is a multiunit, county-level unemployment change, state fixed effects, year dummies , and state-year interaction effects.