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Entrepreneurship and Survival Dynamics of Immigrants to the U.S. and their Descendants[#]

Dimitris Georgarakos
Goethe University Frankfurt and CFS

Konstantinos Tatsiramos
IZA

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Abstract

Many studies have explored the determinants of entering into entrepreneurship and the differences in self-employment rates across racial and ethnic groups. However, very little is known about the survival in entrepreneurship of immigrants to the U.S. and their descendants. We adopt a modeling framework based on duration analysis, which takes into account both the fact that the stock of entrepreneurs initially observed represents a selected sample and the inability of observing in the data the exit time for some spells. Unlike previous studies, we find a lower survival probability in entrepreneurship for Mexican and other Hispanic immigrants, which does not carry on to their U.S.-born descendants. We also find that these two immigrant groups tend to enter entrepreneurship from unemployment or inactivity and they are more likely to exit towards employment in the wage sector, suggesting that entrepreneurship represents for them an intermediate step from non-employment to paid employment.

JEL Classification: F22**,** J15, J82, C41

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1. Introduction

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Self-employment rates across racial and ethnic groups differ substantially in the United States, where Hispanics and African-Americans exhibit lower rates compared to Whites and Asians (Fairlie and Meyer 1996). Identifying the causes of these differences is important as self-employment may determine to a large extent migrants' success and well-being in the host country and may even offer an avenue of escaping poverty for the more disadvantaged groups.[1] In addition, it is relevant for the efficient design of policies that target entrepreneurs from disadvantaged groups.

In this paper, we investigate the self-employment dynamics of various ethnic and racial groups in the U.S. Understanding the dynamics of self-employment (entry, survival and exit state) is relevant for explaining the observed differences in self-employment rates. While there is an extensive literature on the determinants of business ownership emphasizing the role of wealth holdings[2], less is known about the factors that influence survival into entrepreneurship. Fairlie (2005) finds that disadvantaged groups have relatively low rates of entry into and high rates of exit out of self-employment. Lofstrom and Wang (2006), focusing on the comparison between Mexican-Hispanics and other Hispanics, find no significant differences in their entry rates, but lower survival probabilities for Mexican-Hispanics.

The existing literature has recognized the importance of exit rates in explaining differences in self-employment across various ethnic and racial groups, but it studies them in a static framework that suffers from a number of shortcomings. This paper aims to contribute to the existing literature by addressing some of these limitations in the following ways:

[1] Hotz-Eakin, Rosen and Weathers (2000), have presented evidence of stronger upward mobility in the income distribution among low-income self-employed workers compared to low-income wage/salary workers, and Fairlie (2004) has documented faster earnings-growth for the former group. Looking at different racial and ethnic groups, Hispanics and African-Americans perform worse in terms of earnings compared to Whites and Asians (Fairlie, 2005). There is also evidence of heterogeneity in terms of asset holdings among immigrants, with Europeans and Asians having substantially more wealth than the average immigrant (Cobb-Clark and Hildebrand, 2006).

[2] For example, see Evans and Jovanovic (1989), Evans and Leighton (1989), Quadrini (1999), Gentry and Hubbard (2004), who are documenting a positive effect of wealth on the probability of starting a business. This has mainly interpreted as an indirect evidence for the existence of liquidity constraints that impose barriers to new business formation. An exception is Hurst and Lusardi (2004) who find a positive relationship between wealth and the propensity to start up a business only for the top five percent of the wealth distribution.

First, we employ duration analysis which provides a dynamic framework that addresses the inability of static binary choice models to take into account left-truncation and right censoring. The former relates to the fact that the stock of entrepreneurs initially observed has on average lower risk of exiting from entrepreneurship, forming a selected sample that is dominated by those successful enough to survive up to that point. Ignoring such a selection mechanism might lead to biased inference. The latter refers to the inability of observing in the data the exit time for some spells.

Second, we extend the duration analysis to examine exits into different states, that is, exits to employment in the wage sector or to non-employment. This can be important since interpreting the high exit rates from entrepreneurship as failures might be misleading if these exits are associated with transitions to paid employment in the wage sector.

In addition, we apply our approach to identify potential differences in survival rates in business ownership between immigrants to the U.S. and their descendants. Existing studies have already pointed to the strong intergenerational links underlying self-employment rates, suggesting that disparities in the previous generation tend to be reproduced in the next one (see for instance, Fairlie 1999 and Hout and Rosen 2000).[3]

We use data from the Survey of Income and Program Participation (SIPP, 1996), which provides information on monthly basis and offers details on immigrant status. Its key advantage is that the exact date of starting up a business is known. This allows us to construct business ownership durations and adequately control for the left-truncated spells.

Our findings suggest that a dynamic analysis that takes into account left truncation and right censoring can lead to quite different conclusions compared to those derived from a static binary framework. Unlike previous studies, we find a lower survival probability in entrepreneurship for foreign-born Mexicans and other Hispanics compared to non-Hispanic whites but this is not the case for Europeans and Asians. In addition, we show that such

[3] Intergenerational mobility and differences in earnings between first and second or higher generations have been also analyzed (e.g. Borjas, 1993; Chiswick, 1977; Trejo, 2003).

differences in survival do not carry on to the U.S.-born descendants of these two immigrant groups, suggesting that they experience similar self-employment patterns with natives. Furthermore, analyzing the destination state, we find that Mexican and other Hispanic immigrants tend to enter entrepreneurship from unemployment or inactivity, and they are more likely to exit towards employment in the wage sector. This suggests that entrepreneurship represents for them an intermediate step from non-employment to paid employment. On the other hand, African-Americans who also exhibit a lower survival in entrepreneurship, show a higher propensity to exit to non-employment.

The rest of the paper is organized as follows. The details of the data are discussed in Section 2, while Section 3 describes the empirical hazard and survival functions based on the data. Section 4 presents the econometric model and Section 5 the empirical results. Section 6 offers concluding remarks.

2. Data

The empirical analysis is based on the 1996 panel of the SIPP. The 1996 survey is a rotating panel collected every four months for approximately 36,700 U.S. households spanning over a 4 year period. Each wave of the SIPP contains both core questions common to each wave and topical questions that are not updated in each and every wave. The core questions provide information on business ownership for each person in the household above 16 years old and the exact starting date of the business. Knowing the exact starting date is important for constructing exact spell durations.[4]

The additional advantage of using the SIPP is that it contains a migration module in wave 2 of the panel. Based on the information about the country of birth in the migration module, we are able to distinguish between U.S. born and foreign-born individuals. For the

[4] The PSID, which also contains immigration history information and wealth data, does not provide the day of entering into business. Therefore, any analysis needs to be based on an inflow sample since 1998, when a representative sample of 491 immigrant families was included in the survey, which would lead to a very small sample.

latter group, we consider different groups of immigrants, namely, Mexicans, other Hispanics, Europeans (including Australians and Canadians), and Asians. Furthermore, using the available information about the ethnic origin of individuals, we also distinguish the U.S.-born in the following groups: Mexicans, other Hispanics, African-Americans, Asians, and non-Hispanic whites[5]. Those U.S.-born individuals with a foreign ethnic origin are considered as the descendants - second or higher generation - of the foreign-born.

SIPP data also provide information on wealth at the household level in waves 3, 6, 9, and 12. From the assets and liabilities module we use household's total net wealth which is equal to total assets minus liabilities. Although the SIPP contains detailed information on specific assets and liabilities, it does not gather information about assets held off-shore which may be particularly important for immigrant households, but this is a limitation shared by all other available data sources, such as the PSID (Cobb-Clark and Hildebrand, 2006).

We obtain an unbalanced panel for those who entered the sample in the first wave of 1996. We make this restriction as the migration module is only asked at wave 2.[6] Multiple spells (owning more than one business) for each individual are taken into account. The sample of business owners consists of the stock of those who are owners at the first wave of the panel, and the inflow into entrepreneurship since then.[7] The analysis focuses on males, in order to avoid the selectivity issues related to female employment, aged 20-64.

The resulting sample consists of 4567 business spells of which 4094 are owned by a U.S.-born and 473 by a foreign-born individual (10.4% of the total sample). One-third of the spells (1375) end with an exit from entrepreneurship and the rest are right-censored. Table 1 presents relevant summary statistics. The first two columns show that foreign-born

[5] In what follows, U.S.-born descendants of European immigrants are considered as non-Hispanic whites. We also distinguish the group of African-Americans in order to separate them from the reference group of non-Hispanic whites.

[6] The remaining sample represents about 90% of the total sample. We also exclude from the analysis individuals born in Puerto Rico on the basis that their unique legal position makes it difficult to sensibly include them in the foreign-born population, and American Indians as they differ from the Americans and are very few to be included in the analysis as a separate group.

[7] The way to deal with the bias that arises from stock sampling, since only those who have survived in entrepreneurship are observed in wave 1, is discussed in section 4.

individuals are slightly younger, less educated, more likely to be married with more children, and have lower average wealth, income, and business equity, compared to the U.S-born. Considering foreign-born immigrants by origin, we observe that Mexicans have the highest proportion of high school drop-outs (about 60%), and the lowest wealth and income levels, followed by other Hispanics.

[Table 1 about here]

3. Empirical Hazard Function and Survival Estimates

Figure 1 depicts the empirical hazard function based on the Kaplan-Meier estimators. Panel A shows the hazard function for the foreign and U.S-born individuals. The general pattern of the hazard function is non-linear with an increasing exit rate at the beginning of the spell, which declines with the elapsed time into entrepreneurship. The U.S.-born experience a faster initial increase in the hazard rate compared to their foreign-born counterparts, which reaches about 1.5%. After about the first year, the hazard rate of the foreign-born overtakes the U.S.-born until they converge. Panel B distinguishes between U.S.-born (i.e. non-Hispanic whites), foreign-born and U.S-born descendants of immigrants. The hazard rate for the U.S-born descendants initially increases, exceeding 2% around the first year of duration and converges after a year and a half to the levels of the other two groups. In Panel C we distinguish the foreign-born into four main ethnic groups, namely, Mexican, other Hispanic, Asian, and European. To ease comparisons, we still report the hazard function for the U.S.-born descendants of immigrants and the U.S.-born white non-Hispanics as in Panel B. Foreign-born Mexicans and other Hispanics show the highest exit rates, with the Mexicans reaching the rate of 2.5% in the first year. Finally, Panel D depicts hazard functions of the U.S-born descendants of immigrants by ethnic group, suggesting that the large increase on the hazard rate for the U.S.-born descendants in Panels B and C is mainly driven by the U.S-born Mexicans.

[Figure 1 about here]

Figure 2 displays the survival function which is the percentage of spells surviving into entrepreneurship. The survival function in panel A, which reflects the overall higher hazard rate of foreign-born immigrants, lies below that of the U.S-born. Distinguishing among the four groups of immigrants, Panel C shows that foreign-born Mexicans have the lowest survival probabilities followed by other Hispanics. Finally, in Panel D, it is the U.S-born Mexicans who exhibit the lowest survival among the U.S.-born descendants.

[Figure 2 about here]

Although informative, this analysis which is based on the empirical estimates of the hazard and survival functions does not control for all possible factors at work. In particular, the observed differences between the foreign-born and their U.S.-born descendants and across ethnic groups might be due to differences in characteristics, such as wealth and/or skills. Moreover, the negative duration dependence that is suggested by Figure 1 might be spurious. For instance, individuals with lower entrepreneurial ability, which is mainly unobserved, are more likely to exit business faster, so that the remaining sample represents a selected group of those with higher ability. These observed and unobserved characteristics might affect the patterns in survival probabilities and duration dependence that we see in the data. To take these differences into account we estimate an appropriately specified econometric model.

4. Econometric Model

We investigate the transitions out of entrepreneurship in a multivariate setting by estimating a discrete time hazard function, as outlined in Narendranathan and Stewart (1993) and Jenkins (1995).

Suppose that the transition out of entrepreneurship for an individual i is a continuous process with hazard

$$\theta_i(t) = \lambda(t)\exp(x_i'(t)\beta) \tag{1}$$

where $\lambda(t)$ denotes the baseline hazard, $x_i(t)$ is the vector of time dependent and independent explanatory variables, and β is a vector of unknown parameters. The discrete

time hazard denotes the probability of a spell of entrepreneurship being completed by time $t+1$, given that it was still continuing at time t. The discrete time hazard is therefore given by

$$h_i(t) = 1 - \exp(-\int_t^{t+1} \theta_i(u)du = 1 - \exp[-\exp(x_i(t)'\beta)\gamma(t)] \tag{2}$$

where

$$\gamma(t) = \int_t^{t+1} \lambda(u)du \tag{3}$$

denotes the integrated baseline hazard. We do not impose any functional form for $\gamma(t)$, and we estimate the model semi-parametrically. We allow for 12 duration intervals of 6 months each, which cover a duration period of up to 6 years, and an open interval of more than 72 months duration. For normalization purposes we set the coefficient of the first interval to be zero.

As discussed in Section 2, we observe individuals who start-up a business after their first interview (inflow sample) and those who already own a business at their first interview (stock sample). The log-likelihood contribution of an inflow spell of length d_i is

$$\begin{aligned} L_i = {} & c_i \ln h_i(d_i) + \sum_{t=1}^{d_i-1} \ln[1-h_i(t)] = \\ & c_i \ln\{1-\exp[-\exp(x_i(d_i)'\beta)\gamma(d_i)]\} - \sum_{t=1}^{d_i-1} \exp(x_i(t)'\beta)\gamma(t) \end{aligned} \tag{4}$$

where c_i is an indicator variable that equals to 1 if the spell is completed and 0 if it is censored.

The spells that come under observation after having been exposed to the risk of the event (exit business) for some time are left-truncated (see Guo, 1993; Jenkins, 1995). The typical problem of left-truncation is sample selection. The left-truncated cases, sampled at the beginning of the observation period, tend to over-represent low-risk cases among any given cohort. In our context this implies that from all those who entered entrepreneurship at a given

date the stock that we observe at the beginning of our sample period is dominated by those successful enough to survive up to that point. Treating the left-truncated spells as standard spells leads to underestimation of the hazard rates at shorter durations. To take into account this source of bias we modify the likelihood function by conditioning the transition rates on the length of business operation at the first interview date. Therefore, each spell is weighted according to the elapsed period until it is observed, which corrects for the sample selection bias. We are able to do so since the data provide the exact starting date for each particular business. Suppose that an individual i enters the survey j months after having started a business and runs it for another k_i months, completing a total duration of $d_i = j_i + k_i$ months in entrepreneurship, that can be either censored or uncensored. The individual likelihood contribution for the left-truncated spells becomes

$$L_i = c_i \ln h_i(d_i) + \sum_{t=j_i+1}^{d_i-1} \ln[1-h_i(t)] = \\ c_i \ln\{1-\exp[-\exp(x_i(d_i)'\beta)\gamma(d_i)]\} - \sum_{t=j_i+1}^{d_i-1} \exp(x_i(t)'\beta)\gamma(t) \tag{5}$$

The log-likelihood, which is the sum of these contributions both for the inflow and the stock sample, is maximized with respect to β and a full set of γs to provide maximum likelihood estimates.

We extend the above model to take into account competing risks. As Narendranathan and Stewart (1993) show, if distinct destination states depend upon disjoint subsets of parameters, the parameters of a state-specific hazard can be estimated by treating durations finishing into other states as censored at the time of exit. We focus on the distinction between transitions to paid employment and to non-employment, which includes both unemployment and inactivity.[8] For each specific transition we treat exit to the other state as censored spells. Therefore, the semi-parametric hazard specification in (4) and (5) used for the single-risk model can be applied for the transitions to employment and to non-employment, respectively.

[8] Due to sample size limitations we do not distinguish in what follows between unemployment and inactivity.

5. Empirical Results

We first provide estimates from a logistic regression on the determinants of starting up a business. Although the innovative part of our study is the analysis of the survival into entrepreneurship and of exits to different states, for consistency with the existing literature we also look at the determinants of entry into entrepreneurship and the extent to which they differ among various immigrant groups and the U.S.-born.

In each estimated model we distinguish between the foreign-born (Mexican, other Hispanic, Asian and European) and the U.S.-born descendants of immigrants, so that the reference group comprises non-Hispanic whites.[9] We control for the effect of years since migration (YSM) in a flexible way using a set of dummies for 5-10, 10-30 and more than 30 years in the U.S. Since these apply only to the foreign-born, the main immigrant effect in our tables represents recent immigrants who have arrived in the U.S. in the last 5 years. For completeness, we present apart from the coefficient estimates and corresponding standards errors, the associated average marginal effects (AME) along with their significance. Calculating and reporting AME allows economically meaningful interpretations and comparisons across models.[10]

5.1 Transitions into Entrepreneurship

The sample in the entry model consists of all the individuals who do not own a business and we estimate the determinants of the probability to enter into entrepreneurship in the following wave. Results from Table 2 suggest that there is no significant difference in the entry rates between immigrant ethnic groups and the non-Hispanic whites (reference group). The coefficient estimates and the AME of U.S.-born groups also imply insignificant differences.

[Table 2 about here]

[9] We also include a dummy for African-Americans to distinguish them from the reference group.
[10] We only report in tables the estimates of a selected number of controls. The estimates of the other variables are available in Georgarakos and Tatsiramos (2007).

This finding is consistent with existing evidence of no differences in the entry rates among ethnic and racial groups. Lofstrom and Wang (2006), who also employ SIPP data, do not find any significant effects, in accordance with the effects reported in Table 2. In addition, Fairlie (2005) shows that among Latinos, immigration is not associated with significantly higher rates of entry. In terms of other characteristics, a college degree and being previously unemployed or inactive significantly encourage entering into entrepreneurship.[11] The higher entry rate of unemployed and inactive individuals suggests entrepreneurship as a possible way out of non-employment. The effect is larger for unemployed suggesting an increase to the probability of entering into entrepreneurship by about 2%.

We have further investigated this pathway through business ownership by estimating the probability to become an entrepreneur by ethnic group and immigrant status.[12] In line with the reported results from the pooled sample of Table 2, the average marginal effects of being foreign born for each ethnic group are not significantly different from zero. We find, however, differences in the effect of previous labor market status. In particular, Mexicans and other Hispanics, who are not employed, are significantly more likely to start up a business but this is not the case for Asians and Europeans. For Mexicans, being unemployed increases the entry probability by 1.6% and for other Hispanics by 5.0%. We will investigate later the association between the original labor market state and the subsequent, following the transition out of entrepreneurship, employment status in order to understand the extent to which business ownership represents a stepping stone from non-employment to paid-employment.

5.2 Transitions out of Entrepreneurship

5.2.1 Logistic Estimates

[11] The corresponding AME, although significant, are quite small in magnitude given that they refer to the probability of starting up a business in the next quarter.
[12] These estimates are not reported here for brevity but are available in Georgarakos and Tatsiramos (2007).

Turning to the analysis of the determinants of the exit probability and the extent to which they differ across immigrant groups as well as between first and second generation, we first perform a static logit analysis that does not impose too much structure in the empirical model and is broadly used in the empirical literature. Logit analysis, however, does not capture duration dependence and does not take into account left truncation and right censoring, which might lead to biased estimates. The probability of exiting within a particular period can be written as: $\Pr(t \geq t_r) = 1/(1+e^{x'\beta})$ and $\Pr(t < t_r) = (e^{x'\beta})/(1+e^{x'\beta})$, where t is the completed duration of business ownership, t_r is a threshold (1, 2, 3, or 4 years), x is a vector of explanatory variables, and β is a vector of unknown parameters to be estimated.

In Table 3 we present the coefficient estimates and AME of the logit model estimated on a sample of all existing business spells where the dependent variable equals to one if an exit occurs within the period defined by the threshold t_r. All foreign-born recent immigrant groups show higher exit rates compared to non-Hispanic whites. The effects are sizeable with magnitudes between 14%-21%. With regard to the U.S.-born descendants of immigrants, we observe significant and positive effects for Mexicans and other Hispanics.

[Table 3 about here]

These effects are in line with findings reported by Fairlie (2005). Based on logit regressions for the probability to exit from self-employment using the Current Population Survey his findings suggest that there appears to be no difference in transition rates out of self-employment between native and immigrant Latinos and that white immigrants have high exit rates relative to white natives. The effects with respect to the other covariates suggest that those who are older, more educated, married, wealthier, run small businesses, and live in states with high unemployment rates are less likely to exit from entrepreneurship.

5.2.2 Hazard Estimates

In order to illustrate the importance of taking into account left truncation, we estimate the hazard model outlined in section 4 under two different scenarios. In the first, we ignore the information on the starting date of the business, as if it was not known, while in the second, we condition on the elapsed duration as described in (5) for the left truncated spells.[13]

Estimates not controlling for selection

The hazard estimates for the immigrant groups without controlling for selection, reported in Model 1 of Table 4, suggest quite similar results with the logit estimates. The corresponding AME show significant effects for each of the immigrant groups we consider with magnitudes varying between 17%-24% for recent immigrants.

One important difference between the static and the dynamic analysis that becomes evident (by comparing the logit estimates of Table 3 with Model 1 of Table 4) is that the observed disparities in survival across immigrant groups do not carry on to the U.S.-born descendants. Both the coefficient estimates and the marginal effects suggest that U.S.-born Mexican and other Hispanic do not exhibit significantly different exit rates relative to the reference group. The AME for Mexicans is 5.2% and for other Hispanics is 3.5%. Both of them are lower than the corresponding marginal effects from the static logit estimation in Table 3 and are not significant. Moreover, they differ from previous studies that report significantly higher exit rates for both immigrant and native born Latinos.

The main difference between the static and the dynamic duration model that does not correct for selection due to left truncation is that the latter takes into account right censoring. In a static logit regression the indicator variable of exit within a certain period (e.g. 1 year) is zero for the ongoing spells. Thus, the results can be sensitive to differences in the censoring rates among groups, since those groups with a lower share of right censored spells will appear as having relatively higher exit rates that are only due to the sampling scheme. Indeed, the

[13] The controls are the ones which are used in the logit analysis, except that we now capture economic wide effects by using a time-varying state unemployment rate in the discrete hazard model, compared to the unemployment rate at the beginning of the spell which is used in the logit model.

U.S.-born descendants of immigrants in our data exhibit lower right-censoring rates (63.9%) compared to natives (67.8%), and such rates are particularly low for U.S-born Mexicans and other Hispanics (63.8% and 64.8%, respectively) compared to Asians (69.7%).

[Table 4 about here]

Estimates controlling for selection

Model 2 in Table 4 reports the hazard estimates and the AME when we take into account both right-censoring and the selection bias induced by left truncation. The findings suggest that there are differences in the hazard rates across different immigrant groups. In particular, foreign-born Mexicans and other Hispanics exhibit significantly higher exit rates, while those of Asians and Europeans do not differ significantly from the reference group, which comprises non-Hispanic whites. In particular, for the recent Mexican and other Hispanic immigrants the AME is 13% and 12%, respectively. Overall, we observe lower effects for all the immigrant groups when we control for the selection bias due to left-censoring.

The results deviate from the earlier estimates (Model 1) that did not account for the sample selection due to stock sampling. The selection bias arises from the fact that those with lower abilities tend to exit faster and thus the more successful entrepreneurs are more likely to be observed at a *given* point in time. This means that the results can be quite sensitive to differences in left-truncation rates among groups. By not taking into account this selection we tend to estimate higher exit rates for groups with lower left-truncation rates. This happens because at a given point in time they are compared to groups that exhibit higher left-truncation rates and mostly consist of individuals with higher entrepreneurial ability on average, who are actually less likely to exit from business. Indeed, the foreign-born in our data exhibit the lowest left-truncation rates (57%) followed by the U.S. born descendants of immigrants (61.1%) and the natives (71.8%). This is not surprising since immigrants have been on average fewer years in the U.S. and have therefore a higher share of recently started businesses in the sample.

To summarize, the above comparisons show how much different results can be obtained when one relies on static logit models that ignore left truncated spells and right-censoring, and it points to an issue that seems to be overlooked by the existing empirical literature on business survival of various racial and ethnic groups. In contrast to previous studies (Fairlie 2005; Lofstrom and Wang 2006) we find that both foreign born Mexican and Other Hispanic exhibit higher exit rates compared to white non-Hispanic but this is not the case for Europeans or Asians. In addition, we show that this difference does not carry on to their U.S. born descendants. Finally, African-Americans is the only group among the U.S-born individuals with a significantly higher exit rate from entrepreneurship, which is in line with existing evidence of low self-employment rates among blacks and a higher exit rate from self-employment (Fairlie 1999, 2005).

Regarding the effect of other characteristics, age, education, and being married have a significantly negative effect on the exit rate from entrepreneurship. In particular, an additional year of age lowers the hazard at a decreasing rate, while being a college graduate has the largest negative impact. Wealthier entrepreneurs are also less likely to exit. This effect points on the importance of economic resources and on the relevance of liquidity constraints, that the less well to do are more likely to face, in business survival. [14] While high unemployment rates at the state level were found to be a pushing factor for starting up a business, they no longer affect the survival into entrepreneurship. Finally, the duration dependence coefficients show a non-linear effect of the elapsed time in entrepreneurship on the exit rate. The hazard rate is increasing at the beginning of the spells and declines as the spells last longer.

5.2.3 Competing Risk Model

[14] We have estimated the model without controlling for wealth and income and the results were not altered. In fact, the effects for the immigrant groups become even stronger. The reason is that Mexican and other Hispanics have on average lower wealth and income levels so when we do not control for them the effect is picked up by the immigrant group dummies.

Having shown a higher exit rate from entrepreneurship for Mexican and other Hispanic immigrants, we go a step further in our analysis by investigating the nature of these transitions. Based on the logit estimates for entry in section 5.1, we have seen that unemployed and inactive individuals are more likely to enter into entrepreneurship suggesting non-employment as a pushing factor, which was found to be more prevalent for Mexicans and other Hispanics. We extend our hazard model into a competing risk framework where we consider transitions from business to either employment or non-employment, as described in section 4.[15] This is informative to the extent to which the observed higher exit rates for certain groups are associated with higher failure rates or with transitions to paid employment.[16]

Models 3 and 4 in Table 4 report coefficient estimates and associated AME for the transitions to paid employment and for the transitions to non-employment, respectively. The findings suggest that the high transition rates of Mexican and other Hispanic out of entrepreneurship are directed towards paid-employment and not towards non-employment. The AME for the transitions to paid employment is 23% for Mexicans and 17% for other Hispanics recent immigrants. Interestingly, the opposite holds for African-Americans, where the AME is 13% and significantly different from zero for exits from entrepreneurship to non-employment.

5.3 Sensitivity Analysis

We first investigate the sensitivity of our results by relaxing the maintained assumption that all heterogeneity is due to observed variables. We assume that unobserved heterogeneity can be represented by the introduction into the hazard function of a stochastic disturbance term v, with density function $f_v(\,)$,which is independent of the factors that determine the hazard

[15] Controlling for past labor market status in the hazard model is not possible as we do not have this information for the left truncated spells. That is, the spells for business that started before the first available wave in 1996. In the entry model this information is available as the sample which is used is conditioned on being either into paid-employment or non-employment. Focusing only on the inflow sample (the fresh spells) reduces the sample size so dramatically that any similar analysis is not feasible.

[16] We do not make a distinction by the reason for exiting the business because this information is not available for all the observed spells in the sample leaving very few observations for the immigrant groups.

function. Following a widely used approach of duration analysis in labor economics that is based on Heckman and Singer (1984), we do not impose a distributional assumption on v, which allows the distribution to be asymmetric. The distribution of unobserved heterogeneity $f_v(\ )$ is assumed to be discrete with two points of support p_1 and p_2, where:

$$\Pr(v = v_a) = p_1 \qquad \Pr(\mathrm{v} = v_b) = p_2 = 1 - p1 \tag{6}$$

which is supposed to have a logit specification with $p_1 = \frac{e^{a_1}}{e^{a_1} + e^{a_2}}$, and α_2 is set equal to zero for normalization. The unobserved effect is removed by taking expectations

$$L_i = E_v[L_i \mid v_i] \tag{7}$$

For the model that takes into account left truncation unobserved heterogeneity was not found to be significant. We have also estimated the model under the assumption that the unobserved term follows the gamma distribution. Again, we did not find any significant unobserved heterogeneity as the variance of the heterogeneity term was zero.

We also evaluate the sensitivity of our main results with respect to the way duration dependence is specified. To this end we have allowed a flexible specification for duration dependence based on the piece-wise exponential form which was common for all groups. Since the effect of time on entrepreneurship might differ between immigrants and the U.S.-born, we allow for specific-group duration dependence. We have defined 12-month interval dummies (instead of 6-month) in order to facilitate an adequate number of observations in each cell. Allowing for group-specific duration dependence does not affect our main findings for the two foreign-born immigrant groups (Mexican and other Hispanic) and for African-Americans, while again no effect was found for the U.S-born descendants of immigrants. Interestingly, capturing the spikes of the hazard for the U.S.-born immigrants as shown in Figure 1, we observe lower effects for this group. In addition, allowing for group-specific unobserved heterogeneity it turned out, once again, not to be significant. Finally, we have checked the sensitivity of our results by restricting the sample used in the estimation to those

aged 20 to 55, in order to preclude exits due to retirement. Once again the findings are qualitatively similar to those we present. [17]

5.4 Simulations

Using the coefficient estimates of Model 2 in Table 4, we simulate the survival function for different ethnic groups by nativity. The simulation is performed for a reference individual with the following characteristics: aged 40, high school drop out, married, operating in the transportation sector with a small size business in an urban area. The number of children, wealth, income and the state unemployment rate are fixed at the respective means.

The top left panel of Figure 3 shows the simulated survival function of foreign-born vs. U.S.-born. The U.S.-born are distinguished between U.S.-born with immigrant descent, African American and non-Hispanic white. The foreign born with African Americans exhibit the lowest survival. After 2 years (24 months) about 50% of the entrepreneurs in these two groups still survived in business, while the corresponding figure for the U.S.-born descendants of immigrants is close to 60% and for the non-Hispanic white the survival rate is above 60%. The top right panel of Figure 3 depicts the simulated survival function of foreign born by origin. We observe that the overall low survival rate of foreign born is due to the low survival of Mexican and other Hispanic immigrants. Finally, the third panel of Figure 3 depicts the simulated survival function of U.S.-born descendants by ethnic origin and the African Americans. We observe that the differences across groups are less pronounced especially during the first year of survival. Moreover, the survival functions for the U.S-born descendants are shifted upwards compared to the foreign-born, so that at a given duration there is a higher survival rate. African Americans and other Hispanics exhibit the lowest survival followed by Mexicans, while Asians and non-Hispanic whites have the highest survival rates.

[17] These results are available upon request.

[Figure 3]

6. Conclusion

This paper investigates the survival dynamics in entrepreneurship among immigrant groups to the U.S. and their descendants. We adopt a modeling framework based on duration analysis, which is more appropriate in the current context compared to the broadly used static discrete choice models. We do so by utilizing information available in the SIPP on the date of starting up a business, which allows us to construct the exact survival duration into entrepreneurship. Our estimation takes into account the fact that the stock of entrepreneurs initially observed represents a selected sample (left-truncated) that is dominated by those successful enough to survive up to that point. In addition, we correct for right censoring, namely the inability of observing in the data the exit time for some spells. Given the differences in left truncation and right censoring rates between foreign born and natives we show that ignoring such mechanisms can have an important effect on the estimation results.

We find a lower survival probability in entrepreneurship for Mexicans and other Hispanics compared to non-Hispanic whites. However, such differences in survival do not carry on to the U.S.-born descendants of these two immigrant groups, suggesting that they experience similar self-employment patterns with natives. Investigating further these transitions, we find that Mexican and other Hispanic immigrants tend to enter entrepreneurship from unemployment or inactivity, and they are more likely to exit towards employment in the wage sector. However, African-Americans who also exhibit a lower survival in entrepreneurship, show a higher propensity to exit to non-employment.

These results contribute to our further understanding of the observed differences in self-employment rates among racial and ethnic groups. For Mexicans and other Hispanics, entrepreneurship seems to represent an intermediate step from non-employment to paid employment, which is not the case for African-Americans. These findings suggest that interpreting exits from entrepreneurship as failures without having identified the dynamics of these transitions across labor market states and in particular the reason of exit and the

destination state may be misleading. Data with more details on the precise reason of exit are necessary and this seems a promising direction for future research given the heterogeneity that different immigrant groups display with respect to the two aggregate exit states that we were able to examine. Exploring differences in wages and well-being that such transitions imply can intuitively complement the above analysis.

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Appendix A

We compute reported marginal effects in the following way. We start by estimating the relevant limited dependent variable model. We then simulate the model parameters by making 150 independent draws from the multivariate normal distribution, subject to the restrictions that the average of simulated values be equal to the respective estimated parameter and that the structure of the estimated robust variance covariance matrix be preserved. For a given set of simulated parameters, we calculate marginal effects for each individual household and then derive the average marginal effect from the relevant sample using survey weights. We repeat the process for every set of simulated parameters, thus computing a series of average marginal effects. The mean of this series is the estimated average marginal effect and the standard error is the simulated standard error of the marginal effect. With regard to the duration models, marginal effects refer to the cumulative probability of exiting from entrepreneurship over a 12 month period.

With the above process we try to avoid some pitfalls involved in automatic computation of marginal effects evaluated at the mean characteristics by standard econometric software, which have recently been emphasized.[18] Although it is quite common practice to report such marginal effects, this is often not economically relevant and sometimes even misleading. One typical example is the inability to distinguish variables interacted with other regressors.[19] This is relevant to our empirical specification given that the immigrant status is implicitly interacted with the dummies representing years since immigration. Deriving averages of marginal effects that have been first evaluated at each single observation can provide instead a more realistic and economically relevant interpretation.

[18] There is growing discussion of these issues and an effort to provide codes that circumvent some inefficiencies of standard software packages (see, for instance, King et al., 2003; and Bartus, 2005). Brambor et al. (2005) discuss models with interactions and point to problems in empirical literature.

[19] They also fail to distinguish among single dummy variables and groups of dummy variables that represent a given attribute; or properly evaluate effects of continuous variables entering with particular nonlinear forms.

Figure 1. Empirical Hazard Estimates

[See Figure1.eps file]

Source: SIPP (1996), authors' calculations.

Figure 2. Empirical Survival Functions

[See Figure2.eps file]

Source: SIPP (1996), authors' calculations.

Figure 3. Simulated Survival Functions by Ethnic Groups

[See Figure3.eps file]

Source: SIPP (1996), authors' calculations.

Table 1. Characteristics of Individuals Experiencing Spells of Self-Employment.

	U.S.-Born		Foreign-Born		Mexican	
Number of Spells	4094		473		107	
Variables	Mean	S.D	Mean	S.D	Mean	S.D
Age	41.55	10.77	41.21	10.61	38.32	9.99
High School Drop out	0.087	0.281	0.219	0.414	0.611	0.490
High School	0.284	0.451	0.263	0.441	0.136	0.344
College beyond High School	0.290	0.454	0.252	0.434	0.203	0.404
College Graduate	0.340	0.474	0.267	0.443	0.050	0.219
Married	0.672	0.469	0.705	0.457	0.742	0.440
Number of Kids	1.062	1.214	1.359	1.189	2.026	1.362
Business Equity	6.359	18.707	3.967	12.918	1.231	4.418
	Median		Median		Median	
Wealth	12.455		6.627		1.630	
Income	0.561		0.477		0.307	

	Other Hispanic		European		Asian	
Number of Spells	104		127		135	
Variables	Mean	S.D	Mean	S.D	Mean	S.D
Age	40.20	10.06	43.53	10.94	42.11	10.70
High School Drop out	0.211	0.410	0.095	0.294	0.047	0.213
High School	0.350	0.479	0.237	0.427	0.310	0.464
College beyond High School	0.264	0.443	0.328	0.471	0.200	0.402
College Graduate	0.175	0.381	0.341	0.476	0.443	0.499
Married	0.620	0.488	0.749	0.435	0.698	0.461
Number of Kids	1.116	1.098	1.077	1.045	1.325	1.051
Business Equity	3.146	11.524	3.866	8.597	6.243	17.853
	Median		Median		Median	
Wealth	3.152		16.217		12.484	
Income	0.396		0.578		0.557	

Note: SIPP 1996. Wealth, Income and Business Equity are measured in 10,000's dollars in 1996 prices.

Table 2. Logit Estimates - Entry into Entrepreneurship

	COEF.	S.E	AME	
Foreign-Born				
Mexican	-0.009	0.200	0.0003	
Other Hispanic	-0.035	0.178	0.00003	
Asian	0.114	0.172	0.002	
European	0.127	0.181	0.002	
Years since Migration 5-10	0.146	0.212	0.002	
Years since Migration 10-30	0.010	0.166	0.0002	
Years since Migration 30+	0.149	0.240	0.002	
U.S.-Born				
Mexican	-0.135	0.121	-0.002	
Other Hispanic	0.128	0.155	0.002	
Asian	-0.132	0.239	-0.001	
African American	-0.076	0.084	-0.001	
High School	0.005	0.079	0.00003	
College beyond High School	0.075	0.079	0.001	
College Graduate	0.299	0.080	0.004	***
HH Wealth	-0.002	0.003	-0.0003	
HH Income	-0.102	0.012	-0.019	***
Previously Unemployed	0.952	0.089	0.018	***
Previously Inactive	0.410	0.067	0.006	***
Constant	-4.356	0.150	-	***
Log-Likelihood		-11825.08		
Observations		175229		

Note: The table reports coefficient estimates (COEF), robust standard errors (SE), average marginal effects (AME) and their significance based on simulated standard errors (***, **, * denote significance at 1%, 5% and 10%, respectively). The sample consists of all individuals who do not own a business in a given wave and the model estimates the probability of starting up a business during the quarter until the next wave. The specification includes controls for age, marital status, number of children, urban residency, state unemployment rate and year dummies. The marginal effects for the Years since Migration groups provide the effect for being in each of these groups relative to being a recent immigrant. The marginal effects for income and wealth are based on a $5000 increase in the underlying variables.

Table 3. Logit Estimates - Exit from Entrepreneurship.

	≤ 1year				≤ 2year				≤ 3year				≤ 4year			
	COEF.	S.E	AME		COEF.	S.E	AME		COEF.	S.E	AME		COEF.	S.E	AME	
Foreign-Born																
Mexican	0.471	0.431	0.053		1.081	0.450	0.146	**	0.945	0.439	0.134	**	1.412	0.432	0.209	***
Other Hispanic	0.169	0.519	0.015		1.184	0.418	0.158	**	0.763	0.434	0.103	**	0.821	0.429	0.125	*
Asian	0.471	0.429	0.059		1.165	0.403	0.155	**	0.738	0.410	0.099		1.156	0.397	0.171	***
European	0.591	0.475	0.047		1.557	0.461	0.214	***	1.321	0.467	0.187	***	1.636	0.441	0.243	***
Years since Migration 5-10	0.108	0.494	0.018		-1.040	0.468	-0.113	**	-0.546	0.468	-0.068		-1.052	0.460	-0.147	**
Years since Migration 10-30	-0.571	0.413	-0.043		-1.160	0.398	-0.121	***	-0.804	0.404	-0.097	**	-1.076	0.394	-0.144	***
Years since Migration 30+	-0.955	0.588	-0.072	*	-1.617	0.532	-0.160	***	-1.406	0.507	-0.168	***	-1.600	0.487	-0.216	***
U.S.-Born																
Mexican	-0.008	0.300	-0.002		0.588	0.275	0.081	**	0.443	0.265	0.068	*	0.279	0.254	0.047	
Other Hispanic	0.366	0.348	0.039		0.721	0.323	0.092	**	0.726	0.346	0.102	*	0.353	0.331	0.051	
Asian	-1.164	0.839	-0.082		-0.133	0.456	0.012		-0.859	0.455	-0.079		-0.400	0.484	-0.038	
African American	-0.296	0.228	-0.025		-0.069	0.206	-0.006		0.089	0.190	0.014		0.078	0.182	0.013	
High School	-0.450	0.167	-0.049	**	-0.378	0.151	-0.051	**	-0.253	0.141	-0.039	*	-0.228	0.135	-0.041	*
College beyond High School	-0.320	0.168	-0.038	*	-0.208	0.151	-0.031		-0.206	0.141	-0.033		-0.137	0.135	-0.027	
College Graduate	-0.751	0.188	-0.080	***	-0.449	0.167	-0.063	***	-0.364	0.155	-0.058	**	-0.343	0.147	-0.064	**
HH Wealth	-0.021	0.006	-0.020	***	-0.022	0.006	-0.027	***	-0.026	0.005	-0.037	***	-0.028	0.005	-0.047	***
HH Income	-0.091	0.026	-0.113	***	-0.099	0.026	-0.149	***	-0.098	0.025	-0.159	***	-0.104	0.024	-0.182	***
Constant	3.361	0.353	-	***	3.569	0.338	-	***	3.457	0.322	-	***	3.552	0.319	-	***
Log-Likelihood	-1458.36				-1849.97				-2067.20				-2321.56			
Observations	4567				4567				4567				4567			

Note: The table reports coefficient estimates (COEF), robust standard errors (SE), average marginal effects (AME) and their significance based on simulated standard errors (***, **, * denote significance at 1%, 5% and 10%, respectively). The sample consists of all existing business spells and the model estimates the probability of exiting in the period mentioned in each column. In each estimation we include controls for age, marital status, number of children, industry dummies, size of business, urban residency, state unemployment rate and year dummies. The marginal effects for the Years since Migration groups provide the effect for being in each of these groups relative to being a recent immigrant. The marginal effects for income and wealth are based on a $5000 increase in the underlying variables.

Table 4. Discrete Hazard Estimates for Spells of Entrepreneurship.

	(1)				(2)				(3)				(4)			
	No Left-Censoring				***Controlling for Left-Censoring***											
	Single Risk				*Single Risk*				*Competing Risk*							
									To Paid-Employment				To Non-Employment			
	COEF.	S.E	AME		COEF.	S.E	AME		COEF.	S.E	AME		COEF.	S.E	AME	
Foreign-Born																
Mexican	1.000	0.227	0.239	***	0.490	0.233	0.133	**	0.802	0.274	0.229	***	-0.181	0.441	-0.031	
Other Hispanic	0.774	0.252	0.180	***	0.428	0.260	0.117	*	0.596	0.316	0.173	**	0.019	0.473	0.013	
Asian	0.746	0.253	0.173	***	0.234	0.240	0.064		-0.141	0.320	-0.043		0.703	0.428	0.176	
European	0.792	0.264	0.184	***	0.084	0.291	0.019		0.217	0.342	0.061		-0.262	0.557	-0.040	
Years since Migration 5-10	-0.468	0.277	-0.087	*	-0.160	0.268	-0.050		-0.051	0.313	-0.011		-0.496	0.574	-0.081	
Years since Migration 10-30	-0.807	0.224	-0.141	***	-0.424	0.227	-0.137	*	-0.587	0.279	-0.171	**	-0.055	0.412	-0.003	
Years since Migration 30+	-0.527	0.298	-0.096	*	0.153	0.335	0.045		-0.004	0.401	0.003		0.534	0.568	0.151	
U.S.-Born																
Mexican	0.248	0.189	0.052		0.159	0.181	0.045		0.051	0.228	0.014		0.317	0.313	0.075	
Other Hispanic	0.145	0.264	0.035		0.237	0.234	0.070		0.281	0.281	0.088		0.144	0.483	0.047	
Asian	-0.130	0.345	-0.020		-0.027	0.317	-0.011		0.030	0.369	0.010		-0.194	0.684	-0.018	
African American	0.157	0.117	0.032		0.225	0.107	0.067	**	0.079	0.139	0.024		0.486	0.175	0.118	***
High School	-0.207	0.099	-0.048	**	-0.169	0.098	-0.055	*	0.092	0.132	0.027		-0.534	0.154	-0.153	***
College beyond High School	-0.102	0.100	-0.025		-0.201	0.100	-0.065	**	0.143	0.133	0.044		-0.770	0.168	-0.208	***
College Graduate	-0.265	0.110	-0.060	**	-0.373	0.110	-0.122	***	-0.022	0.143	-0.009		-0.976	0.191	-0.251	***
HH Wealth	-0.017	0.004	-0.003	***	-0.012	0.003	-0.003	***	-0.011	0.004	-0.003		-0.014	0.006	-0.003	**
HH Income	-0.024	0.017	-0.006		0.002	0.018	0.001		0.031	0.024	0.011		-0.040	0.028	-0.010	*
Constant	-3.708	0.313	-	***	-3.407	0.289	-	***	-4.544	0.366	-	***	-3.395	0.477	-	***
Log-Likelihood	-8986.42				-7285.53				-5331.71				-2740.33			
Observations	131717				131717				131717				131717			

Note: The table reports coefficient estimates (COEF), robust standard errors (SE), average marginal effects (AME) and their significance based on simulated standard errors (***, **, * denote significance at 1%, 5% and 10%, respectively). In each estimation we include controls for age, marital status, number of children, industry dummies, size of business, urban residency, state unemployment rate, year dummies and duration dependence dummies. The marginal effects for the Years since Migration groups provide the effect for being in each of these groups relative to being a recent immigrant. The marginal effects for income and wealth are based on a $5000 increase in the underlying variables.