Cascading Ripples: Contagion Effects of Entrepreneurial Activity on Self-Employment Attitudes and Choices in Regional Cohorts

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Research summary: We introduce a contagion model of self-employment that relates regional cohort self-employment to individuals' preferences for and decisions to engage in entrepreneurial action. To test the predictions of our model via evidence from two studies. Study 1 uses cross-sectional data from the US General Social Survey (GSS) and examines the correlation between regional cohort self-employment and individuals' attitudes for self-employment. Study 2 uses longitudinal data from the Household, Income, and Labour Dynamics in Australia (HILDA) survey and examines the likelihood of transition into self-employment as a function of regional cohort entrepreneurship. Our results provide evidence that individuals who belong to regional cohorts with a greater proportion of entrepreneurs are more likely to express favorable attitudes toward self-employment and to enter into self-employment.

Managerial summary: A large literature in the social sciences indicates that people's preferences and actions are influenced by the behaviors of those around them. We find this is true when it comes to entrepreneurship. Specifically, we document that people who live in regions with higher proportion of entrepreneurs are more likely to express favorable attitudes toward self-employment and more likely to start new business ventures. This suggests that people embedded in environments where there is a lot of entrepreneurial activity are more likely to 'catch the bug' of self-employment as they use already established entrepreneurs in the region as a roadmap for their own thinking and action.

Keywords: Self-Employment, Contagion, Entrepreneurship

INTRODUCTION

There is an old saying in western culture, "you become who you surround yourself with." The principle is that there is a *contagion effect* where over time people adopt the behaviors of those around them. This is provocative when it comes to entrepreneurship because it suggests that people embedded in environments where there is a lot of entrepreneurial activity might 'catch the bug' of self-employment as they observe the actions and outcomes realized by other people in their community who engage in entrepreneurship. Indeed, prior research has documented spatial variation in entrepreneurship (Andersson & Koster, 2011) and considered that clusters of entrepreneurial activity emerge via a "feedback effect where localities with a high density of established entrepreneurs are more likely to breed new entrepreneurs" (Andersson & Larsson, 2016: 39). This is consistent with research that conceptualizes the environment as a source of clustering (Minniti, 2005) via transmission of entrepreneurial actions and outcomes through peer networks (Qin & Estrin, 2015). It also parallels anecdotal evidence that this dynamic occurs in communities such as California's Silicon Valley or North Carolina's Research Triangle that experience disproportionally high numbers of self-employment events.

While this line of investigation has proven immensely insightful, it leaves open the question of what occurs in larger geographic areas where entrepreneurial activity is more normally distributed and one cannot directly "observe someone else's behavior and the consequences of it" (Minniti, 2005: 5). That is, we lack theoretical explanations and empirical evidence regarding potential effects of entrepreneurial activity writ-large on individuals' self-employment attitudes and choices when that activity occurs in spatial areas that extend beyond observed behavior and personal relationships. In fact, a common assumption for the persistence and path dependence of entrepreneurial clusters over time has been the existence of regional "entrepreneurship culture" (Koster, 2011; Fritsch & Wyrwich, 2014), which can influence

people's attitudes toward entrepreneurship, but so far the evidence has been largely inferential and implicit.

Prior research on spatial variation in entrepreneurship has also treated entrepreneurs within specified borderlines as a homogenous group, and this represents an artificial assumption given that entrepreneurs are quite heterogeneous along several dimensions (e.g., Delmar & Davidsson, 2000; Hundley, 2000; Parker, 2004). We embrace this heterogeneity by considering the presence of cohorts (same gender, similar age, and so on) among agglomerations of entrepreneurs. This is important given that research on referent comparison indicates that people devote more attention to the activities of those who are most similar to them (Festinger, 1954). Therefore, it is reasonable to expect that the heterogeneity of regional entrepreneurship will play a role as those considering self-employment are likely to pay more attention to the actions of those in their cohort and less attention to those who are not. This logic, then, raises the question: is it possible that a reinforcing effect exists such that individuals are more likely to express favorable attitudes toward self-employment and enter into self-employment as a function of regional cohort entrepreneurship?

The purpose of this study is to investigate the existence of such dynamics via the introduction of a contagion model of self-employment. The notion of contagion flows from a sizable literature in psychology, sociology, and economics that describes a phenomenon where people's attitudes and choices are influenced by the attitudes and actions of others (Hoff & Stiglitz, 2016). Specifically, as more people act in a given direction, others are more likely to "hop on the bandwagon" and do so in ways that do not require personal connections such that contagion can be rather automatic and implicit (Frith & Frith, 2012; Happé, Cook, & Bird, 2017). We use these insights to derive predictions about the degree to which individual attitudes

toward and actual entry into self-employment are a function of the proportion of people in their regional cohort engaged in entrepreneurship. We extend this by further building on cohort delineations to advance that these relationships are stronger for males, younger people, and those at the tails of the income distribution.

We test our predictions via two separate studies based on cross-sectional and panel data derived from two nationally representative samples, one in the United States and one in Australia. Using these datasets concomitantly provides a more compelling picture of the phenomena by allowing us to analyze how regional cohort characteristics affect people's attitudes toward self-employment (U.S. data) and then explore how cohort characteristics influence the likelihood of self-selection into self-employment (Australian data). Our analyses provide suggestive evidence of contagion effects as attitudes towards self-employment and actual entry into self-employment are positively related to the proportion of entrepreneurs in one's regional cohort. These effects are quite strong—e.g., people who belong to a regional cohort with a 10-percentage point greater proportion of entrepreneurs, all else equal, are twice as likely to enter self-employment.

Our model and findings advance the entrepreneurship literature by adding depth to the emerging research on cascading effects in entrepreneurial clusters along different spatial boundaries. Previous studies have offered conceptual mechanism such as local peer networks (Minniti, 2005) that operate in tight communities such as residential neighborhoods (Andersson & Larsson, 2016). However, as one moves to broader spatial boundaries (i.e., regions), a mechanism such as peer networks lacks explanatory power because one's peer network often does not extend much beyond the local community. We address this by introducing the mechanism of contagion as a conceptual explanation that operates when spatial boundaries

become more expansive. This theoretical base engenders key empirical sapience as we present some of the first results on the relationship between the degree of regional cohort entrepreneurship and individual self-employment attitudes at the regional level. This highlights the advantage of employing multiple datasets as a distinctive strength of our contribution, such that we provide direct evidence on both attitudes and behavior in the same study. While there are certainly limits to what the empirical data can tell us, the net effect is the realization of new insight on the relationship between entrepreneurial clusters and self-employment attitudes and behavior that have important implications for future research.

CONCEPTUAL FOUNDATIONS

Entering Self-Employment

Self-employment occurs when one elects to work for oneself and new venture creation is the most widely cited instrument. Researchers have long been interested in uncovering the factors that drive entry into self-employment and hence there is an extensive literature on the subject (e.g., Shepherd, 2011; Autio, Pathak, & Wennberg, 2013; Bjørnskov & Foss, 2016). Most germane to our investigation is research documenting a positive reinforcing effect between the density of entrepreneurs and follow on entrepreneurship (cf., Etzioni, 1987; Sorenson & Audia, 2000). Importantly, the explanatory mechanisms in these studies tend to be peer networks that rest to a great degree on proximity relationships, which are highly useful in explaining the reinforcing effect in local communities where direct communication or observed behavior is the norm (Bosma, Hessels, Schutjens, Praag, & Verheul, 2012; Minniti, 2005). This approach, however, becomes problematic outside the local level where proximal distance grows beyond the reach of individual peer networks. Because our study explores the reinforcing effect at the *regional* level, a new approach is required. Hence, we introduce the concept of *contagion* as an

explanatory mechanism that is consistent with theoretical models at the local level but transcends it by operating on a regional scale.

Concept of Contagion

Contagion is a dynamic that occurs when a person or group influences the attitudes and behaviors of another person or group (Schoenewolf, 1990). It is essentially a form of mimicry where referent comparisons cause entities to form similar attitudes or engage in like behavior (e.g., Adelman & Zajonc, 1989; Sullins, 1991). As such, there are two aspects of contagion—one involving attitude and another one involving behavior, although undoubtedly the two are interconnected (Ajzen, 2001). Regarding attitude, contagion research tends to look at the "attitudinal climate" and the degree to which that climate evokes preferences that are consistent with that climate (Jackson & Rodkey, 1994). Moving to behavior, scholars often consider events where individual behavior has changed to become "more like that of the actor or initiator" as evidence of contagion (Polansky, Lippitt, & Redl, 1950, p.322). In both the attitudinal and behavioral approaches, contagion can be an explicit (deliberate, conscious) or implicit (automatic, subconscious) process. In that sense, the dynamic occurs independently of whether actors knowingly or unknowingly influence the attitudes and behavior of others and whether those who are influenced are aware of this process or not (Kelly & Barsade, 2001).

An important aspect of contagion is that the behavior mimicked does not have to be directly observed or communicated by the focal actor. Instead, the process can take place distally via information signals (Lang & Stulz, 1992) and typically occurs when many people act in the same way at a relative point in time (Prechter, 2013). Housing bubbles, stock market and fashion trends are examples of contagion that occurs via diffusion of information about the behavior of others (Brunnermeier, 2001; Grinblatt, Titman, & Wermers, 1995). These incidences highlight the realization that the genesis of contagion is often from sources that extend far

beyond one's peer network where people we don't know have the capacity to influence our attitudes and behaviors (Christakis & Fowler, 2009; Raafat, Chater, & Frith, 2009). We advance that the same is true for entrepreneurship where entrepreneurial activity in a region can stimulate contagion such that regions with higher density of entrepreneurial activity can influence self-employment attitudes and decisions of other actors among the same spatial boundaries. This logic underpins our contagion theory of self-employment.

Theory and Hypotheses

Predicating Axioms

The contagion model we introduce is predicated on three fundamental axioms. First, the model operates at the regional cohort level in terms of placing spatial boundaries on the environment. Following previous studies that examine phenomena at the regional level (Ferrer-i-Carbonell, 2005; Luttmer, 2005; Pérez-Asenjo, 2011), we define a region in terms of geography relative to recognized boundaries drawn within the country under consideration. In the United States, for instance, a region is a state, and there are fifty distinct regions for consideration [see Ferrer-i-Carbonell (2005) for Germany or Nikolaev (2016) for Australia]. Further, we bound contagion to influences that occur as a function of activities among one's *cohort*, because individuals more readily identify with other individuals who have common characteristics (Stryker & Burke, 2000; Pérez-Asenjo, 2011). As such, we conceptualize activities among one's regional cohort as the influential unit in our model and define cohort as those who are of the same gender and similar age. This means that one's *regional cohort* consists of those who live in the same state, are of the same gender, similar age and are engaged in entrepreneurial activity.

The second axiom is that the contagion dynamics identified occurs mainly within the population of residents already in the region. This means that while outsiders can become attracted to regions with higher levels of entrepreneurship and in response relocate there to start a

business (cf. Chiles, Meyer, & Hench, 2004), prior research suggests that, on average, this is unlikely because it requires treating entrepreneurs as commoditized goods easily transported from one location to another. That is, this makes relative sense when entrepreneurs relocate to neighborhoods within the same city (Andersson & Larsson, 2016), but at the regional level, moving from say Missouri to Florida because there is higher density of entrepreneurial activity renders such treatments untenable. This is because assuming people readily self-select to areas with higher density of entrepreneurial activity ignores market frictions associated with the costs of "relocating away from things like family and friends" (McMullen & Warnick, 2016: 636). Hence, we advance that contagion effects of entrepreneurship are most likely to manifest within the existing pool of residents in the region.

The final axiom is that attitudes and behaviors are two functional outcome components of contagion. Attitudes are mental evaluations of the overall degree of favorability (positive, negative, or ambivalent) of an agent, situation or event and are expressed as preferences (Ajzen, 2001), while behaviors are actual actions taken in response. Attitudes and behaviors are distinct yet related concepts with attitudes driving behavior via decisions (Ajzen & Fishbein, 1977; Krueger, 2000). It is true, however, that attitudes do not always translate to actions and this is evident in entrepreneurship, a process where the bridge between one's desire to start a new business and starting a business often fails to materialize (Grégoire, Cornelissen, Dimov, & van Burg, 2015). This is an important consideration for our model because referent-based processes, such as contagion, grow in abstractness as spatial distance increases (Trope & Liberman, 2003) and thus may widen the chasm between preference to engage in entrepreneurship and tangibly acting to make that happen. Because our model operates at the regional level, spatial distance is

comparatively significant and thus we explore the contagion effects of entrepreneurship in the regional cohort on *both* observers' self-employment attitudes and behavior.

Attitude Toward and Choice to Engage in Self-Employment

Attitudes play a central role in entrepreneurship (cf. Lumpkin, Cogliser, & Schneider, 2009) and we conceptualize contagion as an important mechanism in the formation of attitudes toward self-employment. Contagion occurs when "others behavior initiates similar processes in an observer" (Loersch, Aarts, Payne, & Jefferis, 2008, p.1556). Because the path to success in entrepreneurship is often winding and uncertain, already established entrepreneurs are often used as a road-map by potential followers (Qin & Estrin, 2015; Stephan & Pathak, 2016). The greater the density of local entrepreneurs one can reference, the clearer the road-map. Indeed, there is some evidence at the community level of a relationship between the fraction of established entrepreneurs and follow-on entrepreneurship as local peer networks facilitate observation of entrepreneurs' actions and outcomes (Minniti, 2005; Sorenson & Audia, 2000). These findings are consistent with the notion that people use the behavior of others to derive their own preferences (Goldstein & Cialdini, 2011). It follows that regions with higher density of entrepreneurial activity will create an environment where onlookers will consider the entrepreneurial activities of others, which in turn will trigger a contagion effect that will manifest itself in more favorable attitudes toward self-employment.

While this suggests that individuals in regions with higher density of entrepreneurial activity are more likely to "catch the bug" of self-employment, an important aspect of this is that one must be able to identify closely enough with the actors whose actions are used as a relevant reference point by the outsider (Hunt, 2015). There are several ways in which people might be more or less able to identify with other actors in their region, but prior research suggests that

cohorts are fundamental when it comes to contagion effects (Ilies, Wagner, & Morgeson, 2007). That is, groups of people who are like the observer in a meaningful way become one's cohort and the actions of those in the cohort are used as a benchmark for comparison as one decides his or her own course of action. In other words, the actions of those in the cohort shape the way one responds to information and situations encountered. This is supported by research that documents how information cascades through cohorts underpins phenomena ranging from fashion trends to cultural change (Bikhchandani et al., 1992).

Cohorts can form around several different attributes, but germane to our theory are cohorts that develop around the region where people live and work (cf. Kaminsky & Reinhart, 2000). Regions embed unique cultures, norms, and rules such that distinct institutional logics—widely accepted expectations that serve as guidelines for actor behavior—emerge (Friedland & Alford, 1991; Rao, Monin, & Durand, 2003). The net effect is that actors tend to categorize themselves as members of a regional collective and therein identify more closely with those in the collective (Deaux & Martin, 2003). In the United States, people who live in the same state are more likely to identify with others who also live in the same region (e.g., "we are Texans"). This is important because prior work documents that contagion is more likely to occur when observers perceive that they face similar circumstances as those observed (Sullins, 1991). Applied to self-employment, this suggests that contagion is most likely to occur among regional cohorts because the proximity of one's region increases the odds that observers will believe they face a similar situation as those entrepreneurs who precede them in self-employment. We assert this dynamic will manifest itself in individual attitudes toward self-employment, suggesting the following:

Hypothesis 1a: *The greater the proportion of entrepreneurs in the regional cohort, the more favorable individual attitudes toward self-employment will be.*

While attitudes toward self-employment are important, we are also interested in the degree to which the contagion effect we identify will extend to behavior. There is a strong correlation between attitude and behavior (Ajzen & Fishbein, 1977), but behaviors are constrained in ways that attitudes are not and thus can sometimes diverge (Bird, 1988; Krueger et al., 2000). Having said this, we believe that the dynamic articulated in H1a will extend to the behavioral choice to engage in self-employment. While the spatial distance between actors among regions may increase the abstractness of mimetic behavior that is the hallmark of contagion, if we consider cohorts, it becomes evident that individuals tend to see the activities of cohort peers as informative for their own choices (Blanton, Buunk, Gibbons, & Kuyper, 1999). In that way, the relationship between entrepreneurship in the cohort and observers contemplating self-employment is likely to shape the way individuals make decisions about pursuing self-employment (DiMaggio, 1997). Specifically, actors in regional cohorts are likely to feel they face a similar situation as their peers who are already entrepreneurs and thus the contagion effect outlined above is likely to be realized in onlookers' choices to engage in self-employment. Mimicking the behavior of others via information obtained through secondary channels can be a useful strategy because it allows individuals to compare alternative outcomes without the costly trial-and-error process (Rendell et al., 2010). In that sense, contagion behavior may be particularly important in the domain of entrepreneurship where decisions are made in a highly uncertain environment, and the cost of errors is high. This suggests the following:

Hypothesis 1b: *The greater the proportion of entrepreneurs in the regional cohort, the more likely the behavioral choice to enter self-employment will be.*

Moderating Role of Gender

If, as we have argued, contagion among regional cohorts occurs because individuals can more readily extrapolate their decisions to engage in entrepreneurial action when the proportion of entrepreneurs in one's regional cohort is higher, then characteristics of the cohort that might

further delineate this process may strengthen (or mitigate) the contagion effect. Specifically, prior research on vicarious self-perception has shown that individuals use the behavior of others to infer their own preferences, but do so more vigorously when actors are members of the same category (Goldstein & Cialdini, 2011). One factor that further delineates categories among regional cohorts is gender. Gender is a well-established determinant of self-employment, and prior research has documented women's propensity to select self-employment trailing that of men for reasons such as childcare concerns (Klyver, Nielsen, & Evald, 2013; Koellinger, Minniti, & Schade, 2013). Even in countries with high levels of gender equality such as Norway, the fraction of male entrepreneurs tends to be significantly greater than that for women (Berglann, Moen, Røed, & Skogstrøm, 2011).

While informative, there is more to the story if we consider gender in relation to contagion dynamics, because it is not about whether women are less likely to engage in self-employment, but whether they are more (or less) susceptible to the contagion of self-employment. In this vein, there is evidence to suggest that men may be more susceptible to self-employment contagion. It has been documented, for instance, that "men are more responsive than women to the wage differential between wage employment and self-employment" (Georgellis & Wall, 2005, p.231) and men are more assertive and focused on material success (Hofstede & Hofstede, 2001). Recent studies further document that men are more likely to be influenced by environmental factors while women's tendency to become entrepreneurs is less likely to be affected by social context and more likely to be influenced by their genetics (Zhang et al., 2009). Finally, despite earning lower wages, on average, women tend to report higher levels of job satisfaction, which provides implicit evidence that they might be less prone to contextual effects (Simoes et al., 2016). These insights suggest that as men consider "similar others," they are more likely to

identify and mimic the behavior of entrepreneurs who precede them. This dynamic should unfold similarly for both attitudes toward self-employment and the behavioral choice to engage in self-employment, leading to the following set of hypotheses:

Hypothesis 2a: *The positive relationship between the proportion of entrepreneurs in the regional cohort and individual attitudes toward self-employment will be stronger for men than women.*

Hypothesis 2b: *The positive relationship between the proportion of entrepreneurs in the regional cohort and the likelihood of choosing self-employment will be stronger for men than women*.

Moderating Role of Age

Another factor that is likely to enhance category delineation across regional cohorts is age. Simply put, age influences how people think and act and this is especially true when it comes to the workplace and careers. A good example of this are studies that document how generational differences influence people's perceptions about workplace values, with younger people placing more importance on job titles and status (Cennamo & Gardner, 2008). This coincides with research that documents misfit with the labor market as a function of age, with young people often struggling to find a match between their skills and interests with a viable career path. In this respect, younger people typically exhibit underdeveloped skill sets and often find themselves working for lower quality firms or in jobs that are a poor aspirational fit (Åstebro et al., 2011). At the same time, because younger people have more time to recover their initial investment and have more physical and mental availability, they also tend to be more risk embracing (Simoes et al., 2016). In that way, age influences mobility decisions (Campbell, Ganco, Franco, & Agarwal, 2012) and younger people are more likely to search for possible pathways within the labor market, including self-employment as a career. These searches can take many forms including exploring hybrid entrepreneurship where one combines self-employment with a wage-earning job (Folta, Delmar, & Wennberg, 2009). The ramification is that as young people consider self-

employment as a path to reduce labor market friction, they are more susceptible to the influence of other entrepreneurs in their cohort (i.e., contagion).

What this implies for our model is that there will be important differences between how younger and older individuals respond to cascading entrepreneurial activity in the regional cohort. Younger people are more likely to search for a "road-map" to self-employment that will lead to desired monetary and non-monetary benefits. Also, young people are more likely to act impulsively (Steinberg et al., 2008) and follow the actions of peers than those who are older, which can increase the odds that one will "run off the cliff" because others in the cohort are doing so. This suggests that the positive effect associated with regional cohort entrepreneurship on both attitudes toward self-employment and the choice to engage in self-employment will be stronger for younger observers. Taken together, this leads to the following set of hypotheses:

Hypothesis 3a: *The positive relationship between the proportion of entrepreneurs in the regional cohort and individual attitudes toward self-employment will be stronger for younger than older cohort observers.*

Hypothesis 3b: *The positive relationship between the proportion of entrepreneurs in the regional cohort and the likelihood of choosing self-employment will be stronger for younger than older cohort observers.*

Moderating Role of Relative Position in the Income Distribution

A final variable that is likely to influence the extent of contagion in one's regional cohort is individuals relative position in the income distribution. It is well established that one's income is an influential factor in attitudinal and behavioral outcomes (Clark, Frijters, & Shields, 2008) with the magnitude of the effect skewed toward the tails of the income distribution (Duesenberry, 1949; Ferrer-i-Carbonell, 2005). Hence, income creates a bit of a 'bi-modal' world where those on the low-end of the income distribution often think and act in ways that are different from those on the high-end (Hirschman & Rothschild, 1973; McBride, 2001). Applied to entrepreneurship, this realization has stimulated research documenting relative income as an

important determinant of entrepreneurial attitudes, such that entrepreneurial intention often form more readily for those on the lower end of the income distribution (Joona & Wadensjö, 2013; Schjoedt and Shaver, 2007). Possible reasons for this effect range from ability mismatch and friction in the labor market (Åstebro et al., 2011) to asymmetric comparisons between one's current position in the lower-end of the income distribution and those who are higher on the income ladder (Duesenberry, 1949; Ferrer-i-Carbonell, 2005).

Because contagion flows from referent comparisons by onlookers, this implies for our model that those who are on the lower-end of the income distribution may be more likely to be swayed by the proportion of entrepreneurs in their cohort. This is because people at the bottom of the income distribution frequently experience feelings of relative deprivation (Clark & Oswald, 1996; Stutzer, 2004; Ferrer-i-Carbonell, 2005), and since entrepreneurship is commonly portrayed as a path to higher income and independence (Benz & Frey, 2008; Shane, 2008), entrepreneurial activity by others in the cohort inform one's own considerations of engaging in entrepreneurship (Senik, 2008; Knight, Lina, & Gunatilaka, 2009). These dynamics among those in the lower-end of the income distribution manifest via strengthening the relationship between the proportion of entrepreneurs in the regional cohort and individual attitudes toward self-employment. This suggests the following hypothesis:

Hypothesis 4a: *The positive relationship between the proportion of entrepreneurs in the regional cohort and individual attitudes toward self-employment will be stronger for people in the lower end of the income distribution.*

While the lower-end of the income distribution is more relevant for attitudes, we advance that the upper-end is more useful for predicting behaviors. This reflects the previous characterization of income creating a bi-modal world where the tails of the income distribution differentially affect thinking and behavior (Duesenberry, 1949; Hirschman & Rothschild, 1973;

McBride, 2001). What this means for our models is that while people at the lower end of the income distribution may be more likely to express a positive attitude toward entrepreneurship, when it comes to the choice to physically enter self-employment, availability of resources becomes a key consideration. Capital is a necessary and essential element for starting a business, and in this regard, prior studies document empirically that "liquidity constraints tend to exclude those with insufficient funds at their disposal" (Evans & Jovanovic, 1989, p. 808). Not only do some entrepreneurial activities require a considerable initial investment, but also more financial capital means more collateral which increases the likelihood of external funding (Elston & Audretsch, 2011). This suggests that those on the upper-end of the income distribution may be better able to follow their regional cohort peers into self-employment because they can more readily tap capital needed to start a business. It follows that:

Hypothesis 4b: *The positive relationship between the proportion of entrepreneurs in the regional cohort and the likelihood of choosing self-employment will be stronger for people in the upper end of the income distribution.*

METHODS

To test our theoretical model, we conducted two studies that each draw on unique nationally representative datasets. Study 1 investigates the contagion effects of cascading entrepreneurial activity on attitudes toward self-employment using data from the US General Social Survey (H1a-H4a). Study 2 examines the same contagion effects but with respect to the individual choice to engage in entrepreneurial action via actual entry into self-employment (H1b-H4b). The multi-study approach allows us to explore both attitudes and behaviors in the same paper.

STUDY 1: ATTITUDES TOWARD SELF-EMPLOYMENT (GSS)

Data and methods

We utilized data from the nationally representative General Social Survey (GSS) conducted by the National Opinion Research Center at the University of Chicago. The GSS is a cross-

national survey that covers the period from 1972-2012, and with more than 65,000 observations, it is often regarded as the single best source of data on societal trends in the US. The first wave of the survey took place in 1972, and until 1994 the survey was conducted annually (due to funding issues, there were no waves for 1979, 1981, and 1992). The vast majority of data were obtained in face-to-face interviews. We used a pooled cross-section of individuals for which data on the variables of interest (described below) is available. Table 1 provides summary statistics and a correlation matrix of variables used in this study.

[Table 1 around here]

Dependent variable: Preference for self-employment

The dependent variable is preference for self-employment and comes from a special module in the GSS dataset that evaluates individual attitudes towards self-employment. Specifically, respondents were asked to evaluate their preferences with the following question: "*Suppose you were working and could choose between different kinds of jobs. Which of the following would you personally choose*? (circle one code for each - *being an employee* [or] *being self-employed*") We recoded answers to this question so that preference for self-employment is indicated with a value of 1 and preference for employment with 0. By this parameter, close to 65 percent of the respondents in our sample reported preference to be self-employed.

Independent variable: Regional cohort self-employment

In line with our conceptual axioms, theory, and prior studies (Ferrer-i-Carbonell, 2005; Nikolaev, 2016; Pérez-Asenjo, 2011), we operationalize regional cohort as individuals who live in the same state, are of the same gender and in the same age range. Hence, regional cohort self-employment is a computed variable derived by first calculating the proportion of self-employed people in a region (number of entrepreneurs in sample by state / total number of

participants in the sample by state). The proportion of entrepreneurs by state is then further delineated into cohorts via grouping by age and gender. Thus, for all waves of the GSS, we calculate the proportion of self-employed males and females ages 18-21, 22-25, 26-29,...,62-65, who live in one of the 50 US states.[1] This approach is common for creating reference groups in the literature when using observational survey data (e.g., Clark, Frijters, & Shields, 2008).

While cohorts may manifest along various spatial boundaries, we focus on states because state residency frequently defines individuals' self-image and distinctiveness. For instance, people often identify geographically by using expressions such as "I am a Californian" or "I am from Michigan." Such expressions convey information about individual's distinctive characteristics and values often associated with a region as they relate to identification with others from the same geographical space (Gilbert, Price, & Allan, 1995). Further, state governments in the US are institutional units holding fiscal, legislative and executive authority over a defined geographical area, which gives them a significant discretion in their policy. In addition, states also have their own distinctive history that can reinforce people's regional bonds. This provides further rationale for using states as a unit of analysis to define spatial boundaries at the regional level. Importantly, our analysis relies on cross-sectional data and is thus based on *between* region variance where the proportion of entrepreneurs within a region is considered relative to other regions as a driver of self-employment attitudes.

Moderator variables: Gender and age

Gender is measured as a binary variable equal to 1 if the respondent is a female and 0 if male. Overall, 45 percent of the respondents in our sample were males, with the remaining 55 percent females. Consistent with previous studies and general patterns of self-employment, we find that

[1] A total of 53,439 observations from the GSS were used to calculate regional cohort self-employment.

nearly 72 percent of the male respondents in our sample say that they would like to be self-employed while only 58 percent of females do. The average age of respondents in our sample is 46 years. We find that younger people are more eager to be self-employed, with 72 percent of respondents between the ages 22 to 30 expressing preference for self-employment and 62 percent for older cohorts (ages 50-60).

Control variables

At the individual and household level, we control for the respondent's educational attainment, household income, marital status, and health status. At the regional (state) level, we control for the proportion of people with a college education or higher, average income, and the proportion of employed people in one's region. These variables were selected based on the extant literature on the determinants of self-employment (cf. Parker, 2004). Our final sample consists of people ages 18 to 65, which leaves us with a pooled sample of 3,036 individuals. We also utilize additional control variables that account for family background (mother and father's education and father's self-employment status) as well as the respondent's immigrant status in robustness tests. We use these variables only for sensitivity analysis because they are not available for all respondents (N = 1284 observations).

Analytical strategy

Because our dependent variable, preference for self-employment, is a dichotomous variable (values of 0 or 1), we use a multi-level pooled logit model. In all models, we conservatively use robust standard errors to account for cross-state heterogeneity (White, 1980). We furthermore cluster the error terms at the regional level to control for the so-called Moulton bias (Moulton, 1986) associated with multi-level designs. In logit models, the log-odds of the outcome is modeled as a linear combination of the independent

variables, which allows us to predict the likelihood that an individual will have a preference for self-employment conditional on variables of interest.[2]

Results (GSS)

Table 2 presents our findings from the cross-sectional pooled GSS data. Model 1 includes only the baseline control variables. Model 2 tests our main hypothesis (H1a) and model 3, 4 and 5 test the hypotheses associated with the moderating variables gender (H2a), age (H3a), and income (H4a). Finally, model 6 serves as a robustness check by adding control variables associated with respondents' family background (parents' educational background and father's self-employment status) and immigrant status.

[Table 2 around here]

All estimations in this table suggest that regional cohort self-employment is positively and significantly correlated with the likelihood that a person will prefer to be self-employed ($\beta = 1.85$, $p < .001$). In other words, higher proportion of self-employed people in one's regional cohort significantly increases the odds that an individual will want to be self-employed, holding socio-demographic and other cohort characteristics constant. In this vein, Model 2 (test of H1a) reveals that the log odds of the self-employment preference variable increase by 0.185 with 10 percentage point increase in the proportion of self-employed people in one's regional cohort.

[Figure 1 around here]

To gain further understanding of these results, we calculated the predicted probabilities that a person will report preference for self-employment while holding all other variables in our model at their sample means. Figure 1 shows the predicted probability that a

[2] We follow the identification strategy in Andersson and Larson (2016) and use variables that are contemporaneous in nature.

respondent will report preference for self-employment with 95 percent confidence intervals at different values of regional cohort self-employment. The figure implies, for example, that as the proportion of self-employed people in the regional cohort increases from 10 to 20 percent, the probability for an "average" person to report preference for self-employment increases from 60 to 70 percent (a 5-percentage point increase).

Next, we interacted our regional cohort self-employment variable with our moderating variables gender, age, and relative income. These results are summarized in models 3-5 (H2a-H4a) in Table 2. We report a joint F-test for the main and interactive effects at the bottom of Table 2. Since interpretation of interaction terms in logit models is not straightforward (Ai & Norton, 2003), Figure 1 shows the predicted probability that an individual will report preference for self-employment conditional on their gender (male vs female), age group (older than 50 and younger than 30), and relative income (higher or lower than the mean income in our sample) while all other variables are at their sample means. We find that men (model 3, H2a) and younger respondents (model 4, H3a) are more likely to be affected by regional cohort self-employment when it comes to their preferences for self-employment. These differences tend to be much smaller if an individual belongs to a cohort with more self-employed people. We do not find, however, significant differences based one's relative position in the income distribution (model 5, H4a).

Finally, as a robustness analysis, model (6) retests our main hypothesis (H1a) with additional control variables of respondent's family background (i.e., mother and father's educational attainment and father's self-employment status) and immigration status. Consistent with our findings from model 2, the estimated coefficient is positive and significant ($\beta = 3.32$, $p < .001$). This provides further evidence for our entrepreneurship theory of contagion.

STUDY 2: ENTRY INTO SELF-EMPLOYMENT (HILDA)

Data and methods

We conducted analyses using data from the HILDA survey, waves 1-14 (2001-2014). HILDA is a nationally representative panel of Australian households that includes a rich set of survey questions about respondents' socio-demographic characteristics, labor market status, life events, personality traits, and occupational roles. Wave 1, which started in 2001, consists of 19,914 individuals living in 7,682 households, which are subsequently re-interviewed in the following years. Table 3 provides summary statistics and a correlation matrix for all variables used in this study.

Dependent variable: Entry into self-employment

The dependent variable in this study is "entry into self-employment" and is a dummy equal to 1 if an individual was not self-employed in the previous year, but reports being "self-employed" at the time of the next survey wave. Here we define "self-employed" as an individual who selects one of the following two options: (1) employee of own business or (2) employer/self-employed and exclude people who report being "unpaid family members." By this definition, close to 14 percent of the respondents in our sample are considered "self-employed" which is consistent with self-employment patterns in majority of Western developed countries (Blanchflower, 2000).[3] Over the course of the survey, we observe 1992 cases of entry into self-employment, which provides sufficient variation for our analysis.

Independent variable: Regional cohort self-employment

Like study 1, regional cohort self-employment is a computed variable derived by calculating the proportion of self-employed people in each region (number of entrepreneurs in sample by

[3] Data from the OECD suggests that the self-employment rate in Australia has varied from a high of 13.5 percent in 2001 to a low of 10.1 percent in 2014, which provides further confidence in our approach.

region / total number of participants in the sample by region) and then further calculated via proportion by age group and gender at the time (i.e., year) of interview. Thus, we calculate the proportion of self-employed males and females ages 18-21, 22-25, 26-29, ... ,62-65, who live in one of the thirteen Australian areas (Sydney, Balance of New South Wales, Melbourne, Balance of Victoria, Brisbane, Balance of Queensland, Adelaide, Balance of South Australia, Perth, Balance of Western Australia, Tasmania, Northern Territory, Australian Capital Territory).[4] Just as in study 1, the analysis is based on *between* region variance where the proportion of entrepreneurs within a region is considered relative to other regions as a driver of entry into self-employment.

Moderator variables: Gender and age

Gender is a binary variable equal to 1 if the respondent is a female and 0 if male and the sample is a close even split between male and female respondents. Consistent with previous studies and general patterns of self-employment, we find men to be almost twice as likely to be self-employed as women (19 vs 11 percent, respectively). The average age of respondents in our sample is 40 years. The proportion of self-employed people substantially increases with one's age group. Finally, relative income is a binary variable that is equal to unity if an individual is in the bottom 20 percent of income earners and 0 otherwise. The final sample analyzed consists of 135,067 individual-year observations from 22,298 individuals who are tracked over time.

Other controls

At the individual and household level, we control for the respondent's level of education (years of education), individual labor income, household size, number of children, marital status,

[4] For example, the regional cohort group for a 35 year old female who lived in the Balance of Queensland region during the 2014 wave of the HILDA survey are other 34-36 year old females who also lived in the same region in 2014.

and health status. At the regional level, we control for the average level of education, average income, and the proportion of employed people in one's region. As a robustness test, we add controls for personality traits, occupational roles, and life events. These variables were selected based on the extant literature on the determinants of self-employment (see Parker, 2004).

Analytical strategy

Since our dependent variable, entry into self-employment, is a binary variable which takes the values of 0 or 1, we use a multi-level logit model for the main analytical part of study 2. In all models, we use robust standard errors clustered at the regional cohort level to account for heteroscedasticity and the Moulton bias (1986). Again, the log odds of the outcome are modeled as a linear combination of the independent variables, so our model predicts the likelihood that an individual will transition into self-employment, conditional on several socio-demographic variables and other regional characteristics.

Results (HILDA)

Table 3 shows Pearson correlations for all variables used for the main analysis. The results in this table reveal a positive and statistically significant correlation ($p<0.001$) between regional cohort self-employment and entry into self-employment. These bi-variate correlations, however, should be treated with caution because omitted variables correlated with both the likelihood to enter self-employment and regional cohort self-employment may bias the results.

[Table 3 about here]

Table 4 presents our main findings based on pooled data from all waves of the HILDA survey (2001-2014). Model 1 includes only the baseline controls, while Model 2 tests our main hypothesis (H1b) and model 3, 4, and 5 test the hypotheses associated with the moderating variables gender (H2b), age (H3b), and relative income (H4b).

[Table 4 about here]

All estimations in this table indicate that regional cohort self-employment is positively and significantly associated with the likelihood to enter self-employment, holding socio-demographic and other cohort characteristics constant. Specifically, Model 2 represents the test for the main effect (H1b) and reveals that the log odds of entry into self-employment increases by 0.3672 with 10 percentage point increase in the number of self-employed people in one's regional cohort.

To further understand these results, we calculated the predicted probabilities of transitioning into self-employment holding all other variables in the model at their sample means. Figure 2 shows the predicted probability of entry into self-employment with 95 percent confidence intervals at different values of regional cohort self-employment. The figure illustrates that the probability of transitioning into self-employment for an "average" person who belongs to a regional cohort with 10 percent average self-employment is 0.9 percentage points. This probability, however, increases by almost 50 percent for an individual who belongs to a regional cohort with 20 percent average self-employment.

[Figure 2 around here]

Next, we test H2b-H4b using the same strategy as before and estimate logit models by interacting our main variable of interest, regional cohort self-employment, with our moderating variables gender and age. These results are summarized in models 3-5 in Table 4. For easier interpretation of the results, Figure 2 also shows predictive margins of the main variables of interest. We don't find a statistically significant difference between men and women (model 3, H2b). We do find, however, that younger respondents (age<30) are more likely to be affected by regional cohort self-employment when it comes to their decision to

become self-employed (model 4, H3b). Older people, on the other hand (age>50), are influenced very little by regional cohort self-employment. This finding is quite different than the results for preference for self-employment (study 1). That is, in study 1 we found that regional self-employment significantly influenced older people's preferences for self-employment. Yet, the results in study 2 suggest that despite a greater preference to work for themselves, and perhaps even greater wealth of social and economic resources at hand, older people's self-employment behavior does not follow. Finally, we find evidence that the association between regional cohort self-employment and the individual decision to engage in self-employment is contingent on one's relative position in the income distribution (H4b). Specifically, people at the bottom 20 percent of income earners seem to be unaffected by regional cohort entrepreneurship compared to those at the top 20 percent.

Because it is possible that omitted variables in the error term such as personality traits, occupational choice, or exogenous life events are correlated with both the individual probability of starting a business and the regional level of cohort self-employment, biasing our empirical estimations, Table 1A in the appendix presents several robustness tests. For comparison purposes, model 1 shows our baseline specification from Table 4. In model 2, we add twenty-four life events ranging from recent loss of a job and divorce to death of a family member and major improvement in finances. Model 3 builds on model 2 by including controls for thirty-one occupations ranging from consulting and customer service to corporate managers and agriculture. Finally, using a special module from the HILDA survey, which is available for only three waves (2005, 2009, and 2013), we control for the Big Five Personality traits: agreeableness, conscientiousness, extroversion, emotional stability, and openness to new experiences. The results from these estimations confirm our original findings, bolstering

confidence in our empirical estimations.

SELF-SELECTION OR CONTAGION DYNAMICS

Because individuals who have intentions to start their own businesses can move to areas that provide attractive amenities, the positive association between regional self-employment and the probability of transitioning into self-employment we document could be a by-product of regional self-selection (e.g., Pflüger & Südekum, 2008). To ensure that this is not the case, we conducted several robustness tests (Table 2A and 3A). First, to descriptively account for the possibility of self-selection, we used a module in the HILDA survey that specifically asks respondents what is the *main reason* for relocating. One possible answer is that individuals anticipated starting a new business, which allowed us to account for entrepreneurial intentions *ex-ante*. We found that less than 0.5 percent of the respondents in our overall sample moved to a new location with the intention to start a new business.[5] Thus, it is unlikely that self-selection is driving our findings. We followed this in the GSS dataset by using information on respondents' state of residence at the age of 16 and restricted the sample to only individuals who are still living in the same state (as they were at age 16) during their current interview. Table 2A shows that the results from our restricted sample (model 2) were identical to our baseline estimation from Table 2.[6]

We then conducted additional restricted sample replication tests of our main analysis with the HILDA dataset such as eliminating all individuals who relocated to a new area with the intention to start a new business (Table 3A, model 2), further restricting the sample to individuals who have lived in their current residence for at least five years (model 3), focusing

[5] Over the course of the survey, 2001-2014, less than 8 percent of the individuals who transitioned into self-employment reported relocating with the intention to start a new business (n=107 individuals).
[6] Unfortunately, there is no information on whether respondents moved out and then moved back into their current state of residence.

only on individuals who relocated, but not with the intention to start a new business (model 4), comparing the sub-sample of individuals who relocated to a new area in the past two years (model 5) against individuals who have lived in the area for 5 years or less (model 6),[7] and controlling for the fraction of regional entrepreneurs at the beginning of the survey in 2001 (model 7) since regions with higher initial density of entrepreneurs are likely to exhibit more favorable economic characteristics that can attract more entrepreneurs later (Andersson & Larsson, 2016). Finally, we used changes in regional cohort entrepreneurship from the previous period (model 8) as our main explanatory variable. In *all cases*, we found consistent results with our original findings (model 2, Table 4), which for comparison purposes are presented in model 1 of Table 3A.

DISCUSSION

It is well understood that there is a regional aspect to entrepreneurship such that certain areas develop a "collective programming of the mind" that is favorable to self-employment events (Beugelsdijk, 2007, p.191). We provide new insights on this dynamic by introducing a contagion model of self-employment predicting that individuals' attitudes toward self-employment and decisions to engage in self-employment are influenced by the proportion of entrepreneurs in one's regional cohort. Using data from the GSS survey, we found that individuals tend to have more favorable attitudes toward self-employment if the proportion of entrepreneurs in their regional cohort is higher. Our results furthermore suggest that this effect is moderated by personal characteristics such as age and gender, but not by one's relative position in the income distribution. Data from the HILDA survey revealed that not only does regional cohort entrepreneurship influences one's attitudes toward self-employment, but also individuals'

[7] If people with entrepreneurial intentions or skills sort themselves into areas with high density of entrepreneurs, we should expect the marginal effect of regional entrepreneurship to be higher for the recent migrants compared to people who have lived in the region for longer periods of time (Andersson & Larsson (2016).

decision to enter self-employment. This effect was significant over and above material outcomes, personality traits, occupational choice, and other cohort characteristics. These findings have several important implications for the entrepreneurship literature.

Implications for entrepreneurship literature

First, prior research has established that self-employment and start-up rates tend to be relatively persistent and path dependent over long periods of time (e.g., Andersson & Koster, 2011). One possible explanation for these patterns is the existence of regional entrepreneurship culture that influences people's attitudes toward self-employment (Beugelsdijk, 2007, 2010). This hypothesis, however, has only been *indirectly* tested via inferences from macro-level data on outcomes (e.g., Fritsch & Wyrwich, 2014). This approach overlooks the possibility of a meso-level relationship that runs from regional context to individual-level attitudes and behavior across regions where spatial differences trigger contagion. It also artificially treats entrepreneurs as a homogenous group and thus fails to account for the effects of substantial differences in age, gender, income and so on (Parker, 2004). Our conceptual model and empirical findings fill these gaps in the literature and add new insights to the study of spatial entrepreneurial clusters.

Second, our theoretical explanations and empirical findings extend conversations on the role of peer groups in entrepreneurship. Previous studies have documented peer influence as a catalyst for starting a business, but these effects flow from close-tie peer group interactions where personal relationships with entrepreneurs encourage "others in the network to follow their steps" (Qin & Estrin, 2015; p. 237). We add to this by documenting a similar effect at the regional cohort level where the notion of "peer" extends well beyond personal networks. This supports the view that peer effects can also take place under conditions where interpersonal interactions are unlikely. Given that we offer contagion as an explanatory mechanism for this dynamic, researchers exploring peer effects in local networks may benefit from considering

contagion as another useful conceptual tool in those contexts. Doing so opens the door to future investigations that can explore the extent to which personal interaction versus distal information assimilation influence the degree to which mimetic processes affect entrepreneurship intentions and behavior.

A final implication of our findings is that we move forward discussion about potential catalysts for regional variations in entrepreneurial activity. Prior results from data such as the Global Entrepreneurship Monitor (GEM) reveal institutional and economic factors as important drivers of differences in entrepreneurial attitudes and events across regions (Bosma & Schutjens, 2011). While informative, this line of research overlooks contagion as an equally important dynamic in the regional variation equation. To that end, we offer evidence of contagion effects across regional cohorts in the U.S. and Australia. The policy implication is that contagion effects could serve as a *multiplier* (Glaeser, Sacerdote, & Scheinkman, 2003) where an exogenous shock can create both direct effects on individual attitudes and behavior and indirect effects as people adopt the attitudes and behaviors of others in their regional cohort. In that sense, contagion can not only amplify the effects of policy both in terms of scope and durability (Andersson & Larsson, 2016), but also, as our study suggests, do so for targeted groups of individuals who belong to different regional cohorts.

Limitations and future research

Our study is not without limitations. First, attitudes toward self-employment were captured in the US data while selection into self-employment was encompassed in the Australian data. As such, questions may emerge regarding how attitudes in the US are informative of behaviors in Australia. In response, we offer evidence from the 2015 GEM survey suggesting that attitudes and behaviors toward entrepreneurship exhibit similar patterns in these two countries. Similarities exist in areas such as the percentage of the population who see good

opportunities to start a firm where they live (47% in US and 49% in Australia), the number of individuals who intend to start a business in the next three years (12.3% in US and 14% in Australia), the percentage of total early-stage entrepreneurs (11.8% in US and 12.7% in Australia), as well as the ratio of female to male total early-stage entrepreneurs (.63 in the Us and .65 in Australia). These patterns indicate close parallels between these two countries.

A second potential limitation of our research is that unobserved environmental factors can be correlated with both the level of regional cohort self-employment and individual attitudes and behavior toward self-employment. In this respect, one alternative explanation for our findings could be that unobserved institutional support mechanisms such as government subsidies, or other kinds of training programs, can provide incentives for individuals to pursue self-employment and, at the same time, be correlated with the proportion of regional entrepreneurs. Due to data limitations, we cannot entirely rule out this possibility. Prior research, however, indicates that entrepreneurial culture, which we advance subsumes regional cohort contagion, often operates independently of economic programs and can even survive considerable shocks such as financial crises or changes in regulatory regimes (Fritsch & Wyrwich, 2014; North, 1990).

A final limitation is that we were unable to provide suitable proxy measures for the cognitive processes that underpin contagion. This is a function of being naturally constrained by survey questions from secondary data sources that were not designed to capture such mechanisms. However, this is more than just a data issue because contagion is underpinned by cognitive processes that are difficult to capture even with primary data (McMullen & Dimov, 2013). We see this as an opportunity for future studies that build on our evidence for contagion dynamics as justification for studying the black-box of how contagion unfolds. Such an

approach might directly tackle the cognitive underpinnings of contagion by exploring things like identity (Rao et al., 2003) and how growing self-employment in regions shapes mental images and beliefs (Wood, McKelvie, & Haynie, 2014) about the likelihood of success for their own envisioned venture. Researchers could also look at how the codification and dissemination of information (Strang & Meyer, 1993) about entrepreneurial activity in an area might influence the way individuals interpret and evaluate opportunities to pursue self-employment.

Conclusion

We present evidence for a cascading ripple effect from regional cohort self-employment down to individual attitudes and behavior associated with choosing to engage in self-employment. Our results suggest that contagion effects, which are often omitted from mainstream entrepreneurship models, play a significant role in driving self-employment. In that vein, we uncover that individuals who belong to regional cohorts with a greater proportion of entrepreneurs are more likely to express favorable attitudes toward and enter self-employment.

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Study 1: Attitudes Toward Self-Employment (GSS)

Table 1: Correlation Matrix and Summary Statistics

	n	Mean	Std. Dev.	Min	Max	[1]	[2]	[3]	[4]	[5]	[6]
[1] Preference SE	3018	0.654	0.476	0	1	1					
[2] Regional SE	3018	0.121	0.197	0	1	0.142*	1				
[3] Female	3018	0.548	0.498	0	1	-0.144*	-0.144*	1			
[4] Degree	3018	1.271	0.912	0	3	0.013	0.009	-0.05*	1		
[5] Age	3018	45.613	16.682	18	89	-0.112*	0.139*	0.064*	-0.131*	1	
[6] Married	3018	0.513	0.501	0	1	0.01	0.064*	-0.064*	0.081*	0.087*	1
[7] Widowed	3018	0.077	0.266	0	1	-0.09*	-0.012	0.157*	-0.155*	0.433*	-0.314*
[8] Divorced	3018	0.152	0.359	0	1	-0.000	0.011	0.032	0.011	0.062*	-0.431*
[9] Separated	3018	0.033	0.180	0	1	-0.000	-0.011	0.038*	-0.053*	-0.042*	-0.201*
[10] Never Married	3018	0.220	0.415	0	1	0.051*	-0.082*	-0.067*	0.019	-0.422*	-0.552*
[11] Health	3018	3.033	0.825	1	4	0.028	0.032	-0.022	0.253*	-0.241*	0.079*
[12] Pr College	3018	0.314	0.273	0	1	0.044*	0.011	-0.079*	0.542*	-0.120*	0.088*
[13] Mean Income	3018	10.400	0.642	6.091	12.093	0.024	0.121*	-0.164*	0.261*	-0.072*	0.277*
[14] Pr Employed	3018	0.648	0.340	0	1	0.081*	0.058*	-0.242*	0.252*	-0.543*	0.075*
[15] Father SE	1284	0.301	0.460	0	1	0.037	0.101*	0.012	-0.017	0.183*	0.029
[16] Father Degree	1284	0.862	0.992	0	4	0.073*	-0.019	-0.062*	0.324*	-0.318*	-0.092*
[17] Mother Degree	1284	0.912	1.181	0	4	0.084*	-0.010	-0.072*	0.339*	-0.353*	-0.101*
[18] Immigrant	1284	0.930	0.264	0	1	-0.041	-0.022	0.023	-0.052*	0.040	-0.028

	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]
[7] Widowed	1										
[8] Divorced	-0.125*	1									
[9] Separated	-0.057*	-0.080*	1								
[10] Never Married	-0.158*	-0.221*	-0.102*	1							
[11] Health	-0.129*	-0.055*	-0.065*	0.069*	1						
[12] Pr College	-0.139*	0.008	0.001	-0.029	0.150*	1					
[13] Mean Income	-0.211*	-0.015	-0.068*	-0.144*	0.183*	0.349*	1				
[14] Pr Employed	-0.341*	0.051*	0.015	0.096*	0.213*	0.310*	0.390*	1			
[15] Father SE	0.092*	-0.057*	0.030	-0.061*	-0.023	-0.048*	-0.058*	-0.121*	1		
[16] Father Degree	-0.136*	-0.014	0.011	0.204*	0.169*	0.233*	0.117*	0.206*	-0.078*	1	
[17] Mother Degree	-0.123*	-0.044	0.016	0.245*	0.184*	0.283*	0.073*	0.195*	-0.072*	0.577*	1
[18] Immigrant	0.028	0.040	-0.001	-0.026	-0.020	-0.037	-0.045*	-0.028	-0.051*	0.006	-0.055*

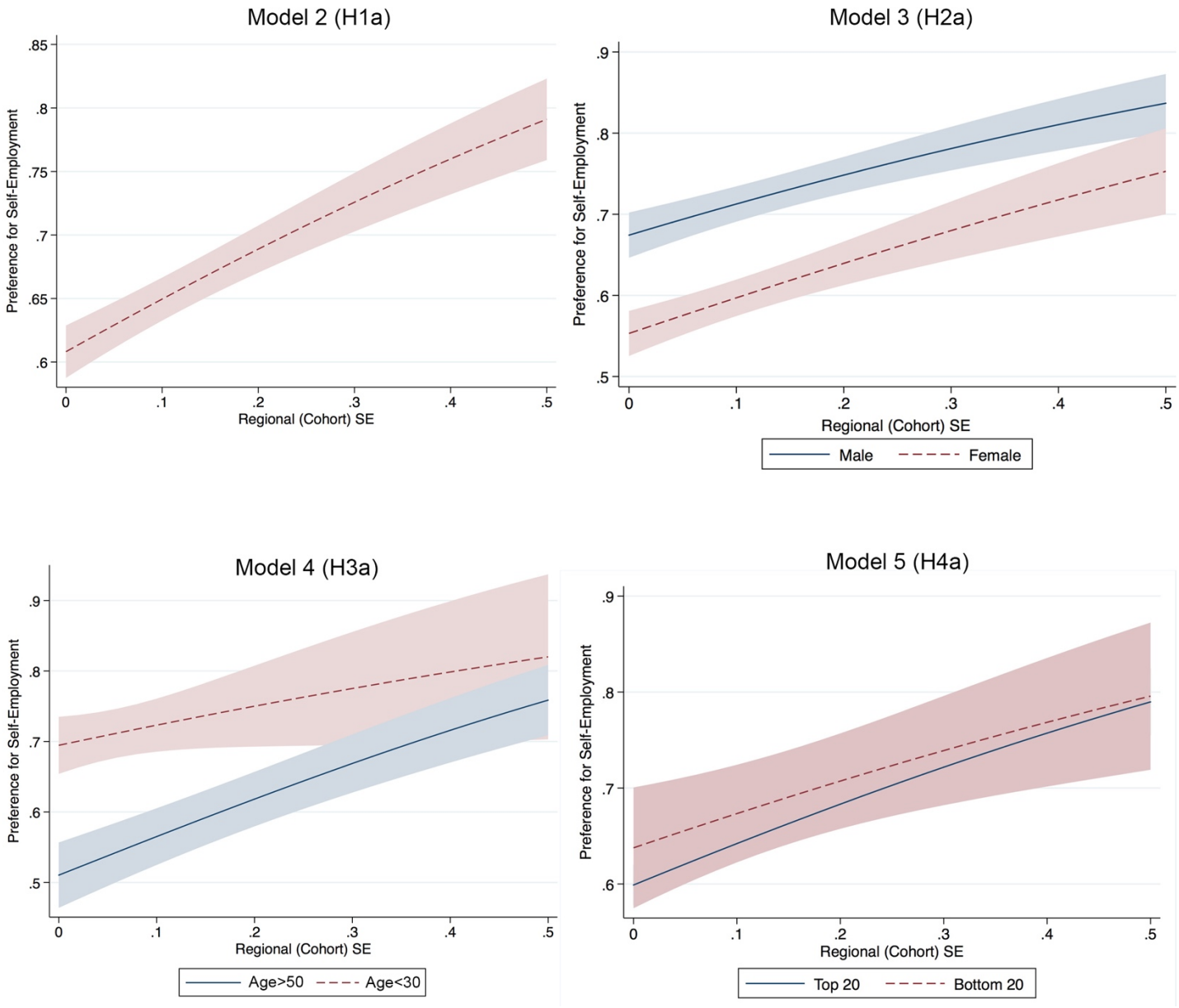
Note: Authors' calculations (General Social Survey). The categories white, less than high school, and poor health are used as a based category. * p<0.05

Table 2: Attitudes Toward Self-Employment (GSS)

Variables	(1) Controls β	(1) Controls se	(2) Main Effect (H1a) β	(2) Main Effect (H1a) se	(3) Interaction (H2a) β	(3) Interaction (H2a) se	(4) Interaction (H3a) β	(4) Interaction (H3a) se	(5) Interaction (H4a) β	(5) Interaction (H4a) se	(6) Robustness β	(6) Robustness se
Age	-0.016***	(0.004)	-0.021***	(0.003)	-0.021***	(0.004)	-0.021***	(0.004)	-0.020***	(0.004)	-0.0509***	(0.0157)
Female	-0.582***	(0.085)	-0.529***	(0.085)	-0.528***	(0.092)	-0.528***	(0.083)	-0.490***	(0.085)	-1.225***	(0.299)
Degree (Base = LTHS)												
High School	-0.152	(0.141)	-0.139	(0.124)	-0.139	(0.14)	-0.139	(0.14)	-0.111	(0.119)	-0.173	(0.601)
College	-0.470***	(0.159)	-0.453***	(0.17)	-0.453***	(0.162)	-0.452***	(0.163)	-0.342***	(0.132)	-0.546	(0.684)
Graduate	-0.276	(0.231)	-0.261	(0.173)	-0.261	(0.231)	-0.26	(0.231)	-0.184	(0.201)	-1.136	(0.71)
Marital												
Widowed	-0.206*	(0.120)	-0.158	(0.164)	-0.158	(0.13)	-0.157	(0.132)	-0.211*	(0.123)	0.242	(0.541)
Divorced	-0.070	(0.089)	-0.063	(0.119)	-0.063	(0.093)	-0.064	(0.094)	-0.041	(0.093)	-0.881**	(0.377)
Separated	-0.158	(0.187)	-0.177	(0.228)	-0.177	(0.189)	-0.174	(0.189)	-0.180	(0.149)	-0.658	(0.73)
Never Married	-0.125	(0.130)	-0.132	(0.116)	-0.132	(0.131)	-0.135	(0.129)	-0.107	(0.123)	-1.021**	(0.408)
Health (Base=Poor)												
Fair	0.028	(0.221)	0.031	(0.216)	0.031	(0.234)	0.03	(0.235)	0.044	(0.223)	-0.0633	(0.877)
Good	0.014	(0.212)	0.007	(0.205)	0.007	(0.219)	0.005	(0.22)	-0.002	(0.201)	-0.382	(0.828)
Excellent	0.131	(0.233)	0.087	(0.213)	0.087	(0.239)	0.084	(0.24)	0.029	(0.231)	-0.318	(0.829)
Log Income	-0.036	(0.068)	-0.039	(0.063)	-0.039	(0.07)	-0.039	(0.07)	0.171	(0.152)		
Father Self-Employed											-0.920***	(0.312)
Father Education											-0.253*	(0.138)
Mother Education											0.490***	(0.173)
Immigrant												
Regional Controls												
Proportion College	0.479***	(0.173)	0.507***	(0.196)	0.507***	(0.173)	0.506***	(0.175)	0.393**	(0.168)	-0.0847	(0.318)
Average Income	0.013	(0.111)	-0.035	(0.094)	-0.035	(0.115)	-0.031	(0.115)	-0.074	(0.088)	0.0226	(0.087)
Proportion Employed	-0.120	(0.184)	-0.233	(0.162)	-0.233	(0.188)	-0.23	(0.19)	-0.205	(0.173)	-0.714*	(0.411)
Main Effect												
Regional (Cohort) SE			1.851***	(0.236)	1.853***	(0.326)	1.324*	(0.79)	1.909***	(0.250)	3.321***	(0.64)
Interactions												
Regional SE x Female					-0.005	(0.431)						
Regional SE x Age							0.01	(0.012)				
Regional SE x Income									-0.266	(0.610)		
Joint F-test (interaction)					p=0.000		p=0.000		p=0.000			
Log Likelihood	-1889		-1856		-1856		-1856		-2076		-761.1	
Pseudo R2	0.03		0.05		0.05		0.05		0.05		0.05	
N Observations	3018		3018		3018		3018		3018		1284	

Note: Authors' calculations (General Social Survey). All models are estimated with an ordered logit model. Robust standard errors clustered at the state level reported in parentheses. Dependent variable in all regressions is a binary variable indicating preference for self-employment. Regional self-employment by age group and sex cohort.

*** p<0.01, ** p<0.05, * p<0.1



Note: The figures show predictive margins with 95% confidence intervals for models 2-5 (H1a-H4a) from Table 2. Preference for self-employment is predicted at different values of the mean regional (cohort) self-employment while holding all other variables in the model at their means.

Fig. 1: Predictive Margins with 95% confidence intervals, Table 2 (H1a-H4a)

Study 2: Entry into Self-Employment (HILDA)

Table 3: Correlation Matrix and Descriptive Statistics, HILDA 2001-2014

Variable	n	Mean	Std. Dev.	Min	Max	[1]	[2]	[3]	[4]	[5]
[1] Entry SE	124908	0.013	0.114	0	1	1				
[2] Regional SE	124908	0.161	0.123	0	1	0.013*	1			
[3] Female	124908	0.531	0.499	1	2	-0.025*	-0.234*	1		
[4] Age	124908	40.927	12.831	14	101	-0.014*	0.647*	0.011*	1	
[5] Education	124908	12.544	2.391	0	18	0.032*	-0.109*	-0.034*	-0.157*	1
[6] Household Size	124908	2.992	1.445	1	16	0.007*	-0.225*	-0.014*	-0.383*	0.039*
[7] Log Income	124908	7.950	4.562	0	13.658	0.039*	-0.271*	-0.108*	-0.372*	0.342*
[8] N Children	124908	0.830	1.140	0	12	0.010*	-0.195*	0.017*	-0.348*	0.028*
[9] Single	124908	0.203	0.402	0	1	-0.021*	-0.309*	-0.049*	-0.519*	-0.041*
[10] Widowed	124908	0.013	0.112	0	1	-0.020*	0.170*	0.129*	0.363*	-0.171*
[11] Divorced	124908	0.063	0.242	0	1	-0.003	0.061*	0.056*	0.137*	-0.027*
[12] Separated	124908	0.030	0.171	0	1	-0.002	0.024*	0.0156*	0.042*	-0.012*
[13] Health	124908	3.406	0.958	1	5	0.020*	-0.186*	-0.011*	-0.302*	0.214*
[14] Av Education	124908	12.081	0.557	10	14	0.052*	-0.248*	-0.079*	-0.399*	0.374*
[15] Av Income	124908	23925	6450	9697	48612	0.016*	-0.151*	0.003	-0.021*	0.199*
[16] Employment	124908	0.446	0.043	0.328	0.701	0.014*	-0.186*	0.003	-0.065*	0.177*

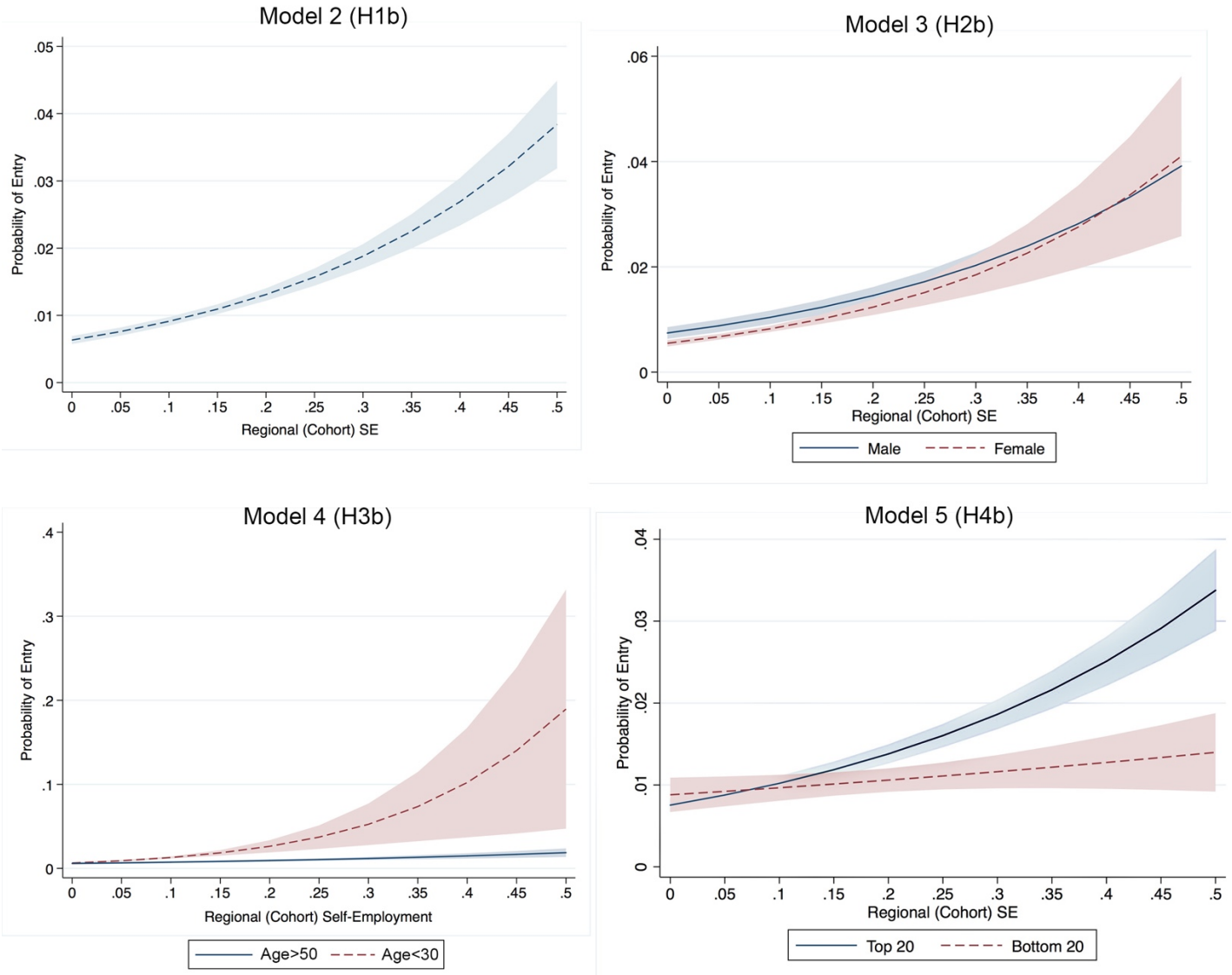
	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
[6] Household Size	1									
[7] Log Income	0.106*									
[8] N Children	0.819*	0.062*	1							
[9] Single	0.044*	0.031*	0.013*	1						
[10] Widowed	-0.233*	-0.235*	-0.135*	-0.125*	1					
[11] Divorced	-0.190*	-0.027*	-0.083*	-0.138*	-0.058*	1				
[12] Separated	-0.087*	-0.006*	-0.009*	-0.091*	-0.038*	-0.042*	1			
[13] Health	0.136*	0.249*	0.120*	0.124*	-0.115*	-0.079*	-0.033*	1		
[14] Av Education	0.181*	0.492*	0.170*	-0.120*	-0.376*	-0.011*	0.038*	0.129*	1	
[15] Av Income	0.022*	0.109*	-0.042*	0.028*	-0.017*	-0.006*	-0.023*	0.045*	0.213*	1
[16] Employment	0.023*	0.127*	-0.026*	0.037*	-0.030*	0.002	-0.020*	0.054*	0.116*	0.715*

Note: Authors' calculations (HILDA, 2001-2014). The categories male and married are used as a based category. * indicates statistical significance at 5% level.

Table 4: Entry into Self-Employment (HILDA, 2001-2014)

	(1) Controls		(2) Main Effect (H1b)		(3) Interaction (H2b)		(4) Interaction (H3b)		(4) Interaction (H4b)	
Variables	β	se	β	se	β	se	β	se	β	se
Individual Controls										
Female	-0.501***	(0.068)	-0.178**	(0.078)	-0.309***	(0.094)	-0.156*	(0.082)	-0.238***	(0.070)
Age	-0.001	(0.002)	-0.025***	(0.003)	-0.024***	(0.003)	-0.006*	(0.003)	-0.025***	-(0.003)
Education	0.047***	(0.012)	0.044***	(0.013)	0.045***	(0.013)	0.039***	(0.013)	0.042***	(0.012)
Household Size	-0.157***	(0.030)	-0.131***	(0.028)	-0.131***	(0.028)	-0.104***	(0.029)	-0.143***	(0.030)
Log Income	0.001	(0.008)	0.018**	(0.009)	0.018**	(0.009)	0.013	(0.009)	0.156	(0.115)
N Children	0.186***	(0.030)	0.153***	(0.029)	0.152***	(0.030)	0.076***	(0.027)	0.193***	(0.033)
Single	-0.516***	(0.108)	-0.478***	(0.104)	-0.480***	(0.104)	-0.409***	(0.104)	-0.273***	(0.099)
Widowed	-1.166***	(0.325)	-1.029***	(0.326)	-1.050***	(0.326)	-0.997***	(0.325)	-1.262***	(0.317)
Divorced	-0.242*	(0.139)	-0.173	(0.136)	-0.173	(0.135)	-0.188	(0.140)	-0.295**	(0.143)
Separated	-0.404***	(0.136)	-0.352***	(0.136)	-0.353***	(0.136)	-0.374***	(0.136)	-0.409***	(0.135)
Health: Fair	0.818***	(0.192)	0.824***	(0.193)	0.820***	(0.192)	0.812***	(0.195)	0.790***	(0.191)
Health: Good	1.028***	(0.247)	1.022***	(0.253)	1.017***	(0.252)	1.010***	(0.251)	1.008***	(0.249)
Health: Very Good	1.047***	(0.224)	1.032***	(0.230)	1.025***	(0.228)	1.022***	(0.228)	1.048***	(0.225)
Health: Excellent	1.203***	(0.262)	1.179***	(0.269)	1.171***	(0.268)	1.181***	(0.267)	1.238***	(0.258)
Regional Controls										
Av Education	-0.273**	(0.122)	-0.098	(0.195)	-0.093	(0.196)	-0.08	(0.194)	-0.08	-0.194
Av Income	0.000***	(0.000)	0. 000	(0.000)	0. 000	(0.000)	0.000*	(0.000)	0.000*	(0.000)
Pr Employed	1.702	(1.175)	1.319	(1.502)	1.329	(1.524)	0.929	(1.628)	0.929	-1.628
Main Effect										
Regional (Cohort) SE			3.672***	(4.502)	3.388***	(0.246)	9.876***	(1.593)	3.053***	(0.189)
Interactions										
Female x Regional SE					0.714	(0.520)				
Age x Regional SE							-0.127***	(0.031)		
Income x Regional SE									-2.116***	(0.430)
Joint F-test (Interaction)					p=0.000		p=0.000		p=0.000	
Log Likelihood	-8608		-8508		-8506		-8473		-8526	
Pseudo R2	0.016		0.028		0.028		0.032		0.026	
N Individuals	21172		21172		21172		21172		21172	
N Observations	124908		124908		124908		124908		124908	

Note: Authors' calculations (HILDA, 2001-2014). All models are estimated with an ordered logit model. Robust standard errors clustered at the regional level are reported in parentheses. Dependent variable in all regressions is entry into self-employment. Regional SE = regional self-employment by age and sex cohort.
*** p<0.01, ** p<0.05, * p<0.1



Note: The figure shows predictive margins with 95% confidence intervals for models 2-5 (H1b-H4b) from Table 4. Probability to enter self-employment is predicted at different values of the mean regional (cohort) self-employment while holding all other variables in the model at their means.

Fig 2: Predictive margins with 95% confidence intervals, Table 4 (H1b-H4b)

Supplementary Appendix

Table 1A: Sensitivity Analysis (HILDA, 2001-2014)

Variables	(1) β	se	(2) β	se	(4) β	se	(5) β	se
Regional SE	3.671***	(0.235)	3.652***	(0.234)	3.151***	(0.331)	3.176***	(0.597)
Controls	YES		YES		YES		YES	
Life Events	NO		YES		YES		YES	
Occupation FE	NO		NO		YES		YES	
Personality Traits	NO		NO		NO		YES	
R2	0.030		0.084		0.116		0.130	
N Individuals	21172		20972		17537		12188	
N Observations	124908		121065		92590		21115	

Note: Authors' calculations (HILDA, 2001-2014). All models are estimated with an ordered logit model. Robust standard errors clustered at the regional level are reported in parentheses. Dependent variable in all regressions is entry into self-employment. Regional SE = regional self-employment by age and sex cohort. All models include the control variables from Table 4. Model (2) adds 24 life events ranging from recent divorce and death of a family member to loss of a job and major improvement in finances. Model (3) controls for 31 occupational choices ranging from customer service clerks to corporate managers. Model (4) additionally controls for the Big Five personality traits: (1) Agreeableness, (2) Conscientiousness, (3) Emotional Stability, (4) Extroversion, and (5) Openness to Experience. *** p<0.01, ** p<0.05, * p<0.1

Table 2A: Sensitivity Results, GSS

Variables	(1) Baseline results Table 2 (model 2)	(2) No State Mobility
Regional SE (state)	1.856***	1.856***
	(0.261)	(0.263)
Regional SE (county)		
Log Likelihood	-1856	-1195
R2	0.051	0.051
n Observations	3018	1894

Note: Authors' calculations (General Social Survey). All models are estimated with an ordered logit model. Robust standard errors clustered at the regional cohort level are reported in parentheses. Dependent variable in all regressions is a binary variable indicating preference for self-employment. Regional self-employment by age group and sex cohort. All estimations include the control variables from model 1 in Table 2. No state mobility represents respondents who lived in the same state in which they currently reside at the age of 16. *** p<0.01, ** p<0.05, * p<0.1

Table 3A: Sensitivity Results, HILDA

Variables	(1) Baseline results Table 4 (model 2)	(2) Excludes people who relocated with the intention to start a new business	(3) Lived in the region 5 years or more (excludes people who relocated to start a new business)	(4) Relocated, but not with intention to start a new business	(5) Residency tenure 2 years or less	(6) Residency tenure 5 years or less	(7) Fraction SE 2001
Regional SE	3.672***	3.3531***	3.478***	4.477***	4.539***	4.357***	3.966***
	(0.235)	(0.290)	(0.457)	(0.505)	(0.338)	(0.332)	(0.222)
Log Likelihood	-8508	-6542	-1989	-1610	-2812	-4079	-6446
R2	0.034	0.032	0.030	0.041	0.030	0.032	0.033
n Individuals	21172	15789	7035	12033	11777	11930	11298
n Observations	124908	77134	29809	24057	35897	53080	92138

Note: Authors' calculations (HILDA, 2001-2014). All models are estimated with an ordered logit model. Robust standard errors clustered at the regional level are reported in parentheses. Dependent variable in all regressions is entry into self-employment. Regional SE = regional self-employment by age and sex cohort. All models (1-7) include all baseline controls from model 1 in Table 4. Model (2) excludes individuals who over the course of the survey relocated with the intention to start a new business. Model (3) furthermore restricts the sample to people who have lived in their current residence for at least 5 years. Model (4) examines the sub-sample of respondents who report relocating over the course of the survey, but we exclude all respondents who relocate to "start own business." Model (5) examines the sub-sample of individuals who have lived in the same residence for 2 years or less. Model (6) includes only individuals with a residency tenure for 5 years or less. Model (7) controls for the fraction of self-employed individuals in the region at the beginning of the survey in 2001. *** p<0.01, ** p<0.05, * p<0.1