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Do Attitudes Toward Risk Taking Affect Entrepreneurship? Evidence from Second-generation Americans*

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Abstract

This paper empirically investigates the impact of willingness to take risks on the likelihood of being an entrepreneur. We use a quarter century of data on second-generation Americans from Current Population Surveys in conjunction with country level measures of willingness to take risks from the Global Preference Survey. The average level of risk taking in the country of origin is found to have a positive and significant impact on the likelihood of being an entrepreneur. A one-standard deviation increase in risk taking increases the probability of being an entrepreneur by 15 percent. We also examine other preferences and cultural measures including trust, patience, and individualism. We find that these do not have an impact on entrepreneurship, while risk taking continues to be significant.

JEL Classification: J20, J24, J61, L26, Z10

Keywords: Entrepreneurship, immigrants, second-generation Americans, risk taking, preference measures, occupational choice, comparative development

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1 Introduction

In the study of economic growth, entrepreneurs occupy center stage due to their role in creating firms, spurring innovations, and reducing poverty. Entrepreneurship inherently involves bearing risk. Risk aversion, in turn, is one of the deep parameters in economic theory. Not surprisingly, a large amount of research is devoted to both the measurement of attitudes towards risk, and understanding the relationship between them and entrepreneurial activity. Are entrepreneurs more risk tolerant than rest of the population within a country? Does tolerance towards risk vary systematically across societies, and if so, does this change over time, and is it contingent on other factors? Are other preferences or personality traits more important to entrepreneurship than risk tolerance?

These questions only scratch the surface of what is now a voluminous literature that overlaps disciplines of economics, management, and psychology, among others. In particular, there is now a preponderance of research that use, or conduct their own, surveys, and lab or field experiments which elicit responses to measure risk tolerance. The studies then go on to show a strong association between these and various risky choices made by the subjects, including the choice of being entrepreneur. While this literature has made important strides, particularly in the measurement of risk preferences, identifying its exogenous effects on choosing to be an entrepreneur remains a challenge due to issues of selection bias, small samples, and reverse causation.

This paper assesses the importance of attitudes toward risk taking for entrepreneurship. Specifically, using country-level measures of the willingness to take risks from the recently published Global Preference Survey (GPS) by Falk et al. (2018) in conjunction with twenty five years (1995 to 2019) of individual level occupation data from the Current Population Surveys (CPS), we examine the extent to which variation in the willingness to take risks in the country of origin can explain the likelihood of being an entrepreneur among immigrants and second-generation Americans. We use self-employment as a proxy for entrepreneurship, as in previous studies, and emphasize results for second-generation Americans.

Before summarizing our findings, we highlight the distinguishing features of our approach. Compared to the existing literature, our strategy of using the GPS measure of risk preferences in conjunction with CPS data has several advantages. First, by looking at a single country (where all respondents are exposed to the same broader set of markets and institutions), we already control for a large number of confounding factors that can contaminate the relationship between risk preferences and occupational choice. Second, in our analysis, we focus on the sample of second generation Americans, which further factors out unobserved differences that might be present among first generation immigrants.

Third, by using entirely separate data sources for our risk tolerance measure and individual occupational choices, we are able to avoid the pitfalls of other studies that rely on the same survey to examine the link between the two variables. Fourth, the CPS data affords us the luxury of considerably larger samples and an extensive set of individual-level controls. Fifth, the GPS itself is a culmination of a long research project with numerous prior peer reviewed studies and validation exercises (e.g Dohmen et al., 2011a,b, Falk et al., 2016, Vieider et al., 2015), thus carrying far more credibility than previous survey based questions. It also has the distinct advantage that it covers 76 countries, thus allowing for considerable global variation.

We find that the average level of risk taking in the country of origin has a positive and significant impact on the likelihood of being an entrepreneur among both groups. For example, a one-standard deviation increase in risk taking increases the probability of being an entrepreneur by 10 percent among immigrants (relative to the sample mean), and by 15 percent among the second-generation Americans (relative to the sample mean). These findings highlight the importance and persistence of attitudes towards risk in entrepreneurship, and thus reinforcing a large literature documenting the same for other measures of preferences or cultural factors (e.g., patience, trust, etc) in different contexts (such as growth, labor market participation, etc). We then implement an extensive set of sensitivity checks to show that our results are robust to additional controls, estimation techniques, and different samples.

While our analysis is centered around the willingness to take risks, it is certainly not the only preference parameter or cultural factor that can affect the decision to be an entrepreneur. Indeed, the literature has often foregrounded other factors such as the role of patience (or "long term orientation"), the importance of individualism (or "locus of control"), as well as social capital measures such as trust. We examine the importance of these variables. They are also captured either by the GPS, or the widely used cultural dimensions of Hofstede et al. (2010). To summarize our results, we find surprisingly mixed information on the role of patience. The GPS measure of patience has shown to be not only strongly correlated with per capita incomes and other aggregate outcomes in Falk et al. (2018), but also dominate other preference measures in this respect. We find some evidence that it is associated with entrepreneurship, but in a horse race with risk preference it tends to lose its explanatory power. Hofstede's measure of long term orientation, turns out be uninformative about entrepreneurship in our sample. We also find no effect of other preferences and beliefs, including trust from the GPS and, individualism and uncertainty avoidance from Hofstede's data. Risk preference, on the other hand, continues to be positive and significant.

Our strategy of using global variations in risk preferences to study outcomes among

the second generation population is motivated by similar research on the transmission of beliefs and preferences (Fernandez and Fogli (2009), Alesina et al. (2013), Galor and Özak (2016), among others). Since we use variations in risk tolerance of the ancestral country, there is the question of robustness to other geographic, historical and cultural factors. As with these studies, our baseline regressions control for a host of these factors including continent dummies, a range of geo-climactic variables that are common in the literature, as well as median age and religious composition. In further robustness tests, we also consider additional factors such as per capita income and legal origins. We also include a set of individual characteristics (e.g., gender, age, race, etc) to control for variation across individuals that may affect the propensity to become entrepreneur.

The paper is organized as follows. The next section provides a review of the related studies, and puts the contribution of this paper in perspective. Section 3 discusses data and presents statistics about key variables, and Section 4 presents the empirical methodology. Section 5 presents and discusses baseline findings, and investigates their robustness. Section 6 extends the analysis examining alternative preference/cultural measures. Section 7 concludes the paper.

2 Related Literature

This paper lies at the intersection of two growing bodies of research: (i) the transmission of beliefs and preferences and their implications for various outcomes, and (ii) entrepreneurship. Notable examples in the former are Fernandez and Fogli (2009), Alesina et al. (2013), Galor and Özak (2016), and Figlio et al. (2019). Fernandez and Fogli (2009) use cultural proxies such as female labor force participation rates and fertility rates in ancestral countries to examine decisions regarding work and fertility rates of second generation American women. Alesina et al. (2013) dig deeper into the past, and argue that the historical prevalence of plow agriculture shaped gender norms. Exploiting CPS data, they show that second generation American women from countries that traditionally used the plow are less likely to participate in the labor force. Galor and Özak (2016) show that second generation populations in Europe and the US tend to exhibit more long term orientation and lower smoking rates if the returns to pre-industrial agricultural investments was higher in their ancestral countries. Figlio et al. (2019) show that immigrant school children from countries which have higher values of long term orientation tend to perform better in schools in Florida.[1] Our findings reinforce the broader message of these papers

[1]While the above papers rely entirely or partly on US Data, a number of others have used second generation data from European countries. These include Alesina and Giuliano (2011) on family ties,

regarding persistence of preferences, values, and beliefs. This is in contrast to some of the research that shows risk tolerance can change dramatically due to individual experiences (Jakiela and Ozier, 2019) or beliefs and values, more generally, might converge towards those of the host country (Giavazzi et al., 2019). Clearly, at least as far as risk tolerance is concerned, there is a strong component that persists over time.

Our paper makes a contribution to the large body of work on entrepreneurship. While acknowledging the risky nature of entrepreneurship, papers in this literature argue that changes in economic conditions that individuals face can also affect their decision to become entrepreneur. Researchers have investigated several factors affecting entrepreneurship, including financial constraints (Cagetti and De Nardi, 2006, Evans and Jovanovic, 1989, Hurst and Lusardi, 2004), family background and inheritance (Fairlie and Robb, 2008, Hurst and Pugsley, 2012), discrimination in financial markets (Asiedu et al., 2012, Blanchard et al., 2008), tax policies and politics (Beland and Unel, 2019, Cullen and Gordon, 2007), immigration (Fairlie and Meyer, 2003, Kerr and Kerr, 2018), and globalization (Eren et al., 2019, Grossman, 1984, Unel, 2018).

Our paper is more closely related to the literature that focuses on the interplay between preferences and entrepreneurship. Studies emphasize that individuals who become entrepreneurs are more tolerant of risk, as well as other motives such as placing a greater value on non-pecuniary benefits (e.g., being their own boss).[2] Among theoretical papers, Kihlstrom and Laffont (1979) explicitly model Knightian risk in a general equilibrium model where the distribution of risk aversion in the population emerges as a key determinant of entrepreneurship. Galor and Michalopoulos (2012) also consider a long run model of growth and entrepreneurship. The presence of entrepreneurial traits is conducive to economic growth. However, as incomes rise, societies tend to become less entrepreneurial as risk tolerant households reduce their fertility rates. Doepke and Zilibotti (2014) construct a model where parents invest in their children's preferences. Their core model centers around the role of patience in innovation, though they later consider a variation where risk preferences matter. The long-run growth depends on the initial distribution of patient vs impatient, or risk tolerant vs risk averse households. Hurst and Pugsley (2016) develop a general equilibrium model of occupational choice to study how preference heterogeneity with respect to non-pecuniary benefits and wealth affect entrepreneurship. They show that non-pecuniary entrepreneurs self select into small scale firms, and subsidies designed to stimulate more business entry reduce welfare.

There is also a large body of empirical work on risk preferences and self employment

Luttmer and Singhal (2011) on preferences for redistribution, and Mocan (2019) for leisure preferences.

[2]For an comprehensive discussion of the various economic theories of entrepreneurship, we refer the reader to Parker (2018).

with mixed results. One of the earliest studies, Blanchflower and Oswald (1998) show that the main barrier to self-employment is liquidity and financial constraints, whereas childhood psychological factors do not play a role. However, a number of subsequent papers do correlate risk tolerance with self employment. Ekelund et al. (2005) look at Finnish data and find that individuals who had low values of a measure of fear of uncertainty are more likely to be self employed later in life. Using the 2004 wave of German Socio-economic panel, Dohmen et al. (2011b) show that the willingness to take risks is significantly associated with the choice to be self-employed.[3] Caliendo et al. (2014), also using the German Socio-Economic Panel for 2000-2009, shows that risk tolerance is significantly associated with self employment, and also entry into self employment. Skriabikova et al. (2014) provide evidence from Ukraine that attitudes towards risk is correlated with self-employment. In a recent paper, Levine and Rubinstein (2017), using data from the CPS and National Longitudinal Survey of Youth (NLSY), show that although education and family background are important in decision to become entrepreneur, other traits are also important. Individuals who become entrepreneurs (the incorporated self-employed in their sample) score higher on learning aptitude tests, exhibit greater self-esteem, and engage in more illicit/risky activities as youth than others.[4] In contrast to these papers, Holm et al. (2013) is an example of a large scale experimental study that finds entrepreneurs do not differ in their attitudes towards risk (non-strategic uncertainty) compared to the rest of the population. Koudstaal et al. (2016) also conduct lab-in-the field experiments on entrepreneurs and managers, and note that the two groups differ in their aversion to losses, and not to risk aversion in general.[5] Thus, while research has advanced considerably, providing a causal interpretation remains fertile ground.

To our knowledge, other than the exploratory regressions in Falk et al. (2018), Bouchouicha and Vieider (2019) is the only empirical study that employs worldwide variation in risk tolerance to examine entrepreneurial outcomes. However, the latter look at the reverse effect, i.e. impact of per capita income on risk tolerance. One would hardly doubt that over time as economies develop, population compositions evolve, and institutions change, attitudes towards risk as well as other cultural beliefs will change (Alesina and Giuliano, 2015). By looking at second generation Americans, we are able to bypass the

[3]Dohmen et al. (2011a) document the transmission of attitudes towards risk and trust between generations, but indicate that regional variations can also affect these attitudes.

[4]Hsieh et al. (2017) argue that the inconclusive evidence of risk on entrepreneurship may reflect the likelihood of risk averse individuals compensating by investing in "balanced skills", and in the process might even be more entrepreneurial.

[5]More generally, Astebro et al. (2014) survey the literature on risk preferences and entrepreneurship and conclude that the importance of risk taking is as best suggestive and certainly not the primary driver. They also consider other behavioral factors such as overconfidence, overprecision, and also, as we mentioned earlier, non-pecuniary benefits.

thorny issue of reverse causality.

3 Data

We first discuss the sources and construction of our sample of immigrant and second generation entrepreneurs and workers, followed by the variables connected to their country of origin.

3.1 Individual-level Data

The individual level data used to examine occupational choices are drawn from the Annual Social and Economic (ASEC) files of the Current Population Survey (CPS), conducted by the U.S. Census Bureau for the Bureau of Labor Statistics. Surveys are publicly available at the Integrated Public Use Micro Samples (IPUMS) website (Ruggles et al., 2019). Our analysis uses repeated cross-section data that cover 50 states and D.C. from 1995 to 2019.[6] The ASEC survey includes information about individuals' gender, race, age, education, nativity (including their parents) as well as their current and prior year worker class for their major job, industry where they work/worked, etc.[7] The survey classifies individuals as wage and salary workers or self-employed, and the latter are further classified as incorporated and unincorporated.

As discussed, our analysis uses two samples: immigrants and second-generation Americans (i.e., U.S.-born individuals whose parents are foreign-born). For the former, we only include immigrants whose birthplace is the same as their parents. Thus, immigrants whose birthplace is different from their parents and immigrants whose parents are from different countries are excluded from this sample. The second sample includes U.S.-born individuals whose parents are from the same foreign country, and thus excludes the second-generation Americans whose parents are from different countries. We impose these restrictions on

[6]This is a repeated cross-section as individuals are not interviewed over the years. The sample period begins in 1995 because the CPS underwent a substantial change in 1994. Additionally, data on birthplace and parents' birthplace are not available for years prior to 1994. The Bureau of Labor Statistics has also conducted the American Community Surveys annually since 2001. However, these surveys do not have information about the birthplace of parents.

[7]The General Social Survey (GSS) is another US based survey that contains data on various topics (such as demography, work, civil liberties, crime and violence, social mobility, etc.) since 1972. The survey includes information about the birth places of the ancestors of second or higher generation Americans. However, for our purpose, the GSS is not as comprehensive and consistent as the CPS-ASEC surveys. For example, the number of observations in each year is substantially smaller than that in the CPS. In addition, the number of country-of-origin is around 40, and most of them are European countries.

our samples to ensure that our regressions results are not affected by the mixture of different cultures. In addition, both samples exclude all source countries with less than 25 observations.[8] As we shall show later, our results are not sensitive to these exclusion criteria.

In constructing our sample, we stay consistent with the empirical literature on entrepreneurship, and more specifically, that of immigration and entrepreneurship. Following Fairlie and Meyer (2003), each of our two samples include individuals between 20 and 64 years old, who worked at least 20 weeks in the previous year and usually at least 15 hours per week in that year. Thus, we consider only individuals with strong labor force attachment. We exclude anyone with imputed or missing worker class, birthplace status, and inconsistent reports (Fairlie and Meyer, 2003, Levine and Rubinstein, 2017). We reclassify industry worked last year into 12 broadly defined sectors, and our analysis consider only individuals working in the non-agricultural private sector. In line with many previous studies (Borjas and Bronars, 1989, Fairlie, 2014), we identify self-employed business owners as entrepreneurs. However, we also present results based on samples in which only incorporated self-employed individuals are identified as entrepreneurs, following Levine and Rubinstein (2017).

Table 1 reports summary statistics for certain characteristics of entrepreneurs (i.e., self-employed business owners) and wage workers. The samples used in this table are the same as that in our main regression analyses. Columns 1 and 2 provide, respectively, statistics for immigrant self-employed and immigrant wage workers. Our sample has 150,447 observations, and about 10% of them are self-employed business owners. Column 1 reports that about 35% of all self-employed individuals are female, 66% white, 80% married, and 52% has some college education. They mostly work full-time, and the number of weeks that they were unemployed was less than one.[9] About 4% of self-employed individuals are in the manufacturing sector and 77% in services. The average number of years that a self-employed immigrant spent in the U.S. is about 20.5. Thus, according to column 1, majority of self-employed immigrants are educated, white, married males, and mostly have full-time, full-year businesses in the service sector. Column 2 presents summary statistics for wage workers, and a comparison with those in column 1 reveals that about 44 percent of workers are females, they are (slightly) younger and less educated, and their share in manufacturing sector is higher. Not surprisingly, the average years that they spent in the U.S. was about three years shorter than immigrant entrepreneurs.

[8] Table A.1 in the appendix lists countries used in each sample.

[9] As described above, we only consider individuals who worked at least 20 weeks in the prior year and usually at least 15 hours each week. Thus our sample excludes individuals with longer unemployment spells.

Columns 3 and 4 report statistics for second-generation Americans. The sample has 35,504 observations, about 7.3% of which are self-employed business owners. It is interesting to note that self-employment among the second-generation is lower than that among (the first-generation) immigrants. Column 3 states that the majority of self-employed individuals are white, college educated males working mostly in the service sector. Statistics for workers in the last column are similar to those in column 3, except that workers are younger, while the female and Hispanic shares are higher. The table provides some interesting contrasts between the immigrant and second-generation self-employed. Comparing columns 1 and 3, second generation entrepreneurs are less likely to be female, Hispanic, or married, but more likely to be younger, white, and have some college education. Most of these are not surprising given that they were children of immigrants who came before our sample period, i.e they pick up some general trends in the labor force and immigration. However, others such as being less likely to be female, might reflect labor market conditions specific to immigrants or other factors that we leave for future research.[10]

3.2 Country of Origin Variables

Variables related to the country of origin are taken from multiple sources. Our main variable of interest, the average willingness to take risks in the country of origin is taken from the Global Preference Survey (GPS) conducted by Falk et al. (2018, 2016). The GPS database, using more than 80,000 participants worldwide, provide preference measures for a nationally representative sample for 76 countries. It includes six different measures of economic preferences: patience, risk taking, positive reciprocity, negative reciprocity, altruism, and trust. Our variable of interest is "risk taking," which Falk et al. derived from a series of quantitative questions and one qualitative question. Quantitative questions are designed to obtain respondents' certainty equivalence, whereas the qualitative one asks for their willingness to take risks on an 11-point scale. Each respondent's overall risk taking is a weighted average of the quantitative measure and the qualitative item. Falk et al. (2018) standardize preference measures at the individual level so that each measure has a mean of zero and a standard deviation of one in the individual-level world sample. The country level values are then calculated by using sample weights from the 2012 Gallup polls.[11]

Values for risk taking range between -1 and 1, where higher values represent a greater willingness to take risk. The average value of risk taking shows considerable variation

[10]While our focus is on the effect of risk taking, we are unaware of any other research that has documented differences between first and second generation entrepreneurs, or compared the latter with second generation wage workers.

[11]The GPS was conducted within the framework of the 2012 Gallup poll.

across countries. It is interesting that the values are higher in many African countries, whereas it is lower in many of those in western Europe. For example, the average risk level is about 0.970 in South Africa, 0.523 in Zimbabwe, and 0.492 in Tanzania, whereas it is -0.158 in Spain, -0.044 in Germany, -0.030 in France, -0.094 in Italy, and 0.049 in the U.K. The average risk taking value is 0.184 in Canada, -0.139 in Mexico, and 0.117 in the U.S. The mean value of risk taking in our first sample (which includes immigrants from 68 countries) is -0.077, with a standard deviation of 0.197. The average value of risk taking in our second sample (which includes only second-generation population whose parents come from 50 different countries) is -0.087 with a standard deviation of 0.186.[12] The fact that risk taking tends to have higher values in African countries, and lower values in western Europe should partly allay concerns that it is approximating for cultural similarity between the latter and the US.

Figure 1.a plots the relationship between the average share of entrepreneurs among immigrants from each country in our sample and the average risk taking level in that country, if we condition on main geographic factors (such as continental fixed effects, latitude, average temperature, average precipitation, landlocked and island dummies). There is a positive correlation between the two measures, but it is statistically insignificant. Figure 1.b plots the same relationship among the second-generation Americans. As in Figure 1.a, there is positive but statistically insignificant correlation between them. This suggests there is a lot of unexplained variation that may be attributable to individual characteristics and other country specific factors. Moreover, it is likely that variations in risk-taking itself reflects differences in other geographic or cultural factors. In our econometric analysis presented in the next section, we control for a range of these. Specifically, we include individual characteristics (such as gender, age, race, etc.) and a host of geo-climactic variables (such average elevation, agricultural land suitability, distance to coast and rivers, etc) in addition to those used in Figures 1.a and 1.b. We also control for differences in religious affiliation (the fraction of population that is Protestant, Catholic, or Muslim) and median age in the ancestral country to rule out any confounding effects of culture or demographics. In our sensitivity analysis, we also consider additional variables such as legal origin of countries (La Porta et al., 2008) and real GDP per capita from the Penn World Tables version 9 (Feenstra et al., 2015) to control for differences in institutions and economic development across countries. Other than the GPS variables, our proximate sources for most country level variables are Galor and Özak (2016) and Henderson et al. (2018). The median age data comes from United Nations (2017).

[12]Even though Falk et al. (2018) standardize their measures at the individual level, this does not translate to a standard deviation of 1 at the country level. In fact, the standard deviation is 0.30 for their 76 country level observations. The mean remains close to 0 (it is 0.01).

4 Model

We investigate the impact of "risk taking" on the likelihood of being an entrepreneur by estimating the following model:

$$E_{ict} = \beta \text{Risk}_c + M_{cst} + Z_c + X_{it} + \eta_{st} + \varepsilon_{ict}, \tag{1}$$

where E_{ict} is an indicator variable that equals one if individual i from country c in year t is an entrepreneur (i.e., self-employed business owner), and zero otherwise. The individual's state of residence is represented by s, and for notational simplicity, we drop it from E_{ict}. The variable Risk_c represents the average value of risk taking in country of origin c, and the coefficient of interest is β. In equation (1), M_{cst} represent the share of individuals from country c in state s's immigrant population, and we include this variable to control for the possible impact of population differences across countries. In particular, it addresses the possibility that existing social networks among immigrants from a country might affect their decision to become an entrepreneur.

The set of time-invariant variables that control for variation across countries is denoted by Z_c. First, it includes four continental dummies (Africa, Asia, Europe, and America) and a border dummy (for Mexico and Canada). Second, it includes a large set of other potentially confounding geographic factors such as landlocked dummy, island dummy, average elevation (meters), roughness, distance to the sea or navigable rivers (1,000s km), average temperature (in Celsius between 1961 and 1990), average precipitation (meter/month over 1961-1990), and average land suitability for agriculture, variation in land suitability, and malaria (the index of the stability of malaria transmission).[13] Finally, we also include median age and controls for religion such as the fraction of population that is Protestant, Catholic, or Muslim.

Individual characteristics are represented by X_{it}, which includes dummies for gender, marital status, two race dummies (black and others), a dummy for Hispanic, three education dummies (high school, some college, college and above), age, and age squared. It also includes the number of years each immigrant has lived in the United States.[14] State-year

[13] One might be concerned that including so many geographic factors creates an over-controlling problem. We also ran regressions including only a parsimonious set -latitude, landlocked, island, temperature, precipitation in addition to continental dummies. The results remain mostly the same.

[14] The CPS data provides additional information about individuals' work, including part-time/full-time status, number of weeks (un)employed, industry worked, etc. We do not include these variable into equation (1), because they pose a reverse-causality problem. For example, an individual may choose to work in an industry because of high entrepreneurial activity there. Further, some industries, might for various reasons tend to have a larger share of entrepreneurs than others leading to a problem of over-controlling. However, in robustness tests, we show that our results are not too sensitive to including these variables.

fixed effects η_{st} are included to control for any other state-level, time-varying confounding factors that can affect estimates. Finally, ε_{ist} is the error term, and we use robust standard errors clustered at the country-of-origin level.

In estimating equation (1), we begin with data on immigrants. However, using this sample is subject to two critiques. First, there is a selection bias in the sense that immigrants are arguably more risk taking because immigrating to another country constitutes substantial uncertainty and challenges in their lives. Consequently, immigrants may be more entrepreneurial (Fairlie and Lofstrom, 2015, Kerr and Kerr, 2018). Second, immigrants face considerable challenges, including discrimination, in labor markets of the host country, which in turn may affect the likelihood of having their own businesses. For example, due to tougher immigration laws in the U.S., increasingly foreign students and workers are returning home/other countries to have their own businesses (Kerr, 2018). Moreover, we have already mentioned the other advantages of using second generation Americans.[15] Therefore, we re-estimate equation (1) using data on the second-generation Americans. In this case, subscript c denotes parents' country of origin.

5 Results

This section present the results of our empirical analysis. We report and discuss baseline results based on equation (1) using data on immigrants and the second-generation Americans. Then we investigate how sensitivity of our results to the choice of control variables and samples.

5.1 Baseline Results

Table 2 reports the impact of risk taking in the country-of-origin on the likelihood of being an entrepreneur among immigrants. Regressions include state-year fixed effects as specified in equation (1), and robust standard errors clustered at the country-of-origin level. Each regression uses 150,447 observations (immigrants) from 68 countries. For brevity, we present only the estimated coefficient on risk taking.[16]

Column 1 reports the results when we do not include any control variables (other than state-by-year fixed effects). The estimated coefficient on risk taking is very small

[15]Second-generation Americans may also be subject to the selection-bias because their parents are less risk averse immigrants. However, being exposed to institutions and cultural life in the U.S., the selection-bias is more likely to have a limited effect. In addition, we relate individual-level occupation choice to the average risk level in the country of origin, not to their parents' risk tolerance.

[16]Detailed tables are available on request.

and negative, and statistically insignificant (similar to what is observed in Figure 1.a). In column 2, we include continental fixed effects and a border dummy. We separate the Americas into two groups - Mexico and Canada, vs. the rest. This is done to better account for any distinct outcomes that might be specific to immigrants from these two places compared to other regions in the continent. The estimate is still negative and statistically insignificant, implying that the unexplained variation is still too high for risk taking to have a perceptible effect on entrepreneurship. While not reported here, the estimated coefficients of continental and border fixed effects are significant. In particular, the estimated coefficient of coming from a border country is negative and highly significant. This is not surprising given that a substantial share of immigrants are from Mexico and they are less likely to be entrepreneurs (See Figure 1.a).

In column 3, the regression includes a range of geographic variables. Specifically we include latitude (absolute value), a dummy variable for landlocked, a dummy variable if the country is an island, average elevation, average roughness of terrain, distance to coast and navigable rivers, average temperature, average annual precipitation, agricultural suitability of land, Gini of land suitability, and a malaria ecology index. While many of the capture pure (dis)advantages of physical geography and early agriculture, some such as distance to coast also capture advantages with respect to market access. These coefficients are motivated by the large literature on deep roots of economic development, and more specifically the documented effects of geography on the evolution of preferences and cultural traits such as patience, trust and cooperation among others.[17] The estimated coefficient on risk taking now is positive and statistically significant at the 10-percent level.

In column 4, we also include median age and the fraction of population in the country-of-origin that is Protestant, Catholic, or Muslim (three separate variables). We include median age because recent studies have shown that the willingness to take risks declines over the life cycle (Dohmen et al., 2017, Sunde and Dohmen, 2016).[18] Thus, even though the GPS is nationally representative, the cross-country variations in the measure of risk taking might be distorted by the age composition of populations rather than the underlying cultural attitudes towards risk. The inclusion of three religion variables is driven by two concerns. First, the intellectual history going back to Weber, on the role of the Protestant ethic and the spirit of capitalism. While his views underscored the virtues of patience and hard work, and not risk taking directly, the former are often considered as desirable

[17] See Spolaore and Wacziarg (2013) for a discussion on deep roots, and also see the brief discussion in Falk et al. (2018) which explicitly discuss the effect that these have on preference measures in the GPS. Henderson et al. (2018) also note that geographic variables can explain almost 50% of the variation in worldwide economic activity.

[18] The median age in our sample of countries ranges from 15.3 in Uganda to 44.7 for Japan.

attributes for an entrepreneur. Second, even though the simple correlation between risk taking and Muslim population shares is only 0.2, the GPS clearly accords higher values to many countries that have substantial shares of Islamic population such as Saudi Arabia, Iran, Algeria, and Nigeria to name a few. Both of these reasons suggest that the effect risk taking might be picking up more complex effects of religious beliefs on entrepreneurship. When we add median age and religion controls, the estimated coefficient on risk taking now is higher and highly significant.[19]

To alleviate concerns that an individual's decision to become an entrepreneur may depend on existing social networks among people from her country, we include the country-of-origin population share among immigrants (M_{cst}) at the state-year level in column 5. This variable has no appreciable impact on the estimated coefficient on risk taking. In fact, the correlation between M_{cst} and entrepreneurship is negative and highly significant (the estimated coefficient is -0.038 with sd of 0.011). One possible explanation for this negative relationship is that individuals from a country with high immigrant share find it easier to integrate into the state's economy, which can offer them better wage and salary job opportunities.

The last column reports the regression results when we include individual characteristics. The estimated coefficient becomes smaller, but is still highly significant. The estimate implies that a one standard deviation increase in risk taking raises the probability of being an entrepreneur by about 10 percent relative to the sample mean.[20] Estimated coefficients on individual characteristics (available upon request) are consistent with statistics reported in Table 1. For example, the estimates on male, age, marital status, education, and the number of years lived in the U.S. are all positive and highly significant, whereas that on being black is negative and significant.

Our analysis so far implies that risk taking behavior has a positive and significant impact on the likelihood of being an entrepreneur. However, given the preceding discussions on limitations of examining immigrants and the advantages of studying the second generation, for the rest of the paper, we turn our focus to the latter.

Table 3 reports regression results when we consider only the second-generation population. As in Table 2, all regressions include state-by-year fixed effects, and standard errors clustered at the parents' country-of-origin level. Each regression uses 35,504 second-generation immigrants, whose parents are from 50 different countries. From column 2 to

[19]The estimated coefficient on median age is positive and highly significant. The estimated coefficients on Protestant and Catholic are negative and significant, and that on Muslim is positive but insignificant.

[20]It is possible that educational attainment may be influenced by the level of risk taking in the country-of-origin. We run the same regression without any educational variables, and the estimated coefficient on risk taking is 0.052 with standard deviation of 0.012. That is, excluding educational categories does not have any significant impact on the result.

6, in each column we add a set of control variables, as specified in the table. A quick comparison with results in Table 2 shows that estimated effect of risk taking is always positive and considerably higher, and the fit of the model is better.

The estimated coefficient on risk taking is positive and insignificant in column 1. It increases but remains insignificant when we include continental fixed effects and a border dummy as shown in column 2. The impact of risk taking on entrepreneurship becomes highly significant when other geographic factors are added (column 3). Including median age and the fraction of Protestants, Catholics, and Muslims in the country of origin increases the point estimates without having any effect on significance (column 4); and similarly adding the country-of-origin population share does not have any appreciable effect on magnitude and significance of the estimate (column 5).

In the last column, we include individual characteristics, and the estimated coefficient on risk taking becomes smaller (cf. column 5), but still remains positive and highly significant. The estimate implies that a one-standard deviation (which is 0.186) increase in risk taking increases the likelihood of being an entrepreneur by 14.8 percent, relative to the sample mean. Thus, the effect of risk taking on the likelihood of being an entrepreneur among the second-generation population is about 50 percent higher than that among immigrants.[21] Going forward, we use column 5 as our baseline specification.

Our analysis so far yields two important conclusions. First, by using country of origin variations in risk preferences, we document the importance of risk taking for entrepreneurship, and also quantify its effects. Second, we also provide evidence that this preference measure is transmitted through generations. Next, we investigate the robustness of our results.

5.2 Robustness

This section presents an extensive set of sensitivity checks to investigate the robustness of our finding that risk taking has a significant positive impact on entrepreneurship among the second-generation immigrants.[22] Table 4 report results from this exercise. All regressions include control variables specified in equation (1). To make the comparison easier, we reproduced column 6 of Table 3 in column 1.

In columns 2 and 3, we consider other sources of variation at the country of origin.

[21] We also run regressions without any educational attainment variables since parents mostly decide how much education their children to get, and their decisions may be influenced by the level of risk taking in the country of origin. However, excluding educational categories from our regression does not have any significant impact on the result. The estimated coefficient on risk taking is 0.057 with standard deviation of 0.012.

[22] Table A.2 in the appendix reports sensitivity checks for immigrants. Results remain mostly robust.

Despite adding a large number of geo-climactic variables, as well as measures of religious affiliation, one might still be concerned that there are additional factors that might correlated with risk-taking. In column 2, we add the legal origin of countries as additional controls. La Porta et al. (2008), summarizing an extensive literature, show that differences in legal origins influence a variety of economic outcomes such as property rights, government ownership of media, entry regulations, etc. It is reasonable to think that by shaping the nature of property rights, contract enforcement, and dispute resolution, differences in legal origins can affect attitudes towards risk. In that case, our risk taking variable is just a proxy for legal origins. In many countries, legal traditions were typically introduced through conquest and colonization, and thus can be considered largely exogenous. However, La Porta et al. (2008) also observe that several countries have adopted their laws voluntarily. For example, Japan adopted the German legal system, while Turkey and several Latin American countries adopted the French legal system voluntarily. The decision to adopt a certain legal system is likely to be driven a number of factors such as religious or political ideology, culture, or even preferences (including attitudes towards risk). In these cases, the relationship may not be truly exogenous, and legal origins itself proxies other deeper determinants. Keeping in mind these complexities, in column 2 we report results when we include four legal origin dummies (British, French, German, or Scandinavian) to our baseline specification.[23] The estimated coefficient on risk taking is still positive and highly significant, although about 20 percent smaller in magnitude. Thus while legal origins might indeed shape attitudes towards risk taking across countries, there is still a substantial residual portion that has a significant effect on entrepreneurship.

In column 3, we add the logarithm of GDP per capita in the country of origin (in 2012) to our baseline specification. Variations in income per capita across countries show strong persistence over time. Nations that are rich today are ones that were also rich in the past, and many poor countries were poor in the past. As theorized by Galor and Michalopoulos (2012), and empirically supported by Bouchouicha and Vieider (2019), there might be a negative effect of economic development on risk taking. In that case, risk-taking may not reflect an exogenous component of preferences but might be correlated with other factors that affect per capita incomes. Besides any direct relationship between risk taking and per capita income, the latter also serves as useful catch-all control for other unknown country specific omitted variables that might be correlated with both risk taking and GDP per capita. When we add GDP per capita as a control for in column 3, the estimated

[23]The omitted category is the Socialist legal system. We find that the estimated coefficients of British, French, and German dummies are positive and significant, and the Scandinavian system is negative and highly significant.

coefficient now becomes smaller. However, it is still highly significant.[24]

Column 4 report results when we extend our baseline specification by including additional controls for individuals. Specifically, we include home ownership status, the number of weeks unemployed last year, and the industry worked. We include home-ownership status because individuals often use their property as collateral when they wish to start their own businesses. Since industries may experience different productivity shocks over time, which may affect individuals' decision to become an entrepreneur, we actually include industry-by-year fixed effects. The estimated coefficient on risk taking is slightly lower than that in the baseline results, but it is still highly significant. While not reported in the table, we should highlight that the estimated coefficients on the number of weeks unemployed and home ownership are negative and highly significant.[25]

We identify all self-employed individuals as entrepreneurs, following many previous studies (Borjas and Bronars, 1989, Fairlie and Robb, 2008). In a recent paper, Levine and Rubinstein (2017) argue that incorporated self-employment is a better proxy because they exhibit traits that are more consistent with entrepreneurship. For example, they show that incorporated self-employed individuals earn more than comparable salaried workers, tend to score higher on learning aptitude tests, exhibit greater self-esteem, and engage in more aggressive and risky activities when young. Following their suggestions, we now examine how our results change if we identify only incorporated self-employed as entrepreneurs.[26] Column 5 shows the results. Risk taking continues to have a positive and highly significant impact on entrepreneurship. Since the share of incorporated self-employed business owners in our sample is about 2.9 percent, the estimated coefficient implies that a one standard deviation (which is 0.186) increase in risk taking value increases the likelihood of being an entrepreneur by 20 percent, relative to the sample mean.

In our baseline specification, we imposed the restriction that an ancestral country have at least 25 observations in the CPS data. We now restrict our sample by considering only

[24]The estimated coefficient on GDP per capita is 0.029 (0.008), i.e. it is positive and significant at the 1-percent level. When we add GDP per capita, the estimate on median age becomes insignificant. This mostly stems from the fact that GDP per capita and median age are highly correlated (the correlation coefficient is about 0.65). In lieu of GDP per capita, we also considered several other contemporaneous variables such as average years of schooling in the country of origin, rule of law, and controls for corruption. Our results remain mostly the same. This is not surprising given that correlation between these variables and per capita income is very high.

[25]In our baseline specification, we considered only individuals working in the non-agricultural private sectors. We also ran regressions including agricultural and public sectors. The estimated coefficient on risk taking was 0.054 (0.015). If we also include home ownership status, the number of weeks unemployed last year, and the industry worked, the estimate becomes 0.048 (0.013). Thus, including the two sectors in our sample does not have any substantial effects on our findings.

[26]Share of incorporated self-employed business owners among second-generation Americans is about 2.9%. It is about 3.5 percent among immigrants.

countries with at least 100 observations. In this case, the number of country-of-origin drops to 30. To minimize any potential problems in inference that may stem from a small number of clusters, we use a procedure developed by Cameron et al. (2008). The p-values associated with a test of significance for each coefficient is obtained from the wild bootstrap t-procedure clustered at the country-of-origin level (with 9,999 replications). Column 6 reports the result from this exercise, and the number in square brackets represents the p-value, not the standard deviation. Estimated coefficient is positive and statistically highly significant. The impact is economically substantial as well. A one standard deviation (which is about 0.185) increase in risk taking increases the likelihood of becoming an entrepreneur by 20 percent.

In our sample, some countries are more represented than others. For example, about half of the second-generation Americans have parents originally from Mexico. This uneven distribution of countries might affect the estimate. To address this issue, we run a regression where each individual observation is weighted by the inverse of the country-of-origin population share in the sample. As shown in column 6, the estimated coefficient from this exercise is the same as that in the baseline case. The standard deviation becomes larger, but the effect of risk taking on entrepreneurship is significant at the 5-percent level. A one standard deviation increase in risk taking increases the probability of being an entrepreneur by 16 percent.[27]

The dependent variable is a binary-choice variable, and thus effects can be estimated using a binary choice model. We employed a linear probability model because coefficients are easier to interpret (Angrist and Pischke, 2009). Further, in binary choice models including fixed effects complicates matters.[28] Having said that, we also estimate effects using a probit model, and the effect of risk taking on entrepreneurship is positive and highly significant. Column 7 reports the estimate when we do not include any fixed effects, and the estimated coefficient implies that the marginal impact of risk taking at the sample mean is about 0.046. If we include state and year fixed effects, the estimated coefficient is still positive and highly significant, and the corresponding marginal impact is about 0.040. These estimates are lower than the corresponding marginal effect in our baseline (which is the estimated coefficient 0.058).

The World Values Survey (WVS) is another periodically conducted cross-country survey that asks questions about people's preferences over a variety of issues (e.g., trust,

[27] As a complementary exercise, we also run a regression by excluding all second-generation Americans with Mexican parents. The estimated coefficient on risk taking remains the same: 0.057 (0.013). In this case, a one standard deviation (0.299) increase in risk taking increases the likelihood of being entrepreneur by 17 percent, relative to the sample mean (which is 0.099).

[28] For example, non-linear panel models with fixed effects suffer from the incidental parameter problem (Arellano and Hahn, 2007), which becomes more severe under repeated cross-section data.

altruism, long-term orientation, etc). In the fifth (2005-06) and the sixth (2010-12) waves of WVS, the only measure that is closely related to risk taking in the GPS data is the response to "Adventure and taking risks are important to this person; to have an exciting life." Choices range from "Very much like me" (coded as 1) to "Not at all like me" (coded as 6). Note that higher values now indicate that individuals are more risk *averse*. Each country's average is obtained by taking the simple mean across the respondents in that country. We use the average value obtained from the last two waves of this survey (prior waves do not include this question).[29]

The last column in Table 4 reports the impact of risk taking on entrepreneurship if we use the measure from the WVS. Since the number of country-of-origin is 41, we report the $p-$value obtained from the wild bootstrap t-procedure clustered at the country-of-origin level (with 9,999 replications). The estimated coefficient on risk taking is very small and insignificant (the number in brackets is the p-value). The question in the WVSs can roughly measure individuals' attitude toward risk, and has been used in earlier studies, but it is not clear how accurately it measures risk taking in an economic context. Risk levels reported in the GPS, however, is based on a series of questions that are created for exactly this purpose. Not surprisingly, the correlation between the average value of risk taking from the WVS and that from the GPS is not high: the coefficient of correlation is about about -0.23 in our sample.[30]

6 Alternative Preference Measures

So far, our research has emphasized the role of risk preferences in choosing to be an entrepreneur. Nevertheless, preferences along other dimensions could matter just as much, or more. Furthermore, these preferences could be strongly correlated with risk taking, in which case, the latter might be proxying for some of the former. In this section, we investigate these possibilities by focusing on a few select measures of other preference and cultural dimensions that are conceivably important for entrepreneurship, or might

[29]For this question, the simple correlation between the two waves is about 0.75. See Inglehart et al. (2014) for more information on WVS.

[30]Rieger et al. (2015) conduct an international survey on risk preferences using about 7,000 individuals in 53 countries, and relate them to economic and cultural factors. They derive risk preferences from the participants' willingness to pay for hypothetical lotteries, and distinguish risk attitudes in the gain and loss domain. Using the median relative risk premium (RRP) for gains and losses at the country level in their survey, we estimate the impact of these measures on entrepreneurship. However, given our set of controls, we can only use 35 countries. Nevertheless, the estimates have the correct sign and, in the case of the RRP for gains, a large coefficient. However, they are not statistically significant. On drawback of this survey is that it is not as representative and extensive as the GPS. The participants were first- or second-year undergraduate students from departments of economics, finance, or business administration.

be correlated with risk taking. In particular, we examine the importance of trust, time preferences (as captured by measures of patience and long term orientation), individualism, and uncertainty avoidance. Measures for these are available in the GPS and also Hofstede et al.'s (2010) cultural dimensions.[31]

We begin by looking at the effect of trust on entrepreneurship. The role of trust in building institutional quality and on economic growth is now widely acknowledged, and so is its persistence across generations.[32] As Guiso et al. (2006) observe, trust can play an important role in economic outcomes through various channels. It is a salient factor when trade involves buyers and sellers who are strangers, when legal enforcement is imperfect, and when transactions are conducted over a length of time. In such environments, they observe, trustworthy individuals are more likely to be successful as entrepreneurs. When they examine the effect of trust on entrepreneurship, Guiso et al. (2006) find significant positive effects.[33] In subsequent research using a Dutch sample, Guiso et al. (2008), they show that stock market participation is driven by trust and not attitudes towards risk. These findings suggest that though entrepreneurship is a risky activity, the degree to which individuals trust each other in society might be important as well. Furthermore, trust in institutions might shape attitudes towards risks.

To gain further insight, we use the GPS measure of trust. In the survey, this is based on a self assessed question, "I assume that people have only the best intentions." In their own investigations, Falk et al. (2018) note that trust is not significantly correlated with GDP per capita once one adds geographic controls. This runs counter to the large literature showing the importance of trust on comparative development.[34] Column 1 in Table 5 displays the coefficient for trust in our baseline specification: it is positive but insignificant. In column 2, we run the horse-race between trust and risk taking. Trust is insignificant, while risk-taking continues to be positive and significant with the magnitude of the estimated coefficient in line with earlier estimates.[35]

[31]The Hofstede cultural dimensions are widely used in economics and management. However, they are based mainly on IBM employees, and thus are not representative samples for the countries surveyed.

[32]For example, see the surveys in Guiso et al. (2006) and Alesina and Giuliano (2015), and further literature cited in these papers.

[33]Their sample is second generation Americans in the GSS.

[34]In studies that preceded theirs, the more commonly used measure of trust is a question in the World Values Survey and the GSS (for USA) asking "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" Falk et al. (2018) note that this value is strongly correlated (0.49) with the GPS measure, but is also not robust in a horse race with their measure of patience in cross-country regressions.

[35]The literature on trust often uses religious affiliation dummies as instruments. Consequently, one might be concerned that we are over-controlling in both columns by including religious composition variables of the country of origin. If we consider a more limited set of geography variables and remove religion controls, like the discussion in footnote 13, our results are unchanged.

The rate of time preference plays a central role in inter-temporal optimization models in economic theory, and thus has important implications for any dynamic decision whether it be entrepreneurship, investment, education, fertility choices, self-control, etc. There is now a wealth of empirical research, using various methods, that uses measures of *patience*, *delayed gratification*, or *long term orientation*, and ties them to many of these outcomes.[36] In the case of entrepreneurship, patience is important since any business undertaking by definition involves upfront costs accompanied with uncertain returns later. The ability to delay gratification (i.e., frugality and thrift) is an important trait in Weber's Protestant ethic and the spirit of capitalism. To the extent that entrepreneurship is central to capitalism, one might expect that variations in time preference should play an important role.[37] In economic theory, of course, the rate of time preference and risk aversion are two different parameters. They can complement each other, or under some situations have opposing implications. For instance, in many studies the positive correlation between measures of risk and individual smoking habits is used to rationalize the appropriateness of the construction of the former. However, clearly smoking runs counter to long-term orientation.[38]

To examine the role of time preferences, we use two measures. One is the GPS measure of patience, and another, the index of "long-term orientation" from Hofstede et al. (2010). Like the construction of risk, the GPS measure is a weighted average of two components, one quantitative and the other qualitative. We also use the Hofstede's measure of long-term orientation (LTO) given its wide use in both economics and management.[39] Columns

[36]See Galor and Özak (2016) for an extensive discussion and the related literature. In this paper, we use these terms interchangeably.

[37]Doepke and Zilibotti (2014) spend most of their survey discussing the endogenous transmission of time preference when discussing entrepreneurship and growth.

[38]Falk et al. (2018) note that the GPS measure of risk taking does not have significant effects on cross-country entrepreneurial outcomes once one controls for their measure of patience. However this might also be due to the fact that their entrepreneurial outcome measures are TFP and scientific articles per capita which might be more correlated with human capital investments rather than entrepreneurship in the traditional sense. In general, compared to other preference measures or personality traits, the empirical literature on patience and entrepreneurship is limited though there is some research on the protestant ethic and entrepreneurship.

[39]LTO "...stands for a society which fosters virtues oriented towards future rewards, in particular adaptation, perseverance and thrift. Short Term orientation stands for a society which fosters virtues related to the past and present, in particular respect for tradition, preservation of "face", and fulfilling social obligations" (Hofstede et al., 2010). We normalize the index dividing by 100 so that it has a range of 0 to 1. Lower values reflect short-term orientation while higher values reflect long-term orientation. It is interesting that in the definition, while long-term orientation seems to capture thrift, short-term orientation is equated with traditional values, which at least in our view, is not the opposite. We should clarify that unlike the other cultural dimensions which are based on interviews of IBM employees, Hofstede et al construct LTO based on factor analysis of three questions from the World Values Survey. See Hofstede et al. (2010) for further details, and also a brief discussion in Figlio et al. (2019, p 280). As a result the sample of countries is larger for LTO than for the other Hofstede measures.

3 and 4 present the results for patience, while columns 5 and 6 for long term orientation. In the case of patience, the variable is initially positive and significant. However, once we add risk, it is no longer significant. This is especially interesting since, in their cross-country outcomes, Falk et al. (2018) tend to find that patience is more salient than other preference measures.[40] When we consider LTO, we see that the variable is uninformative.

Next, we consider a measure of individualism. The Hofstede et al. (2010) measure of individualism "stands for a society in which the ties between individuals are loose: a person is expected to look after himself or herself and his or her immediate family only. Collectivism stands for a society in which people from birth onwards are integrated into strong, cohesive in-groups, which continue to protect them throughout their lifetime in exchange for unquestioning loyalty." One might expect this to be an important personality trait of an entrepreneur, and one which can help cultivate a culture of risk taking.[41] However, as Rieger et al. (2015) observe, this stereotype is not entirely correct. They discuss the literature which documents that collectivist cultures promote risk taking. Indeed, casual observation within the US would lead one to hypothesize that ethnic migrant networks help support entrepreneurship among immigrants. The relevant estimation results are displayed in columns 7 and 8. There is little evidence here to indicate that societal measure of individualism has any effect on entrepreneurship among the second generation population.

Lastly, we look at another measure from Hofstede et al. (2010), "uncertainty avoidance" (UAI). Despite its name, they explicitly rule out this as a measure of risk taking. It is defined "as the extent to which the members of institutions and organizations within a society feel threatened by uncertain, unknown, ambiguous, or unstructured situations," i.e. the extent to which a society might be fatalistic. In high UAI societies, they note, there might be strict rules of behavior. In low UAI societies there are fewer rules, which may be broken if necessary, more deregulation, faster adoption of innovations, and changing jobs is easy. Even if this index is not a reflection of risk-taking, it clearly seems to capture a cultural dimension that is likely to have an impact on entrepreneurship.[42] Columns 9 and 10 display the results for UAI. Like other Hofstede et al.'s (2010) indices, we find no

[40] As in the case of trust, one might be concerned that patience not being as robust might have something to do with the large number of geographic and religion variables that might reflect deeper determinants. In fact, if we use the more limited set of geography variables discussed in footnote 13, the coefficient for patience is *negative* while risk is positive and significant.

[41] Like many other cultural and preference traits, individualism has also been empirically traced to long run factors such as the neolithic revolution (Olsson and Paik, 2016).

[42] Pan et al. (2019) suggest that UAI reflects Knightian uncertainty. They use historical ship arrival records from 1820 to 1957 to assign last names to ethnicity. After identifying the national cultural heritage of US CEO's, they find a more uncertainty-averse (high UAI) cultural heritage is significantly less likely to engage in corporate acquisitions.

evidence that it affects entrepreneurship.

The results indicate overwhelming importance of risk-taking preferences on entrepreneurship. This is reassuring, but also a little surprising to see that none of the other variables seem to retain their significance when factoring in risk taking. We also extended the analysis by including an interaction term between risk taking and other respective preferences, but the estimates turn out to be insignificant. To further reassure ourselves, we repeated the analysis in Table 5 but instead considered two other samples, namely, (a) the sample of immigrants, and (b) the second generation, but defining entrepreneurs as only those who are incorporated (i.e. as in column 5 of Table 4). The results are displayed in appendix Tables A.3 and A.4 respectively. In the case of immigrants, we can compare these to the baseline regression in column 1 of appendix Table A.2. The magnitude of the risk taking coefficient stays more or less the same and remains significant, while other preference measures are either not significant, or as in the case of of individualism is negative and significant. In the case of the second-generation incorporated self employed, we see a similar picture. In fact, once we control for patience the coefficient for risk taking increases, while patience itself has a significant but negative sign.

We conclude this section by noting that the preferences discussed here are ones we feel are more closely connected to entrepreneurship. The GPS also includes additional measures of social preferences such as positive reciprocity, negative reciprocity, and altruism. As with the variables discussed in the tables, we find that they do not have an impact on entrepreneurship, while risk taking continues to be significant.

7 Conclusion

Entrepreneurship has long been recognized as a driving force behind innovation, job creation, and economic prosperity. Haltiwanger et al. (2013), for example, show that expansions of start-ups are major sources of gross job creation in the US. In addition, individual business owners represent more than half of the top 1-percent in the U.S. wealth distribution (Cagetti and De Nardi, 2006). However, entrepreneurship is an inherently risky activity. A large literature has investigated the factors that affect entrepreneurship, but limited attention has been paid to the role of risk. One reason for this is that researchers lack a reliable and objective measure of attitudes toward risk taking. Some surveys ask participants how they evaluate adventure or risky activity, but this is a hardly reliable measure of risk in economics context. Further, identifying its exogenous effects on entrepreneurship is a difficult task due to various statistical issues such as omitted variables, reverse causation.

In this paper, we have attempted to address these concerns, and shown that willingness to take risk does indeed explain the propensity of being entrepreneur. We have used the recently published risk measure from the Global Preference Survey (GPS) (conducted within the framework of the 2012 Gallup poll) by Falk et al. (2018). The GPS is an experimentally validated survey data set of different preference measures (including risk taking), and thus is more credible than previous survey-based questions. In assessing how country-level measure of risk taking from the GPS affect entrepreneurship, we consider self-employed business owners among second-generation Americans in the Current Population Survey (CPS) data over the 1995–2019 period. Rich and reliable nature of the CPS data allows us to precisely control for individual characteristics (gender, age, race, education) that may affect entrepreneurship.

We found that the average level of risk taking in the country of origin has a positive and significant impact on the likelihood of being an entrepreneur among second-generation Americans. More precisely, a one-standard deviation increase in risk taking increases the probability of being entrepreneur by almost 15 percent among second-generation Americans. We extended our baseline model by examining other preference measures (e.g., trust, patience, individualism, etc) that might be influential for entrepreneurship. It turns out that these preference measures do not have any significant impact on entrepreneurship once we control for risk preference.

There are at least a few paths that could be explored in the future. While we have investigated entrepreneurship in general, future research can take advantage of both the GPS data set and availability of other immigrant/second generation individual or firm level data on innovative activity in the US and elsewhere to explore outcomes that are tied to risk taking (including interactions with other preferences, wealth, etc). Also, due to resource limitations, we have only used the national level averages of risk taking. One could potentially exploit some of the individual level variation in the underlying data for gender, age, education to examine the interactions between risk taking and entrepreneurship among each group.

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Tables

Table 1: Summary Statistics of Key Variables

	Immigrants		Second-generation Americans	
	Entrepreneurs	Workers	Entrepreneurs	Workers
	1	2	3	4
Female	0.345	0.438	0.310	0.487
	(0.475)	(0.496)	(0.463)	(0.500)
Age	44.914	40.945	42.833	34.952
	(9.695)	(10.809)	(10.982)	(11.462)
White	0.658	0.656	0.785	0.758
	(0.475)	(0.475)	(0.411)	(0.428)
Hispanic	0.408	0.517	0.351	0.557
	(0.491)	(0.500)	(0.477)	(0.497)
Married	0.797	0.708	0.693	0.479
	(0.402)	(0.455)	(0.461)	(0.500)
Some College	0.519	0.471	0.652	0.631
	(0.500)	(0.499)	(0.477)	(0.483)
Full-time	0.830	0.877	0.820	0.841
	(0.375)	(0.328)	(0.384)	(0.366)
Weeks Unemp.	0.816	1.032	0.588	1.087
	(4.079)	(4.498)	(3.382)	(4.633)
Manufacturing	0.041	0.179	0.046	0.121
	(0.198)	(0.383)	(0.210)	(0.326)
Service	0.767	0.716	0.780	0.809
	(0.423)	(0.451)	(0.414)	(0.393)
Years in U.S.	20.554	17.577		
	(10.748)	(10.794)		
Sample Size	14,889	135,558	2,580	32,924
Shares	9.9%	90.1%	7.3%	92.7%

Notes: Numbers in parentheses are standard deviations. Some College represents individuals who have at least some college education. Calculations are based on the ASEC files (1995–2019) available at the IPUMS website (Flood et al. 2019). Shares indicate the share of each group (entrepreneurs or workers) relative to the sum of the two within each generation.

Table 2: Effects of Risk Taking on Entrepreneurship among Immigrants

	1	2	3	4	5	6
Risk Taking	−0.002	−0.013	0.028*	0.061***	0.059***	0.051***
	(0.042)	(0.047)	(0.016)	(0.013)	(0.013)	(0.012)
Continental FE		✓	✓	✓	✓	✓
Geographic Controls			✓	✓	✓	✓
Age and Religion				✓	✓	✓
Country Pop. Share					✓	✓
Individual Controls						✓
Adjusted R^2	0.005	0.011	0.023	0.024	0.024	0.040

*Notes: Each regression use data on 150,447 immigrants from 68 countries. All regressions include state-year fixed effects, as specified in equation (1). Numbers in parentheses are the robust standard errors clustered at the country-of-origin level, and ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.*

Table 3: Effects of Risk Taking on Entrepreneurship among Second-generation Americans

	1	2	3	4	5	6
Risk Taking	0.024	0.046	0.070***	0.078***	0.075***	0.058***
	(0.025)	(0.036)	(0.019)	(0.013)	(0.013)	(0.012)
Continental FE		✓	✓	✓	✓	✓
Geographic Controls			✓	✓	✓	✓
Age and Religion				✓	✓	✓
Country Pop. Share					✓	✓
Individual Controls						✓
Adjusted R^2	0.015	0.025	0.033	0.034	0.034	0.059

*Notes: Each regression use data on 35,504 second-generation immigrants whose parents from 50 countries. All regressions include state-year fixed effects, as specified in equation (1). Numbers in parentheses are the robust standard errors clustered at the country-of-origin level, and ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.*

Table 4: Effects of Risk Taking on Entrepreneurship among Second-generation Americans: Robustness

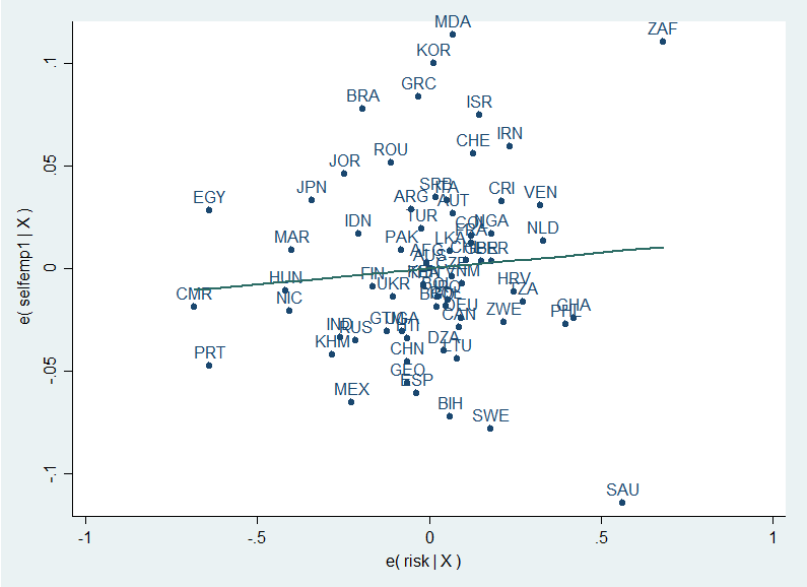
	1	2	3	4	5	6	7	8	9
Risk Taking	0.058***	0.046***	0.045***	0.053***	0.031***	0.078***	0.064***	0.367***	−0.002
	(0.012)	(0.010)	(0.011)	(0.012)	(0.009)	[0.009]	(0.024)	(0.085)	[0.751]
Baseline Results	✓								
Legal Origin		✓							
GDP per Capita			✓						
Addl. Indv. Controls				✓					
Incorp. Self-employed					✓				
Hundred or more Obs						✓			
Estimation with WLS							✓		
Estimation with Probit								✓	
World Values Survey									✓
Observations	35,504	35,504	35,504	35,504	35,504	34,543	35,504	35,504	31,449
Country of Origin	50	50	50	50	50	30	50	50	39
Adjusted R^2	0.059	0.059	0.059	0.084	0.048	0.059	0.212	0.103	0.055

*Notes: All regressions include all control variables as well as state-year fixed effects, as specified in equation (1). Column 1 reports baseline results; column 2 adds legal origin variables; column 3 (log) GDP per capita; column 4 more individual controls. In column 5 the dependent variable is incorporated self-employed, column 6 consider countries with at least 100 observations. Columns 7 and 8 report results from weighted least squares and probit estimations, respectively. Column 9 uses WVS measure of risk taking. Numbers in parentheses are the robust standard errors clustered at the country-of-origin level, and numbers in brackets represent p-values associated with the wild bootstrap t-procedure clustered at the country-of-origin level (with 9,999 replications). ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.*

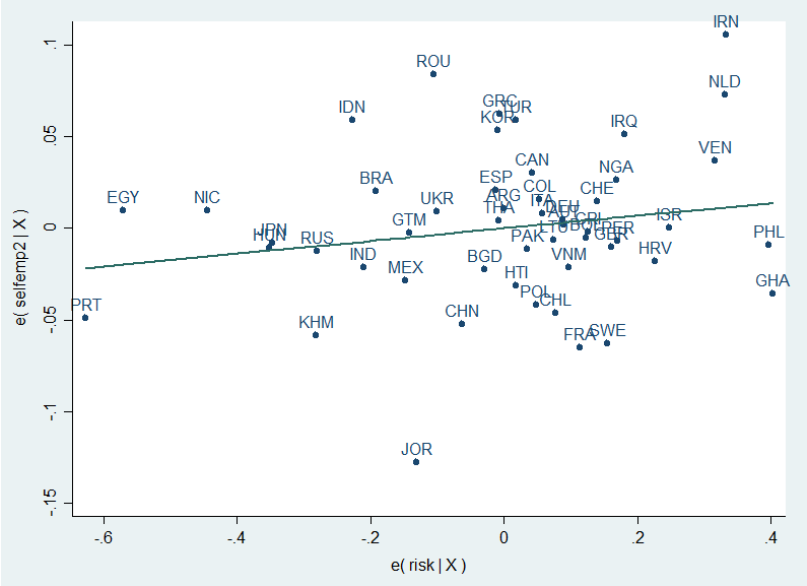
Table 5: Risk Taking vs Alternative Preference Measures

	1	2	3	4	5	6	7	8	9	10
Risk Taking		0.057***		0.077***		0.057***		0.065**		0.059***
		(0.012)		(0.017)		[0.009]		[0.010]		[0.007]
Trust	0.017	0.006								
	(0.012)	(0.009)								
Patience			0.034*	−0.037						
			(0.019)	(0.026)						
Long-term Orient.					−0.010	−0.008				
					[0.855]	[0.827]				
Individualism							0.021	−0.022		
							[0.591]	[0.794]		
Uncertainty Avoid.									−0.040	0.006
									[0.266]	[0.932]
Observations	35,504	35,504	35,504	35,504	34,256	34,256	34,219	34,219	34,219	34,219
Country of Origin	50	50	50	50	44	44	40	40	40	40
Adjusted R^2	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.059

*Notes: All regressions include all control variables as well as state-year fixed effects, as specified in equation (1). Risk Taking, Trust, and Patience are taken from the GPS (Falk et al. 2018), and Long-term Orientation, Individualism, and Uncertainty Avoidance are taken from Hofstede (2010). Numbers in parentheses are the robust standard errors clustered at the country-of-origin level, and numbers in brackets represent p-values associated with the wild bootstrap t-procedure clustered at the country-of-origin level (with 9,999 replications). ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.*



a. Immigrants



b. Second-generation Americans

Figure 1: Share of entrepreneurs vs. average level of risk taking

Notes: Figure 1.a is a conditional scatter plot of the share of entrepreneurs among immigrants from a country against the GPS measure of risk taking for the same country after controlling for continental fixed effects, latitude, average temperature, average precipitation, and dummies for landlocked and islands. Figure 1.b repeats the exercise but uses the share of second generation Americans from the country who are entrepreneurs.

Appendix

Table A.1: Average Risk Taking by Country

Country	Average Risk Taking	Country	Average Risk Taking
Afghanistan	0.120	Japan*	-0.356
Algeria	0.392	Jordan*	-0.125
Argentina*	0.042	Kenya	0.243
Australia	0.137	Lithuania*	-0.046
Austria*	-0.062	Mexico*	-0.139
Bangladesh*	-0.198	Moldova	-0.035
Bolivia*	0.103	Morocco	-0.069
Bosnia and Herzegovina	-0.126	Netherlands*	0.189
Brazil*	-0.251	Nicaragua*	-0.547
Cambodia*	-0.405	Nigeria*	0.386
Cameroon	-0.535	Russia*	-0.323
Canada*	0.184	Pakistan*	0.020
Chile*	0.125	Peru*	0.155
China*	-0.020	Philippines*	0.295
Colombia*	-0.045	Poland*	-0.074
Costa Rica*	0.002	Portugal*	-0.792
Croatia*	0.068	Romania*	-0.230
Czech Republic	-0.020	Saudi Arabia	0.696
Egypt*	-0.281	Serbia	-0.130
Finland	-0.283	South Africa	0.971
France*	-0.030	South Korea*	-0.039
Georgia	-0.081	Spain*	-0.158
Germany*	-0.044	Sri Lanka	0.063
Ghana*	0.618	Sweden*	0.052
Greece*	-0.157	Switzerland*	-0.019
Guatemala*	-0.219	Tanzania	0.492
Haiti*	0.019	Thailand*	-0.124
Hungary*	-0.498	Turkey*	0.023
India*	-0.275	Uganda	0.163
Indonesia*	-0.322	Ukraine*	-0.219
Iran*	0.338	United Kingdom*	0.049
Iraq*	0.166	Venezuela*	0.250
Israel*	0.244	Vietnam*	-0.009
Italy*	-0.094	Zimbabwe	0.523

*Notes: The sample of second-generation Americans only includes countries with *. Source: Global Preference Survey (Falk et al., 2018).*

Table A.2: Effects of Risk Taking on Entrepreneurship among Immigrants: Robustness

	1	2	3	4	5	6	7	8	9
Risk Taking	0.051***	0.063***	0.040***	0.047***	0.024**	0.057***	0.035*	0.268***	−0.009
	(0.012)	(0.012)	(0.012)	(0.011)	(0.009)	(0.012)	(0.017)	(0.035)	(0.008)
Baseline Results	✓								
Legal Origin		✓							
GDP per Capita			✓						
More Indv. Controls				✓					
Incorp. Self-employed					✓				
Hundred or more Obs						✓			
Estimation with WLS							✓		
Estimation with Probit								✓	
World Value Survey									✓
Observations	150,447	150,447	150,122	150,447	150,447	149,718	150,447	150,447	138,451
Country of Origin	68	68	67	68	68	57	68	68	52
Adjusted R^2	0.040	0.041	0.040	0.070	0.038	0.040	0.094	0.054	0.039

*Notes: All regressions include all control variables as well as state-year fixed effects, as specified in equation (1). Column 1 reports baseline results; column 2 adds legal origin variables; column 3 (log) GDP per capita; column 4 more individual controls. In column 3, we have 67 countries because Afghanistan's GDP is not available in the Penn World Tables. In column 5 the dependent variable is incorporated self-employed, column 6 consider countries with at least 100 observations. Columns 7 and 8 report results from weighted least squares and probit estimations, respectively. Column 9 uses WVS measure of risk taking. Numbers in parentheses are the robust standard errors clustered at the country-of-origin level, and ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.*

Table A.3: Risk Taking vs Alternative Preference Measures: Immigrants

	1	2	3	4	5	6	7	8	9	10
Risk Taking		0.055***		0.055***		0.054***		0.063***		0.072***
		(0.012)		(0.015)		[0.015]		[0.003]		[0.007]
Trust	−0.010	−0.019								
	(0.016)	(0.012)								
Patience			0.020	−0.012						
			(0.019)	(0.020)						
Long-term Orient.					0.029	0.035				
					(0.032)	(0.027)				
Individualism							−0.029	−0.040*		
							[0.555]	[0.098]		
Uncertainty Avoid.									0.011	0.050
									[0.914]	[0.148]
Observations	150,447	150,447	150,447	150,447	138,897	138,897	138,955	138,955	138,955	138,955
Country of Origin	68	68	68	68	58	58	45	45	45	45
Adjusted R^2	0.039	0.040	0.039	0.040	0.041	0.041	0.040	0.040	0.040	0.040

Notes: The sample in this table comprises of immigrants. All regressions include all control variables as well as state-year fixed effects, as specified in equation (1). Risk Taking, Trust, and Patience are taken from the GPS (Falk et al. 2018), and Long-term Orientation, Individualism, and Uncertainty Avoidance are taken from Hofstede (2010). Numbers in parentheses are the robust standard errors clustered at the country-of-origin level, and numbers in brackets represent p-values associated with the wild bootstrap t-procedure clustered at the country-of-origin level (with 9,999 replications). ***, **, *and* * *represent statistical significance at the 1%, 5%, and 10% level, respectively.*

Table A.4: Risk Taking vs Alternative Preference Measures: Second-generation Incorporated Self-employed

	1	2	3	4	5	6	7	8	9	10
Risk Taking		0.031***		0.049***		0.020**		0.035***		0.029***
		(0.009)		(0.011)		[0.020]		[0.002]		[0.006]
Trust	0.002	−0.005								
	(0.007)	(0.007)								
Patience			0.009	−0.035**						
			(0.010)	(0.015)						
Long-term Orient.					−0.023	−0.022				
					[0.635]	[0.556]				
Individualism							0.009	−0.014*		
							[0.468]	[0.062]		
Uncertainty Avoid.									−0.023	−0.000
									[0.103]	[0.946]
Observations	35,504	35,504	35,504	35,504	34,256	34,256	34,219	34,219	34,219	34,219
Country of Origin	50	50	50	50	44	44	40	40	40	40
Adjusted R^2	0.048	0.048	0.048	0.048	0.049	0.049	0.049	0.049	0.049	0.049

*Notes: The sample in this table comprises of second generation Americans with entrepreneurs being restricted to only those self employed that are incorporated. All regressions include all control variables as well as state-year fixed effects, as specified in equation (1). Risk Taking, Trust, and Patience are taken from the GPS (Falk et al. 2018), and Long-term Orientation, Individualism, and Uncertainty Avoidance are taken from Hofstede (2010). Numbers in parentheses are the robust standard errors clustered at the country-of-origin level, and numbers in brackets represent p-values associated with the wild bootstrap t-procedure clustered at the country-of-origin level (with 9,999 replications). ***, **, and * represent statistical significance at the 1%, 5%, and 10% level, respectively.*