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The Ins and Outs of Self-Employment: An Estimate of Business Cycle and Trend Effects

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We examine quarterly microlevel data on labor market transitions taken from the Current Population Survey from 1990 to 2014 to estimate how the business cycle affects transitions into and out of self-employment from other labor market states. We control for individual demographics and occupational influences in our analysis to better pinpoint the effect of demand growth on these transitions. We find that changes in demand conditions substantially influence the marginal rate of transition into and out of self-employment from other labor market states, after taking into account demographic and industrial differences. A contraction in demand has a large effect on self-employment because it alters the balance between self-employment entry and exit. Falling demand leads to an increase in exit from entrepreneurship, but has countervailing effects on entry. While a decrease in demand leads to a decrease in the opportunity cost of entry into entrepreneurship by increasing the rate of unemployment, the entry into entrepreneurship is higher from employment than from unemployment or from out of the labor market. Finally, we find that the effect of changes in demand on self-employment differ for incorporated and unincorporated self-employment.

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Introduction

Does self-employment decline or increase in a recession? To what extent is today's lower self-employment level a reflection of an exceptionally large recession in 2008? These are important questions for economists and policy makers who seek to understand the effects of economic expansions and contractions on the labor market.

While economic research has revealed a great deal about how demand conditions can be expected to affect flows into employment and unemployment (Elsby and Solon, 2009, and Shimer, 2012), we have very little insight into how economic expansions and contractions affect self-employment. However, approximately ten percent of those in paid employment are self-employed, and entry into and exit from self-employment occur for different reasons than entry into and exit from wage employment (Shane, 2008), making this absence of information an important omission from our understanding of labor markets.

Recent work and the greater availability of business register data have highlighted the strong cyclical patterns of business starts and raised questions about the impact of the 2007 recession and the financial crisis on employment (Gourio, Messer, and Siemer, 2016, and Siemer, 2014). Notably, Siemer (2014) identifies a missing generation of new firms following the 2007 recession and connects financing constraints for new firms with weaker employment growth in smaller firms. Using the age composition of firms, Pugsley and Sahin (2015) connect weaker employment growth patterns with the increased share of "mature" firms relative to startups. These works offer a reason for some of the changes in labor market dynamism or fluidity noted in Davis and Haltiwanger (2014) and further explored in Molloy, Smith, Trezzi, and Wozniak (2016).

While the hiring patterns of new firms are the focus of these works, the works also suggest the importance of understanding the connection between economic conditions and entrepreneurial activity. The decision to enter into or exit from self-employment is influenced not just by the attributes of the individual making the decision but also the labor market conditions at the time of the choice. With the notable exception of Fairlie (2014), there has been little work on the cyclical patterns of self-employment that goes beyond aggregate time series.

The lack of research on self-employment is problematic. Not only do we not know the magnitude of the effect of a decline in economic output on the fraction of the people in the labor force who work for themselves, but also policy makers and researchers do not agree on the direction of those effects. Because entrepreneurship is central to many economic theories and a focus of public policy, understanding the causes of changes in the level of self-employment matters to both policy makers and academics alike. Developing more accurate predictions of self-employment is an important policy question, particularly if policy makers aim to maintain an active business formation process during economic downturns.

The rate of self-employment might vary over time simply as a function of changes in demographics and industrial composition. However, the rate of self-employment also appears to fluctuate with the business cycle.

We address this gap in knowledge by combining two academic approaches to model the level of self-employment: A flows-based analysis of labor market states (e.g, Barnichon and Nekarda, 2012; Elsby, Michaels and Solon, 2009) and individual-level models of the decision to become or cease to be an entrepreneur (e.g., Blanchflower and Oswald, 1998; Holtz-Eakin, Joulfaian, and Rosen, 1994). By combining a gross flows perspective, which focuses on the underlying decisions to take up self-employment or to quit it in favor another labor market state

(unemployment, employee, out of the labor force), with an older approach to entrepreneurship that focuses on industry, occupational, and demographic factors on the decision to enter or exist entrepreneurship, we better predict entrepreneurial entry and exist because both margins are important, particularly in a cyclical downturn. Specifically, we use a Markov model supplemented with trend factors to identify the impact of cyclical factors on changes in the rate of incorporated self-employment, net of demographic, industry, and occupational factors. This model is applied to quarterly micro-level data on labor market transitions taken from the Current Population Survey from 1990 to 2014.

We find that cyclical economic activity indicators statistically-significant influence the marginal rate of transition into and out of self-employment from other labor market states, but so too are many demographic and industrial differences, often with higher statistical confidence. But because the numbers of people transitioning into and out of self-employment are normally similar and offsetting, cyclical factors can lead to large changes in the number of people who are self-employed.

More importantly, we find that cyclical factors have contributed to recent low levels of self-employment. Most of the time, gross entry and exit are large, but in relative balance. As a result, net entry into self-employment is relatively small (Hipple, 2010). However, a contraction in demand alters the balance between entry and exit, which results in a large effect on self-employment. Decreasing demand leads to an increase in exit from entrepreneurship but has countervailing effects on entry. While a decrease in demand leads to a decrease in the opportunity cost of entry into entrepreneurship by increasing the unemployment rate, the entry into entrepreneurship is higher from employment than from unemployment or from out of the

labor force. Finally, we find that the effect of changes in demand on self-employment differ for incorporated and unincorporated self-employment.

The association between levels of aggregate demand and levels of entrepreneurship might exist because economic downturns lead to reduced entry into entrepreneurship or because they lead to increased exit from it or both. For policy makers to intervene to offset the downward pressure of an economic downturn on self-employment, they need to quantitative estimates of both of entry into self-employment and exit from it. On the entry side, this implies identifying which transitions are most affected by a decline in demand: the transition from wage employment to self-employment, the transition from unemployment to self-employment, or the transition to self-employment from outside of the labor force. Similarly, on the exit side, it is important to identify which transitions are most affected by a fall in demand: the transition from self-employment to wage employment, the transition from self-employment to unemployment, or the transition from self-employment to outside the labor force. Furthermore, the value of any policy intervention depends on whether the patterns described above apply to incorporated self-employment, unincorporated self-employment, or bot. Those who have decided to incorporate (or will) may transition very differently than those for who have (or will) remain unincorporated.

In our analysis, we find that entry into self-employment is enhanced during economic expansions, and exit from it is reduced. Meanwhile, exit from self-employment rises during economic downturns, and entry into it declines.

2.0 Background and Previous Literature

Recent work on the effects of entrepreneurship treats entrepreneurship as a more or less exogenous process, which boosts the employment of others. Gourio, Messer, and Siemer (2016)

and Siemer (2014) highlight the potential role of entrepreneurship on employment growth in business cycles. They also show that recent patterns of reduced entrepreneurship may be altering employment growth patterns in the current recovery. Pugsley and Sahin (2015) connect the aging of firms in the United States, due to significantly reduced numbers of young firms, with changes in employment dynamics. In particular, they find less churning in labor markets.

In contrast with the models of the positive implications of entrepreneurship, early models of self-employment focused on self-employment as an alternative to unemployment, which suggests an inverse relationship between self-employment and demand growth. Dubbing this effect the "recession-pull hypothesis," some researchers argue that the probability of self-employment will rise when demand decreases because "both decreased expected earnings in paid employment and a higher probability of unemployment imply a lower reservation wage for self-employment" (Von Grieff, 2009: 556). Indirect evidence offers some support for this argument. Laid-off workers are between two and three times as likely as those who retain jobs to become self-employed (von Greiff, 2009).

However, even if economic downturns decrease expected earnings from wage employment and, therefore, lower the reservation wage for self-employment, this effect does not necessarily imply that self-employment will increase during economic downturns. Evaluating whether self-employment figures will increase when demand shrinks also requires consideration of three other important factors: which labor market states people are transitioning into and out of; the magnitudes of baseline labor market transitions between different labor market states, and the effect of demand on transitions out of self-employment as well as transitions in. The opportunity cost of transition into and out of self-employment should depend very much on the states people are transitioning between.

The empirical literature on self-employment focuses largely on individual and industry factors that influence the transition to and from self-employment. Wagner (2003) explains that personality and attitudes affect the probability that people will transition to self-employment. Koellinger, Minniti and Schade (2007) identify overconfidence as a prime psychological factor. Van Praag and Cramer (2001) explain that entrepreneurial ability and risk attitude affect the transitions into self-employment.

Shane (2008) documents the high level of variation across industries and occupations in self-employment activity, and explains that the industry in which people are working and the occupations they have chosen have a large effect on their odds of becoming self-employed. Hipple (2010) explains that demographic factors, such as age, race, gender, and education lead to significant differences in self-employment rates among different groups of Americans. Parker (2004) summarizes the economics literature on self-employment and shows that wealth, income, access to health insurance, marital status, and a variety of other individual-level attributes also affect the propensity to become self-employed. Holtz-Eakin, Joulfaian, and Rosen (1994a) and Blanchflower and Oswald (1998) find that access to capital affects the transition into self-employment, while Holtz-Eakin, Joulfaian, and Rosen (1994b) find that access to capital affects transition out of self-employment.

This literature provides important insights into who becomes self-employed. Individual attributes and industry and occupation may account for most of the variation in self-employment. However, the distribution of individual, and their associated industry, and occupational characteristics varies relatively little with the business cycle, even though some sectors are more sharply impacted, because most workers are able to continue in the same sector and occupation. Thus, the variation in self-employment rates observed during economic expansions and

contractions cannot be explained by these factors. Rather, it is likely that expansions or contractions in demand affect entry into and exit from self-employment in ways that account for the variation in self-employment rates across economic conditions. To assess this hypothesis, we examine the effect of variation in demand across industry and time on self-employment entry and exit, controlling for occupation and individual demographics.

3.0 Trends in Self-employment

The number of incorporated and unincorporated self-employed Americans dropped substantially during the Great Recession, and neither form of self-employment has fully rebounded in the subsequent recovery. From November 2007 to June 2009, the Bureau of Labor Statistics (BLS) estimates that the number of incorporated self-employed individuals decreased from 5.8 million to 5.3 million, while the number of unincorporated self-employed people stayed constant at 10.1 million. At the end of 2014, the number of incorporated self-employed individuals stood at 5.7 million, while the number of unincorporated self-employed people was at 9.3 million.

The decline in self-employment during the Great Recession is notable only in its severity. While data limitations preclude us from examining the decline in incorporated self-employment during recessions prior to 2001, we can look at the rise and fall in overall self-employment during those downturns. As Figure 1 shows, self-employment declined as a fraction of the labor force during eight of the ten recessions that the United States has experienced since 1948.

Figure 1 also shows an important split in the self-employment data between incorporated and unincorporated self-employment beginning in 2000. Individuals who are self-employed and respond that the "business is incorporated," are included in BLS statistics for wage and salary

employment, while the unincorporated self-employed are reported separately. With the survey redesign in 1994, the change in the survey process boosted reports of incorporated self-employment (Hipple, 2010). This distinction is important, in part, because the number of incorporated self-employed individuals continued to increase up to the Great Recession and, as we will show, the incorporated self-employed are typically higher skilled, older individuals who may be more representative of the entrepreneurs typically modeled in the literature. In our modeling, we analyze both forms of self-employment, although we think the results for the incorporated should be more relevant to policy makers.

4.0 A Model of the Ins and Outs of Entrepreneurship

The flows approach to labor markets simply recognizes that the law of motion governing a labor market state can be informative about how the levels of labor market states evolve over time after a shock. For example, Barnichon and Nekrada (2012) apply a simple law of motion on the unemployment state to forecast near-term unemployment rates more accurately than a standard time series approach, and Tasci (2012) applies a similar approach to estimate the natural rate of unemployment. To illustrate the implications of the approach on entrepreneurship, consider a simple two-state world in which the population consists of individuals (normalized to 1) who are either self-employed (*S*) or not (~*S*) and transition with probability $\lambda_t^{S,\sim S}$ from *S* to ~*S* and with probability $\lambda_t^{\sim S,S}$ from ~*S* to *S*. The law of motion which governs transition is:

$$S_{t+1} - S_t = -\lambda_t^{S,\sim S}\, S_t + \lambda_t^{\sim S,S}(1 - S_t)$$

With ex post measures of transition that are measured at all times *t*, this law of motion is just an identity that describes the state of entrepreneurship. To make this simple model more

informative, we need reliable statistical models of the transition probabilities, which can be used to project how the self-employment rate responds to changes in the transition probabilities.

In the case of self-employment, we want to further disaggregate the labor market states in order to have a complete model of labor market transition. We draw a distinction between incorporated and unincorporated self-employment because the cost of incorporation and the associated activities of may alter subsequent decisions, along with the ability and interest in maintaining that labor market status. Similarly, the probabilities of moving from being an employee of another entity, from being unemployed, or from being out of the labor force to a self-employment state are likely to be predictably different.

The five labor market states we will consider are: employee, *E*; unemployed, *U*; incorporated self-employment, *I*; unincorporated self-employment (or contractors, to distinguish from unemployed) *C*; and individuals not in the labor force, *N*. Applying this approach to the task of generating laws of motion to and from the larger set of states to the incorporated self-employment states results in:

$$\Delta I_t = I_{t+1} - I_t = -\left(\lambda_t^{IC} + \lambda_t^{IE} + \lambda_t^{IU} + \lambda_t^{IN}\right) I_t + \lambda_t^{CI} C_t + \lambda_t^{EI} E_t + \lambda_t^{UI} U_t + \lambda_t^{NI} N_t$$

Parallel equations are implied for each of the other labor market states. Defining a vector $\mathbf{Y_t} = [I_t, C_t, E_t, U_t, N_t]$, then the transitions are $\mathbf{Y_{t+1}} - \mathbf{Y_t} = \mathbf{A}\mathbf{Y_t}$, where **A**=

$$\begin{pmatrix} -\lambda_t^{IC} - \lambda_t^{IE} - \lambda_t^{IU} - \lambda_t^{IN} & \lambda_t^{CI} & \lambda_t^{EI} & \lambda_t^{UI} & \lambda_t^{NI} \\ \lambda_t^{IC} & -\lambda_t^{CI} - \lambda_t^{CE} - \lambda_t^{CU} - \lambda_t^{CN} & \lambda_t^{EC} & \lambda_t^{UC} & \lambda_t^{NC} \\ \lambda_t^{IE} & \lambda_t^{CE} & -\lambda_t^{EI} - \lambda_t^{EC} - \lambda_t^{EU} - \lambda_t^{EN} & \lambda_t^{UE} & \lambda_t^{NE} \\ \lambda_t^{IU} & \lambda_t^{CU} & \lambda_t^{EU} & -\lambda_t^{UI} - \lambda_t^{UC} - \lambda_t^{UE} - \lambda_t^{UN} & \lambda_t^{NU} \\ \lambda_t^{IN} & \lambda_t^{CN} & \lambda_t^{EN} & \lambda_t^{UN} & -\lambda_t^{NI} - \lambda_t^{NC} - \lambda_t^{NE} - \lambda_t^{NU} \end{pmatrix}$$

A variety of models could be applied to estimate the transition probabilities included in the A matrix. In the labor market flows literature, simple time series models are applied to estimate

the relevant components of the transition probabilities. For this paper, we seek to include both individual characteristics and aggregate influences, including cyclical elements.

The existing literature on self-employment decisions has identified a range of individual characteristics that play a role in determining transition probabilities (for example, age, sex race, and education), which slowly evolve with the population over time. Prior researchers have also noted that there are occupations and industries that are more easily entered by potential entrepreneurs or that remain more prone to layoffs et cetera, which we will treat as the fixed industry component of transition probabilities associated with an individual's current industry and occupation. We identify these factors with X_{it}. Separately, there are potential cyclically varying probabilities associated with the identification and funding of projects, which could vary both by individual *i*'s industry *j* and with time: V_{jt}. Each individual's transition probabilities can be represented as $\lambda_{it}^{AB} = f(X_{it}, V_{jt}: A \rightarrow B)$. The fact that transition probabilities likely vary according to the composition of the current labor market state (i.e., employee or unemployed) implies that the transition probabilities include multiple source of time variation which could induce cyclical patterns including the cyclicality of other states.

We implement this model with a set of five multinomial logit models for each of the source labor market states. A complete transition model can be estimated with the desired controls if individuals are observed in two adjoining years with information on their labor market status in both years. For example, the probability of moving from unemployment to incorporated self-employment (*A*=*U* in period t to *B*=*I* in period t+1) would be estimated as follows:

$$\lambda_{it}^{UI} = \Pr\left(I_{it+1} \middle| U_{it}; X_{it}, V_{jt}\right) = \begin{cases} \dfrac{1}{1 + \sum_{m \in (I,C,E,N)} e^{\beta_{mU} X_{it} + \delta_{mU} V_{jt}}}, if A = U \\ \dfrac{e^{\beta_{SU} X_{it} + \delta_{SU} V_{jt}}}{1 + \sum_{m \in (I,C,E,N)} e^{\beta_{mU} X_{it} + \delta_{mU} V_{jt}}}, if\ B \in (I, C, E, N) \end{cases}$$

To simplify the notation, an *i* subscript implies a specific *j* for all states except *N* (out of the labor force), who have no known industry or occupation and experience. The estimated parameters β and δ are allowed to vary for each transition pair, the original and subsequent states of the worker, but are fixed across time. While the notation is complicated, the estimates are relatively straightforwardly implemented with a multinomial logit for each origin state to yield a consistent estimators of the Markov transition matrix. Given these estimates, the questions about the business cycle that this research explores can largely be formulated in terms of the marginal effect of the sum of the demand effect variable and its lags on the transition probability from a given labor market state to another, at average values of the control variable. We apply standard delta-method techniques to formulate standard errors around these marginal effects associated with these estimates.

5.0 Measuring Entrepreneurship Transitions in the CPS

The most basic measure of entrepreneurship, self-employment, may overstate the number of "true" entrepreneurs by including many people who are acting as independent contractors. On the other hand, focusing only on incorporated self-employment may underestimate the roughly 75 percent of entrepreneurs who use sole proprietorships or partnerships as their legal structure.

Our analysis uses the Current Population Survey to observe transitions in labor force status including self-employment states. This is the same source as the Bureau of Labor Statistics uses in their official labor market flows and self-employment figures. We cannot apply the official statistics and need individually matched survey data to observe transitions in and out of self-employment, because the labor market flows data do not report transitions between all forms of self-employment and other labor market states. In particular, self-employed individuals who describe their businesses as incorporated are typically grouped with those working for other

people (whom we will refer to as employees). In addition, our desire to control for individual characteristics and demand levels for different industries necessitates the use of matched micro data. We matched the survey waves using state, household id, survey period, and then confirmed the person level match with demographic factors in race, age and education.

We construct economic activity measures for each major industries to account for opportunity and possible financing constraints. We do this at the lowest level of analysis possible. The Bureau of Economic Analysis produces only annual breakdowns of gross domestic product by sector. Therefore, we are precluded from more a fine-grained analysis.

Our year-over-year matches achieve an efficiency of approximately 65 percent. This matched household data introduces non-random variation into the data because households sometimes change in non-random manners between surveys. Abowd and Zellner (1985) show that transition data based on the CPS is subject to errors. While we cannot implement their approach for adjusting the data due to a lack of outside references, we systematically adjust the sampling weights to account for the known problem of attrition. Households that are more likely to not report in the second period are also more likely to transition between labor market states than households that stay at the same address and report in the second year. Inevitably, young households are more likely to be excluded from the matched sample than older households. We use the observed frequencies in the unmatched sample to adjust the sample weights: $\ddot{\omega}(age = a, S = s) = \frac{\sum_{unmatch} \dot{\omega}(age=a,S=s)}{\sum_{match} \dot{\omega}(age=a,S=s)} \dot{\omega}(age = a, S = s), \forall a, s$

Where age is a grouped variable and S refers to the labor market status of the individual in the first year of observation. Such an adjustment enforces that the matched sample weights sum to expected population estimates of the unmatched sample. These adjusted sample weights are used throughout the estimation procedures.

While our focus is on self-employment transitions, other employment states do have significant demographic components, which may influence transition rates to and from self-employment.

The fractions of the population for the demographic, occupation, and industry variables are shown for each labor force state in Table 1. It is immediately clear that the demographic, occupation, and industry distributions are quite different in alternative labor market states.

6.0 Results

Most of the time, flows into and out of self-employment are roughly balanced, with individual demographic, occupational, and industry characteristics accounting for much of the predictable variation in who transitions into and out of both self-employment states. Figure 3 shows the baseline transition probabilities applied to the 2003 populations in each labor market state. The baseline is the predicted probability of transitioning from labor market state 1 to labor market state 2, at the average value of all data for individuals who were recorded in state 1 in our estimation sample. The numeric totals are not a specific prediction for flows in 2003 because they account for demographics, industries, or cyclical variation, but they serve to illustrate some patterns implied by the baseline estimates. In particular, the totals illustrate that the number of people transitioning into incorporated self-employment from the other labor market states is roughly equal to the number of people transitioning out of incorporated self-employment states from the other labor market states and, as with most gross flows analyses, the probabilities of movement are far larger than the net changes in the labor market states. However, the baseline transition rates from specific labor market states to and from self-employment states are quite different in order to maintain this balance. For example, the baseline rate of transition, over a one-year period, from incorporated self-employment to wage employment is 22.0 percent, while

the baseline transition rate from wage employment to self-employment is 0.8 percent. Due to the difference in the magnitudes of these probabilities, the flows can be roughly offsetting. There are also differences between outcome states. Incorporated self-employed people are relatively more likely to transition into working for others than out of the labor force or into unemployment. There are also large flows recorded between incorporated and unincorporated self-employment that may reflect challenges for some respondents to answer the incorporation question, but this problem is essentially the same point raised by Abowd and Zellner (1985) and is a reflection of challenges that are a feature of the primary data source on labor force status. This makes us cautious in the interpretation of the levels of transition rates, although the patterns relative to the cyclical variation or trend factors should be less affected by random misreporting.

Table 2 presents the baseline probabilities and marginal impacts of the demographic and industry factors on each of the transition rates to or from incorporated self-employment. The baseline transition rates and many marginal effects are statistically significant. Despite using robust standard errors clustered by quarter and year, the standard errors are at least an order of magnitude smaller than the baseline transition probabilities. The reported coefficients are the estimated marginal impacts of demographic and industry factors at zero for all of the demand variables and at the mean of all other variables. Marginal effects should be compared by applying them first to the relevant baselines in order to account for population differences, which as noted above, leaves flows roughly balanced. Coefficients shown in bold are statistically significant at the 95 percent confidence level.

There is a very strong demographic impact on transition rates to and from incorporated self-employment, as prior literature (Parker, 2004; Hipple, 2010) has reported. For example, employees between the ages of 20 and 29 have a reduced probability of transition to incorporated

self-employment relative to the excluded category of employees aged 40 to 49, which is roughly large enough to offset the expected average transition rate.

The large scale of many of the coefficients (relative to the baseline probabilities) shows why evolving demographic patterns within labor market states could alter realized transition rates. The normal composition of the population in a given labor market state can over-represent certain demographic and industry groups as shown in Table 2, but, in addition, business cycles can significantly alter the composition of the population in a given state (for example, the composition of the unemployed pool is typically older in a recession).

The demographic and industry factors are interesting because some implied probabilities (for example, the higher entry and lower exit transitions for older workers into incorporated self-employment) point to the potential for secular rise in incorporated self-employment. However, to be complete, all of the demographic and industrial variables need to be accounted for to produce a specific prediction of the implied trends. Table 3 presents the baseline probabilities and marginal impacts of the demographic and industry factors on each of the transition rates to or from unincorporated self-employment. As with incorporated self-employment, the marginal impacts of demographic and industry factors are sizeable.

Our model estimates account directly for the effects of demand variation, which would include economy-wide business cycles, through our quarterly industry-level output growth measures. We have no ex ante prediction for how the timing of demand is likely to effect the transition decisions of individuals, so we allowed the current quarter and up to three quarters of lagged values to enter into the transition equations. When evaluating the response of individuals to demand conditions, we considered the sum of these coefficients, in order to allow for uncertainty in the timing of responses. Given that demand variables are all standardized, the

reported effects for measured demand rising in all industries one standard deviation for four quarters, although, in most cases, the statistical significance of the demand variables is concentrated in a quarter or two.

In Table 4, we show the marginal effect of changing demand conditions on the transitions to and from incorporated self-employment. The model estimates reveal that the transitions out of incorporated self-employment all show statistically-significant impacts of the demand variables, while the movements into incorporated self-employment show no statistically significant cyclical pattern.[1] While the results are expressed in terms of positive responses to growth, during the depths of the 2007–2009 recession, most industries saw two standard deviation declines in demand that persisted for some time. Contemplating the Great Recession in these estimates, we should expect approximately a doubling of flows into unemployment from incorporated self-employment. The flow to employment is also enlarged, but relatively less when compared to the baseline flow. Recessions appear to reduce flows from incorporated self-employment to out of the labor force.

In Table 5, we show the marginal effect of changing demand conditions on the transitions to and from unincorporated self-employment. Contrasted with flows into and out of incorporated self-employment, a one standard deviation change in demand has a more balanced effect on transitions into and out of unincorporated self-employment. Moreover, the direction of the effects is different. Economic contractions significantly motivate people to leave unincorporated employment for other labor market states, while economic expansions motivate people to enter unincorporated self-employment.

[1] Recall that the models were implemented with robust standard errors accounting for clustering at a quarterly level. This was specifically applied to allow the statistical significance of our demand variables to be evaluated according to just the time-series variation.

In order to better evaluate the scale of the impacts of trend and cyclical factors over time, we implement hypothetical alternative projections with specific restrictions on the factors affecting flows between labor market states. In particular, to identify the impact of trends on the transition rates ($\overline{\Lambda}_t^{AB}$), we estimate flows from A to B while allowing only trend factors in the transition probabilities to evolve: $\overline{\Lambda}_t^{AB} = E_t\left[f\left(X_{it}, \overline{V_t}, \right)\right] \cdot \bar{S}^A$, where E_t is the expectations of *f( )* at the mean of the demand variables $\overline{V_t}$, and $\bar{S}^A$ is the average share over the full time period of individuals in labor market state *A*. Similarly, we also estimate transition rates while allowing the cyclical variables to vary in time, but constraining the share of the labor force to its full sample average: $\widetilde{\Lambda}_t^{AB} = E_t[f(X_{it}, V_t,)] \cdot \bar{S}^A$.

Figure 4A (the upper set of four charts) shows the decomposition of flows to and from incorporated self-employment into the basic underlying trend that comes from industry and demographics and the additional effect that comes from the business cycle. The predicted flows in figure are expressed as percentages of the working-age population and are aligned the figures for comparison with flows in and out of incorporated self-employment.

The charts on the left side of the figure show the transitions into incorporated self-employment from employment and unemployment. The overlapping nature of the lines in the figure shows that there is virtually no effect of the business cycle on transitions into incorporated self-employment from these two other labor market states.

By contrast, the panels on the right-hand side of the figure show that the business cycle influences the transitions out of incorporated self-employment into both employment and unemployment. When the economy is expanding, people are less likely than the trend would predict to move from incorporated self-employment to employment, while they are more likely to make this transition during an economic downturn. Similarly, when the economy is

expanding, people are less likely to move from incorporated self-employment into unemployment than the overall trend would predict and are more likely to make this transition during an economic downturn.

Figure 4B (lower set of four charts) shows the decomposition of flows to and from unincorporated self-employment into the basic underlying trend that comes from industry and demographics and the additional effect that comes from the business cycle. The upper left panel shows the effect of the cycle over and above the effect of the underlying trend on transition from employee to unincorporated self-employment. The panel in the figure shows that when the economy is expanding, more people transition from employee to unincorporated self-employment than the underlying trend would predict, and when the economy is contracting, fewer people transition from employee to unincorporated self-employment than the underlying transition would predict.

For the opposite transition— from unincorporated self-employment to employee—the business cycle also has an effect over and above that of the underlying trend. As the panel in the figure shows, the size of the effect is smaller than the effect on inflows in the opposite direction. When the economy is expanding, the business cycle reduces the transition from unincorporated self-employment to employee to below the trend that would otherwise be expected. When the economy is contracting, the cycle increases this transition to higher than what would be expected just from the trend factors alone.

We also see comparable patterns in the panels in the bottom row of the figure, which capture the transitions into and out of unincorporated self-employment from unemployment. In contrast to the pattern described above, here the smaller effect of the business cycle lies on the inflow side and the larger effect lies on the outflow side. However, the business cycle increases

the transition from unemployment to unincorporated self-employment relative to what would have been expected from the underlying trend. When the economy is expanding, the rate of transition from unemployment to unincorporated self-employment exceeds the trend line, and when the economy is contracting, it falls below the trend line.

Unlike incorporated self-employment, the size of the effects of the business cycle on transitions from unincorporated self-employment to unemployment are larger than the effects on the outflows. When the economy is expanding, the transition rate from unincorporated self-employment to unemployment is below the rate of the underlying trend. When the economy is contracting, the transition rate is higher than the underlying trend, as the spike during the Great Recession clearly demonstrates.

The size of the cyclical effects (controlling for trend and population composition) can be estimated by taking the difference between the previous estimates: $C_t^{AB} = \widetilde{\Lambda}_t^{AB} - \overline{\Lambda}_t^{AB}$. To consider the inflows and outflows for incorporated self-employment, *I*, from the major labor market states, we consider inflows of $\sum_{A\in\{U,E,N\}} C_t^{AI}$ and outflows of $\sum_{B\in\{U,E,N\}} C_t^{IB}$. These are described as net inflows and outflows because it is quite possible for the components to have counteracting cyclicality. Figure 6 shows the predicted net flows to incorporated and unincorporated self-employment that come from the business cycle. The figure clearly demonstrates two points. First, cyclical effects clearly lead to net flows into both self-employment states when the economy is expanding and to flows out when the economy is contracting.

Second, most of the effect of the business cycle on net flows comes from the impact of the business cycle on outflows, not on inflows, for incorporated self-employment, while the cyclicality of inflows plays a larger role for unincorporated self-employment. For incorporated

self-employment, demographics, industry, and idiosyncratic factors are the primary determinant of inflows regardless of the business cycle, but net outflows depend much more on whether the economy is expanding or contracting. The lack of a procyclical rebound would slow the recovery in incorporated self-employment because there is little other than regular inflows (and reduced outflows) to restore the lost self-employment numbers. For unincorporated self-employment, cyclical inflows can help boost numbers, but this recent recovery has yet to be strong enough to support boosted inflows.

Third, the scale of the cyclical effects is relatively large for the unincorporated. The unincorporated self-employed are typically about twice as numerous as the incorporated self-employed, so we should expect to see larger flows, but the scale of cyclical effects is almost ten times as large for the unincorporated self-employed.

The inflow measures shown in Figure 5 are made up of inflows from employees, the unemployed, and individuals not in the labor force. In Table 4 and 5, the impacts of the cyclical variables were generally small and statistically insignificant, while the inflows were positive (procyclical) and statistically significant for unincorporated self-employment inflows. Figure 6 subdivides the predicted effects of the business cycle on inflows from different labor market states. The figure shows that in most years, the cyclical effect on transition into incorporated self-employment comes mostly from people employed by others who move into business for themselves. While the patterns are similar, the scale of the effects is again far smaller for flows into incorporated self-employment. And while all of the inflows shown for unincorporated self-employment are statistically significant, the flows from employment are clearly the largest. The effect of the business cycle on the movement of the unemployed and those not in the labor force

into unincorporated self-employment is relatively small in magnitude by comparison in most years.

Figure 7 subdivides the predicted effects of the business cycle on outflows from self-employment to the major labor market states. Tables 4 and 5 show that these flows are statistically significant in all cases, except for the transition from unincorporated self-employment to not in the labor force. Figure 7 shows that in most years, the cyclical effect on transition out of incorporated self-employment comes mostly from people who are incorporated self-employed transitioning into employees of someone else. The effect of the business cycle on the movement of the incorporated self-employed into unemployment or exiting the labor force is relatively small in magnitude by comparison in most years. While this pattern is similar to what exists for unincorporated self-employment, the distribution is much more balanced across labor market states. However, it should be noted that in the case of outflows, the scale of the effects is just about half as large (or proportional to the size of the population) for incorporated self-employment.

Finally, there is one transition that we have not examined so far, which is movement between self-employment states. While flows to and from incorporation could reflect problems of individuals reliably knowing their (or their family members') status, we would not expect random errors of identification to have a cyclical pattern. Tables 6 and 7 address the transitions between the two types of self-employment. Table 6 shows that demographic and industry factors affect the two types of transitions differently and not in an offsetting manner, which suggests real motivation for changes. Table 7 shows that demand conditions matter far more for the transition from unincorporated self-employment to incorporated self-employment than for the transition from incorporated self-employment to unincorporated self-employment. Economic expansions

reduce the transition from unincorporated to incorporated self-employment in a statistically significant manner and at roughly five times the magnitude of the effect of demand conditions on the reverse transition.

Figure 8 examines the cyclical effect on transitions from unincorporated to incorporated self-employment. The figure shows that the business cycle has a much larger effect on transitions from unincorporated self-employment to incorporated self-employment than on transitions from incorporated self-employment to unincorporated self-employment. When the economy is expanding, people are less likely to transition from unincorporated self-employment to incorporated self-employment than when the economy is contracting.

7.0 Policy Implications

Our analysis points to three policy implications. First, encouraging people to go into business for themselves is not a silver bullet that can be used to solve problems at the time of economic downturns, despite the belief of many scholars and policy makers that it might be. For instance, Congregado et al. (2009:1) argue, "As national economies continue to feel the forces of globalization, and large companies proceed with outsourcing and downsizing strategies, efforts to find alternative sources of economic growth are intensifying. For many years, governments around the world have regarded entrepreneurship as a promising candidate in this respect." Unfortunately, entry into self-employment declines during recessions and exit from it accelerates. Therefore, self-employment can do little to counterbalance the negative employment effects of reduced demand.

Second, efforts to enhance self-employment need to consider ways to reduce exit from self-employment as well as ways to enhance entry into it. This is important since changes in demand

affect exit from self-employment as well as entry to it. Because the magnitude of the change in exit is substantial, policy makers' abilities to maintain entrepreneurial activity in a downturn requires efforts to minimize the number of people who exit from self-employment.

Finally, while some observers have argued that economic downturns increase entrepreneurial activity by pushing unemployed people into business for themselves when faced with the potential loss of wage employment (Fairlie, 2012) the dynamic decisions surrounding self-employment and the business cycle are far more nuanced. Focusing only on potential entry into self-employment neglects a number of other influential factors, including the odds of exiting self-employment, the small number of unemployed people relative to people in other labor force categories, or the difference between incorporated and unincorporated self-employment.

On balance, recessions reduce self-employment. Would-be entrepreneurs appear to see recessions as a time when a new business is less likely to be successful (Haltiwanger et al, 2012), and the existing self-employed find it more difficult to keep their businesses going (Hipple, 2010). Though some people shift to self-employment when a contracting economy threatens wage employment, that effect is small relative to the effect of a contracting economy on other labor market transitions. The largest cyclical effect is the increase in the flows from self-employment to unemployment in a downturn.

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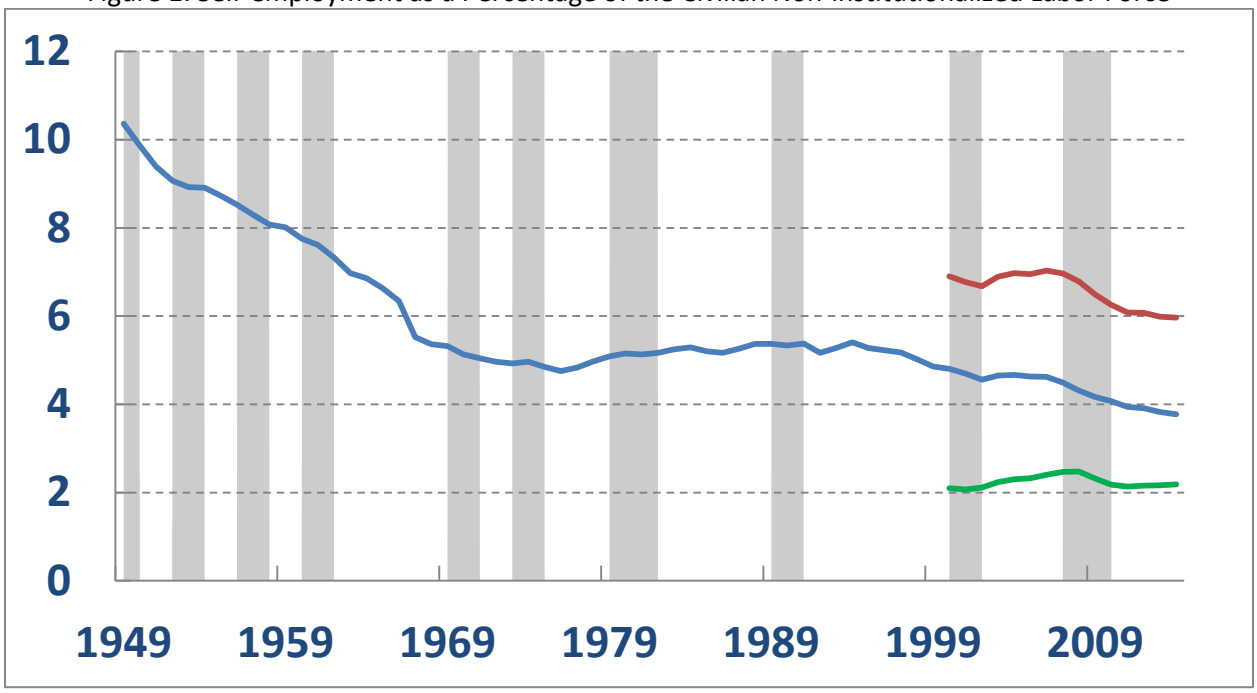
Figure 1: Self-employment as a Percentage of the Civilian Non-institutionalized Labor Force



Source: Created from data from the Bureau of Labor Statistics

Figure 2: Cyclical Demand Variation at the Industry Level

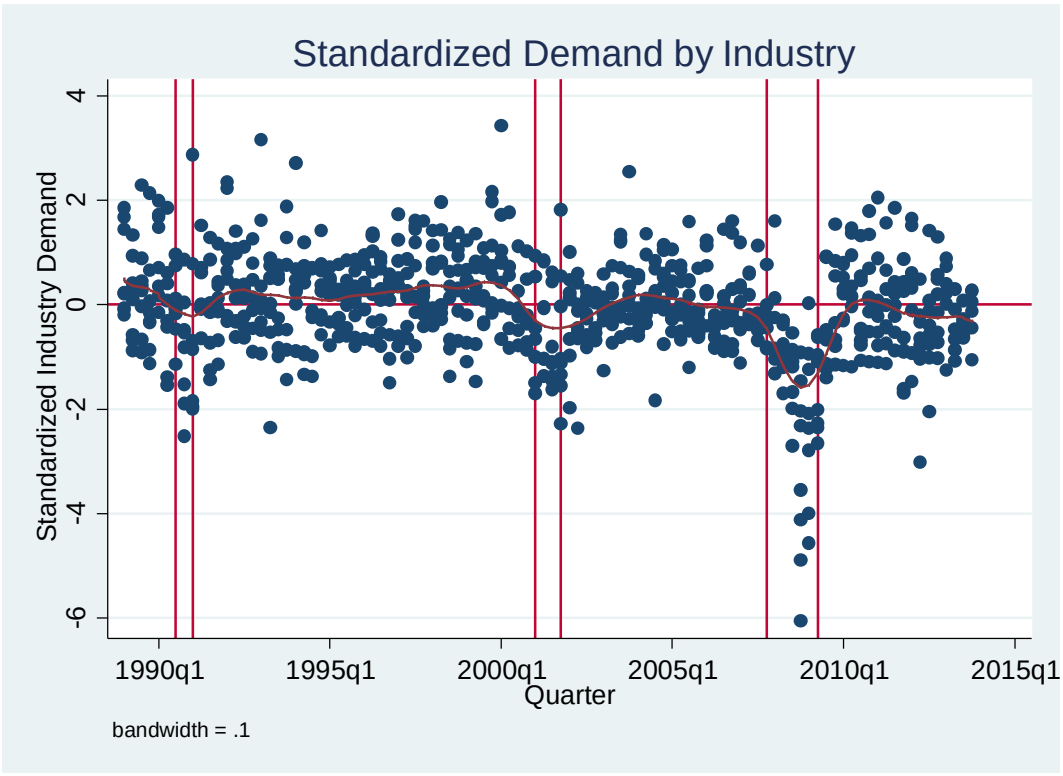


Figure 3: Baseline Transition Rates to and from Incorporated Self-Employment
(2003 quantity estimates)

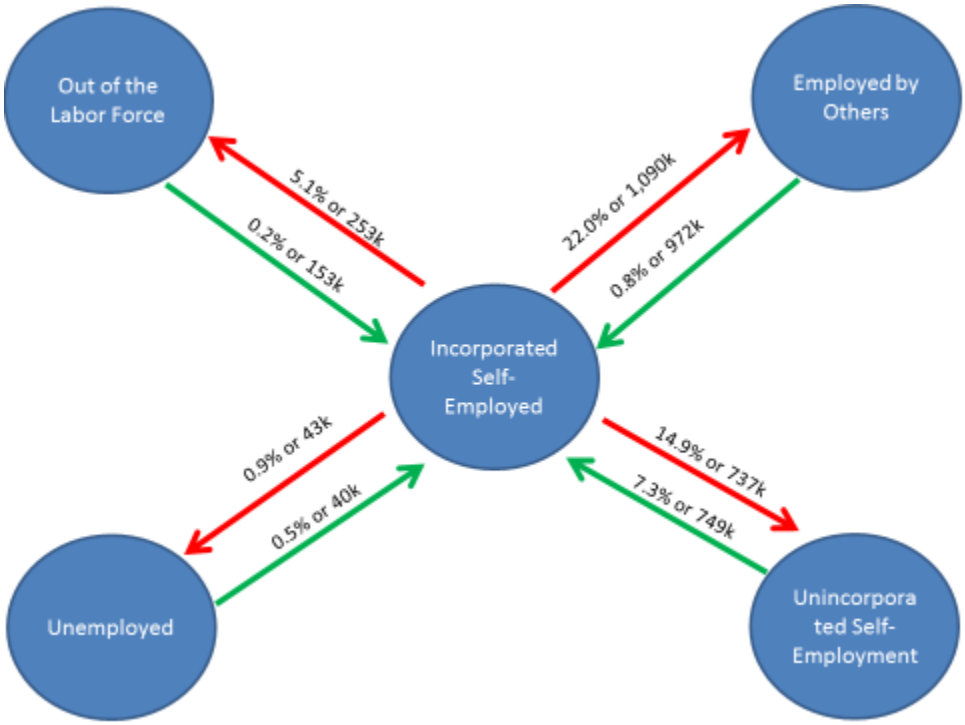
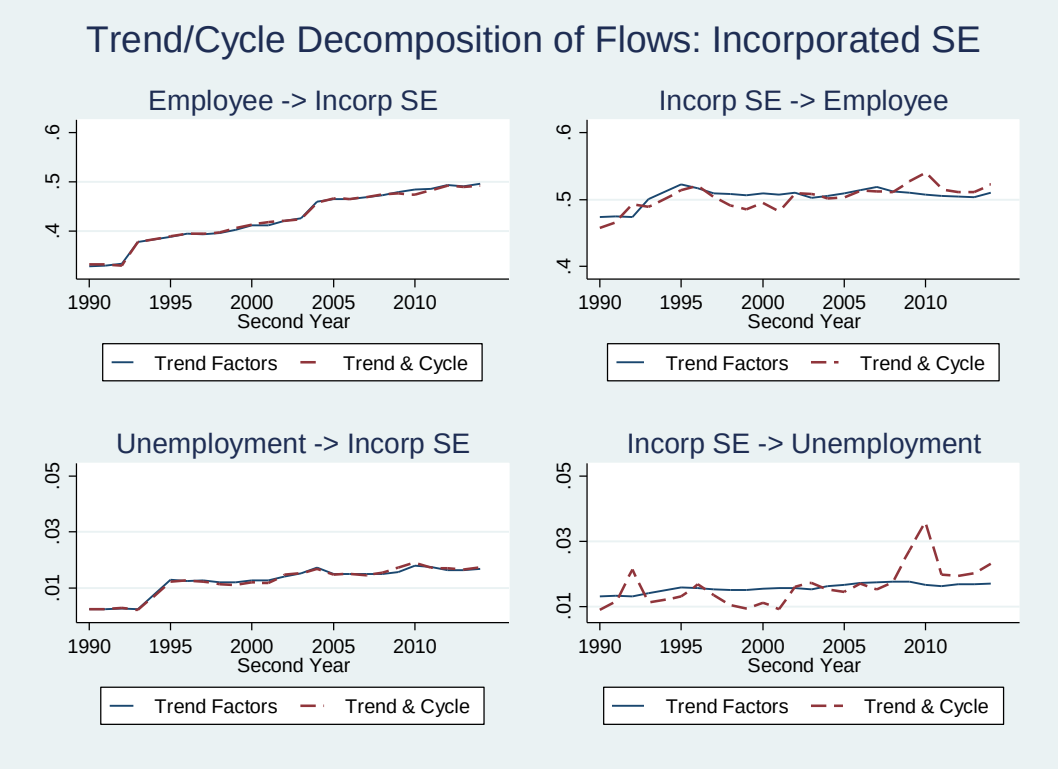


Figure 4A & 4B: Trend and Cycle Decomposition of Flows



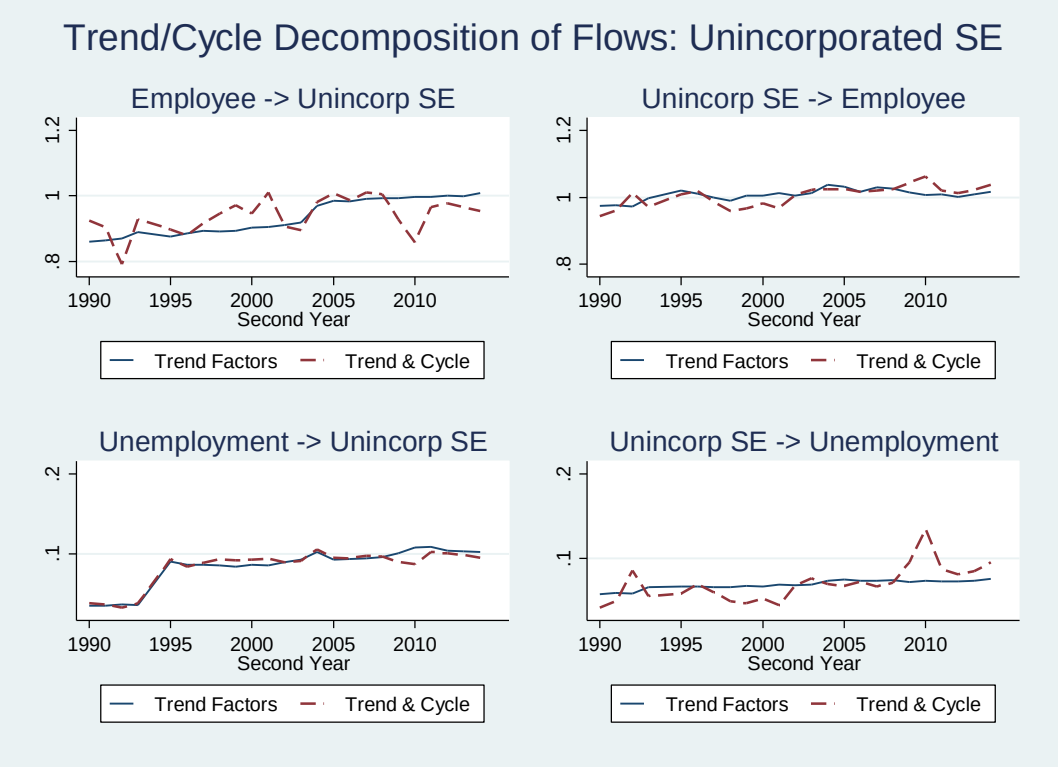


Figure 5. Predicted Cyclical Net Flows

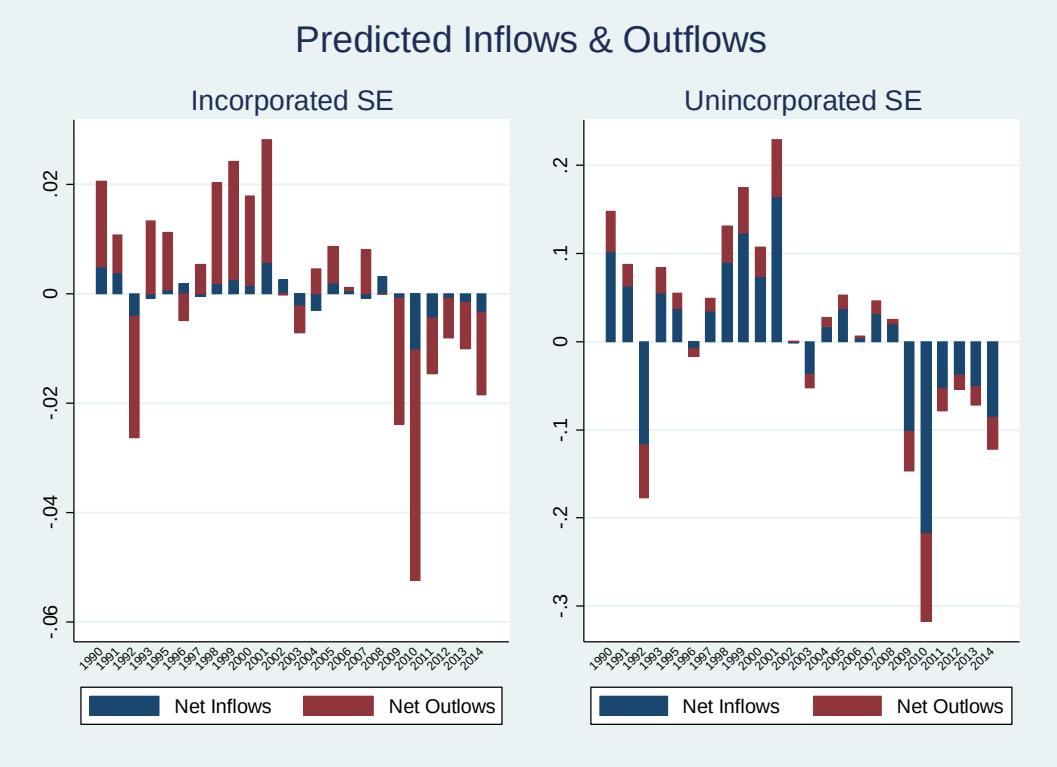


Figure 6. Predicted Cyclical Inflows

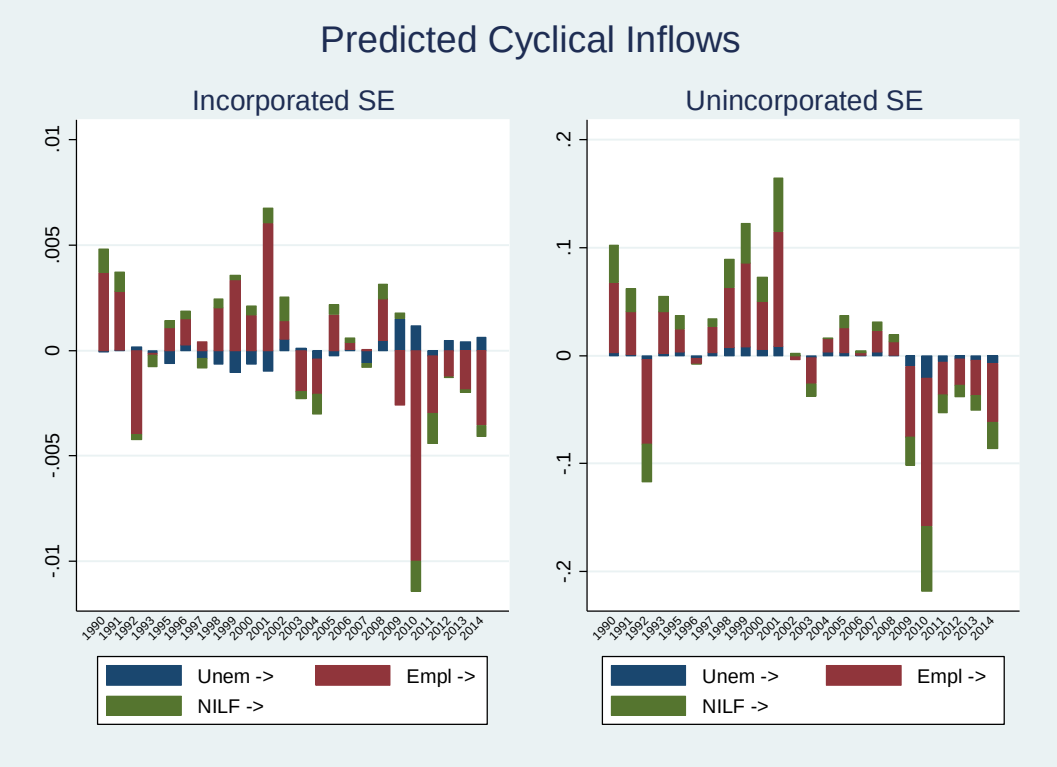


Figure 7. Predicted Cyclical Outflows

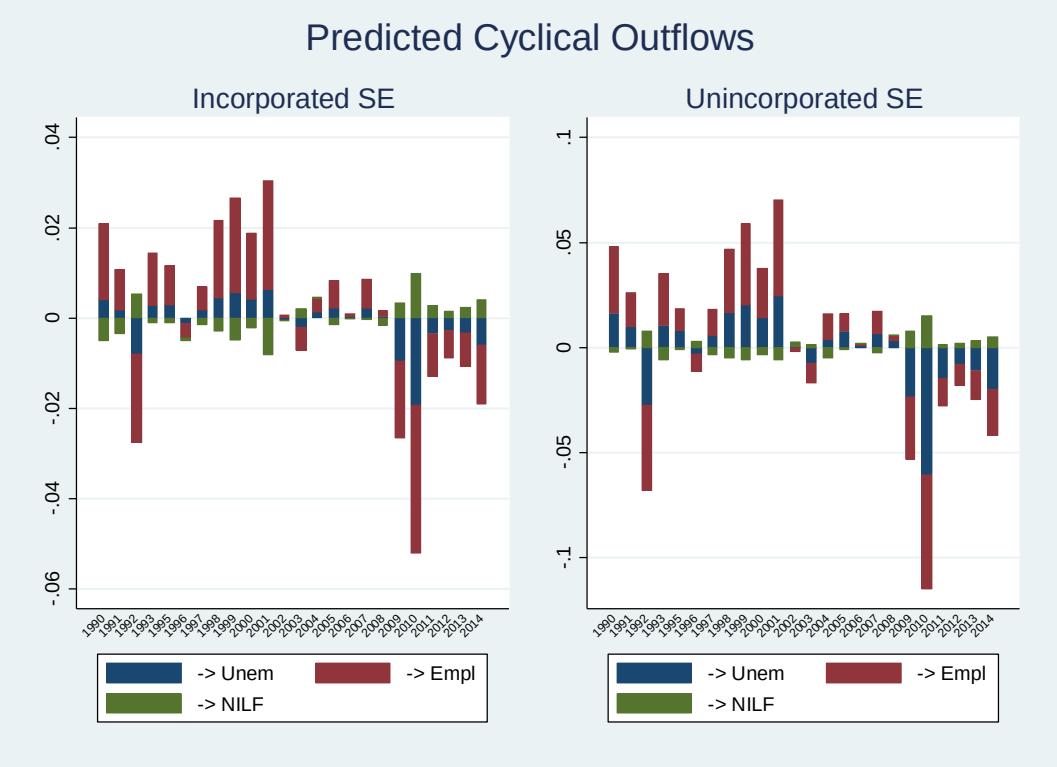


Figure 8: Predicted Cyclical Flows between Self-Employment States

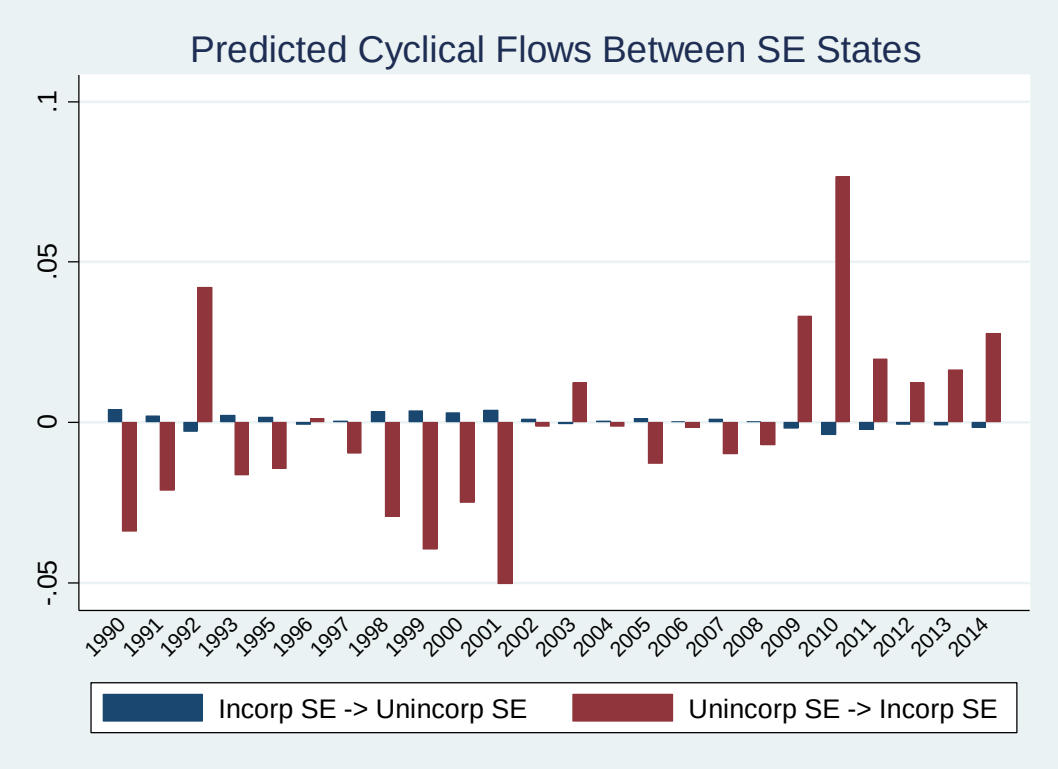


Table 1

Estimation Sample Shares by Labor Force Status

	Incorp. SE	Unincorp. SE	Employee	Unemployed	Not in Labor Force
Ages: 20-29	1.1%	3.3%	14.3%	32.4%	20.6%
30-39	11.0%	15.5%	24.2%	22.2%	9.0%
40-49	26.9%	24.9%	24.4%	17.5%	8.8%
50-59	30.4%	25.9%	21.2%	15.3%	8.8%
60-69	21.3%	19.1%	12.3%	9.5%	13.1%
70-79	9.4%	11.2%	3.6%	3.1%	39.6%
HS Dropout	4.0%	10.0%	10.2%	25.5%	28.3%
HS Graduate	47.3%	56.8%	56.3%	53.9%	53.8%
Assoc. Deg.	7.1%	7.2%	8.0%	6.4%	4.5%
Bach. Degree	25.3%	16.2%	17.0%	10.6%	9.1%
Grad. Degree	16.3%	9.9%	8.5%	3.6%	4.3%
White, non-Hispanic	85.5%	82.2%	73.0%	55.8%	71.9%
Black	3.5%	5.2%	10.9%	20.3%	12.1%
Asian	5.0%	3.7%	4.1%	3.8%	4.1%
Other Race	0.9%	1.5%	1.6%	3.0%	1.8%
Hispanic	5.1%	7.5%	10.4%	17.1%	10.2%
Female	26.4%	37.3%	48.4%	44.6%	62.4%
Management/Professional	55.2%	36.6%	34.7%	17.2%	
Other Occupations	16.0%	32.6%	26.5%	47.0%	
Service Occupations	3.3%	11.7%	12.6%	13.4%	
Sales	25.5%	19.1%	26.3%	22.3%	
Agric. & Mining	4.1%	12.2%	2.2%	2.6%	
Construction	14.9%	15.3%	5.6%	10.4%	
Manufacturing	7.3%	3.6%	14.8%	11.6%	
Trade	25.0%	17.6%	23.9%	20.7%	
FIRE	8.8%	6.8%	6.7%	4.0%	
PBS	18.0%	16.7%	8.6%	11.8%	
Educ & Health	12.7%	14.8%	24.2%	11.8%	
Other Industries	9.3%	13.0%	14.1%	27.2%	

Table 2

Marginal Effects on Transitions to and from Incorporated Self-Employment

	Employee --> Incorp. SE	Unemploy --> Incorp. SE	NILF --> Incorp. SE	Incorp. SE --> Employee	Incorp. SE --> Unemployed	Incorp. SE --> NILF
Baseline:	**0.008**	**0.005**	**0.002**	**0.220**	**0.009**	**0.051**
Ages: 20-29	**-0.011**	**-0.010**	**-0.003**	**0.162**	**0.008**	**0.067**
30-39	**-0.004**	**-0.003**	**-0.001**	**0.053**	0.002	**0.013**
50-59	**0.001**	0.000	0.000	**-0.021**	-0.001	0.000
60-69	**0.002**	**-0.001**	**-0.001**	**-0.043**	**-0.002**	**0.036**
70-79	**0.004**	**-0.003**	**-0.003**	**-0.057**	**-0.007**	**0.091**
HS Dropout	**-0.002**	**-0.003**	**-0.002**	0.001	**0.005**	0.023
Assoc. Deg.	0.000	**0.002**	**0.001**	**0.012**	-0.001	-0.003
Bach. Degree	**0.003**	**0.002**	**0.002**	**0.028**	0.002	**-0.003**
Grad. Degree	**0.005**	**0.004**	**0.002**	**0.037**	0.000	**-0.009**
Black	**-0.006**	**-0.002**	**-0.002**	**0.067**	**0.009**	**0.026**
Asian	0.000	0.001	**0.0003**	**0.036**	0.002	**0.014**
Other Race	**-0.003**	-0.001	**-0.001**	0.002	0.004	0.005
Hispanic	**-0.003**	**-0.002**	**-0.001**	**0.063**	**0.005**	**0.012**
Female	**-0.005**	**-0.003**	**-0.001**	**0.034**	0.001	**0.049**
Agric. & Mining	**0.004**	0.001		**-0.082**	-0.003	0.005
Construction	**0.009**	**0.002**		**-0.014**	**0.002**	0.000
Manufacturing	**-0.001**	**-0.002**		**0.025**	-0.003	-0.003
Trade	**0.003**	0.000		-0.006	-0.002	-0.005
FIRE	**0.002**	0.000		**0.033**	-0.002	-0.001
PBS	**0.005**	0.001		0.003	0.000	**-0.008**
Educ & Health	**-0.003**	**-0.004**		0.009	**-0.003**	**-0.020**
Management	**0.007**	**0.004**		0.006	**-0.002**	**-0.005**
Service Occ.	**0.002**	0.001		0.007	-0.001	-0.003
Sales	**0.007**	**0.003**		**0.025**	-0.001	0.004

Table 3

Marginal Effects on Transitions to and from Unincorporated Self-Employment

	Employee --> Unincorp. SE	Unemploy --> Unincorp. SE	NILF --> Unincorp. SE	Unincorp. SE --> Employee	Unincorp. SE --> Unemployed	Unincorp. SE --> NILF
Baseline:	**0.0164**	**0.026**	**0.010**	**0.203**	**0.016**	**0.099**
Ages: 20-29	**-0.0134**	**-0.035**	**-0.013**	**0.175**	**0.017**	**0.120**
30-39	**-0.0028**	**-0.008**	**-0.001**	**0.055**	**0.002**	**0.028**
50-59	**-0.0004**	0.000	**-0.002**	**-0.033**	-0.001	**0.004**
60-69	0.0004	-0.004	**-0.006**	**-0.068**	**-0.005**	**0.061**
70-79	**0.0062**	-0.006	**-0.014**	**-0.096**	**-0.011**	**0.151**
HS Dropout	**0.0015**	-0.001	**-0.004**	**0.017**	**0.008**	**0.038**
Assoc. Deg.	-0.0014	0.003	**0.002**	0.001	0.001	**-0.008**
Bach. Degree	0.0007	**0.005**	**0.003**	**0.015**	0.002	**-0.010**
Grad. Degree	**0.0039**	**0.008**	**0.005**	**0.022**	-0.003	**-0.027**
Black	**-0.0072**	**-0.010**	**-0.007**	**0.075**	**0.014**	**0.044**
Asian	**0.0014**	**-0.010**	**-0.003**	**0.032**	**0.004**	0.007
Other Race	**-0.0031**	**-0.006**	**-0.002**	0.012	**0.007**	**0.027**
Hispanic	-0.0009	**0.004**	**-0.001**	**0.072**	**0.009**	**0.016**
Female	**-0.0020**	**-0.013**	**-0.005**	**0.023**	0.000	**0.072**
Agric. & Mining	**0.0056**	0.003		**-0.070**	**-0.009**	**0.037**
Construction	**0.0097**	**0.014**		0.006	**0.004**	**0.015**
Manufacturing	**-0.0135**	**-0.015**		-0.004	**-0.005**	**0.014**
Trade	**-0.0044**	-0.002		**0.013**	**-0.002**	**0.017**
FIRE	**0.0023**	0.002		**0.084**	-0.002	**0.014**
PBS	**0.0031**	0.002		**0.036**	0.001	**0.015**
Educ & Health	**-0.0076**	**-0.005**		**0.016**	0.000	**0.019**
Management	**-0.0052**	**0.013**		**-0.024**	**-0.004**	**-0.009**
Service Occ.	**0.0015**	0.003		0.005	**-0.005**	0.006
Sales	**-0.0038**	-0.001		0.002	**-0.004**	0.004

Table 4

Marginal Effects of Demand Conditions on Transitions to and from Incorporated Self-Employment

From Incorporated Self-Employment to:		Marginal Effect	z score
Unemployment			
	Baseline Effect	**0.0087**	
	Sum of Demand Coefficients	**-0.0034**	**-7.1**
Wage Employment			
	Baseline Effect	**0.2200**	
	Sum of Demand Coefficients	**-0.0086**	**-2.7**
Not in the Labor Force			
	Baseline Effect	**0.0510**	
	Sum of Demand Coefficients	**0.0021**	**2.1**

To Incorporated Self-Employment From:		Marginal Effect	z score
Unemployment			
	Baseline Effect	**0.0045**	
	Sum of Demand Coefficients	-0.0003	-1.2
Wage Employment			
	Baseline Effect	**0.0076**	
	Sum of Demand Coefficients	0.0001	0.6
Not in the Labor Force			
	Baseline Effect	**0.0021**	
	Sum of Demand Coefficients	0.0000	0.3

Table 5

Marginal Effects of Demand Conditions on Transitions to and from Unincorporated Self-Employment

From Unincorporated Self-Employment to:		Marginal Effect	z score
Unemployment			
	Baseline Effect	**0.0163**	
	Sum of Demand Coefficients	**-0.0054**	**-5.3**
Wage Employment			
	Baseline Effect	**0.2034**	
	Sum of Demand Coefficients	**-0.0072**	**-3.3**
Not in the Labor Force			
	Baseline Effect	**0.0993**	
	Sum of Demand Coefficients	0.0013	1.5

To Unincorporated Self-Employment From:		Marginal Effect	z score
Unemployment			
	Baseline Effect	**0.0258**	
	Sum of Demand Coefficients	**0.0028**	**3.6**
Wage Employment			
	Baseline Effect	**0.0164**	
	Sum of Demand Coefficients	**0.0013**	**6.1**
Not in the Labor Force			
	Baseline Effect	**0.0103**	
	Sum of Demand Coefficients	**0.0010**	**6.1**

Table 6

Marginal Effects on Transitions to and from Unincorporated Self-Employment

	Incorp. SE --> Unincorp. SE	Unincorp. SE --> Incorp. SE
Baseline:	**0.149**	**0.073**
Ages: 20-29	0.017	**-0.048**
30-39	**0.016**	**-0.009**
50-59	0.001	-0.001
60-69	0.002	**-0.010**
70-79	0.000	**-0.031**
HS Dropout	**0.027**	**-0.027**
Assoc. Deg.	**-0.015**	**0.012**
Bach. Degree	**-0.026**	**0.019**
Grad. Degree	**-0.026**	**0.033**
Black	**0.045**	-0.001
Asian	**0.025**	**0.021**
Other Race	**0.034**	**-0.008**
Hispanic	**0.034**	**-0.010**
Female	-0.001	**-0.043**
Agric. & Mining	**0.030**	**-0.027**
Construction	**-0.027**	**0.010**
Manufacturing	**-0.065**	**0.029**
Trade	**-0.028**	**0.019**
FIRE	0.010	**0.011**
PBS	-0.009	**0.008**
Educ & Health	0.009	**-0.009**
Management	**-0.051**	**0.044**
Service Occ.	0.008	0.003
Sales	**-0.045**	**0.035**

Table 7

Marginal Effects of Demand Conditions on Transitions to and from Unincorporated Self-Employment

		Marginal Effect	z score
Incorporated SE to Unincorporated SE	Baseline Effect	**0.1487**	
	Sum of Demand Coefficients	-0.0014	-0.9
Unincorporated SE to Incorporated SE	Baseline Effect	**0.0728**	
	Sum of Demand Coefficients	**-0.0080**	**-6.1**