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THE EFFECT OF IMMIGRATION ON NATIVE SELF-EMPLOYMENT

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ABSTRACT

A rapidly growing literature examines the impact of immigrants on the labor market outcomes of native-born Americans. However, the impact of immigration on natives in self-employment has not been examined, despite the over-representation of immigrants in that sector. We first present a new general equilibrium model of self-employment and wage/salary work. For a range of plausible parameter values, the model predicts small negative effects of immigration on native self-employment rates and earnings. Using 1980 and 1990 Census microdata, we then examine the relationship between changes in immigration and native self-employment rates and earnings across 132 of the largest metropolitan areas in the United States. We find evidence supporting the hypothesis that self-employed immigrants displace self-employed natives. The effects are much larger than those predicted by simulations of the theoretical model. Immigrants, however, do not have a negative effect on native self-employment earnings. Our findings are similar if we weight immigration rates by the propensity of immigrant groups to be self-employed or if we try alternative estimation techniques and specifications.

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1. Introduction

From 1981 to 1996, over 12.5 million immigrants were legally admitted to the United States (Immigration and Naturalization Service 1997). Additionally, from 4.6 to 5.4 million undocumented immigrants are estimated to have resided in the United States in October 1996 (INS 1997). A rapidly growing literature examines the impact of these immigrants on the labor market outcomes of native-born Americans.[1] Most previous studies focus on the effects of immigration on the wages and employment of less-skilled native-born workers. However, the impact of immigration on native self-employment -- another segment of the labor force that contains a disproportionate number of immigrants -- has not been examined.[2] We address this gap in the literature by exploring whether self-employed immigrants displace self-employed natives and depress their earnings.

An analysis of the effects of immigration on the self-employment prospects of native-born Americans is important for several reasons. First, immigrants may limit the opportunities for disadvantaged native ethnic groups to use business ownership as a route of economic advancement.[3] Overall, a high self-employment rate for an ethnic or racial group is strongly associated with a high average income for that group[4], and, despite likely underreporting, the self-employed earn more on average than wage and salary workers. Self-employment is also

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[1]See Borjas (1994) and Friedberg and Hunt (1995) for reviews of this literature.

[2]1990 Census microdata indicate that immigrant self-employment rates are 23 percent higher than native rates in the United States. For further evidence of higher immigrant self-employment rates see Borjas (1986), Yuengert (1995) and Fairlie and Meyer (1996).

[3]Glazer and Moynihan (1970, p. 36) argue that "business is in America the most effective form of social mobility for those who meet prejudice."

[4]See Section VI of Fairlie and Meyer (1996).

viewed as a potential route out of poverty. It is currently being promoted by many states and the

federal government as a way to leave the welfare and unemployment insurance rolls.[5] Third,

ethnic and racial business ownership patterns contribute to tensions between groups.[6] Fourth, it

has been argued that political influence comes with small business success.[7] Finally, an

examination of the impact of immigration on native self-employment is of interest for the same

reasons we are interested in the impact of immigration on the wages and employment of native-

born wage and salary workers. The extent to which immigrants displace native workers from

their jobs and bid down their wages determines one of the main costs of immigration and affects

political support for U.S. immigration policies.

In previous work (Fairlie and Meyer 1998), we estimate the effect of immigration on the

self-employment prospects of native-born blacks. We generally find that immigration has no

effect or only a small negative but statistically insignificant effect on black self-employment.

This finding, however, does not rule out the possibility that there is a large negative effect on the

self-employment prospects of native nonblacks. Self-employed native-born Europeans,

Hispanics (of white race), or Asians may be more concentrated in the neighborhoods and

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[5]For descriptions of these programs see Guy, Doolittle, and Fink (1991) and Raheim (1997) for the AFDC program, and U.S. Department of Labor (1992) and Benus et al. (1995) for the UI program.

[6]The recent racial conflicts between Koreans and African-Americans in many large cities are in large part due to the presence of Korean-owned businesses in black communities (see In-Jin Yoon, 1991b and Min 1996).

[7]See Brown, Hamilton, and Medoff (1990).

industries in which self-employed immigrants tend to locate.[8] Furthermore, self-employed nonblacks represent 96 percent of all self-employed natives potentially placing a larger number of them at risk of displacement than self-employed native blacks.

In this paper, we extend the analysis in Fairlie and Meyer (1998) to include an examination of the effects of immigration on the self-employment prospects of native-born nonblacks.[9] Larger sample sizes for nonblacks than for blacks allow us to estimate the effects of immigration on the earnings of self-employed natives and include more metropolitan areas in the United States in our sample. We also present a new general equilibrium model of self-employment and wage/salary work. This theoretical model predicts how an influx of immigrants would affect the native self-employment rate and earnings in the self-employment sector. For a range of plausible parameter values, the model predicts small effects of immigration on native self-employment rates and earnings.

Using 1980 and 1990 Census microdata, we examine the relationship between changes in

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[8]Prior to the large inflows of immigrants in the past three decades, Ivan Light (1972, p. 3) noted that "In every large black neighborhood in the United States, white proprietors virtually monopolize local retail trade," suggesting that even in black neighborhoods self-employed whites may have been at a higher risk of being displaced by self-employed immigrants than self-employed blacks. A more specific example is provided by Yoon (1997) who notes that Korean-owned businesses moved into parts of Chicago's West and South sides that were previously dominated by Jewish- and Italian-owned businesses.

[9]Two previous studies use aggregate data from the 1980 Census to examine the effects on whites (Light and Sanchez 1987 and Light and Rosenstein 1995). These studies find that the immigrant self-employment rate and the immigrant share of the total self-employed have essentially no effect on the self-employment rates or self-employment earnings of native whites. We contribute to these results by using data from both 1980 and 1990 and by including metropolitan area fixed effects. We also include individual-level controls in our regressions, employ instrumental variables techniques, and try specifications in which our measure of immigration is weighted by the propensity of different immigrant groups to choose self-employment.

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immigration and native self-employment rates and earnings across 132 of the largest metropolitan areas in the United States.[10] We find evidence supporting the hypothesis that self-employed immigrants displace self-employed natives. Immigrants, however, do not have a negative effect on native self-employment earnings. Our findings are similar if we weight immigration rates by the propensity of immigrant groups to be self-employed or if we try alternative estimation techniques and specifications.

2. Theoretical Model

A formal model is useful to assess the likely impact of immigration flows on the self-employment prospects of natives. We are interested in the effect of immigration on both the self-employment earnings and self-employment rate of natives. As in past work such as Altonji and Card (1991) and Borjas (1994), we view each labor market as a closed economy. Like these other papers, we allow immigration to have an effect on product demand and consequently labor demand, as well as on labor supply. In short, immigration increases the supply of those entering self-employment, but also increases the demand for the output of the self-employed. The relative importance of these shifts in supply and demand will then determine the change in the return to self-employment and the self-employment rate.

Our model differs from the models mentioned above in that it allows occupational choice (self-employment vs. wage/salary work), but assumes that only one type of skill is used in each sector. The earlier models mentioned above assume that workers differ in their skills and that firms can substitute one skill for another to some extent. These fixed worker skills determine

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[10]For brevity, we refer to nonblack natives as natives in the remainder of the paper.

where each person works. Differences between immigrants and natives come about because the two groups are allowed to differ in their skill composition. In contrast, in our model, workers choose to supply their labor to a sector based on its wage and possibly other characteristics. Immigrants and natives are allowed to differ in these labor supply functions as well as their product demand functions. These differences in supply and demand functions can be due to differences in skill composition or to different preferences for job autonomy or other nonwage characteristics such as hours of work.

Let there be two producing sectors, the self-employment sector, and the wage/salary sector, each with its own good. We divide the population into immigrants and natives, letting the two groups have possibly different demand functions for the two goods and possibly different labor supply functions to the two sectors. In the model, wages, prices, employment and output in the two sectors are endogenously determined.

To flesh out the model, assume that the self-employment and wage/salary sectors use labor to produce Q_s and Q_w units of aggregate self-employment and wage/salary output, respectively. We ignore capital as an input for simplicity. Each sector has a constant returns to scale technology so that the unit cost functions in the two sectors can be written as $a_s W_s$ and $a_w W_w$, where W_s and W_w are the wage rates in the two sectors. Assuming that each sector is perfectly competitive implies that prices in the two sectors are $P_s = a_s W_s$ and $P_w = a_w W_w$.

On the individual demand side, we take there to be N^i immigrants and N^n natives each with individual demand functions $D_j^i(W_s, W_w, P_s, P_w)$ and $D_j^n(W_s, W_w, P_s, P_w)$, respectively, where $j \varepsilon \{s,w\}$ denotes the self-employment or wage/salary sector. On the labor supply side, we write

the per person immigrant and native labor supply functions to the two sectors as

$L_j^i(W_s, W_w, P_s, P_w)$ and $L_j^n(W_s, W_w, P_s, P_w)$, respectively. Normalizing $P_w=1$ and using the

constant returns to scale assumption implies P_w and W_w are fixed. We write the product demand

functions with P_s as their only argument and write the labor supply functions with W_s as their

only argument.[11]

Product market equilibrium requires that product demand equals output, or

(1) $\quad Q_s = N^i D_s^i(P_s) + N^n D_s^n(P_s)$ and

(2) $\quad Q_w = N^i D_w^i(P_s) + N^n D_w^n(P_s)$.

Labor market equilibrium requires that labor supply equal labor demand in each sector or

(3) $\quad Q_s \alpha_s = N^i L_s^i(W_s) + N^n L_s^n(W_s)$ and

(4) $\quad Q_w \alpha_w = N^i L_w^i(W_s) + N^n L_w^n(W_s)$.

We then examine the effect of an increase in the number of immigrants on the wage of

the self-employed. Using (1) and (3) we obtain

(5) $\quad \alpha_s N^i D_s^i(P_s) + \alpha_s N^n D_s^n(P_s) = N^i L_s^i(W_s) + N^n L_s^n(W_s)$.

Differentiating this equation we have

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[11]We use this notation even though P_s and W_s are proportional to each other given the constant returns to scale assumption. As we discuss later, the price is the main determinant of product demand and the wage is the main determinant of labor supply.

$$(6) \quad a_s dN^i D_s^i + a_s N^i \frac{dD_s^i}{dP_s} \frac{dP_s}{dW_s} dW_s + a_s N^n \frac{dD_s^n}{dP_s} \frac{dP_s}{dW_s} dW_s = dN^i L_s^i + N^i \frac{dL_s^i}{dW_s} dW_s + N^n \frac{dL_s^n}{dW_s} dW_s$$

A change to elasticities and some algebra gives us

$$(7) \quad \frac{\frac{dW_s}{W_s}}{\frac{dN^i}{N}} = \frac{P_s D_s^i - W_s L_s^i}{\beta W_s L_s^i \varepsilon_s^i + (1-\beta) W_s L_s^n \varepsilon_s^n - \beta P_s D_s^i \eta_s^i - (1-\beta) P_s D_s^n \eta_s^n} = \gamma, \text{ where}$$

$$N = N^i + N^n, \quad \beta = \frac{N^i}{N}, \quad (1-\beta) = \frac{N^n}{N},$$

$\varepsilon_s^i \equiv \frac{dL_s^i}{dW_s} \frac{W_s}{L_s^i}$ is the immigrant elasticity of labor supply to the self-employment sector,

$\varepsilon_s^n \equiv \frac{dL_s^n}{dW_s} \frac{W_s}{L_s^n}$ is the native elasticity of labor supply to the self-employment sector,

$\eta_s^i \equiv \frac{dD_s^i}{dP_s} \frac{P_s}{D_s^i}$ is the immigrant elasticity of demand for self-employment output, and

$\eta_s^n \equiv \frac{dD_s^n}{dP_s} \frac{P_s}{D_s^n}$ is the native elasticity of demand for self-employment output.[12]

Equation (7) has a nice interpretation. The numerator is the value of self-employment

output consumed by each immigrant minus the value of self-employment output produced by

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[12]We should emphasize, that while labor supply depends on P_s as well as W_s, the role of P_s will be relatively small. Analogously, while product demand depends on W_s as well as P_s, the role of W_s will be relatively small. To see this point, realize that labor supply should depend on the relative wage in self-employment (which only depends on W_s) and real income. Real income is $\frac{W_s L_s + W_w L_w}{P_s D_s + P_w D_w}$ (dropping the superscripts for now). A given percentage change in W_s will have a much bigger effect through the real wage than the same percentage change in P_s will through real income since L_s and D_s are so much smaller than L_w and D_w, and because the changes in W_s and P_s will mostly cancel each other in the real wage. Similarly, the demand for self-employment output should depend on its relative price (which only depends on P_s) and real income, and the influence of W_s through real income will be small.

each immigrant. When immigrant consumption is less than output, the wage in self-employment falls when immigration rises. The wage in self-employment rises with immigration when the opposite is true. The magnitude of any change in the wage is also determined by the denominator which is a total labor supply share and output share weighted sum of labor supply and output demand elasticities. All of the terms in the denominator are positive.

We can then calculate the type of derivatives empirically estimated in Section 4. These derivatives give the implied change in the number of natives who are self-employed when the number of self-employed immigrants rises by one:

$$(8) \quad \frac{dL_s^n}{dN^i}\frac{N^n}{L_s^i} = \varepsilon_s^n \gamma (1-\beta)\frac{L_s^n}{L_s^i}.$$

To provide an idea of the magnitude of the expressions in equations (7) and (8), we calculate them under various assumptions. For simplicity, we assume that immigrant and native supply and demand elasticities are the same, i.e. $\varepsilon_s^i = \varepsilon_s^n = \varepsilon$ and $\eta_s^i = \eta_s^n = \eta$. Different elasticities for immigrants and natives would not appreciably alter the results as one can see by examining the denominator of (7). We also assume $P_s D_s^i = W_s L_s^n = \delta$ and that $W_s L_s^i = \rho\delta$, $\rho > 1$. Note that if $P_s D_s^i = W_s L_s^n$, the expressions in (7) and (8) are zero, so that immigration has no effect on native self-employment. Equating product supply and demand in the self-employment sector then implies $P_s D_s^n = \delta(1 + \frac{\beta}{(1-\beta)}(\rho - 1))$.

Under these assumptions (7) becomes

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$$(9) \quad \frac{\frac{dW_s}{W_s}}{\frac{dN^i}{N}} = \frac{1-\rho}{\beta\varepsilon\rho + (1-\beta)\varepsilon - \beta\eta - (1-\beta)\eta(1+\frac{\beta}{1-\beta}(\rho-1))} \approx \frac{-(\rho-1)}{\varepsilon + |\eta|} \text{, and (8) becomes}$$

$$(10) \quad \frac{dL_s^{\,n}}{dN^i}\frac{N^n}{L_s^{\,i}} = \frac{\frac{dW_s}{W_s}}{\frac{dN^i}{N}}\frac{\varepsilon(1-\beta)}{\rho} \approx \frac{-\varepsilon(\rho-1)}{\rho(\varepsilon + |\eta|)}.$$

In Table 2, we report our simulated effects of immigration on the native wage and employment in the self-employment sector using equations (9) and (10). We take β, the immigrant share of employment, to be 0.12, the 1990 share for the metropolitan areas we examine (see Section 3). We take ρ, the ratio of immigrant to native per capita supply to the self-employment sector, to be either 1.2 or 1.3, numbers which bracket the 1990 ratio (see footnote 2). We consider a wide range of plausible values for ε and η (0.2 to 2.0 in absolute value). The larger values are probably more plausible because these sector specific elasticities should be larger than overall elasticities since they reflect substitution between the two sectors. The implied effect of immigration on native self-employment earnings rises as ϵ and η falls and as ρ rises. The effect of immigration on earnings is small except when the assumed supply and demand elasticities are very small. In all cases the effect on the native self-employment rate is small. For example, when we set $\rho=1.3$ and take the supply and demand elasticities to be equal to 1, the elasticity of self-employment earnings with respect to immigration is -0.145, and the number of natives

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displaced by each self-employed immigrant is under 0.10. Overall, the model implies very small effects of immigration on both native self-employment earnings and the native self-employment rate.

3. Data

The data used in this study are from the Public Use Microdata 5-Percent Samples of the 1980 and 1990 Censuses of Population. These datasets are the only sources of national microdata that are large enough to allow comparisons of native self-employment rates across a large number of metropolitan areas. In addition, they are preferable to published aggregate data because they provide more flexibility in creating sample restrictions and definitions of key variables and because they allow us to directly control for individual-level characteristics in our regressions. Finally, the detailed geographical information in the Census makes it possible to create consistent metropolitan area definitions over time.

Self-employed workers are defined as those individuals who identify themselves as mainly self-employed in their own not incorporated or incorporated business on the class of worker question.[13] In 1990, the relevant choices on the Census questionnaire were 6) "SELF-EMPLOYED in own NOT INCORPORATED business, professional practice, or farm" and 7) "SELF-EMPLOYED in own INCORPORATED business, professional practice, or farm" (U.S. Bureau of the Census, 1993: E-15).[14] We find using a 1/1000 random sample from the 1990

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[13]Unpaid family workers are not counted as self-employed.

[14]The class of worker question refers to the individual's "chief job activity or business last week." Individuals who hold more than one job are asked to refer to the one at which they worked the most hours. The class of worker question on the 1980 Census is nearly identical.

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Census that 34.0 percent of all self-employed men and 24.2 percent of all self-employed women report having their own incorporated business.

In our study, we include only individuals ages 16 to 64 and impose additional sample restrictions depending on the measure of self-employment that we are using. Our first measure, the self-employment rate, is defined as the fraction of workers that is self-employed. We include only individuals who worked at least 20 weeks in the past year and usually worked at least 15 hours per week during that year. As in most previous studies of self-employment, we include only workers in non-agricultural industries. The second measure, the self-employment ratio, is defined as the fraction of the total population that is self-employed. The sample used to calculate this ratio is not restricted to include only workers. Instead, we only exclude individuals who are currently enrolled in school or who are institutionalized. Therefore, agricultural workers, the unemployed, and workers with few total annual hours are included in the sample. We provide estimates using both measures of self-employment in most of the analyses discussed below.

Metropolitan Area Sample, Native Self-Employment, and Immigration

To assess the effects of immigration on native self-employment we examine differences in immigration and self-employment across geographic areas. These geographic areas should approximate labor markets for the self-employed. We take the standard approach in the literature which uses metropolitan areas (MAs) as the geographic areas. The specific MA definitions we use follow Jaeger (1996) and Bound and Holzer (1996).[15] These definitions combine detailed geographical areas identified in the Censuses to provide consistent or nearly consistent

[15]See Loeb, Turner and Jaeger (1996) for a description of the geographic matching process.

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definitions of 132 metropolitan areas in 1980 and 1990. These metropolitan areas create a sample that represents 68.5 percent of the U.S. native nonblack population (ages 16 to 64) in 1980 and 69.5 percent in 1990. The sample also captures 90.0 and 91.7 percent of the immigrant population (ages 16 to 64) in 1980 and 1990, respectively.

In Table 1, we report native self-employment rates and ratios and average native self-employment earnings by gender and year for our sample of 132 MAs.[16] The self-employment rate and self-employment ratio for natives are defined as above. From 1980 to 1990, the self-employment rate and ratio increased substantially for native women, but only slightly for native men. The increase for native women agrees with other evidence on increases in female self-employment (see Devine, 1994 and U.S. Small Business Administration, 1998).

We also report mean log self-employment earnings (in 1990 dollars) for self-employed natives meeting the sample restrictions for the self-employment rate and ratio. The results indicate that average earnings increased rapidly from 1980 to 1990 for self-employed native women, but remained essentially the same for self-employed native men. Finally, we report the immigrant share, which is defined as the fraction of the total population (ages 16-64) that is immigrant. The immigrant share increased from 8.4 percent to 12.1 percent from 1980 to 1990 for our sample of MAs.

The combination of the upward trend in the immigrant share and the upward trends in native self-employment rates and self-employment earnings (at least for women) does not provide support for the crowding out hypothesis. These trends, however, do not rule out the possibility that native self-employment and self-employment earnings declined substantially in

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[16]The reported values of these measures are similar to those for the entire United States.

MAs that received large inflows of immigrants, while increasing in other MAs. To investigate

this further, we examine the relationship between changes in the native self-employment rate and

average self-employment earnings, and changes in the immigrant share for our sample of 132

MAs.

We plot the relationship between the change in the native self-employment rate and the

change in the immigrant share for men and women in Figures 1 and 2, respectively.[17] The area of

the bubble representing each of the 132 MAs is proportional to the inverse of the standard error

of the corresponding self-employment rate. For both native men and women, there does not

appear to be a clear relationship between the two variables. We also plot the relationship

between the change in mean log self-employment earnings for natives and the immigrant share in

Figures 3 and 4. Again, a clear visual relationship between the two variables is not apparent.

4. Results

Although the plots are informative, we are interested in obtaining estimates of the size of

the effects of immigration on native self-employment rates and earnings and determining whether

these effects are statistically different from zero. We also would like to control for individual-

and MA-level characteristics that affect self-employment rates and earnings. We accomplish

these goals by estimating equations for the probability of self-employment and self-employment

earnings using our sample of natives residing in one of the 132 MAs.

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[17]Although not reported, we also create plots for the 1980 and 1990 cross-sectional
relationships between native self-employment rates and immigrant shares. We generally find
positive relationships between these variables for both men and women. Any inferences from
these results regarding the impacts of immigration on native self-employment are suspect,
however, due to the lack of measurable and unmeasurable MA-level controls.

Estimating the Effects of Immigration on Native Self-Employment

We first examine the effect of immigration on the native self-employment rate. We estimate this effect using probit regressions for the probability of self-employment among native-born Americans. Due to the presence of a MA-level error component we estimate a random effects probit regression to obtain efficient coefficient estimates and correct standard errors. Following Borjas and Sueyoshi (1994), we estimate the random effects probit in two stages.[18] The first stage consists of a probit regression using individual-level data from 1980 and 1990:

(11) $Prob(Y_{imt}=1) = \Phi(X_{imt}'\beta + \alpha_m + \alpha_{m90})$,

where $Y_{imt}=1$ if the individual is self-employed, Φ is the cumulative normal distribution function, X_{imt} is vector of individual-level characteristics, α_m is a fixed effect for MA m, $m=1,...,M$, and α_{m90} is a fixed effect for MA m in 1990. The second stage consists of a linear regression of the estimates of the first difference fixed effects, α_{m90}, on first differences (or changes from 1980 to 1990) in the MA-level variables:

(12) $\hat{\alpha}_{m90} = Z_{m90}'\gamma + w_m$,

where Z_{m90} includes first differences of the immigrant share and other MA-level characteristics.

The first-stage probit regression controls for changes from 1980 to 1990 in individual-level characteristics and for unobserved metropolitan-area characteristics that do not change from 1980 to 1990. The second-stage regression controls for changes from 1980 to 1990 in the included metropolitan-area variables. The coefficient estimates from this regression are in the same metric as probit coefficients and their standard errors account for the group-level component

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[18]See Fairlie and Meyer (1998) for a more thorough discussion.

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in the error term.

As suggested in Borjas and Sueyoshi (1994), we estimate the second-stage regression using generalized least squares (GLS). Specifically, we use the weighting matrix $\Omega = \sigma_u^2 I_M + V_{\alpha\alpha}$, where $V_{\alpha\alpha}$ is the MxM block of the covariance matrix from (11) which is associated with the first difference fixed effects (α_{m90}).[19] The use of Ω places different weights on each MA which are related to the inverse of the precision of its fixed effect in the first-stage probit regression. We also use OLS to estimate our second-stage regressions as a sensitivity check.

We estimate two-stage probit regressions for men and women using two different measures of self-employment and immigration. The sample sizes used in the first-stage probit regressions range from 2.5 to 3.5 million observations. For computational reasons we estimate these probit regressions using a choice-based sampling maximum likelihood estimator (CBSMLE).[20] The sample used for this estimator includes all of the observations in which the dependent variable equals 1 and an equal-sized random sample of observations in which the dependent variable equals 0. The likelihood function is then weighted appropriately.[21] The resulting sample sizes range from 240,000 to 770,000 observations. In these first-stage probit regressions we include individual-level controls for age, education level, marital status, number of children, disability status, and veteran status.[22] We do not report these results, and instead focus

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[19]We estimate σ_u^2 following Borjas (1987).

[20]See Amemiya (1985) for more details.

[21]Observations in which Y=0 and Y=1 are given weights of p/0.5 and (1-p)/0.5, respectively, where p is the proportion of ones in the original sample.

[22]The coefficient estimates on these variables are consistent with previous work. We find that the self-employment probability is higher for those who are older, more educated, married, and

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on the results of the second-stage regressions.

In Table 3, we report estimates of the effects of the change in immigrant share and the weighted immigrant share (described below) from the second-stage regressions using our two measures of self-employment and three estimation techniques. All second-stage regressions include the reported immigration measure and additional MA-level controls.[23] The coefficient estimates on the immigration measures are not overly sensitive to the inclusion of these controls.

We first discuss the results for the GLS regressions, which are reported in Specifications 1 and 4.[24] The dependent variable used in Specification 1 is the self-employment rate. The samples of native men and women used in the first stage regressions are limited to the working population (ages 16-64). For men, the coefficient estimate on the immigrant share is negative and statistically significant. In the second panel we report the estimates for native women. We also find a negative and statistically significant coefficient estimate on the immigrant share, although the coefficient is smaller. These results suggest that immigration reduces the probability of self-employment among native-born male and female workers.

In Table 3, we also report estimates for the weighted immigrant share. This measure of

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non-veterans. The estimated effect of the number of children and disability status are not easily summarized as they differ more by sample and gender.

[23]These MA-level controls include changes in the log average income of natives, the native unemployment rate, and the log native population.

[24]We also estimate these regressions using the 1980 and 1990 cross-sections. For both years, we find positive and statistically significant coefficients on the immigration measures for native men and women. We are concerned, however, that these estimates are biased due to unobserved MA characteristics that are correlated with native self-employment rates and the immigrant share.

immigration addresses the concern that immigrant groups differ in their impact on native self-employment. For example, it is likely that an immigrant from a high self-employment rate group, such as Cubans, Koreans, or Russians, has a larger crowding out effect on self-employed natives than an immigrant from a low self-employment rate group, such as Cambodians, Filipinos, or Mexicans. This observation suggests that we weight the immigrant share in an MA by the propensity of immigrants in that area to be self-employed. Therefore, we define the weighted immigrant share in MA m as:

$$(13) \qquad I_m^W = \frac{1}{\alpha N_m^T} \sum_{g=1}^{G} S_{-mg} N_{mg}, \quad ,$$

where g=1,...,G denotes immigrant groups, α is a scaling factor that equates the total number of "weighted" immigrants and the total number of actual immigrants, S_{-mg} is the self-employment rate (or ratio) for group g using all MAs except MA m, N_{mg} is the number of immigrants of group g in MA m, and N_m^T is the total population in MA m.[25] Using the self-employment rates (or ratios) as weights allows immigrants from high-self-employment rate groups to count more than immigrants from low self-employment rate groups.[26] This reweighting of immigrants makes little difference in the results. For both men and women, the coefficient estimate on the weighted

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[25]More details are provided in Fairlie and Meyer (1998).

[26]The weighted immigrant share variables are very similar to the unweighted share variables. The main exception to this pattern is that MAs with many immigrants from Mexico tend to have lower weighted immigrant shares than unweighted immigrant shares, and MAs with many immigrants from Asian countries tend to have higher weighted immigrant shares.

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immigrant share is only slightly larger than the coefficient estimate on the immigrant share. Furthermore, both coefficient estimates remain statistically significant.

Specification 4 reports estimates from the GLS second-stage regressions for the self-employment ratio. The samples used to estimate the first-stage regressions include the entire non-school, non-institutionalized population (ages 16-64). The self-employment ratio is a much broader measure of self-employment than the self-employment rate as it also includes individuals who, while primarily self-employed, worked few weeks or few hours per week last year. In addition, the use of this measure does not exclude from the sample someone who may have been displaced from self-employment into unemployment.[27] For native men, the results from using this alternative sample and definition of self-employment are very similar to those for the self-employment rate. The coefficient estimates for native women are somewhat smaller than those reported in Specification 1 and are now statistically insignificant at conventional levels. Overall, these results indicate that our estimates of the effects of immigration are not overly sensitive to the chosen measure of self-employment.

The finding of a negative coefficient on the immigrant share in the probit regressions is consistent with our hypothesis that self-employed immigrants crowd out self-employed natives. Thus far, however, we have not determined if these coefficient estimates imply large or small effects of immigration on native self-employment. Recall that our second-stage coefficients are in the same metric as the probit coefficients, making them difficult to interpret. We now convert

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[27]A simple calculation shows that this second difference is probably of less importance. A self-employed worker displaced into unemployment reduces the numerator of both the self-employment rate and ratio by one, and reduces the denominator of the ratio by one, but leaves the denominator of the rate unchanged. However, since the denominator is so much larger than the numerator, the resulting difference between the rate and ratio measures will be small.

these coefficients into derivatives.

One useful rescaling of the coefficients is to calculate the implied change in the number of self-employed natives in an MA when one more self-employed immigrant arrives. This rescaling, referred to below as the scaled derivative, is equal to:

$$(14) \qquad \gamma_I \varphi(\tilde{w}) N_N^L \frac{N_N}{(N_N + N_I)^2} \frac{N_I}{N_I^S}$$

where γ_I is the coefficient on the immigrant share, φ is the normal probability density function, N_N^L is the number of natives in the labor force of the appropriate gender, N_I^S is the number of self-employed immigrants of either gender[28], and N_N and N_I are the total number of natives and immigrants of either gender, respectively.[29] $\tilde{w}$ is defined to solve $S_N = \Phi(\tilde{w})$, where S_N is the native self-employment rate (or ratio) for the relevant gender. Note that $\gamma_I \varphi(\tilde{w})$ represents the change in the probability of self-employment with respect to a one unit change in the immigrant share (evaluated at the average probability in the sample) and the remainder of (14) represents the needed change in variables to obtain the scaled derivative.

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[28]We use the non-school, non-institutionalized population and the broader definition of self-employment for these last two expressions in the case of the self-employment ratio outcome, in order to be compatible with this alternative measure of self-employment.

[29]This formula relies on the implicit assumption that the number of immigrants who are self-employed in an MA is proportional to the number of immigrants in that MA. While crowding out or enclave effects (which work in different directions) would make this assumption not strictly correct, it is unlikely to be far from the truth.

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We report estimates of these scaled derivatives in Table 3.[30] The derivative estimates indicate that the coefficients on the immigrant share and weighted immigrant share imply large effects of immigration on native self-employment. The derivative estimates imply that an additional self-employed immigrant results in a decrease of 0.57 to 0.70 self-employed native men and a decrease of 0.14 to 0.17 self-employed native women. Clearly, immigration appears to have a large negative effect on the propensity of natives to choose self-employment.

To check the robustness of these results, we estimate second-stage regressions using two additional estimation techniques. In Specifications 2 and 5 of Table 3, we report OLS estimates.[31] The samples and explanatory variables used are the same as those used in Specifications 1 and 4. For native men, the OLS coefficient estimates are fairly similar to the GLS estimates in both the self-employment rate and self-employment ratio regressions. In all cases, they remain negative, large, and statistically significant. For native women, the coefficient estimates on the immigration measures are now much smaller in the self-employment rate regressions, but are similar to the GLS estimates in the self-employment ratio regressions.

Our first-difference estimates eliminate the bias due to MA fixed effects that are correlated with native self-employment and the immigrant share. These estimates, however, do not eliminate potential biases due to MA-specific transitory effects that are correlated with changes in

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[30]Standard errors for these derivative estimates are not reported, but are simply equal to the coefficient standard error times the ratio of the derivative estimate to the coefficient estimate. We assume that LF_B, S_B and S_I are nonstochastic for this calculation.

[31]A potential problem with the GLS estimates occurs if there is an important omitted variable that is specific to one or a few of the MAs with large regression weights. Because OLS places the same weight on each observation, the effect of such an omitted variable on the coefficient estimates is lessened.

native self-employment and changes in the immigrant share. In particular, immigrants may choose to live in MAs that are experiencing fast local economic growth. The MAs that are experiencing fast local economic growth are also likely to have increasing levels of native self-employment, thus causing a spurious positive correlation between changes in native self-employment and immigration.[32] To address this problem, we apply the instrumental variables (IV) approach taken in Altonji and Card (1991). In particular, we use the 1980 value of our immigration measure as an instrument for the change in its value from 1980 to 1990.

We report the IV results in Specifications 3 and 6 of Table 3.[33] For native men, the coefficients on the immigrant and weighted immigrant shares become more negative for the self-employment rate. The coefficient estimates, which remain statistically significant, imply that each self-employed immigrant displaces 0.84 to 0.85 self-employed native men. In contrast, the IV estimates for the self-employment ratio are less negative, implying derivatives of -0.37 and -0.43. For native women, the IV estimates are more negative than the GLS estimates in the self-employment rate regressions and are similar in the self-employment ratio regressions. Overall, the IV results do not change our conclusions regarding the effect of immigration on native self-

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[32]Another potential problem is that the location decisions of immigrants may be directly related to MA levels of native self-employment, implying that the immigrant share is not an exogenous variable in our second-stage regressions. We argue, however, that this is unlikely because self-employment, even for immigrants, represents a relatively small share of the workforce. Further support of this argument is provided by the finding in Bartel (1989) that recent immigrants tend to locate in SMSAs which have large numbers of previous immigrants from the same country, and that economic factors have a relatively small effect on location decisions.

[33]The formula for the vector of second-stage coefficient estimates is:
$(Z'\Omega^{-1}W(W'\Omega^{-1}W)^{-1}W'\Omega^{-1}Z)^{-1}Z'\Omega^{-1}W(W'\Omega^{-1}W)^{-1}W'\Omega^{-1}\delta$, where Z, Ω, δ are as defined above, and W includes the 1980 immigration measure and first differences of the MA-level controls.

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employment.

Estimating the Effects of Immigration on Native Self-Employment Earnings

We now examine the question of whether immigrants depress the earnings of self-employed natives. To answer this question we estimate several regressions in which the dependent variable is the log of self-employment income.[34] Similar to (11) and (12), we estimate these regressions in two stages. In the first stage, we estimate OLS regressions using our samples of self-employed native men and women. The same independent variables, MA fixed effects, and MA first difference fixed effects are included as those in (11). The second-stage regression is a regression of the first difference fixed effects on first differences (changes from 1980 to 1990) in the MA-level variables.

The results from the second-stage self-employment earnings regressions are reported in Table 4. In Specifications 1-3, we report results for the sample of native self-employed workers who meet the hours and weeks worked restrictions of the self-employment rate measure. Specifications 4-6 report results for the less restrictive group of self-employed workers who may work any number of hours and weeks (the self-employment ratio definition). We first discuss the GLS results (Specifications 1 and 4).[35] For both native men and women, the coefficient estimates are positive and statistically significant implying that immigration *increases* the earnings of self-employed natives. To determine whether the coefficients imply large or small effects we calculate

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[34]Self-employment earnings less than e are set to e before taking logs.

[35]We use the inverse of the variance of the first difference MA fixed effects as weights in these regressions.

scaled derivatives. The scaled derivatives reported in this table represent the change in log earnings (or percent change in earnings) due to a 0.0364 percentage point change in the immigrant share, which is equal to the change in the immigrant share from 1980 to 1990 for our sample of MAs. Thus, the coefficient estimates imply that an increase in immigration comparable to that experienced in the 1980s for our sample of 132 MAs increases self-employment earnings by approximately 9 to 13 percent for native men and 6 to 10 percent for native women.

In Table 4, we also report estimates from OLS and IV second-stage regressions. The OLS estimates (Specifications 2 and 5) are smaller than the GLS estimates and the IV estimates are larger.[36] Both estimation strategies, however, provide positive coefficient estimates and do not change our conclusions regarding the effect of immigration on native self-employment earnings.

The positive estimates reported in Table 4 are puzzling in light of the predictions of the theoretical model. One possible explanation for these results, however, is that self-employed immigrants are primarily displacing natives who own "marginal" businesses. Even if immigration depresses earnings at all points of the earnings distribution, average native self-employment earnings may increase due to this compositional change.

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[36]An alternative approach to IV that may remove the potential spurious correlation created by immigrants choosing to live in areas that are experiencing fast local economic growth is to use wage/salary workers as a control group. If we assume that immigration has no or only a small effect on natives' wages (as is found in most previous studies) then estimates of the effects of immigration on self-employment earnings relative to wage/salary earnings will provide unbiased estimates of the effects of immigration on native self-employment earnings. To explore this alternative we estimate two-stage earnings regressions using our samples of all workers. In the second-stage regressions in which the dependent variable is the first difference MA fixed effect interacted with a dummy variable for self-employment, we find positive and generally statistically significant coefficients on the immigrant share. In all cases, however, the coefficients are smaller suggesting that the positive coefficient estimates reported in Table 4 may be partly due to a positive correlation between immigration and growth in overall earnings.

One method of investigating this hypothesis is to use hours and weeks worked as a proxy for "marginal" businesses and compare the effects of immigration across different groups of self-employed natives based on hours and weeks worked. We first return to the results presented in Table 3. If self-employed immigrants primarily displace "marginally" self-employed natives then we might expect to find larger negative effects on the probability of self-employment when we relax the hours and weeks restrictions. The estimates reported in Table 3 run counter to the hypothesis as we generally find less negative coefficient and derivative estimates in the self-employment ratio regressions than in the self-employment rate regressions for both men and women.

Although not reported, we also estimate self-employment probit regressions with samples that include only full-time, full-year workers.[37] These samples will exclude potentially displaced low-hours self-employed natives who are loosely attached to work. For native men, we find less negative coefficient estimates in some of the specifications, but all of the coefficient estimates remain large and negative. The coefficient estimates are more negative using the full-time, full-year sample for women.[38]

Our comparison of results using various levels of hours and weeks worked restrictions does not provide evidence that immigrants are primarily displacing low-hours (or "marginal")

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[37]We define full-time, full-year workers as those who worked at least 40 weeks and usually worked at least 35 hours per week last year.

[38]We also estimate self-employment earnings regressions using the full-time, full-year sample. We find very similar coefficients on the immigrant and weighted immigrant shares to those reported in Table 4. These results provide further evidence that the positive coefficient estimates on the immigrant share cannot simply be due to the disproportionate displacement of self-employed natives with low-hours.

self-employed natives.[39] This finding, however, does not rule out the possibility that the positive coefficients in the self-employment earnings regressions are due to the displacement of marginal, but high-hours self-employed.

Effects of Immigration by Education Level and Additional Estimates

To further explore the crowding-out hypothesis we estimate the effect of immigration on self-employment probabilities and earnings among natives with different levels of education. We report second-stage GLS results by education level for the self-employment rate in Table 5 and for self-employment earnings (using the self-employment rate definition) in Table 6.

The results reported in Table 5 provide evidence of strong displacement effects for native men who have the two lowest levels of education (high school dropouts and high school graduates).[40] The coefficients on the immigrant share are negative and statistically significant. For native men who attended college or who graduated from college the coefficient on the immigrant share is negative, but is small and statistically insignificant. The results for native women are less clear. The coefficients on the immigrant share are more negative for the two highest education levels, but only the coefficient for those who attended college is statistically

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[39]The results for these different groups of workers, however, provide evidence on the robustness of the findings that immigration has a large negative effect on the probability of self-employment among natives and a positive effect on native self-employment earnings.

[40]These two groups of self-employed native men and those who attended, but did not graduate from college have large industry concentrations in construction, retail trade, and business and repair services, which represent three of the four largest industry shares for self-employed immigrants. Interestingly, the second largest industry share for self-employed immigrants is professional services, which has the largest share of self-employed native men who are college graduates.

significant.

The results for self-employment earnings are more similar across education levels. We find positive and generally statistically significant coefficients on the immigrant share in all of the specifications reported in Table 6. These results provide further evidence against the hypothesis that the positive coefficient estimates in the self-employment earnings regressions are due to compositional changes.

We also estimate a series of employment and earnings equations in which we control for the predicted change in self-employment and self-employment earnings using national changes by industry. Based on an MA's industry distribution in 1980, we predicted changes in self-employment rates and earnings using national changes by industry between 1980 and 1990. We then included these predictions in the appropriate regressions. These additional controls tended to slightly decrease the magnitude of the immigration effects, but had little overall effect on the bottom line provided by the estimates without these controls.

5. Conclusions

Using 1980 and 1990 Census microdata, we find that immigration has a large negative effect on the probability of self-employment among native nonblacks. Using various estimation techniques and measures of self-employment and immigration, our estimates indicate that from 0.37 to 0.85 self-employed native men and from 0.09 to 0.19 self-employed native women are displaced by each self-employed immigrant. These estimates of displacement effects are statistically significant in almost all cases for native men and in some cases for native women.

These findings differ from those in our previous work indicating that immigration has no

or only a small negative, but statistically insignificant, effect on black self-employment. These findings also conflict with our general equilibrium model of Section 2, which predicted small effects on the native self-employment rate. While differences between empirical findings and theoretical predictions are not rare, these contrasting results present an interesting puzzle for future work.

Although we find evidence of substantial crowding out due to immigration, native self-employment was on the rise, in both levels and rates, during the 1980s. From 1980 to 1990 the number of businesses in the United States owned by native-born men and native-born women increased by 720,000 and 1,116,000, respectively.[41] Thus, at the national level self-employed immigrants may have primarily taken away opportunities for natives to start new businesses instead of actually putting many self-employed natives out of business. This may explain why the potential negative effects of immigration on native self-employment has not been used a major argument against current U.S. immigration policy.

In contrast to our findings for the effects of immigration on the probability of native self-employment, our estimates of the effects of immigration on native self-employment earnings do not have the expected sign. In both native male and female self-employment earnings regressions, we find positive and statistically significant coefficients on the immigrant share, suggesting that immigration increases native self-employment earnings. These surprising results may be due to immigrants primarily displacing marginal or low-income self-employed natives, but our analyses do not provide clear evidence supporting this hypothesis.

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[41]National self-employment rates increased from 10.4 to 10.8 percent for native men and from 4.0 to 5.9 percent for native women.

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Table 1
Native Self-Employment Measures and Immigrant Share for
132 Metropolitan Area Sample
1980 and 1990 Census

	1980	1990	Change
Native Men			
Self-Employment Rate	10.0%	10.5%	0.5%
Self-Employment Ratio	10.9%	11.5%	0.6%
Mean Log SE Earnings (Rate)	10.22	10.17	-0.04
Mean Log SE Earnings (Ratio)	9.70	9.70	0.00
Native Women			
Self-Employment Rate	3.7%	5.6%	2.0%
Self-Employment Ratio	3.3%	5.7%	2.4%
Mean Log SE Earnings (Rate)	8.99	9.17	0.18
Mean Log SE Earnings (Ratio)	7.66	8.05	0.40
Immigrant Share of Population	8.4%	12.1%	3.6%

Notes: From 132 metropolitan area sample of those aged 16-64. The *self-employment rate* is the fraction of the employed that is self-employed. The *self-employment ratio* is the fraction of the noninstitutional, not in school population that is self-employed. Census sample weights are used in 1990.

Table 2
Simulated Effects of Immigration on
Native Wage and Native Employment in Self-Employment Sector

Simulation Parameters				Implied Effects of Immigration	
ε	η	β	ρ	$\dfrac{dW_s}{W_s} / \dfrac{dN^i}{N}$	$\dfrac{dL_s^n}{dN^i} \dfrac{N^n}{L_s^i}$
0.20	-0.20	0.12	1.20	-0.488	-0.072
0.50	-0.50	0.12	1.20	-0.195	-0.072
1.00	-1.00	0.12	1.20	-0.098	-0.072
2.00	-2.00	0.12	1.20	-0.049	-0.072
0.20	-0.20	0.12	1.30	-0.724	-0.098
0.50	-0.50	0.12	1.30	-0.290	-0.098
1.00	-1.00	0.12	1.30	-0.145	-0.098
2.00	-2.00	0.12	1.30	-0.072	-0.098

Notes: See the text for the model assumptions and the justification of the proposed parameters.

Table 3
Two-Stage Probit Estimates for Probability of Self-Employment
1980 to 1990 First-Difference Second-Stage Regressions

	Self-Employment Rate			Self-Employment Ratio		
	GLS	OLS	IV	GLS	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Native Men						
I. Immigrant Share	-0.7481	-0.7649	-0.9685	-0.6926	-0.8054	-0.5229
	(0.2328)	(0.2498)	(0.2937)	(0.2107)	(0.2245)	(0.2660)
Scaled Derivative	-0.6452	-0.6597	-0.8353	-0.5743	-0.6678	-0.4336
II. Weighted Immigrant Share	-0.8165	-0.8458	-0.9897	-0.7025	-0.8377	-0.4519
	(0.2627)	(0.2820)	(0.3366)	(0.2412)	(0.2570)	(0.3085)
Scaled Derivative	-0.7042	-0.7294	-0.8535	-0.5825	-0.6946	-0.3747
Native Women						
I. Immigrant Share	-0.4402	-0.2583	-0.5461	-0.3363	-0.2771	-0.3885
	(0.2093)	(0.2887)	(0.2515)	(0.2360)	(0.2663)	(0.2935)
Scaled Derivative	-0.1555	-0.0913	-0.1930	-0.1440	-0.1186	-0.1664
II. Weighted Immigrant Share	-0.4703	-0.2859	-0.5133	-0.3833	-0.3549	-0.3444
	(0.2311)	(0.3214)	(0.2907)	(0.2645)	(0.3007)	(0.3364)
Scaled Derivative	-0.1662	-0.1010	-0.1814	-0.1641	-0.1519	-0.1474

Notes: From 132 metropolitan area sample of native-born nonblacks aged 16-64. The IV columns use the 1980 immigration variable to instrument for the change between 1980 and 1990. *Standard errors* are reported in parentheses. The *scaled derivative* approximates the change in the number of self-employed natives when the number of self-employed immigrants increases by one. The *weighted immigrant share* weights immigrant groups by their self-employment rate (or ratio). All specifications include 1980 to 1990 changes in log average income of natives, native unemployment rate, and log native population.

Table 4
Two-Stage Log Self-Employment Earnings Regressions
1980 to 1990 First-Difference Second-Stage Regressions

	Self-Employment Rate Definition			Self-Employment Ratio Definition		
	GLS	OLS	IV	GLS	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Native Men						
I. Immigrant Share	2.4909	1.7168	3.2020	3.0323	2.1137	3.7693
	(0.1494)	(0.3063)	(0.1679)	(0.2138)	(0.4119)	(0.2406)
Scaled Derivative	0.0907	0.0625	0.1166	0.1104	0.0769	0.1372
II. Weighted Immigrant Share	2.8679	2.2222	3.7475	3.4683	2.6765	4.3491
	(0.1593)	(0.3313)	(0.1874)	(0.2258)	(0.4494)	(0.2661)
Scaled Derivative	0.1044	0.0809	0.1364	0.1262	0.0974	0.1583
Native Women						
I. Immigrant Share	2.3683	1.8005	3.0046	1.6201	1.6314	2.3944
	(0.3142)	(0.6421)	(0.3514)	(0.4423)	(0.8657)	(0.4957)
Scaled Derivative	0.0862	0.0655	0.1094	0.0590	0.0594	0.0872
II. Weighted Immigrant Share	2.7817	2.3173	3.6573	2.0354	1.7434	3.2051
	(0.3360)	(0.6994)	(0.3929)	(0.4687)	(0.9481)	(0.5504)
Scaled Derivative	0.1013	0.0844	0.1331	0.0741	0.0635	0.1167

Notes: From 132 metropolitan area sample of native-born nonblacks aged 16-64. The IV columns use the 1980 immigration variable to instrument for the change between 1980 and 1990. *Standard errors* are reported in parentheses. The *scaled derivative* approximates the change in native log self-employment earnings when the immigrant share increases by the change from 1980 to 1990 for our sample of 132 MAs (=0.0364). The *weighted immigrant share* weights immigrant groups by their self-employment rate (or ratio). All specifications include 1980 to 1990 changes in native unemployment rate and log native population.

Table 5
Two-Stage Probit Estimates for Probability of Self-Employment
1980 to 1990 First-Difference Second-Stage Regressions by Education Level

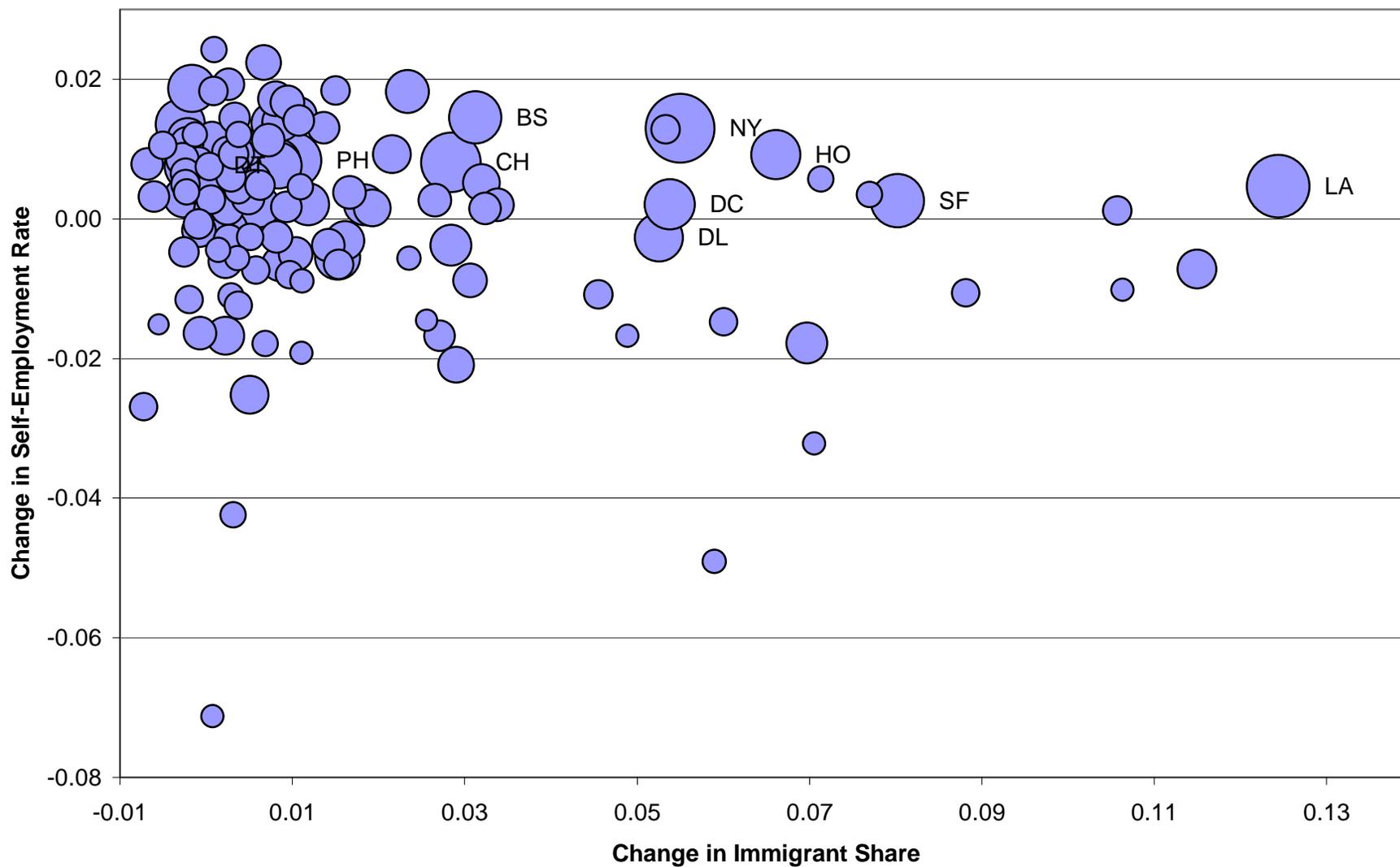| | Self-Employment Rate | | | |
	GLS	GLS	GLS	GLS
	(1)	(2)	(3)	(4)
Sample	High School Dropout	High School Graduate	Some College	College Graduate
Native Men				
I. Immigrant Share	-1.0777	-0.6472	-0.2073	-0.1244
	(0.3895)	(0.3065)	(0.2905)	(0.2388)
Scaled Derivative	-0.1510	-0.1710	-0.0490	-0.0393
II. Weighted Immigrant Share	-1.0804	-0.6904	-0.2610	-0.1595
	(0.4430)	(0.3456)	(0.3283)	(0.2649)
Scaled Derivative	-0.1514	-0.1824	-0.0616	-0.0503
Native Women				
I. Immigrant Share	-0.3535	-0.2973	-0.5585	-0.5803
	(0.4726)	(0.2479)	(0.2162)	(0.4145)
Scaled Derivative	-0.0163	-0.0396	-0.0638	-0.0578
II. Weighted Immigrant Share	-0.3517	-0.2861	-0.6280	-0.6208
	(0.5300)	(0.2753)	(0.2341)	(0.4610)
Scaled Derivative	-0.0162	-0.0381	-0.0717	-0.0619

Notes: From 132 metropolitan area sample of native-born nonblacks aged 16-64. All specifications use GLS and are for the self-employment rate. *Standard errors* are reported in parentheses. The *scaled derivative* approximates the change in the number of self-employed natives when the number of self-employed immigrants increases by one. The *weighted immigrant share* weights immigrant groups by their self-employment rate. All specifications include 1980 to 1990 changes in log average income of natives, native unemployment rate, and log native population.

Table 6
Two-Stage Log Self-Employment Earnings Regressions
1980 to 1990 First-Difference Second-Stage Regressions by Education Level

Sample	Self-Employment Rate Definition			
	GLS (1)	GLS (2)	GLS (3)	GLS (4)
	High School Dropout	High School Graduate	Some College	College Graduate
Native Men				
I. Immigrant Share	2.6426	2.9366	2.0352	2.4884
	(0.4483)	(0.3034)	(0.3076)	(0.2390)
Scaled Derivative	0.0962	0.1069	0.0741	0.0906
II. Weighted Immigrant Share	3.2169	3.4411	2.3359	2.7305
	(0.4782)	(0.3217)	(0.3317)	(0.2539)
Scaled Derivative	0.1171	0.1253	0.0850	0.0994
Native Women				
I. Immigrant Share	0.8548	1.6759	2.7280	2.2073
	(0.9245)	(0.5600)	(0.5738)	(0.6641)
Scaled Derivative	0.0311	0.0610	0.0993	0.0804
II. Weighted Immigrant Share	0.9927	1.8921	3.1935	2.5308
	(0.9985)	(0.5973)	(0.6207)	(0.7044)
Scaled Derivative	0.0361	0.0689	0.1162	0.0921

Notes: All specifications use GLS and the self-employment rate definition. From 132 metropolitan area sample of native-born nonblacks aged 16-64. *Standard errors* are reported in parentheses. The *scaled derivative* approximates the change in native log self-employment earnings when the immigrant share increases by the change from 1980 to 1990 for our sample of 132 MAs (=0.0364). The *weighted immigrant share* weights immigrant groups by their self-employment rate. All specifications include 1980 to 1990 changes in native unemployment rate and log native population.
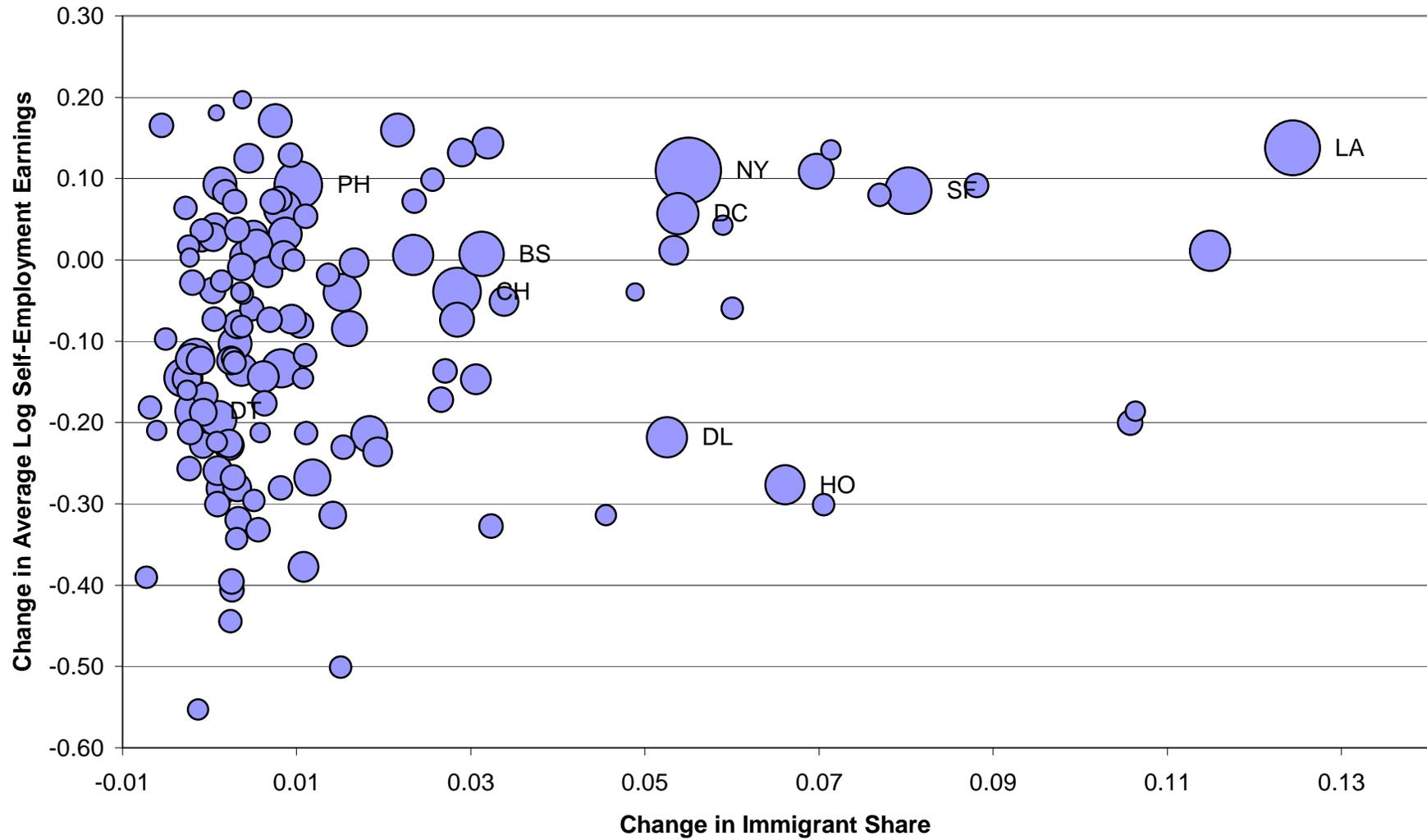
Figure 1
Change in Male Self-Employment Rate Versus Change in Immigrant Share (1980 to 1990)

Figure 2
Change in Female Self-Employment Rate Versus Change in Immigrant Share (1980 to 1990)
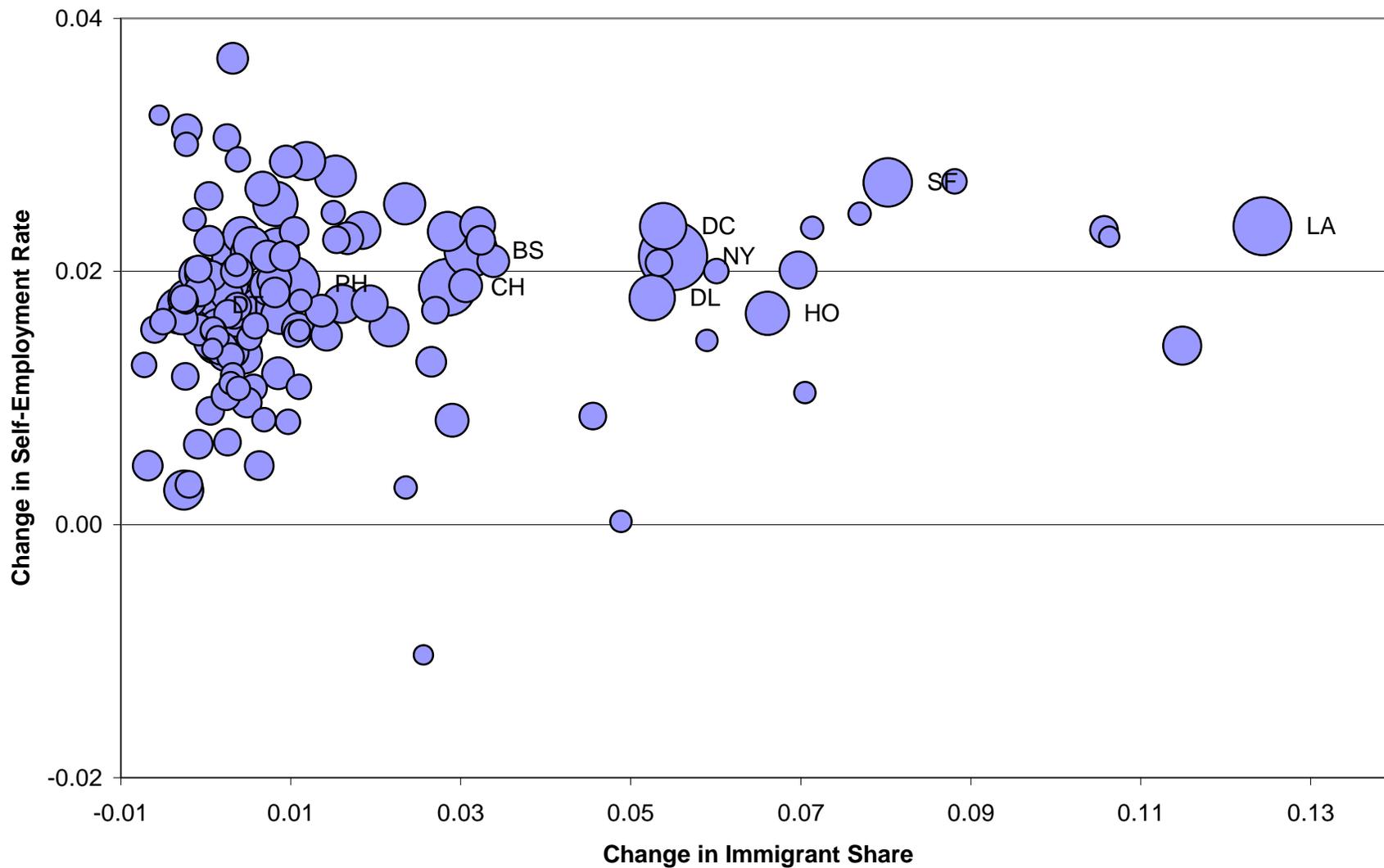
Figure 3
Change in Male Average Log Self-Employment Earnings Versus Change in Immigrant Share
(1980 to 1990)

Figure 4
Change in Female Average Log Self-Employment Earnings Versus Change in Immigrant Share
(1980 to 1990)