Entrepreneurship: The Role of Extreme Events

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10 July 2011

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Acknowledgements

We benefited greatly from the comments of two anonymous referees and from the editor, Arye Hillman. Fernanda Llussá and José Tavares would like to thank the *Fundação para Ciência e Tecnologia* for financial support. Tymur Gabunya and Kerstin Ringelhan provided excellent research and editorial assistance, respectively. Tavares thanks *Nova Forum* for financial support.

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Abstract

We use aggregate country data as well as individual surveys to uncover, for the first time, the effect of extreme events such as natural disasters and terrorist attacks on entrepreneurial activity. We find that natural disasters and terrorist attacks do influence individual perceptions of the rewards to entrepreneurship and, more surprisingly, extreme events affect entrepreneurship rates positively in a robust and significant way.

Key Words

Extreme Events; Perceptions; Entrepreneurship.

1. Introduction

This paper analyzes how extreme events impact entrepreneurial activity, either directly or indirectly, through the perceptions of individuals and potential entrepreneurs. We use both aggregate country data on the occurrence of natural disasters and terrorist attacks, as well as individual-level, cross-country survey data.

Extreme large-scale events such as terrorist attacks and natural disasters have the potential to impact psychologically the population of whole countries, affecting their perceptions and economic behavior (see a brief overview in Brück and Wickström (2004)). These events may lead to the destruction of physical assets important for the conduct of business, disrupt markets and competition, and give rise to new business opportunities. In the case of terrorism, attacks are carried out with the *intention* of creating fear and changing perceptions, with destruction being just a means to that end. Physical losses are often not quantitatively significant,[1] while the changes in perceptions and world view may be quite important. In the case of natural disasters, there are obviously not ulterior intentions behind their occurrence, and they can create massive physical destruction, such as demonstrated in the recent tsunami in Japan.

Both types of extreme events may appear to be randomly distributed across time and space. For natural disasters this view is quite natural: even if we know where an active volcano is located, we still do not know when (and how) it will erupt.[2] In the case of terrorism, terrorists actually have an incentive to make attacks appear as random as possible in order to maximize their "audience's" anxiety, making risk appear ubiquitous and unpredictable, as suggested in Gaibulloev and Sandler (2008). With the security services intent on preventing terrorism and with the specific occurrence of natural disasters nearly impossible to predict, both types of events can be seen as major exogenous events. Individuals can assess the probabilities of being affected by them, but they can never be certain about them, and their actual occurrence always brings surprise, dismay, and a re-evaluation of their individual outlook and, possibly, worldview. The actual and psychological impact of extreme events may thus affect, among other things, the propensity to undertake entrepreneurial activity. Unlike the case of (organized) crime in general, terrorist acts and, by definition, natural disasters, are not aimed specifically at entrepreneurs. We hence posit that both types of events are exogenous when viewed from the perspective of entrepreneurs.

We thus expect to observe significant effects of these events on the perceptions of entrepreneurs. Furthermore, we can expect both direct effects on entrepreneurship and indirect effects, which may act through a change in perceptions. In addition, different population groups may be affected in different ways, depending on the "vulnerability" of their perceptions to changes and on their different stakes in the economy.

Using individual-level data from 43 countries from the period 2002 to 2005, we find that extreme events, measured through the number of victims, do affect individual perceptions, such as Fear of Failure, Expected Business Opportunities, and Expected Level of Competition.

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[1] The events of 9/11 being, arguably, an exception.

[2] Remember the impact of the Eyjafjallajokul volcano in Iceland, with unprecedented impact on air travel in Europe.

This article contributes to the literatures on the effects of extreme events, their role as drivers of entrepreneurship and on individual perceptions affecting business activity. First, the article provides quantitative estimates of the relative impact of the intensity of extreme events on entrepreneurial activity. The analysis improves our understanding of how extreme events like terrorism and natural disasters impact the economy beyond the obvious, and often relatively limited, physical destruction. We identify perceptions as a key channel for the transmission of the non-physical effects of extreme events, and find that terrorist attacks and natural disasters have similar but not identical effects on perceptions. The analysis suggests that the total costs of terrorism are routinely under-estimated to the extent that such indirect but significant effects of terrorism on economic activity are not captured in cost calculations based on direct estimates of destruction.

Second, we analyze, for the first time, the role of extreme events as direct determinants of entrepreneurship. Both the timing and magnitude of these events are exogenous, allowing for a proper empirical identification. This is a promising endeavor as it relies on exogenous variation to identify changes in entrepreneurial activity. Using a well-known, large-scale individual level dataset on entrepreneurship to evaluate the impact of extreme events places our findings within the larger debate on the drivers of entrepreneurship. Contrary to the common view, extreme events are associated with an increase in entrepreneurial activity. Though relatively small, the effects are robust and significant.

Third, we investigate the benefits of further policy analysis, as they suggest how to reduce the costs of terrorism (and natural disasters) by promoting individual adjustments to those events. For a given level of risk, it is socially desirable to learn how to reduce the economic burden on entrepreneurship and economic activity, by countering the impact on most vulnerable groups and understanding the behavior of the most resilient groups.

The remainder of the paper is organized as follows. Section 2 provides a literature review in the fields of terrorism, entrepreneurship and perceptions. Section 3 introduces the data. Section 4 discusses the specification and presents the results. Section 5 discusses the robustness of the estimates and section 6 concludes.

2. Literature Review

In this paper, we build on different literatures, namely on the concept of entrepreneurship (1), and the individual drivers of entrepreneurship (2), the role of perceptions as drivers of entrepreneurship (3), and extreme events both as drivers of perceptions (4) and direct drivers of entrepreneurship (5). Figure 1 represents the framework we situate this paper in, which will also help us structure this brief review of the literature.

(1) We consider entrepreneurship to be the ability to identify and take advantage of unexploited business opportunities. To be able to do so, individuals need to balance opportunities and risk, subject to budget and market constraints as well as their own human capital endowments. For this optimization problem, entrepreneurs must process significant amounts of data concerning, inter alia, their own strengths and weaknesses (including fear of failure and their own confidence in their skills), emerging business opportunities, the level of competition, and exogenous shocks to their markets. In addition to standard economic considerations, issues of a more subjective nature as well as psychological considerations of

how people perceive, transmit and process information hence also play a role in the entrepreneurial calculus. In this sense, entrepreneurs create and implement new production functions under conditions of uncertainty, where the uncertainty can be both extrinsic (related to their environment) and intrinsic (related to their view of themselves).[3] We will employ a measure of entrepreneurship activity taken from the Global Entrepreneurship Monitor (TEA), an indicator which takes the value 1 when an individual is planning to start a business or is one of the owners of a new business (started in the last 6 months). This can also be called "nascent entrepreneurship".[4]

(2) The set of drivers of entrepreneurial behavior identified in the literature are associated with extrinsic and intrinsic factors. See Baumol (1968), and Schumpeter (1934), for two seminal views of entrepreneurship. Extrinsic factors may include standard variables commonly included in empirical studies such socio-economic conditions (as in Lefkowitz (1994)), family status (Justo et al. (2006)), human and social capital (Greene (2000)), age, and education (Llussá (2009), Minniti and Nardone (2007),). These findings motivate our choice of control variables in the empirical analysis below. Intrinsic factors may include drivers of entrepreneurship such as perceptions, which are typically harder to observe.

(3) We focus our analysis in particular on the role of perceptions as a transmission mechanism from extreme events to entrepreneurial activities. 'Perception' in this paper refers to the process within an individual of receiving, organizing and interpreting sensory information to gain awareness and understanding of itself and its environment. 'Perception' points to a highly subjective and individual process of observation and interpretation (which is falling far short of calling perceptions irrational). As people have different sensory capabilities and interpretative skills, perceptions are likely to differ across people even if they may be stable for a given person over time, all other things being equal. Arenius and Minniti (2005) explore the role of perception sin nascent entrepreneurship. Both Llussá (2009) and Minniti and Nardone (2007), explore the relation between gender, perceptions, and entrepreneurship. Perceptions may also vary with education and other measures of skill and ability; however, as we define perceptions here, they do not represent a skill in themselves but rather a way to view reality that may affect the propensity to start a business.

The literature is divided as to the quality of perceptions that individuals form. On the one hand, people tend to predict future outcomes that affect their lives quite well. See, for instance, Dominitz (1998) and Manski (2004). Perceptions, on the other hand, may differ from actual risk levels and are often biased. Busenitz and Barney (1997) and Cooper et al. (1988) suggest that, while common to all individuals, these distortions may actually be particularly prevalent among entrepreneurs. For instance, as entrepreneurs associate their perceived entrepreneurial capabilities with a higher probability of success, they are "overly" receptive to entrepreneurial opportunities. Minniti and Nardone (2007) claim that gender attitudes toward entrepreneurship reflect mostly subjective perceptions, not objective conditions.

(4) In general, there is a scarcity of research on the individual-level drivers of perceptions.[5] In particular, the literature on entrepreneurship tends to view perception variables as invariant over time. The literature does not exploit the possibility of aggregate events that may

[3] Appropriately, Kirzner (1979) equates a talent for entrepreneurship with "alertness".

[4] See Arenius and Minniti (2005), and Branco et al. (2010).

[5] See Delavande and Kohler (2008) for an example of an exception.

substantially alter how entrepreneurs individually evaluate risk, opportunities, and levels of competition. One exception is Voors et al. (2010) who conduct experimental field work in Burundi and find evidence that individuals exposed to greater levels of violence are more risk seeking and have higher discount rates. The authors claim their results are consistent with the idea that preferences are endogenous and respond to life experience and context. Through this channel, adverse temporary shocks can have long-term consequences via the channel of induced changes in preferences. Another exception is Bozzoli et al. (2010a). They show that, in spite of increased pessimism in the short term, individuals cope with violence and displacement, presumably by adopting appropriate strategies.

(5) Extreme events such as terrorism and natural disasters are likely to affect entrepreneurship directly as well. See Sandler (2009) and Llussá and Tavares (2008) for a review of the economics literature on terrorism, and Brück et al. (2008) for reviews of the economics literature of security. Galbraith et al. (2006) discusses the relationship between disasters and entrepreneurship. [6] As recognized in the literature, entrepreneurial activity may be a side-effect, a response to crises, poor institutions, or even a business climate that discourages formal activities. The fact that extreme events have been found to have a negative impact on growth and income per capita is perfectly consistent with the possibility that extreme events encourage entrepreneurial activity and new business creation. Blattman and Miguel (2010) argue that the impact of civil war on institutions, technology, and culture, all determinants of long-term economic performance, is still far from well understood.

Terrorist attacks and natural disasters may either discourage or encourage entrepreneurial activity and economic growth. See, for instance, Brück et al (2011), and Gaibulloev and Sandler (2008)). Entrepreneurial activity is not necessarily associated with higher income, as suggested by the well documented fact that poor countries display very high levels of (mostly informal) business creation. Our data set takes into account formal and informal business creation.

On the positive side, extreme events may encourage new businesses. The disruption of customary habits and the weakening of traditional institutions create opportunities and may change the balance of power in favor of smaller, more flexible, organizations. Alesch et al. (2001) show that precautions to protect life and property within a disaster area are not correlated with post-disaster business survival, suggesting more complex mechanisms are at work and need to be considered, rather than the mere material impact of disasters. Bennett and Estrin (2006) suggest that there might be a decrease in market entry requirements and a lower cost of discovery of profitable business activities.

Moreover, as "incumbent" businesses suffer the brunt of physical destruction, new opportunities open for emerging competitors. Alesch et al. (2001) find that, while local business organizations that are "marginal" may not reopen, stronger businesses also lose market share both in regional and national markets. In addition, after a violent event, governments and state institutions may actually improve how they deal with business and the business climate itself may improve as a consequence. There is evidence that disasters expose corruption and may lead, indirectly, to better decision making (see, for instance, Bellows and Miguel 2006 and Blattman 2009.)

[6] Frey (2009) proposes strategies for businesses to reduce the probability of being targeted by a terrorist attack, and to minimize the costs if and once it happens.

The need to summon new physical – and psychological – energies may favor the emergence of hitherto untapped private initiative. Tierney and Webb (2001) suggest that disasters bring new resources into the affected communities, with the potential for providing a stimulus to new business activity. Bozzoli et al. (2010b) study individuals affected by violence in Colombia and find that, while high homicide and displacement rates decrease self-employment at the local level, a high influx of displaced persons raises the probability of self-employment at the municipality of destination.

On the negative side, the actual destruction involved may impair business activities and, as such, discourage the creation of new ventures. Gaibulloev and Sandler (2008) suggest that terrorism and other violent events may hinder growth by raising the costs of businesses – in wages, insurance premiums, and security expenditures -, which reduce profits and returns and discourage new business creation. Tierney and Webb (2001) find that, though there are "insulating factors", such as firm size, which partially protect incumbent firms from the negative effects of disasters, the latter may exacerbate the difficulties that businesses were already experiencing on a daily basis. In addition, the uncertainty created by current and future attacks and the implicit threat to capital endowments and to property rights in extreme events should discourage the incentive to invest and create new businesses.

Furthermore, destruction reinforces unequal distribution of resources, including income and power. Bircan et al. (2010) report rising levels of inequality during war, and especially in the early period of post-war reconstruction. Tierney and Webb (2001) suggest larger firms suffer relatively less in the wake of natural disasters.

Finally, extreme events induce a governmental response, which arises naturally from the need to coordinate the social response and, sometimes, the actual reconstruction effort. Increased state intervention may indirectly discourage business creation, through discretionary behavior and unwarranted regulation. Llussá and Tavares (2011) examine the impact of terror attacks on different macroeconomic aggregates and find that, in several instances, government spending increases after a terrorist event.[7]

3. Data

In our empirical analysis, we draw on data from the Adult Population Surveys, collected by the Global Entrepreneurship Monitor (GEM). [8] This data contain detailed information on individuals from 44 countries. The micro survey data is collected annually and in a consistent manner across countries.[9] In this paper we use yearly data from 2002 to 2005.[10] We use the largest available sample for which the perception indicators are collected.

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[7] See also Crain and Crain (2006).

[8] Countries included are United States, Russia, South Africa, Greece, Netherlands, Belgium, France, Spain, Hungary, Italy, Switzerland, Austria United Kingdom, Denmark, Sweden, Norway, Poland, Germany, Peru, Mexico, Argentina, Brazil, Chile, Australia, New Zealand, Singapore, Thailand, Japan, South Korea, China, Canada, Uganda, Portugal, Ireland, Iceland, Finland, Croatia, Slovenia, Venezuela, Hong-Kong, Taiwan Jordan, Israel. Years: 2002 to 2005. We formally analyze the effect of extreme events on entrepreneurship, both directly and indirectly, through changes in perceptions. Our sample includes 43 countries and covers the four year period between 2002 and 2005 (see http://www.gemconsortium.org/).

[9] Each year a sample of at least 2,000 randomly selected individuals in each country are surveyed by phone or through face-to-face interviews. On average, a total of 35 national experts in each country are responsible for conducting the surveys. A coordination team at London Business School supervises the data collection and checks for inconsistencies.

Variables are defined in the Appendix and summary statistics are presented in Table 1. In our sample 84% of individuals are classified as entrepreneurs, the average age of individuals is about 38 years old, 63,7% are males, 56% have at most a secondary degree, 26% have post-secondary education and 17% have graduate experience. In terms of income, 28% consider themselves as belonging to the poorest 33% in the country, 34% consider themselves middle income and the rest see themselves among the third richest in the society.

The GEM data set include measures of perception variables related to entrepreneurship such as Fear of Failure (individuals who answer that fear of failure can prevent them to start a new business – coded as 1), Business Opportunities (individuals that answered yes there will be good opportunities for starting a business in the area where they live in the next six months – coded as 1) and Competition (individuals that think there are many businesses offering the same products or services to their potential customers – coded as 1).

In the sample, 20,9% of respondents consider that it may prevent them from starting a business, 61.4% consider there is a good opportunity for starting a business in the area where they live in the next six months, and 48.1% of individuals expect substantial competition when they start a business.

As to the indicators of extreme events, we focus on the intensity of events as to the number of people affected. We use the absolute number of victims of terrorist attacks and people affected by natural disasters (in thousands). Our use of absolute rather than relative victimization is intentional and corresponds to our view that these events modify perceptions in the wake of reporting in the media, not by directly affecting the physical context in which business is conducted.[11] The traumatic and psychological impact of these events, we believe, is more directly associated with the absolute rather than the relative number of people affected. We will analyze the direct effect of extreme events on entrepreneurial activity, as well as its indirect effect through changes in individual perceptions that may affect entrepreneurial activity.

By country, we compute the mean number of victims of terrorist attacks - 11, with a maximum number of victims at 95, and the mean number of victims of natural disasters - 68, with a maximum at 1800. The correlation between these two variables is extremely low, with a value of -0.0096., reflecting the fact that Natural Disasters and terrorist attacks are driven by very different processes.

4. Specification

Figure 1 charts the relationship between extreme events and entrepreneurship investigated in this paper, highlighting both the direct and the indirect effects through changes in perceptions. First we determine how Fear of Failure, Expected Business Opportunities and Expected Level of Competition are affected by the occurrence of a natural disaster or a terrorist attack. We control for individual characteristics such as age, education, and level of income. Our sample includes countries whose macroeconomic and institutional characteristics vary widely and may correlate with the entrepreneurship indices so we include country fixed effects in all

[10] The set of surveys available for which the methodology is most consistent across time.

[11] However, results with the relative rather than absolute number of affected give the same qualitative results.

specifications. The dependent variables are binary. We use Probit estimation and standard errors clustered at the country level.

Equation (1) below summarizes our first specification.

$$y_{ijt} := \alpha + \beta_1 \,.\, \text{EXTREME}_{jt} + \beta_2 \,.\, X_{ijt} + \eta_t + \varepsilon_{ijt} \quad (1)$$

where α is a constant, EXTREME_{jt} is a vector of extreme events which varies over time and across countries (not across individuals), and X_{ijt} is a vector of individual characteristics - including age, education and income.

We now turn to the determinants of entrepreneurship, taking into account, for the first time, the direct impact of extreme events on entrepreneurial activity. Our specification studies, for an individual i located in country j in year t, an indicator variable y_{ijt} which measures whether the individual is involved in entrepreneurial activity or not.

In sum, our second specification can be summarized as:

$$y_{ijt} := \alpha + \beta_1 \,.\, \text{EXTREME}_{jt} + \beta_2 \,.\, \text{PERCEPTIONS}_{ijt} + \beta_3 \,.\, X_{ijt} + \eta_t + \varepsilon_{ijt} \quad (2)$$

where α is a constant, EXTREME_{jt} is the vector of extreme events, PERCEPTIONS_{ijt} is a vector of individual perceptions, and X_{ijt} is the vector of individual characteristics. Finally, η_t is a vector of country dummies and ε_{ijt} is a well-behaved error term. The coefficient on a variable such as Terrorist Attacks, for instance, will give us the change, after an attack, in the probability of becoming an entrepreneur for the individual with the average sample characteristics.

In our sample, the correlation between the occurrence of natural disasters and terrorist attacks is not significantly distinct from zero. This fact adds to the exogenous nature of extreme events to support their use as right-hand side determinants of both perceptions and entrepreneurial activity.

5. Results

Table 2 presents the results for specification (1). As we can verify, Natural Disasters tends to decrease fear of failure but, on the other hand, decrease Expected Business Opportunities, so that the net effect on entrepreneurship rates *through* perceptions is undetermined. Terrorist Attacks, on the other hand, tend to *increase* Expected Business Opportunities, but have no noticeable effect on both Fear of Failure and the Expected Level of Competition.

In Table 3 we present the results of specification (2), introducing in turn indicators of perceptions and of extreme events, and then introducing both simultaneously. Results are presented for our full sample. We find, as expected, that an increase in Fear of Failure discourages individuals from creating a new business firm, while a rise in Expected Business Opportunities encourages firm creation. On the other hand, changes in the Expected Level of Competition also decrease the likelihood of the individual being an entrepreneur. These coefficient signs are reassuring as to the relation between perceptions and entrepreneurial propensity in our sample.

When indicators for extreme events are included, we find that, while Natural Disasters discourage entrepreneurship over and above its effect on perceptions, the opposite occurs with Terrorist Attacks, which seems to encourage entrepreneurship. The low physical impact of Terrorist Attacks as compared to Natural Disasters,[12] and both its quantitatively significant coefficient and its positive sign, seems to point to an impact on entrepreneurship that cannot be explained by changes in actual business conditions alone.

In Table 4 we examine the impact of extreme events on the entrepreneurship rates for different population groups, defined according to gender, education, household income, and age. The sign of the coefficients tend to be the same across demographic groups, though their size and significance vary. The occurrence of Natural Disasters discourages entrepreneurial activity, and significantly so for some groups. Males, individuals with post-secondary or graduate education, middle income, and the young and the middle aged are the groups more discouraged by natural disasters. Young males respond in the same direction, though less intensively. Terrorist Attacks, on the other hand, tends to lead to more entrepreneurial activity throughout, but more so for females, individuals with secondary or post-secondary education, that are higher income and older.

In sum, in spite of having a different impact on entrepreneurial rates, Natural Disasters and Terrorist Attacks seem to affect most negatively the entrepreneurial propensity of the young males, with average or higher education, and low income. These effects are above and beyond those working through changes in individual perceptions as to business conditions, as reported in Table 2. Moreover, the control variables are in line with previous studies of the determinants of entrepreneurial activity.[13]

6. Conclusions

We conduct an investigation of the indirect impact of the intensity of extreme events – Natural Disasters and Terrorist Attacks – on perceptions that affect entrepreneurial activity, as well as the direct impact of those events on entrepreneurial activity itself. On the one hand, we find that, contrary to expectations, Terrorist Attacks have a positive, significant, and robust impact on entrepreneurial activity across different population groups. Natural Disasters, on the other hand, tend to impact entrepreneurial activity negatively.

Our results suggest that, while imposing aggregate costs in terms of growth and per capita income at the country level, extreme events may be associated with changes in perceptions that affect the rate of entrepreneurial activity. It is important that future research investigates how the positive responses may be encouraged and the negative ones mitigated, as both play a role in encouraging individual initiative and economic growth in the aftermath of disaster.

[12] See Tavares (2004), for a comparison of the impact of natural disasters and terrorist attacks.

[13] See, for instance, Llussá (2009).

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Appendix

Definition of Variables

Total Entrepreneurial Activity

Units: Individual dummy variable. Takes the value 1 if individuals are either starting a new business including any self-employment, selling any goods or services to others or are owners and managers of a young firm, 0 otherwise.

Source: Global Entrepreneurship Monitor (GEM).

Terrorist Attacks

Unit: Total number of affected individuals, that is, sum of fatalities with injured, by country and year.

Source: Global Terrorism Database.

Natural Disasters

Unit: Total number of individuals affected (dead or wounded) by the natural disaster by country and year. In thousands.

Source: International Disaster Database

Fear of Failure

Units: Individual dummy variable. Takes the value 1 when individuals answer that fear of failure can prevent them from starting a new business.

Source: Global Entrepreneurship Monitor (GEM).

Expected Business Opportunities

Units: Individual dummy variable. Takes the value 1 when individuals answered yes there will be good opportunities for starting a business in the area where they live in the next six months.

Source: Global Entrepreneurship Monitor (GEM).

Expected Level of Competition

Units: Individual dummy variable. Takes the value 1 when individuals answered that there are many businesses offering the same products or services to their potential customers.

Source: Global Entrepreneurship Monitor (GEM).

Age

Units: Age of individual at time of interview. Years.

Source: Global Entrepreneurship Monitor (GEM).

Low Income

Units: Takes value 1 for individuals who report that their household income is in the lowest 33rd income percentile of their country's income distribution at the time of the interview.

Source: Global Entrepreneurship Monitor (GEM).

Middle Income

Units: Takes value 1 for individuals who report that their household income is in the middle 33rd income percentile of their country's income distribution at the time of the interview.

Source: Global Entrepreneurship Monitor (GEM).

Upper Income

Units: Takes value 1 for individuals who report that their household income is in the upper 33rd income percentile of their country's income distribution at the time of the interview.

Source: Global Entrepreneurship Monitor (GEM).

Some Secondary

Units: Takes value 1 for individuals with some exposure to secondary education.

Source: Global Entrepreneurship Monitor (GEM).

High School

Units: Takes value 1 for individuals with completed secondary education.

Source: Global Entrepreneurship Monitor (GEM).

College

Units: Takes value 1 for individuals with a college degree.

Source: Global Entrepreneurship Monitor (GEM).

Graduate

Units: Takes value 1 for individuals with some graduate school education.

Source: Global Entrepreneurship Monitor (GEM).

Table 1: Summary Statistics

	N. Obs.	Mean	Std. Deviation	Minimum	Maximum
Fear of Failure	14073	0.209	0.406	0	1
Expected Business Opportunities	14073	0.614	0.487	0	1
Expected Level of Competition	14073	0.481	0.500	0	1
Total Entrepreneurship Rate	14073	0.840	0.367	0	1
Age	14073	37.793	12.194	1	97
Male	14073	0.637	0.481	0	1
Some Secondary Degree	14073	0.281	0.449	0	1
Secondary Degree	14073	0.280	0.449	0	1
Post-Secondary Degree	14073	0.263	0.440	0	1
Graduate Experience	14073	0.173	0.379	0	1
Low Income	14073	0.285	0.451	0	1
Middle Income	14073	0.344	0.475	0	1
High Income	14073	0.372	0.483	0	1
Terrorist Attacks	12960	10.998	23.589	0	95
Natural Disasters	13880	68.030	337.561	0	1800.107

Note: Countries included are United States, Russia, South Africa, Greece, Netherlands, Belgium, France, Spain, Hungary, Italy, Switzerland, Austria United Kingdom, Denmark, Sweden, Norway, Poland, Germany, Peru, Mexico, Argentina, Brazil, Chile, Australia, New Zealand, Singapore, Thailand, Japan, South Korea, China, Canada, Uganda, Portugal, Ireland, Iceland, Finland, Croatia, Slovenia, Venezuela, Hong-Kong, Taiwan Jordan, Israel. Years: 2002 to 2005.

Table 2: Perceptions and Extreme Events

Probit Specification – With Country Dummies (2002 – 2005)

	Fear of Failure				Expected Business Opportunities				Expected Level of Competition			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Natural Disasters	-0.835e-4 (0.523e-4)	-0.128e-3*** (0.373e-4)			-0.105e-3* (0.621e-4)	-0.215e-3*** (0.801e-4)			0.916e-4 (0.246e-3)	0.301e-3 (0.426e-3)		
Terrorist Attacks	0.161e-3 (0.284e-3)		0.177e-3 (0.280e-3)		0.439e-3* (0.242e-3)		0.459e-3** (0.224e-3)		-0.798e-3 (0.540e-3)		-0.814e-3 (0.556e-3)	
Age	-0.346e-3 (0.434e-3)	-0.299e-3 (0.422e-3)	-0.346e-3 (0.434e-3)	-0.305e-3 (0.419e-3)	-0.001** (0.580e-3)	-0.001** (0.550e-3)	-0.001** (0.001)	-0.001** (0.545e-3)	0.824e-3 (.0004408)	0.829e-4 (0.417e-3)	0.827e-4 (0.441e-3)	0.241e-4 (0.420e-3)
Male	-0.035*** (0.006)	-0.039*** (0.006)	-0.035*** (0.006)	-0.040*** (0.006)	0.023** (0.011)	0.020* (0.010)	0.023** (0.011)	0.021** (0.010)	-0.008 (0.012)	-0.008 (0.012)	-0.008 (0.012)	-0.007 (0.011)
Secondary Degree	-0.035*** (0.012)	-0.035*** (0.011)	-0.035*** (0.012)	-0.034*** (0.011)	-0.007 (0.012)	-0.010 (0.013)	-0.007 (0.012)	-0.012 (0.013)	-0.020 (0.017)	-0.015 (0.016)	-0.020 (0.017)	-0.014 (0.016)
Post-Secondary Degree	-0.031** (0.013)	-0.032** (0.012)	-0.031** (0.013)	-0.031** (0.012)	-0.006 (0.014)	-0.010 (0.014)	-0.006 (0.014)	-0.007 (0.014)	-0.072*** (0.017)	-0.065*** (0.016)	-0.072*** (0.017)	-0.064*** (0.016)
Graduate Experience	-0.025* (0.014)	-0.025* (0.014)	-0.025* (0.014)	-0.023* (0.014)	0.002 (0.012)	0.465e-3 (0.013)	0.002 (0.012)	0.784e-3 (0.013)	-0.072*** (0.016)	-0.063*** (0.019)	-0.072*** (0.016)	-0.061*** (0.019)
Middle Income	-0.011 (0.009)	-0.011 (0.009)	-0.011 (0.009)	-0.012 (0.010)	0.014 (0.012)	0.013 (0.011)	0.014 (0.012)	0.011 (0.011)	-0.811e-3 (0.015)	-0.003 (0.014)	-0.817e-3 (0.015)	-0.003 (0.014)
High Income	-0.034*** (0.011)	-0.034*** (0.011)	-.034*** (.012)	-0.035*** (0.011)	0.028** (0.012)	0.025** (0.011)	0.028** (0.012)	0.026** (0.011)	0.706e-3 (0.016)	0.642e-3 (0.015)	0.702e-3 (0.016)	0.442e-3 (0.015)
Number of Observations	12960	13880	12960	14073	12960	13880	12960	14073	12960	13880	12960	14073
Number of Countries	40	43	40	45	40	43	40	45	40	43	40	45
Pseudo R2	0.0282	0.028	0.028	0.028	0.039	0.037	0.039	0.038	0.0508	0.047	0.051	0.049
Log Pseudo-Likelihood	-6424.2336	-6897.461	-6424.267	-7006.550	-8339.210	-8920.595	-8339.242	-9035.198	-8518.1326	-9158.173	-8518.152	-9269.811

Note: Significant at 1% (***), at 5% (**) and at 10% (*). Standard errors in parentheses adjusted for clustering by country.

Table 3: Entrepreneurship, Perceptions, and Extreme Events

Dependent Variable ***Tea***					
Natural Disasters	-	-	-	-0.001***	-0.643e-3***
	-	-	-	(0.268e-3)	(0.178e-3)
Terrorist Attacks	-	-	0.001***	-	0.001**
	-	-	(0.445e-3)	-	(0.519e-3)
Fear of Failure	-	-0.006	-0.012*	-0.008	-0.012*
	-	(0.007)	(0.007)	(0.007)	(0.007)
Expected Business Opportunities	-	0.051***	0.053***	0.050***	0.053***
	-	(0.010)	(0.011)	(0.011)	(0.011)
Expected Level of Competition	-	-0.059***	-0.061***	-0.058***	-0.061***
	-	(0.020)	(0.022)	(0.021)	(0.022)
Age	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	(0.340e-3)	(0.346e-3)	(0.372e-3)	(0.350e-3)	(0.373e-3)
Male	0.002	0.746e-3	0.995e-3	-0.966e-4	0.659e-3
	(0.007)	(0.007)	(0.008)	(0.007)	(0.008)
Secondary Degree	0.008	0.007	0.012	0.012	0.013
	(0.014)	(0.013)	(0.014)	(0.013)	(0.014)
Post Secondary Degree	0.018	0.014	0.016	0.015	0.017
	(0.017)	(0.016)	(0.016)	(0.016)	(0.016)
Graduate Experience	0.086***	0.082***	0.083***	0.084***	0.084***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Middle Income	-0.007	-0.008	-0.008	-0.007	-0.008
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
High Income	-0.035***	-0.036***	-0.037***	-0.036***	-0.037***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
# obs.	14073	14073	12960	13880	12960
# countries	45	45	40	43	40
RMSE	0.356	0.354	0.360	0.354	0.359

Note: Significant at 1% (***), at 5% (**) and at 10% (*). Standard errors in parentheses adjusted for clustering by country.

Table 4: Entrepreneurship and Extreme Events

Dependent Variable	*Whol Sample*	*Males*	*Females*	*No Education*	*Secondary Education*	*Post-Secondary Education*	*Graduate Education*	*Low Income*	*Middle Income*	*High Income*	*Young*	*Middle age*	*Old*
TEA	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*
Natural Disasters	**-0.643e-3*** (0.178e-3)**	**-.929e-3*** (0.177e-3)**	-0.270e-3 (0.179e-3)	**-0.670e-3*** (0.200e-3)**	0.142e-3 (0.208e-3)	**-0.003*** (0.534e-3)**	**-0.001*** (0.124e-3)**	-0.116e-3 (0.189e-3)	**-0.002*** (0.233e-3)**	-0.328e-3 (0.303e-3)	**-0.754e-3*** (0.173e-3)**	**-0.866e-3*** (0.190e-3)**	**0.002*** (0.632e-3)**
Terrorist Attacks	**0.001** (0.519e-3)**	**0.001* (0.599e-3)**	**0.002*** (0.369e-3)**	**0.001 *** (0.206e-3)**	**0.002** (0.780e-3)**	**0.003*** (0.659e-3)**	0.789e-3 (0.501e-3)	**0.001*** (0.418e-3)**	**0.001** (0.532e-3)**	**0.002*** (0.603e-3)**	0.001 (0.674e-3)	**0.001*** (0.440e-3)**	**0.002*** (0.575e-3)**
Fear	**-0.012* (0.007)**	-0.009 (0.011)	-0.018 (0.012)	-0.006 (0.013)	-0.008 (0.011)	-0.020 (0.020)	-0.010 (0.018)	-0.022 (0.020)	-0.016 (0.013)	0.001 (0.011)	-0.019 (0.012)	-0.361e-3 (0.010)	-0.010 (0.028)
Businessop	**0.053*** (0.011)**	**0.046*** (0.012)**	**0.067*** (0.012)**	**0.056*** (0.017)**	**0.075*** (0.016)**	**0.048*** (0.016)**	**0.020 (0.013)**	**0.060*** (0.017)**	**0.045*** (0.011)**	**0.056*** (0.019)**	**0.032** (0.014)**	**0.073*** (0.017)**	**0.065*** (0.018)**
Ecompet	**-0.061*** (0.022)**	**-0.055** (0.023)**	**-0.073*** (0.024)**	**-0.072* (0.037)**	**-0.072*** (0.022)**	**-0.042*** (0.012)**	**-0.048 (0.038)**	**-0.082*** (0.026)**	**-0.041* (0.021)**	**-0.067** (0.026)**	**-0.053** (0.023)**	**-0.068*** (0.024)**	**-0.063* (0.034)**
# obs.	12960	8335	4625	3369	3769	3575	2247	3558	4485	4917	5739	6022	1199
# countries	40	40	40	39	40	38	38	40	40	40	40	40	39
RMSE	0.359	0.363	0.353	0.363	0.372	0.374	0.292	0.348	0.353	0.373	0.340	0.372	0.384

Note: Significant at 1% (***), at 5% (**) and at 10% (*). Standard errors in parentheses adjusted for clustering by country. Please note that all individual controls as in Table 3 have been included in the specifications, though results have not been reported for reasons of parsimony.

Figure 1: Entrepreneurship, Perceptions, and Extreme Events