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The Fear Factor: Determinants of Entrepreneurial Fear of Failure

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Abstract

This thesis aims to investigate determinants of fear of failure in entrepreneurial activity that could inhibit starting a business. The study uses cross-sectional, pooled OLS, and panel regressions. The dependent variable is fear of failure regarding entrepreneurship, measured with the Global Entrepreneurship Monitor (GEM) survey question of whether fear of failure would prevent the responder from starting a firm. The unit of analysis is at country level. I categorize determinants into demographic, property rights, and procedural variables. A population of higher working age ratio (measured as the population aged 15-64 divided by the population aged 65 and over) correlates with a decreasing fear of failure. Additionally, stronger property rights appear to decrease fear of failure. I do not find a statistically significant relationship between fear of failure and procedural variables in my datasets. A binary variable for whether the country is in Asia appears to show a positive association with fear of failure, increasing it by ten percentage points. Since decreasing fear of failure is desirable to promote greater entrepreneurial activity, a better understanding of the determinants of fear of failure is essential to inform public policies to spur entrepreneurial growth. The findings from this study, while not conclusive, identify the importance of further research based on larger datasets and variables that are more robust.

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1. Introduction

When Prime Minister Shinzo Abe took office in 2012, he vowed to transform the country into an "entrepreneurial powerhouse" (Ujikane 2016). However, in 2014 Japan had one of the lowest rates of total entrepreneurial activity at 3.63%, as measured by the Global Entrepreneurship Monitor. That year, Japan also had one of the highest rates of fear of failure for starting a business at 54.51%. The relationship between entrepreneurial activity and fear of failure is inverse to one another in the example of Japan, and this country is not the only one to face a similar relationship between the two variables.

While a significant amount of academic research exists regarding determinants of entrepreneurship, the specific determinants of fear of failure in entrepreneurial activity deserve greater attention. The purpose of this paper is to investigate what independent variables impact fear of failure for starting a business. Fear of failure is measured by the Global Entrepreneurship Monitor's statistic of the percentage of the population aged 18-64 who indicate that fear of failure would prevent them from starting a business. In the next section, I discuss the existing literature regarding the importance of entrepreneurial activity, the relationship between entrepreneurship and fear of failure, and factors potentially affecting fear of failure. Afterward, I provide a description of the data and discuss the regression results. The final section discusses the limitations of the study.

1.1 The Importance of Entrepreneurial Activity

Entrepreneurship has been a key focus for governments, mainly due to prospects for economic growth. An increase in good market opportunities has been tied to growth of GDP (Audretsch and Fritsch 2002), while consistent positive economic growth has been

tied to high-growth-potential start-ups (Wong, *et al.* 2005) and fast-growing firms (Kemp, *et al.* 2000). In hopes of stirring greater growth, startup funding in Asian countries (such as Singapore and Indonesia) have more than doubled in recent years (Purnell 2016).

Aside from economic growth and wealth levels, entrepreneurial activity links with lower unemployment as well. Haltiwanger, *et al.* (2013) show that newer and younger "entrepreneurial" firms are responsible for net job creation, not small businesses. The authors set up a regression examining net employment growth and find that small firms contribute to growth. However, once they control for firm age, there is no systematic relationship between firm size and growth. Instead, business start-ups and young businesses are the ones that promote job creation rather than just "small firms". An important caveat exists. Haltiwanger, *et al.* (2013, pg. 360) acknowledge, "Young firms exhibit high rates of gross job creation and destruction ... we find that young firms have very high job destruction rates from exit, so that after five years, about 40% of the jobs initially created by start-ups have been eliminated by exit." Yet once the firm survives, young firms grow at a faster pace than more mature businesses. This influence of entrepreneurship on the economy demonstrates the economic importance of studying possible determinants of new firm creation.

1.2 **Relationship between Entrepreneurship and Fear of Failure**

Past studies examine the connection between entrepreneurship and fear of failure in the context of entrepreneurial decisions and risk aversion (Kihlstrom and Laffont 1979). Research shows that risk aversion increases slowly between childhood and adulthood

(Harbaugh, *et al.* 2002). Young children are more influenced than adults are by the chance of winning and are more willing to take risks with negative consequences in the end. Given this tendency for individuals to develop risk aversion over time, fear of failure plays a significant role given the risk attached to starting a new business. In theory, decreasing the perception of the likelihood of failure should increase the probability that an individual will start a new venture (Weber and Milliman 1997). Weber and Milliman's study looks at 24 MBA students at the Graduate School of Business at the University of Chicago rather than polling participants across different countries.

Additionally, one study examining factors affecting nascent entrepreneurship, or those who started a business in the past twelve months, finds fear of failure to be statistically significant and negatively correlated with nascent entrepreneurship (Arenius and Minniti 2005). These results are consistent with Weber and Milliman's theory. Arenius and Minniti's work examines 28 countries across different continents, pointing to an international phenomenon rather than simply a regional one. This further proves the inverse relationship between fear of failure and entrepreneurship since the relationship applies to several different countries, indicating that there is more at work between the two variables than a cultural effect for one country.

Additional scholars such as Vaillant and Lafuente (2007) and Stuetzer, *et al.* (2014) find fear of failure to have a strong negative relationship with entrepreneurial entry. Vaillant and Lafuente (2007, pg. 469) state, "...fear of failure has an institutional dimension to the extent that entrepreneurship in terms of starting a business is less accepted as a career option, and (failed) entrepreneurs face social stigmatization in less entrepreneurship approving institutional environments." Vaillant and Lafuente (2007)

find social stigma regarding entrepreneurial failure to be an important constraint for entrepreneurial activity in Spain, as the social fear of entrepreneurial failure is statistically significant and negatively correlates with entrepreneurship. The authors conduct a rare events logit model regression to determine entrepreneurial activity within the region. Stuetzer, *et al.* (2014) include "fear of failure" as a control variable based on Arenius and Minniti's (2005) work and once again support that "fear of failure" is statistically significant and negatively correlates with individual entrepreneurship.

1.3   Factors Affecting Entrepreneurial Fear of Failure

Though fear of failure exhibits a negative relationship with entrepreneurial activity levels, I wanted to know more about the determinants of fear of failure. Bosma and Schutjens (2010) examine fear of failure by merging GEM (Global Entrepreneurship Monitor) data over 2001-2006 and require GEM participation for at least 3 years during the 2001-2006 period. They find that population density and population growth (signs of an urban region) negatively correlate with one's fear of failure in starting a business. Yet the authors recognize that it is not the urbanization of an area that decreases fear of failure per se, but rather knowing entrepreneurs. Bosma and Schutjens (2010, pg. 728) say, "...it is not per se urban regions that are characterized by high rates of people perceiving economic opportunities or people mentioning having the skills and knowledge to start a firm, but regions where people know many start-up entrepreneurs."

From a policy standpoint, the number of nationally recognized start-up procedures related to registering a business appears to associate with an increased fear of failure. The World Bank Doing Business Project measures these procedures. Unemployment

positively correlates with one's fear of failure in starting a business in Bosma and Schutjens's study. Raffiee, *et al.* (2013) show that hybrid entrepreneurs (those that retain their day job before turning to full-time self-employment) have higher survival rates than those who enter self-employment directly from paid employment. Existing employment provides security for entrepreneurs to begin their venture.

Wyrwich, *et al.* (2015) conduct a study examining Germany over a period of five years (2003-2006; 2008). They find that knowing an entrepreneur reduces fear of failure, as defined by GEM as the percentage of the aged 18-64 population who personally know someone who started a business in the past two years. The dependent variable is fear of failure regarding entrepreneurship, measured with the GEM question of whether fear of failure would prevent the responder from starting a firm (binary variable). These results are consistent with Bosma's conclusion that knowing an entrepreneur, or being located in an area with high population density that provides exposure to entrepreneurs, decreases fear of failure. Wyrwich, *et al.* (2015) use logit regressions and control for age and gender. Fear of failure increases with age in younger years and increases at a slower pace in older years. Regarding gender, women are more likely to experience fear of failure. The authors also conduct a second model that includes controls on education, household income, and employment status. Fear of failure also decreases with higher levels of educational attainment. Income negatively correlates with fear of failure, while unemployment positively correlates with fear of failure. Wyrwich's explanation is that negative labor prospects magnify negative consequences, causing greater fear.

Delmar and Davidson (2000) find age structure and gender partially explain firm formation rates. The perception of business-friendly national policies plays a significant

role. Weak property rights limit the reinvestment of profits in startup manufacturing firms (Johnson, *et al.* 1999). The study uses managers' own evaluations of the security of their property rights and measures protection of property rights by inquiring how many "extralegal payments" go toward licenses, government services, and protection. Greater extralegal payments correspond with a lower sense of property rights protection. Another study by Desai, *et al.* (2003) finds that stronger property rights increase entry rates into entrepreneurial activity. The World Economic Forum's "The Global Competitiveness Report" measures property rights on a seven-point scale. A score of "one" indicates nations without clearly formalized property rights and without strong protection by law and a score of "seven" indicates countries where the government formalizes and reinforces property rights. The survey asks participants, "In your country, to what extent are property rights, including financial assets, protected?" Participants receive a Likert-scale type rating with 1 = "not at all" and 7 = "to a great extent." Therefore, this property rights index is a self-reported measurement and does not reflect an objective measurement system.

Aside from property rights, policies such as bankruptcy laws and taxes contribute to a firm's chances for formation. Armour and Cumming (2008) find bankruptcy law to have a significant effect on entrepreneurship levels. The availability of a "fresh start" increases self-employment in the sample population, while high minimum capital requirements decrease self-employment. A "fresh start" refers to a forgiving bankruptcy law that allows an entrepreneur to re-enter the economy after his or her prior business fails. The minimum capital requirements refer to the cost of incorporating a business. In

addition, Lee, *et al.* (2011) find that less time and less cost associated with bankruptcy procedures encourages a greater number of firms to enter the market.

Regarding taxes, the literature defines two main types of taxes that affect entrepreneurs: corporate income tax and VAT (value-added tax or consumption tax). Da Rin, *et al.* (2011) find a significant negative effect of corporate income taxes on firm entry rates. However, tax reductions only affect entry rates below a certain threshold of taxation and such tax reductions prove more effective given sound institutional infrastructure. Yet corporate taxes do not hinder innovation explicitly. A study by Zhu, *et al.* (2012) finds that 95% of the interviewees of the study, top managers and owners at SMEs (small to medium enterprises), say that the VAT (value-added tax) discourages innovation. For start-ups with high labor costs and low materials costs, the tax code does not permit production costs as a deduction from sales income. However, capital-intensive companies, such as manufacturing companies, deduct these costs from sales for tax purposes. For this reason, knowledge-intensive businesses face tax disadvantages under a high VAT.

While evidence suggests that more business procedures increase fear of failure and knowing an entrepreneur decreases such fear, these determinants need further investigation. No study yet tests property rights, bankruptcy costs, and taxation systems as determinants of fear, yet they deserve attention as potential indicators due to their effects on entrepreneurial activity. In addition, existing literature focuses on the early 2000's as its empirical period, and updated data from the Global Entrepreneurship Monitor could affect results today.

2.   The Model

The choice of models attempts to make use of cross-sectional time-series data, more commonly known as panel data. I use two balanced panel data sets: i) long panel model comprising of annual data from 2006 to 2014 for sixteen countries, and ii) short panel model comprising of annual data from 2011 to 2014 for thirty-seven countries. Additionally, I use a pooled OLS model of all data observations from the two panels.

GEM data availability necessitates the two periods, 2006-2014 and 2011-2014. The 2011-2014 panel includes more countries from Asia and Africa than the 2006-2014 panel. For instance, the 2006-2014 panel contains only one Asian country, while the 2011-2014 panel contains five Asian countries. Figure 4 presents a complete list of countries in both panels. The greater number of countries included in the 2011-2014 dataset may be due to the Global Entrepreneurship Monitor experiencing better survey reach in later years, allowing the organization to collect more data from developing countries in Asia and Africa.

In fact, the first regression I perform is a cross-sectional model including fifty countries for the most recent year of the data (2014). I use this regression to examine possible indicator variables and their relationships with fear of failure.

2.1   Variables of Interest

The dependent variable is the percentage of 18-64 year olds who indicate that fear of failure would prevent them from setting up a business. I examine both the distribution of the fear of failure and the distribution of the natural log of fear of failure. Given that the original fear of failure distribution more closely resembles a normal distribution than the

natural log of fear of failure, I use fear of failure (rather than its natural log) as my

dependent variable. After studying several independent variables to examine each effect

of the variable on fear of failure, I group the variables into three categories: demographic,

property, and procedural.

Demographic variables include the working age ratio (population of working age

[15-64] divided by population in retirement age [65 and over]) and the percentage of the

population living in an urban area. The property variable is a property rights index,

valued on a scale from one to seven. The procedural variables include the number of

procedures required to start a business, the cost of bankruptcy as a percentage of estate,

and the corporate income tax. For the cross-sectional regression, VAT (value added tax)

is included as a variable of interest, though I could not find any longitudinal data for this

variable. Hence, this variable (VAT) is not included in the panel data regressions. I

provide rationale for each variable's inclusion under Section 2.4, Hypotheses

Development.

Several of the variables selected for these models stem from significant variables

for studies examining fear of failure. Studies with the dependent variable of fear of

failure prove limited, so I broaden the scope to studies that also examine firm entry rates.

The data source for fear of failure in starting a business is from GEM's database (Global

Entrepreneurship Monitor). The number of business procedures required to start a

business, the working age ratio, and the percentage of the population living in an urban

area are all from the World Bank. The property rights index is calculated by and available

from the World Economic Forum. Regarding the tax rate statistics, historical corporate

income tax rates are available from KPMG and current VAT tax rates are from the United States Council for International Business.

There is an endogeneity issue present in the data. Higher entrepreneurial activity levels reduce fear of failure, and this regression does not control for the lagged level of entrepreneurship. Therefore, while I frame fear of failure as a negative determinant for entrepreneurship levels, the entrepreneurship levels themselves may be a factor in determining fear of failure.

2.2   **Summary Statistics**

Summary statistics for the year 2014 appear in Figure 1, statistics for the panel 2006-2014 appear in Figure 2, and statistics for the panel 2011-2014 appear in Figure 3. To provide a picture of the dependent variable, the fear of failure statistics for 2014 include 50 observations with a mean of 36.6% and a standard deviation of 9.1%. For the 2006-2014 panel, the fear of failure statistics include 144 observations with a mean of 34.7% and a standard deviation of 8.64%. The 2011-2014 panel uses 148 observations to observe a mean of 35.8% and a standard deviation of 7.89%. Across the three different panels, averages for the variables appear relatively similar. The panels for 2006-2014 and 2011-2014 contain different countries with some overlap. The 2011-2014 panel is not a subset of the larger 2006-2014 panel.

A correlation matrix for the cross-section (2014) shows relatively high correlations (around 50%) for the cost of bankruptcy with the percentage of the population living in an urban area, the working age ratio, the property rights index, and the number of procedures required to start a business (Figure 5). This may be due to more

industrialized countries with established bankruptcy laws, thus creating a higher average cost of bankruptcy as a percentage of estate. However, no variable displays a correlation of over 50% with all other variables.

2.3   Cross-Sectional, Pooled OLS, Fixed Effects, and Random Effects Models

The cross-sectional model includes data from 50 countries for the year 2014 and all variables previously mentioned for the year 2014.

Full cross-sectional model:

$$Fear_i = \alpha + \beta_1 Urban_i + \beta_2 WorkingRatio_i + \beta_3 Property_i + \beta_4 Procedure_i$$
$$+ \beta_5 IncomeTax_i + \beta_6 BankruptcyCost_i + \beta_7 VAT_i + \varepsilon_i$$

α is the intercept; βs are the coefficients or parameter estimates; and ε_i is the error term.

Full pooled OLS model:

$$Fear_{it} = \alpha + \beta_1 Urban_{it} + \beta_2 WorkingRatio_{it} + \beta_3 Property_{it}$$
$$+ \beta_4 Procedure_{it} + \beta_5 IncomeTax_{it} + \beta_6 BankruptcyCost_{it} + \varepsilon_{it}$$

α is the intercept; βs are the coefficients or parameter estimates; and ε_{it} is the error term.

The pooled OLS model increases the number of observations in the regression by treating longitudinal data as additional observations unrelated to each other. It includes all variables except VAT due to lack of longitudinal data for this variable.

Full fixed effects model:

$$Fear_{it} = (\alpha + u_i) + \beta_1 Urban_{it} + \beta_2 WorkingRatio_{it} + \beta_3 Property_{it}$$
$$+ \beta_4 Procedure_{it} + \beta_5 IncomeTax_{it} + \beta_6 BankruptcyCost_{it} + v_{it}$$

u_i is the time invariant fixed effects specific to each country; βs are the coefficients or

parameter estimates; and v_{it} is the error term.

The fixed effects model recognizes country specific differences in each intercept.

It includes all variables except VAT due to lack of longitudinal data for this variable.

Full random effects model:

$$Fear_{it} = \alpha + \beta_1 Urban_{it} + \beta_2 WorkingRatio_{it} + \beta_3 Property_{it} + \beta_4 Procedure_{it}$$
$$+ \beta_5 IncomeTax_{it} + \beta_6 BankruptcyCost_{it} + (u_i + v_{it})$$

The random effects model treats u_i as country specific random heterogeneity by

combining it with the error term v_{it}. It includes all variables except VAT due to lack of

longitudinal data for this variable.

The above equations show full models. In my analysis, I first use a parsimonious

approach to examine the effects of just demographic variables (the percentage of the

urban population and the working age ratio) (Model I). Next, I expand Model I by adding

the property rights index variable (Model II). Finally, I use a full model inclusive of

demographic, property, and procedural variables (number of business procedures

required to start a business, cost of bankruptcy, and corporate income tax) (Model III).

For the 2011-2014 panel, I use a fourth model that adds a dummy variable representing

Asia to the full model (Model IV).

2.4 Hypotheses Development

Past studies have shown that increased urbanization leads to decreasing fear of failure

(Bosma and Schutjens 2010). Thus, I expect the coefficient for urbanization to be

negative. The other demographic variable, the working age ratio, should also have an

inverse effect on fear of failure. The working age ratio serves as an indication of socioeconomic characteristics of the population. I calculate this variable as the ratio of the population aged 15-64 to the population 65 and over. This provides a proxy of the ratio of the working population to the non-working (retired) population. I acknowledge that the ratio is an imperfect indicator of the working population, as the age begins at 15. However, given publicly available data, this was the best proxy of working age I could find. Modigliani's life-cycle hypothesis postulates more young people than old in a society results in more people saving than dissaving (Deaton 2005). Therefore, in an economy with a greater amount of young people, there will be greater savings and likely a more stable economy. Given a society with higher savings, more capital is available for investment. Thus, there will be a greater number of investors putting their savings to work through investment in start-ups or developing companies. With this in mind, I hypothesize that a higher working age ratio will decrease the country's overall score for fear of failure.

$$Working\ Age\ Ratio = \frac{Population\ age\ 15\ to\ 64}{Population\ age\ 65\ and\ older}$$

Regarding urbanization, Bosma and Schutjens (2010) discuss how an urban area leads to a greater spread of ideas among entrepreneurs and might reinforce risk-taking. Given the effect of urbanization on promoting entrepreneurial activity, I would also expect urbanization to decrease fear of failure.

A study by Desai, *et al.* (2003) finds greater property rights to increase entry rates into entrepreneurial activity. Given the inverse relationship between fear of failure and entrepreneurial levels, I hypothesize for stronger property rights to decrease fear of

failure. Both my index of property rights used in this study and Desai's measurement of property rights are identical (World Economic Forum).

The number of business procedures required to start a business likely has a positive relationship with fear of failure, based on Bosma and Schutjens's 2010 study. Bosma and Schutjens find the number of required start-up procedures positively correlate with fear of failure. Their measurement of business procedures shares the same source as my study's measurement, the World Bank Doing Business Project. The cost of bankruptcy likely has a positive influence on fear of failure as well, due to greater consequences of business failure. A higher cost of bankruptcy also points to higher bankruptcy regulations, a dissuader of entering into business. I expect both the corporate income tax rate and VAT to increase fear of failure, yet for different reasons. Corporate income tax eats into corporate profits, with a higher corporate income tax discourages potential businesses from entering into production (Da Rin, *et al.* 2011). VAT will also have a positive effect on fear of failure. Zhu, *et al.* (2012) interview managers and owners in China and find the value added tax encourages projects with high capital expenditures due to tax deductions. This encourages producing manufacturing instead of tech, a wage-driven yet lower capital-expenditure-intensive industry. Therefore, I expect VAT to have a positive effect on fear of failure as well.

My paper tests the following hypotheses:

- Fear of failure in starting a business is negatively associated with a greater urban population.
- Fear of failure in starting a business is negatively associated with a higher percentage of the working age ratio.

- Fear of failure in starting a business is negatively associated with stronger property rights.

- Fear of failure in starting a business is positively associated with a greater number of required procedures to start a business.

- Fear of failure in starting a business is positively associated with a higher corporate income tax.

- Fear of failure in starting a business is positively associated with a higher cost of bankruptcy for a firm.

- Fear of failure in starting a business is positively associated with a higher value-added tax (consumption tax).

3.   Methodology

For the purposes of this study, I use cross-sectional, pooled OLS, fixed effects, and

random effects regression models to examine how variables pertaining to demographics,

property rights, and business procedures affect fear of failure in starting a business. The

cross-sectional model examines the most recent year of completed data, 2014, to gain a

general understanding of variable coefficients. The pooled OLS model includes the

greatest number of observations (228), incorporating both observations from the 2006-

2014 panel and the 2011-2014 panel. I chose to include the period of 2011-2014 (short

panel) for a greater number of countries, while the period of 2006-2014 (long panel)

allows for a longer time horizon. Due to a greater amount of country variation in the

2011-2014 panel, I also include "Asia" as a binary variable to examine the effect of

belonging to the Asian continent on fear of failure.

3.1   **Hausman Test**

The Hausman test evaluates the consistency of an estimator compared to a less efficient

estimator (Park 2011). It involves comparing two different estimators for the parameters

of a model. If the "random effects" assumption fails but the model is otherwise fine, then

the fixed effects estimator remains consistent and the random effects estimator is

inconsistent. This comparison of the random and fixed effects estimators determines the

accuracy of the random effects assumption. A random effects model is preferred under

the null hypothesis or assumption due to higher efficiency when the p-value is not

statistically significant (Stock and Watson 2014). Random effects are estimated with

shrinkage ("linear unbiased prediction"). Under the alternative hypothesis when the p-value is statistically significant, a fixed effects model is consistent and preferred.

After examining the Hausman test results for the panels 2006-2014 and 2011-2014, I do not reject the null hypothesis for 2011-2014. In contrast, I do reject the null hypothesis for 2006-2014. Therefore, I prefer random effects as a model for my 2011-2014 panel data and prefer fixed effects for my 2006-2014 panel data. All regression outputs are included in the tables for both panel periods.

3.2   The Panels for 2006-2014 and 2011-2014

The decision to use two models is based on the countries available for each period. While 2006-2014 captures a longer time horizon, GEM does not measure fear of failure in the same countries every year and some countries surveyed in 2006 are not surveyed in certain subsequent years. The next section discusses further limitations of the data. Additionally, GEM surveys a wider range of countries in 2014 compared to 2006. The 2006 survey includes forty-one countries, compared to one hundred and twenty-nine in 2014. Therefore, choosing later years such as 2011-2014 provides greater variation in data by including more surveyed countries.

To provide an idea of country variation, the 2011-2014 panel includes five Asian countries, while the 2006-2014 panel includes one Asian country. The 2011-2014 panel includes six South American countries, while the 2006-2014 panel includes three South American countries. Overall, the 2011-2014 panel contains thirty-seven countries, while the 2006-2014 panel includes sixteen countries. The 2011-2014 panel presents a greater number of countries and a wider range of country variation.

3.3   Limitations of the Data

There are several limitations of the study, both affecting the variables measuring the fear

of failure and the measurement of fear of failure itself.

Fear of failure in starting a business, as measured by GEM, has some potential

flaws. The survey measures different participants every year. An independent survey

vendor conducts surveys at the same time of year (generally between April and June).

The vendor submits a proposal for GEM data collection. GEM examines the raw data for

a quality check evaluation and uniform statistical calculations before any data becomes

publicly available. GEM calls 2,000 respondents over the phone, yet these are not the

same 2,000 participants every year. Hence, while this represents overall country

sentiment, it might not examine actual change over time for the same country.

Theoretically, different participants could be surveyed in 2007 and produce a higher fear

of failure percentage compared to 2006. The fear of failure statistic would change,

regardless of whether or not these participants held the same views in 2006. However,

GEM does use a representative national survey.

Translation issues also abound. For instance, GEM calculates the actual fear of

failure measure from participants responding to whether fear of failure is a significant

hindrance for them to start a business. The survey vendor asks the question over the

phone across dozens of countries and in dozens of different languages. Participants may

not understand the question or the question's connotation may translate differently in

varied languages. Another measure, the property rights index, represents a subjective

measure of participants' responses to the question: "In your country, to what extent are

property rights, including financial assets, protected?" This will also create translation

issues, as the written translation may result in different connotations as well. The direction of the bias is not clear. While this sentence translates to English in a certain way, the exact same connotation may not replicate across languages.

Procedural variables are also measured with error. GEM bases the cost of bankruptcy, measured as a percentage of estate by the World Bank, on responses from questionnaire respondents. Therefore, this is not an accurate measurement of bankruptcy based on historical industry data. The World Bank sends a questionnaire to experts in insolvency, but these respondents still provide a guess based on a case study. Regarding the tax rates, corporate income tax data collection may be more accurate for certain countries than for others. When examining the data, Germany and Canada's rates fluctuate across the past few years, yet certain countries maintain the same corporate income tax rate during the panel's period. Additionally, prior literature studies this variable only as it relates to entrepreneurial activity. Corporate income tax has not been studied as it relates to fear of failure. The value-added tax rates, however, do not have historical data, since the VAT is only available as of the current period. I include this measurement for the cross-sectional analysis for descriptive purposes.

4.   Results

4.1   **2014 Cross-Section Results**

The cross-section results for 2014 provide a general baseline of contemporaneous

relationships for fear of failure with the selected variables. I run the cross-sectional

regression with heteroscedastic standard errors.

Among the cross-section results, only the working age ratio is statistically

significant ($p < 0.01$, Figure 6). For every one-point increase in the working age ratio, the

percentage of respondents who indicate fear of failure would prevent them setting up a

business decreases by 1.5 percentage points. The rest of the independent variables do not

prove to be statistically significant, implying that any relationship presented could be

purely by chance.

4.2   **Pooled OLS Model of 2006-2014 and 2011-2014 Data**

While the pooled OLS model only contains one statistically significant variable (the

working age ratio), it is worth including due to the larger number of observations ($n =$

228) and because all coefficients possess the expected sign as in my hypotheses. My

hypotheses predict the urban population will have a negative coefficient, the working age

ratio will have a negative coefficient, property rights will have a negative coefficient,

business procedures will have a positive coefficient, cost of bankruptcy will have a

positive coefficient, and income tax will have a positive coefficient. According to the

pooled OLS model (Figure 7), all signs match the hypotheses.

The working age ratio appears statistically significant in the pooled OLS

regression. As the working age ratio increases by one, the percentage of the population

who feel fear of failure will prevent them from setting up a business decreases by 1.28 percentage points. This is statistically significant at 0.1% level ($p < 0.001$, Figure 7). No other variables are statistically significant.

4.3 **2006-2014 Fixed Effects Results**

For the purpose of this section, I will focus on the fixed effects model due to the result of its Hausman test. However, I include a comparison between the fixed effects and random effects models in Section 4.6, A Comparison of Results between Fixed and Random Effects. Three different models examine the fixed effects regression: one focusing on the effect of demographic variables (Model I), another focusing on the effect of adding property rights (Model II), and another examining the explanatory power of the full model including procedural variables (Model III). There are a greater number of observations than the cross-sectional study due to the 2006-2014 panel's longer period ($nt = 144$).

In Model I, the percentage of the population living in an urban area is significant at the 1% significance level ($p < 0.01$, Model I, Figure 8). For each one-percentage point increase in the percentage of the population living in an urban area, the fear of failure percentage increases by 2.34 percentage points. The coefficient for the working age ratio is not statistically significant.

The second model incorporates the property rights index as an independent variable (Model II, Figure 8). This variable is not significant at the 5% significance level.

The third model incorporates the effects of income tax, the number of business procedures required to start a business, and the cost of bankruptcy as a percentage of

estate. None of the results appears statistically significant at the 5% level (Model III, Figure 8).

4.4 **2011-2014 Random Effects Results**

For the purpose of this section, I focus on the random effects model due to the result of its Hausman test. However, I include a comparison between fixed effects and random effects models in Section 4.6, A Comparison of Results between Fixed and Random Effects. Once again, three different models show the random effects regression: one focusing on the effect of demographic variables (Model I), another focusing on the effect of adding property rights (Model II), and another examining the explanatory power of the full model including procedural variables (Model III). While this random effects regression examines a shorter period than the 2006-2014 panel, a greater number of countries are included. As a result, a similar amount of observations exist between the 2006-2014 panel and the 2011-2014 panel ($nt = 148$).

Model I looks at the demographic variables in my study: percentage living in an urban area and the working age ratio. While living in an urban area is not statistically significant at the 5% level, the working age ratio is significant at the 1% level ($p < 0.01$, Figure 9). As the working age ratio increases by one point, the fear of failure percentage decreases by 1.2 percentage points.

Model II examines the property rights index. While the coefficient is the same sign as the 2006-2014 panel (Figure 8), the coefficient itself is no longer close to statistically significant.

Model III adds the effect of procedural variables. None are statistically significant, though it should be noted that the coefficient of the cost of bankruptcy remains positive and close to statistical significance in both 2006-2014 and 2011-2014 time periods. Throughout Model II and Model III, the coefficient for the working age ratio maintains its significance at the 1% significance level ($p < 0.01$, Figure 9). This is the only statistically significant variable in the 2011-2014 panel.

4.5   **2011-2014 Random Effects Results Including Asia**

To examine the effect of belonging to an Asian country, I include a dummy variable for "Asia" in the 2011-2014 random effects regression. I select this panel due to the panel containing five Asian countries (China, Japan, Malaysia, Singapore, and Thailand) versus the 2006-2014 panel, which only contains one Asian country (Japan). I assign a value of one to countries belonging to the Asian continent, while I assign a value of zero to countries not on the Asian continent.

Model IV in Figure 9 illustrates the impact of adding the Asian binary variable. The coefficient for the working age ratio increases in statistical significance, while the binary variable for Asia also displays statistical significance at the 1% significance level ($p < 0.001$, Figure 9). Belonging to the Asian continent correlates with a 10.36% increase in the country's fear of failure. In addition, the explanatory power of the model increases as well. The R^2 increases from 17% to 37% due to the addition of the "Asia" binary variable.

4.6   A Comparison of Results between Fixed and Random Effects

In this section, I compare the differences between the fixed and random effects version of each regression with a special emphasis on the regression not selected by the Hausman test.

For the 2006-2014 panel, the Hausman test selects the fixed effects regression. With fixed effects, only the percentage of the population living in an urban area is significant. In comparison, under the random effects model, more variables are statistically significant. Additionally, the coefficient for the working age ratio is statistically significant at the 1% level (Model I, Figure 8, $p < 0.01$). Under random effects, each increase in the working age ratio decreases the percentage of fear of failure by 2.88 percentage points. In addition, under the second model for random effects, the coefficient for property rights is statistically significant (Figure 8). For every one point increase in the property rights index, the percentage of the population experiencing fear of failure decreases by 3.36 percentage points. In sum, the random effects model for 2006-2014 shows property rights and the working age ratio to be statistically significant in contrast to the fixed effects model. However, both the fixed effects model and the random effects model do not find statistical significance among the procedural variables.

For the 2011-2014 panel, the Hausman test selects the random effects regression. With fixed effects, there are no statistically significant variables. However, all coefficient signs of each independent variable are the same between the fixed effects and the random effects regressions with the exception of one. The coefficient for the income tax rate is positive under random effects and negative under fixed effects. Yet the income tax rate is not statistically significant.

5.   Conclusion

It is difficult to assess the statistical significance of the independent variables given three different sample periods and results. The cross-sectional results emphasize the importance of the working age ratio, as this is the only statistically significant variable among this sample. However, with a low number of observations ($n = 50$), these results are not conclusive. What appears more robust is the working age ratio's statistical significance in the pooled OLS model, featuring 228 observations from the combined panel periods. The pooled OLS model only finds statistical significance for the working age ratio, although it hints that my hypotheses may be correct based on the signs of the coefficients (Figure 7). It is possible that with an even greater number of observations, the additional variables included in the regression would reach statistical significance while holding the same signs.

The working age ratio's coefficient receives additional support as decreasing fear of failure — based on the cross-section, pooled OLS model, and two panel periods. Prior studies of cross-country regressions point to lower savings rates when the population share of the elderly is high, and Modigliani recognizes that a greater percentage of a younger population might generate increased saving due to retirement planning and as a buffer against unexpected emergencies (Deaton 2005). An economy with a greater amount of savings indicates a steadier society and may be the reason for its link with decreased fear of failure. In an economically stable environment, participants in this economy might be more inclined to start a business or less inclined to let fear hold them back. However, while I acknowledge that policymakers cannot significantly affect the working age ratio, there are additional variables policymakers should note.

One of the prime variables that deserve attention from policymakers is property rights. Stronger property rights decrease fear of failure in starting a business, based on this variable maintaining the same coefficient sign regardless of the data used: the cross-section, the pooled OLS, the 2006-2014 panel, and the 2011-2014 panel. The property rights index is statistically significant in the 2006-2014 random effects panel and the 2011-2014 random effects panel. Under a larger set of observations, the property rights index may appear statistically significant under all regression models.

In addition, existing literature points to urbanization's effect on fear of failure to be negative. The evidence regarding the percentage of the population living in an urban area is inconclusive: while it is statistically significant at the 1% significance level in the 2006-2014 panel with fixed effects, the coefficient is positive. This is neither the coefficient sign I expected and nor what researchers have posited. It is also the opposite sign in the panel 2011-2014 (where the coefficient is negative). Thus, I draw no solid conclusion about the effect of urbanization from my research.

The property rights index presents an avenue for future study to clarify the relationship between property rights and fear of failure in starting a business. While variables pertaining to demographics prove significant, a clear link between procedural variables and fear of failure is not established. To better understand the relationship between fear of failure and procedural variables, future studies should examine data that are more robust.

Asia is another significant variable worthy of future study (Figure 9). Though the variable captures the condition of being on the Asian continent, it does not provide any further indication about aspects of Asian culture or society that increase fear of failure. It

may be possible that these countries are Asian outliers, as the data only represents five

countries. From a demographic aspect, the "Asia" variable may be highly affected by the

inclusion of Japan, a country with a high fear of failure rate and a high percentage of

elderly. For future studies, more countries that are Asian should be included in the

sample. Potential socioeconomic influences for a higher fear of failure may stem from the

percentage of the population employed by large firms. Within Korea, *chaebol* firms

receive favorable treatment from the government.. In Japan, the *keiretsu* form a

conglomeration of businesses linked together. Both maintain dominance over their

respective economies. Due to this pressure to secure corporate jobs, fewer citizens in

these Asian countries may feel inclined to take the risk of starting their own firms.

The limitations of this study fall into three categories: nonrepeating data

collection, endogeneity of fear of failure, and self-reported measures. For one, GEM does

not collect fear of failure measures for all countries every year. This results in spotty data

collection and prevents many countries from being included to create a rich panel. With a

greater number of observations, the model's independent variables have a higher

likelihood of being statistically significant.

Another caveat with my study is the potential problem in treating "fear of failure"

as a dependent variable when in fact it could correlate with other variables that affect

entrepreneurial activity, such as the labor market, regulation, demographics, culture,

etc. This leads to endogeneity concerns — if fear of failure correlates with

entrepreneurial activity levels, the entrepreneurial activity levels are themselves likely to

affect fear of failure. A higher initial level of entrepreneurial activity may decrease fear

of failure since prospective entrepreneurs see successful models of startup activity around them.

Finally, participants self-report several of the independent variables, such as the property rights index and the cost of bankruptcy. Individual perceptions and experiences with a government institution will cause self-reporting to be biased. Instead, an unbiased third party or legislative evidence could determine the calculation of these measures better than public sentiment.

5.1   Opportunities for Future Research

Several opportunities exist as avenues for future research. For one, certain variables that produce mixed coefficient signs should be re-examined with a larger set of observations. In particular, additional researchers could test the percentage of the population living in an urban area as an independent variable for a different sample period of fear of failure rates. To explore the existing variables mentioned in this study, further studies could investigate the elements that make up the property rights index.

One important aspect of failure not captured in this study could be a more detailed study of the cultural perspective of failure. The continents each country belongs to could be a possible measurement. While this regression includes a specific variable for Asia, another could be included for Europe, North America, and South America. This way, researchers could compare continental differences. For example, this analysis could examine if Asian countries might have higher or lower fear of failure rates than North American countries. I chose not to do such for this study due to further reducing the degrees of freedom of the regression. Future studies examining fear of failure could also

utilize non self-reported measures and provide a more reliable perspective of property rights or cost of bankruptcy. Additionally, researchers could study the role of the value-added tax in further detail if historical data could be included for this measure.

This study provides greater insight into what affects fear of failure from a demographic and institutional perspective. This study also seeks to expand the understanding of fear of failure from simply a regionally focused one. It highlights indicators that could decrease fear of failure for several different countries, instead of simply proposing a variable to affect one country or one type of country. By increasing the scope of fear of failure to an international context, my study attempts to detect factors that can affect fear of failure despite regional differences. However, as captured by the "Asia" variable, inherent regional differences do still exist and cause difficulty in fitting a linear equation to the data. Determinants of fear of failure prove limited from the scope of this study, yet a greater focus on property rights and an investigative analysis of procedural variables will serve policymakers well for influencing entrepreneurial fear of failure.

Figures

Figure 1: Descriptive statistics for the cross-section, 2014 (*n* = 50).

	Minimum	*Maximum*	*Mean*	*Std. dev.*	*Median*
Fear of failure (%)	13.7	61.58	36.55	9.1	37.62
Population living in urban areas (%)	32.37	100	71.44	16.45	73.97
Working age ratio	2.39	18.18	6.35	3.74	4.57
Property rights index	2.62	6.39	4.8	0.96	4.67
Number of procedures required to start a business	2	16	6.5	3.07	6
Income tax rate (%)	12.5	40	25.05	6.04	25
Cost of bankruptcy, as a percentage of estate (%)	1	32	11.37	6.43	9.5
Value added tax rate (%)	0	27	15.04	6.38	15

Figure 2: Descriptive statistics for the panel, 2006-2014 (*nt* = 144).

	Minimum	*Maximum*	*Mean*	*Std. dev.*	*Median*
Fear of failure (%)	15.12	61.58	34.7	8.64	34.17
Population living in urban areas (%)	49.7	97.82	79.56	11.89	80.99
Working age ratio	2.39	11.12	4.66	1.76	4.05
Property rights index	2.47	6.51	5.16	0.99	5.41
Number of procedures required to start a business	3	16	7.41	3.56	6
Income tax rate (%)	16	40.69	28.29	7.22	28
Cost of bankruptcy, as a percentage of estate (%)	1	18	8.47	4.75	9

Figure 3: Descriptive statistics for the panel, 2011-2014 ($nt = 148$).

	Minimum	Maximum	Mean	Std. dev.	Median
Fear of failure (%)	14	61.58	35.79	7.89	35.89
Population living in urban areas					75.74
(%)	39.29	100	73.53	14.8	
Working age ratio	2.39	13.26	5.74	2.82	4.5
Property rights index	0	6.45	4.79	1.07	4.85
Number of procedures required to					
start a business	3	14	6.64	2.80	6
Income tax rate (%)	10	40.69	24.7	7.12	25
Cost of bankruptcy, as a percentage					
of estate (%)	1	36	10.3	6	9

Figure 4: Fear of failure averages for 2006-2014 and 2011-2014, by country.

Country	*Percentage of 18-64 population who indicate that fear of failure would prevent them from setting up a business*		Country	*Percentage of 18-64 population who indicate that fear of failure would prevent them from setting up a business*	
	2006-2014	**2011-2014**		**2006-2014**	**2011-2014**
Argentina	28.76	25.84	Norway	30.26	38.18
Belgium	37.48	44.37	Panama	-	18.55
Bosnia and Herzegovina	-	27.57	Peru	-	31.54
Brazil	33.57	34.19	Poland	-	46.05
Chile	26.21	27.86	Portugal	-	40.10
China	-	36.32	Romania	-	38.88
Colombia	-	30.98	Russia	-	39.62
Croatia	32.89	33.95	Singapore	-	40.00
Finland	31.68	35.49	Slovakia	-	34.82
France	42.75	40.57	Slovenia	28.22	29.25
Germany	-	40.61	South Africa	-	26.93
Greece	50.35	52.49	Spain	41.72	38.75
Hungary	33.18	39.00	Sweden	-	35.08
Ireland	-	37.09	Switzerland	-	30.02
Japan	44.96	49.81	Thailand	-	49.24
Lithuania	-	40.53	United Kingdom	34.26	36.33
Malaysia	-	31.61	United States	28.56	31.07
Mexico	-	28.37	Uruguay	-	28.80
Netherlands	30.32	34.28			

Figure 5: Correlation matrix for variables of interest, cross-section of 2014.

Measure	1	2	3	4	5	6	7	8
1. Fear of failure	-							
2. Population living in urban areas	.03	-						
3. Working age ratio	-.47	-.47	-					
4. Property rights index	.05	.47	-.31	-				
5. Number of procedures required to start a business	.17	-.43	.56	-.46	-			
6. Income tax rate	.03	.27	.11	-.03	.36	-		
7. Cost of bankruptcy, as a percentage of estate	-.20	-.52	.55	-.48	.56	.09	-	
8. Value added tax rate	.12	.05	-.34	-.14	-.11	-.32	-.13	-

Figure 6: Regression results for the cross-section, 2014.

	Dep. var. = Percentage of respondents in a country who indicate that fear of failure would prevent them from setting up a business.
	Coeff. (β)
Intercept	55.15***
	(12.88)
Demographic	
Population living in urban areas	-0.18
	(0.10)
Working age ratio	-1.54**
	(0.44)
Property	
Property rights index	-0.220
	(1.56)
Procedural	
Number of business procedures required to start	-0.03
a business	(0.59)
Income tax rate	0.27
	(0.26)
Cost of bankruptcy, as a percentage of estate	-0.07
	(0.25)
Value added tax	-0.04
	(0.22)
Number of observations (N)	50
F statistic (df)	2.59
Adjusted R^2	0.19

Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 7: Regression results for the pooled OLS panel, including both 2006-2014 and 2011-2014 observations (duplicates deleted).

	Dep. var. = Percentage of respondents in a country who indicate that fear of failure would prevent them from setting up a business.
	Coeff. (β)
Intercept	38.6***
	(4.83)
Demographic	
Population living in urban areas	-0.02
	(0.24)
Working age ratio	-1.28***
	(0.24)
Property	
Property rights index	-0.27
	(0.65)
Procedural	
Number of business procedures required to start	0.12
a business	(0.20)
Income tax rate	0.14
	(0.09)
Cost of bankruptcy, as a percentage of estate	0.13
	(0.13)
Number of observations (N)	228
F statistic (df)	5.51
Adjusted R^2	0.11

Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 8: Regression results for the panel, 2006-2014.
Dependent variable: *Percentage of respondents in a country who indicate that fear of failure would prevent them from setting up a business*.

	Model I			Model II			Model III		
	FE	**RE**	**Pooled**	**FE**	**RE**	**Pooled**	**FE**	**RE**	**Pooled**
Demographic									
Population living in urban areas	2.34**	0.28*	0.13*	1.93**	0.30*	0.18**	1.92*	0.26*	0.10
	(0.68)	(0.14)	(0.06)	(2.59)	(0.14)	(0.06)	(0.81)	(0.13)	(0.07)
Working age ratio	-0.23	-2.88**	-1.94***	-.006	-2.95***	-2.29***	-0.26	-3.13***	-2.97***
	(2.35)	(0.85)	(0.39)	(0.00)	(0.84)	(0.41)	(2.54)	(0.83)	(0.44)
Property									
Property rights index				-2.44	-3.36**	-1.62**	-2.44	-2.75*	0.51
				(1.76)	(1.14)	(0.75)	(2.06)	(1.15)	(0.97)
Procedural									
Number of business procedures							-0.30	0.23	0.87**
							(0.39)	(0.32)	(0.26)
Income tax rate							0.13	0.12	0.16
							(0.32)	(0.19)	(0.11)
Cost of bankruptcy							0.71	0.24	0.16
							(0.63)	(0.33)	(0.21)
Number of observations (N)	144	144	144	144	144	144	144	144	144
Adjusted R^2	0.01	0.16	0.15	0.01	0.18	0.17	0.009	0.20	0.26
Fixed effects?	Yes	No	No	Yes	No	No	Yes	No	No
Random effects?	No	Yes	No	No	Yes	No	No	Yes	No

Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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Figure 9: Regression results for the panel, 2011-2014.
Dependent variable: *Percentage of respondents in a country who indicate that fear of failure would prevent them from setting up a business.*

	Model I			Model II			Model III			Model IV		
	FE	**RE**	**Pooled**	**FE**	**RE**	**Pooled**	**FE**	**RE**	**Pooled**	**FE**	**RE**	**Pooled**
Demographic												
Population living in urban areas	-0.65	-0.005	-0.002	-0.60	0.002	-0.01	-0.27	-0.01	-0.05	-0.27	-0.01	-0.04
	(0.89)	(0.07)	(0.04)	(0.90)	(0.08)	(0.05)	(1.02)	(0.1)	(0.06)	(1.02)	(0.08)	(0.05)
Working age ratio	-2.60	-1.19**	-1.17***	-2.28	-1.19**	-1.16***	-1.70	-1.37**	-1.22***	-1.70	-1.66***	-1.57***
	(2.25)	(0.38)	(0.21)	(2.31)	(0.38)	(0.22)	(2.35)	(0.43)	(0.25)	(2.35)	(0.38)	(0.22)
Property												
Property rights index				-0.76	-0.24**	0.27	-0.50	-0.24*	-0.05	-0.50	-0.74	-1.25
				(1.21)	(0.83)	(0.63)	(1.24)	(0.86)	(0.71)	(1.24)	(0.82)	(0.65)
Procedural												
Number of business procedures							-0.49	-0.38	-0.30	-0.49	-0.43	-0.54*
							(0.51)	(0.32)	(0.26)	(0.51)	(0.29)	(0.23)
Income tax rate							-0.02	0.13	0.17	-0.02	0.15	0.19*
							(0.28)	(0.15)	(0.11)	(0.28)	(0.14)	(0.09)
Cost of bankruptcy							0.40	0.19	0.004	0.40	0.13	-0.04
							(0.27)	(0.19)	(0.14)	(0.27)	(0.17)	(0.12)
Asia										(omitted)	10.36***	10.82***
											(2.94)	(1.66)
Number of observations (N)	148	148	148	148	148	148	148	148	148	148	148	148
Adjusted R^2	0.05	0.17	0.16	0.05	0.18	0.16	0.06	0.18	0.16	0.06	0.37	0.35
Fixed effects?	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Random effects?	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No

Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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