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Explaining International Differences in Entrepreneurship
The Role of Individual Characteristics and Regulatory Constraints

Silvia Ardagna and Annamaria Lusardi

1.1 Introduction

The regulatory and legal environment is commonly held to be an important factor in determining a country's economic performance. Tight regulation of product and labor markets is one of the most frequently cited reasons for slower growth and higher unemployment in continental Europe than in the United States. Deregulation has been highly recommended to countries like Italy, France, and Germany, as well as to developing nations to improve their economies.

One way in which the regulatory and legal environment can impact growth and employment is its effect on the rate at which new businesses are created. In fact, as suggested by the Schumpeterian approach to economic growth (Aghion and Howitt 1997), new entrepreneurial activities play a vital part in the process of creative destruction that fosters innovation, employment, and growth. While a burgeoning empirical literature has studied the influence of regulation of product and labor markets on gross domestic product (GDP) growth, total factor productivity (TFP), investment, and employ-

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ment using macrodata,[1] little is known about how a country's regulatory and legal environment affect individuals' decisions to engage in new entrepreneurial activity.

In our chapter, we tackle this question using microdata. We study the effect of regulation on entrepreneurship in a broad sample of countries using a novel data set: the Global Entrepreneurship Monitor (GEM). There are several advantages in using data from the GEM. First, we can rely on cross-national harmonized data on entrepreneurship for about 150,000 individuals in thirty-seven developed and developing nations. This is the only data set that allows researchers to compare the level of business creation and its determinants at the micro level across many countries. Second, we can identify two different types of entrepreneurs: those who enter entrepreneurship to pursue a business opportunity and those whose entrepreneurial activity is simply remedial—that is, they could not find a better alternative. This distinction is important in that it allows us to perform an economic analysis of entrepreneurship that has not been possible in previous work. Third, we have information on a wide-ranging set of individual characteristics, including business skills, fear of failure, and social networks. Thus, we can account for a good set of determinants of entrepreneurship across countries. To be able to examine the impact of regulation on entrepreneurial activity, we merge data from the GEM with data on measures of regulation in the product markets, the labor markets, and the legal system.

There are relatively few studies that investigate the factors affecting individual decisions to engage in new entrepreneurial activity in a broad sample of countries; most of the literature uses microdata from one particular country, the United States in the majority of the cases. Also, with the exception of Djankov et al. (2005, 2006a, 2006b, 2008), who investigate the role of a broad set of macro- and microvariables on entrepreneurship in Russia, China, and Brazil, empirical research has focused on a limited number of individual characteristics.[2] Moreover, while the literature has focused on tax policy and liquidity constraints (see, for example, the work by Djankov et al. [2009], Gentry and Hubbard [2000], Evans and Jovanovic [1989], Guiso, Sapienza, and Zingales [2004], and Hurst and Lusardi [2004, 2008]),[3] our chapter looks at other types of regulation, such as the regulation of product and labor markets and contract enforcement. In this respect, our chapter relates to the work of Ciccone and Papaioannou (2006), Desai, Gompers,

1. A nonexhaustive list of papers includes Alesina et al. (2005), Bassanini and Ernst (2002), Bayoumi, Laxton, and Pesenti (2004), Blanchard and Wolfers (2000), Bertrand and Kramarz (2002), Fiori et al. (2007), Loayza, Oviedo, and Serven (2004), and Nicoletti and Scarpetta (2003).

2. See, for example, the papers by Blanchflower (2000, 2004); Blanchflower, Oswald, and Stutzer (2001); and Blanchflower and Oswald (1998); and the review in Hurst and Lusardi (2004, 2008).

3. See also Alfaro and Charlton (2007) for the effects of international financial integration on entrepreneurship.

and Lerner (2003), Klapper, Laeven, and Raja (2006), and Guiso and Schivardi (2006), who investigate the role of regulation in product markets on industries' entry rates and on several other firm characteristics using firm-level data from developed and transitional countries.

Views about regulation vary widely in economic theory. According to public choice theory, regulation is socially inefficient and exists either because industry incumbents are able to lobby government officials to pass laws that grant them rents or because politicians use regulation to extract rents for their own benefit. Hence, regulation is a burden for new and existing firms. The public interest theory of regulation proposes an opposing view: regulation exists to cure market failures; hence, heavier regulation should lead to socially superior outcomes.[4] More generally, regulation can foster or hinder entrepreneurial activity, depending on the dimension of regulation one considers. In our empirical work, we consider three broad areas of regulation: regulation of entry, regulation of contract enforcement, and regulation of labor. For each area, we can envision channels through which regulation affects entrepreneurship in potentially opposite directions. For example, as Ciccone and Papaioannou (2006) show, entry regulation can delay the introduction of new product varieties in industries that experience expansionary global demand or technology shocks. Hence, the rate at which firms enter these particular industries is lower in countries that regulate entry more extensively. Second, credit constraints can bind a larger fraction of would-be entrepreneurs in countries where it is more expensive to comply with entry regulation. As a result, individuals who would like to start a new business are prevented from doing so by credit constraints. This is more likely to occur in less financially developed countries.[5] Finally, as Klapper, Laeven, and Rajan (2006) discuss, entry regulation that protects investors enhances access to credit for would-be entrepreneurs. In this case, entry regulation increases entry rates and facilitates entrepreneurship. Similarly, both contract enforcement regulation, which affects the efficiency and the functioning of the legal system, and the regulation of labor markets can have opposite effects on the individual decision to start a new business (see, for example, Djankov et al. [2003], Desai, Gompers, and Lerner [2003], and La Porta et al. [1998, 2000]). Thus, whether regulation has a beneficial or detrimental effect on entrepreneurship is ultimately an empirical question; the specific goal of our empirical work is to understand whether entrepreneurship flourishes in more or in less regulated environments.

Consistent with the public choice model, we find that regulation acts

4. See Djankov et al. (2002) for an extensive review of the theory of regulation.

5. See Banerjee and Newman (1994) and Desai, Gompers, and Lerner (2003) for the relation between entry costs, financial constraints, and entrepreneurship. See also the work by Blanchflower and Oswald (1998); Evans and Jovanovic (1989); Guiso, Sapienza, and Zingales (2004); and Hurst and Lusardi (2004, 2008) for an overview of the importance and empirical relevance of liquidity constraints.

as a detriment to entrepreneurship, particularly for those individuals who become entrepreneurs to pursue a business opportunity. In our empirical analysis, we estimate the effect of regulation via its impact on individual characteristics. Regulation has the greatest impact on the effects of social networks, business skills, attitudes toward risk, and working status. Specifically, regulation attenuates the effect of social networks, business skills, and working status on entrepreneurship, while it strengthens the impact of attitudes toward risk. We find also that several individual characteristics—gender, age, and education—are important determinants of entrepreneurship, though their effects differ across types of entrepreneurship. For example, the estimates of education are positive and statistically significant for individuals who become entrepreneurs to pursue a business opportunity, while they are negative and statistically significant for those whose entrepreneurial activity is simply remedial. This finding further highlights the importance of being able to distinguish between types of entrepreneurs. Finally, we provide ample evidence that our findings are robust to a variety of extensions and robustness checks. In particular, our results are virtually unchanged when we instrument countries' regulatory indicators with countries' legal origins to account for the potential endogeneity of regulation.

The GEM data can provide very useful information to policymakers. In particular, the data can speak to the determinants of entrepreneurship across countries. Most importantly, the data show there are different types of entrepreneurs, and these differences should be taken into account when evaluating the effects of policies toward entrepreneurship.

This chapter is organized as follows. Section 1.2 describes our data and presents some descriptive statistics. Section 1.3 discusses the empirical methodology and our results, and the last section concludes.

1.2 Data

This section describes the data we employ in the empirical analysis. We begin by discussing the microsurvey data. In section 1.2.2, we illustrate the institutional and regulatory data, and in section 1.2.3, we show descriptive statistics on the relationship among entrepreneurship, personal characteristics (such as age, sex, and education), and countries' regulatory environments. We then perform an econometric analysis of the effect of regulation on different measures of entrepreneurship and several robustness checks.

1.2.1 GEM Microsurvey Data

We use microsurvey data collected by the Global Entrepreneurship Monitor, a research program started in 1998 that annually collects cross-national harmonized data on entrepreneurship. Each year, the project surveys (a) either by phone or face-to-face interviews a sample of at least 2,000 randomly selected individuals in each country (the Adult Population Survey) and (b)

an average of thirty-five national experts in each country, using face-to-face interviews and self-administered questionnaires (Expert Questionnaire Data). A coordination team at the London Business School supervises the contracts to survey vendors, receives the data, checks all data files for inconsistencies, harmonizes the entire data set, and generates new variables.[6]

In this chapter, we use data from the Adult Population Survey of 2001 and 2002. These are the most recent surveys available to researchers who are not directly involved in the GEM project and include information both on individuals' decisions to engage in entrepreneurial activity and on individuals' motivations to start a new business. One advantage of using these data is also that the definitions of variables and the methodology used in collecting the data are consistent between the two years. Countries included in our sample are Argentina, Australia, Belgium, Brazil, Canada, Chile, China, Croatia, Denmark, Finland, France, Germany, Hong Kong, Hungary, India, Ireland, Israel, Italy, Japan, Korea, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Russia, Singapore, Slovenia, South Africa, Spain, Sweden, Switzerland, Taiwan, Thailand, the United Kingdom, and the United States.[7] We restrict our analysis to individuals of eighteen to sixty-four years of age, and the total number of observations in our sample is 152,612.[8]

Measures of Entrepreneurial Activity and Individual Characteristics Data

Our variable of interest is total entrepreneurial activity (*TEA*), which can be further split into total opportunity entrepreneurial activity (*TEAOPP*) and total remedial entrepreneurial activity (*TEANEC*). The indicator variable *TEA* is equal to 1 if individuals are starting a new business or are owners and managers of a young firm; it is equal to zero otherwise. The indicator variable *TEAOPP* is equal to 1 if individuals are starting a new business or are owners and managers of a young firm to take advantage of a business opportunity; it is equal to zero otherwise (opportunity entrepreneurs hereafter). The indicator variable *TEANEC* is equal to 1 if individuals are starting a new business or are owners and managers of a young firm because they could find no better economic work; it is equal to zero otherwise (remedial or necessity entrepreneurs hereafter).[9]

Individuals starting a new business are individuals who (a) alone or with

6. See Reynolds et al. (2005) for more information on the GEM project and the data collection process.

7. Adult Population Surveys have been conducted also in Iceland in 2001 and 2002. We exclude Iceland from our sample, because regulatory variables for most of the indices we use are not available for this country. Including Iceland in the regressions in which we exclude the regulatory variables does not change the main results.

8. In our empirical work, we always use weights. However, the difference between weighted and unweighted statistics and weighted and unweighted empirical estimates is rather small. Results using the unweighted data are available upon request.

9. We will use the terms remedial entrepreneurs and necessity entrepreneurs interchangeably.

others are currently trying to start a new business, including any type of self-employment; or (b) alone or with others are trying to start a new business or a new venture together with their employer as an effort that is part of their normal work; and who (a) have been active in the past twelve months in trying to start the new business, (b) expect to own part of it, and (c) have not paid salaries and wages to anyone, including the owner/managers, for more than three months. Individuals who are owners and managers of a young firm are individuals who alone or with others are the owners of a company they help manage, provided that the company has been paying salaries and wages for no more than forty-two months.[10] Thus, our focus is on firms at the initial planning or inception stage. Our data represent the potential supply of entrepreneurs rather than the actual rate of entrepreneurship.[11] This is a specific definition of an entrepreneur that differs from what other papers have used so far (see, for example, Blanchflower [2004], Evans and Jovanovic [1989], Hurst and Lusardi [2004], and Gentry and Hubbard [2000]), but as explained next, it is appropriate, given the focus of this chapter.

These data present several advantages. First, we can concentrate on the start-up phase and on the first few years of a new business rather than on well-established firms that have been active for many years and for which, for example, the regulatory environment can have different effects. Second, we can distinguish between different types of entrepreneurs; that is, those individuals involved in entrepreneurship to take advantage of a business opportunity as opposed to those individuals for whom entrepreneurship is a remedial activity. This distinction is not available in many previous studies on entrepreneurship, but it can be particularly useful in studying the impact of individual characteristics and countries' institutional and regulatory differences on the creation of new businesses. Moreover, it is useful in studying the effects of policies toward entrepreneurship.

Table 1.1 reports the number of observations for each country in the sample (column [1]); the mean and standard deviation of the variables *TEA*, *TEAOPP*, and *TEANEC* (columns [2] to [7]); and the ratio of the variables *TEANEC*/*TEAOPP* (column[8]) for all countries in our sample and for different groups of countries. We group countries by income groups and by geographic regions using the World Bank classification and by legal origins following the classification in Djankov et al. (2003). We also compute statistics for countries belonging to the European Union (EU).[12] On average, in the

10. Appendix B reports the survey questions that the GEM coordination team used to generate the variables *TEA*, *TEAOPP*, and *TEANEC*. The exact methodology is based on procedures previously used in the US Panel Study of Entrepreneurial Dynamics, and it is described in detail in the 2001 and 2002 Adult Population Surveys data documentation and in Reynolds et al. (2005).

11. One reason to consider the nascent and the early-stage entrepreneurs together is that the size of these two groups can be quite small, particularly among European countries.

12. The World Bank classifies economies in income groups using the gross national income per capita, calculated with the World Bank Atlas method. The most recent classification uses

entire sample, the percentage of individuals participating in entrepreneurial activity is 7.6 percent. Among them, about 36 percent start a new business or are managers/owners of a young firm because other employment options are not available or not appealing, while the rest participate in entrepreneurial activities to exploit a perceived business opportunity. The average entrepreneurship rate is much higher in low- and middle-low-income countries than in high-income countries, with rates of about 14 percent and 6.7 percent, respectively. However, the type of entrepreneurial activities undertaken in these countries is rather different: in poor countries, more than two-thirds of individuals engage in remedial entrepreneurial activities, while this type of entrepreneurship drops to 21.9 percent in high-income countries (see also figure 1.1). Total entrepreneurial activity is highest in Latin America (14.10 percent), followed by countries in the East Asia and Pacific region (9.4 percent), while countries belonging to the European Union have the lowest rate of entrepreneurial activity (5.68 percent). However, as shown in figure 1.1, the ratio of remedial to opportunity entrepreneurial activity is much higher in Latin America than in the Organization for Economic Cooperation and Development (OECD) and EU countries.

Entrepreneurial activity also varies with a nation's legal origin. While in countries with English (common law) legal origin and in countries with French (civil law) legal origin, the percentage of individuals engaging in any type of entrepreneurial activity is almost identical (8.24 percent and 8.36 percent, respectively), individual motivation to start a new business or to be the manager/owner of a young firm varies. On average, 6.04 percent of people become entrepreneurs to take advantage of a business opportunity in countries with English legal origin, while 5.27 percent do so in countries with French legal origin, and the respective ratio of *TEANEC*/*TEAOPP* goes from 28.8 percent to 50.3 percent.

Table 1.2 reports the mean and standard deviation of the regressors we use in the empirical analysis in all countries in the sample (column [1]), in low-income (column [2]), middle-low-income (column [3]), upper-middle-income (column [4]), and high-income countries (column [5]). We use a variety of demographic variables that are also used in many other studies: age, gender, education, working status, and income. Moreover, we use other less used but potentially important variables to explain entrepreneurship: self-assessed business skills, attitudes toward risk, and social networks.[13] We measure self-assessed business skills (*skills*) with a dummy variable equal

data for 2005 (available at: www.worldbank.org/data/countryclass/classgroups.htm). The groups are as follows: low income, $875 or less; lower-middle income, $876 to $3,465; upper-middle income, $3,466 to $10,725; and high income, $10,726 or more. Low- and middle-income economies are also classified by geographical regions. We augmented this classification by including in the various groups the high-income countries. See appendix A for the exact classification of countries in each group.

13. Other papers that have used these types of variables include De Mel, McKenzie, and Woodruff (chapter 2 in this volume) and Djankov et al. (2008).

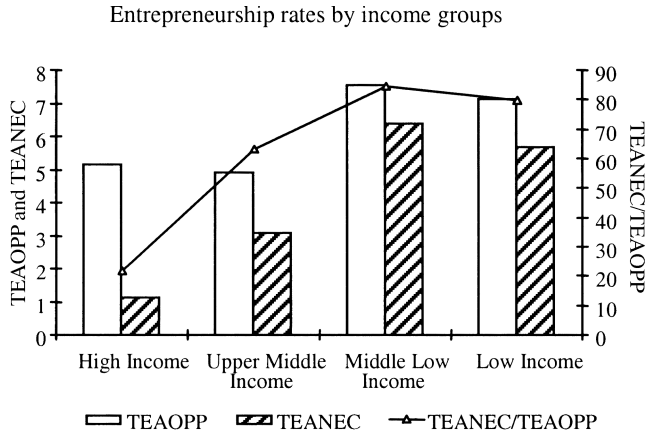
Table 1.1 **Entrepreneurship rates**

	Number of observations	TEA		TEAOPP		TEANEC		TEANEC/ TEAOPP
	(1)	Mean (2)	Standard deviation (3)	Mean (4)	Standard deviation (5)	Mean (6)	Standard deviation (7)	(8)
Argentina	3,438	11.86	32.38	6.03	23.81	5.62	23.03	93.20
Australia	2,785	9.17	28.87	7.23	25.90	1.43	11.88	19.78
Belgium	4,706	3.41	18.16	2.68	16.16	0.45	6.69	16.79
Brazil	3,930	13.68	34.37	7.10	25.68	6.52	24.69	91.83
Canada	4,123	9.39	29.18	7.24	25.91	1.79	13.27	24.72
Chile	1,975	16.01	36.68	9.03	28.67	6.54	24.74	72.43
China	2,054	12.44	33.02	5.17	22.14	7.50	26.34	145.07
Croatia	1,603	3.47	18.30	2.07	14.24	0.8	8.79	38.65
Denmark	3,521	6.82	25.22	5.94	23.63	0.4	6.37	6.73
Finland	2,896	6.59	24.81	5.56	22.92	0.4	7.0	7.19
France	3,122	4.47	20.66	2.91	16.81	0.57	7.55	19.59
Germany	16,570	5.37	22.53	3.90	19.37	1.30	11.32	33.33
Hong Kong	1,638	3.41	18.17	2.26	14.86	1.16	10.71	51.33
Hungary	4,000	8.74	28.25	5.74	23.27	2.64	16.03	45.99
India	4,961	13.11	33.76	7.11	25.70	5.67	23.12	79.75
Ireland	3,194	10.18	30.14	8.11	27.30	1.65	12.76	20.35
Israel	3,399	6.14	24.01	3.47	18.29	0.94	9.55	27.09
Italy	3,486	7.40	26.18	5.11	22.01	1.20	10.91	23.48
Japan	3,659	2.43	15.41	1.31	11.38	0.85	9.17	64.89
Korea	3,669	14.31	35.02	8.09	27.27	4.74	21.26	58.59
Mexico	2,789	16.07	36.73	9.93	29.99	5.29	22.39	53.27
The Netherlands	4,317	5.06	21.92	4.36	20.42	0.43	6.56	9.86
New Zealand	2,967	14.69	35.42	12.13	32.66	2.39	15.28	19.70
Norway	4,009	7.85	26.90	6.66	24.94	0.26	5.07	3.90
Poland	3,395	6.19	24.10	3.28	17.86	2.62	15.99	79.88
Portugal	2,000	6.61	24.86	5.15	22.11	1.31	11.36	25.44

Russia	1,795	2.54	15.71	1.90	13.67	0.5	7.44	26.32
Singapore	3,872	6.02	23.78	4.85	21.50	1.01	9.99	20.82
Slovenia	1,692	4.43	20.58	3.14	17.44	1.29	11.27	41.08
South Africa	10,442	6.40	24.48	3.62	18.68	2.18	14.59	60.22
Spain	3,476	5.23	22.23	3.75	19.01	1.27	11.18	33.87
Sweden	3,552	4.84	21.46	4.00	19.60	0.67	8.13	16.75
Switzerland	1,739	7.11	25.71	6.07	23.89	0.82	9.02	13.51
Taiwan	1,977	4.22	20.11	3.27	17.80	0.72	8.44	22.02
Thailand	985	18.18	38.59	14.53	35.26	3.44	18.23	23.68
United Kingdom	16,923	5.57	22.94	4.28	20.25	0.80	8.89	18.69
United States	7,953	10.73	30.95	9.34	29.10	1.18	10.81	12.63
All	152,612	7.61	26.52	5.3	22.40	1.89	13.61	35.66
Low income	4,961	13.11	33.76	7.11	25.70	5.67	23.12	79.75
Middle-low income	6,969	13.94	34.64	7.56	26.44	6.38	24.44	84.39
Upper-middle income	29,437	8.48	27.86	4.92	21.64	3.10	17.32	63.01
High income	111,245	6.74	25.08	5.17	22.16	1.13	10.56	21.86
OECD	94,998	6.65	24.92	5.26	22.33	1.00	9.98	19.01
EU	67,763	5.68	23.15	4.37	20.45	0.9	9.52	20.59
ECA	12,485	5.92	23.61	3.72	18.92	1.92	13.74	51.61
EAP	14,195	9.39	29.17	5.89	23.54	3.07	17.24	52.12
Latin America	12,132	14.10	34.80	7.77	26.78	5.99	23.74	77.09
English	63,242	8.24	27.51	6.04	23.83	1.74	13.07	28.81
Socialist	14,539	6.86	25.28	3.93	19.42	2.72	16.28	69.21
French	33,239	8.36	27.67	5.27	22.34	2.65	16.07	50.28
German	27,614	6.20	24.11	4.21	20.08	1.63	12.67	38.72
Scandinavian	13,978	6.56	24.76	5.57	22.93	0.45	6.69	8.08

Notes: TEA = 1 if individuals are starting a new business or are owners and managers of a young firm, zero otherwise; TEAOPP = 1 if individuals are starting a new business or are owners and managers of a young firm to take advantage of a business opportunity, zero otherwise; TEANEC = 1 if individuals are starting a new business or are owners and managers of a young firm because they could find no better economic work, zero otherwise. See appendix A for the exact classification of countries in each group.

A



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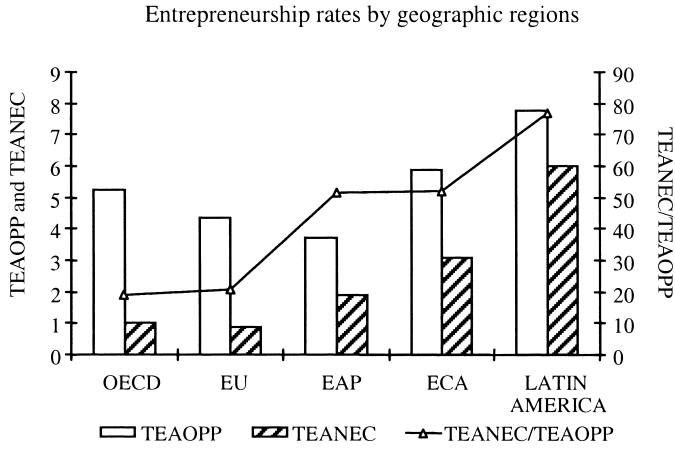

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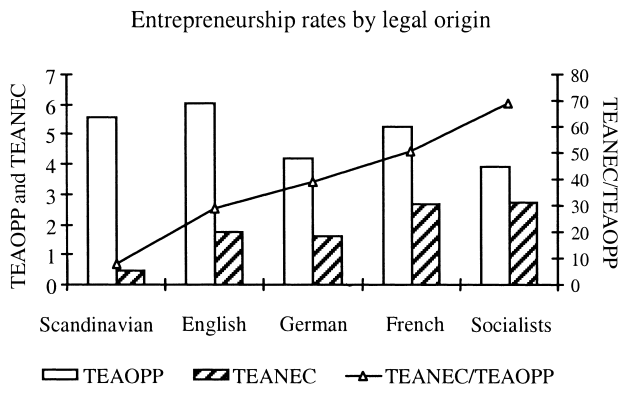

Fig. 1.1 Entrepreneurship across the world

Note: See appendix A.

Table 1.2 **Individual characteristics**

	All (1)	Low income (2)	Middle-low income (3)	Upper-middle income (4)	High income (5)
Age	39.35	38.56	36.32	37.36	40.09
	(12.87)	(10.93)	(12.29)	(13.14)	(12.84)
Percent					
Male	49.35	53.20	52.12	48.22	49.30
	(50.00)	(49.90)	(49.96)	(49.97)	(50.00)
Working	66.31	58.72	68.76	51.82	69.79
	(47.27)	(49.25)	(46.35)	(49.97)	(45.92)
Students	4.77	3.35	3.64	7.48	4.21
	(21.32)	(17.99)	(18.73)	(26.30)	(20.08)
Retired and disabled	6.60	0.67	9.66	9.50	5.87
	(24.82)	(8.15)	(29.54)	(29.32)	(23.50)
Not working	22.33	37.26	17.94	31.20	20.14
	(41.64)	(48.36)	(38.37)	(46.33)	(40.10)
High school	38.30	15.47	11.41	39.77	40.30
	(48.61)	(36.16)	(31.80)	(48.94)	(49.05)
College	30.32	11.75	11.36	19.00	34.52
	(45.97)	(32.21)	(31.74)	(39.23)	(47.54)
Low income	27.90	58.69	55.61	30.14	25.33
	(44.85)	(49.25)	(49.69)	(45.89)	(43.49)
Middle income	40.15	33.37	30.52	38.83	41.12
	(49.02)	(47.16)	(46.06)	(48.74)	(49.20)
Upper income	31.94	7.94	13.86	31.03	33.56
	(46.63)	(27.04)	(34.56)	(46.26)	(47.22)
Knows entrepreneur	34.70	18.53	44.40	32.13	35.46
	(47.60)	(38.85)	(49.69)	(46.70)	(47.84)
Has skills	40.57	40.39	46.88	40.49	40.20
	(49.10)	(49.07)	(49.91)	(49.09)	(49.03)
Fear of failure	33.74	26.63	37.11	29.92	34.78
	(47.28)	(44.20)	(48.31)	(45.79)	(47.63)
Number of observations	152,612	4,961	6,969	29,437	111,245

Notes: Standard deviation in parentheses. Age = age of the individual at the time of the interview; Working = individuals who work at the time of the interview; Students = individuals who are students at the time of the interview; Retired and disabled = individuals who are retired or disabled at the time of the interview; Not working = individuals who do not work and are not students, retired, or disabled at the time of the interview; High school = individuals with a high school degree; College = individuals with at least a college degree; Low income = individuals with income in the lowest thirty-third income percentile of their country's income distribution; Middle income = individuals with income in the middle thirty-third income percentile of their country's income distribution; Upper income = individuals with income in the upper thirty-third income percentile of their country's income distribution; Knows entrepreneur = individuals who know someone who has started a business in the recent past; Has skills = individuals who think they have the knowledge, skills, and experience to start a new business; Fear of failure = individuals who answer that fear of failing can prevent them from starting a new business. See also appendix A.

to 1 if an individual answers that he or she has the knowledge, skill, and experience to start a new business; the variable is equal to zero otherwise. Fear of failure, a proxy for individual attitudes toward risk, is measured by the dummy variable *fear fail,* which is equal to 1 for individuals who answer that fear of failing prevents them from starting a new business; the variable is equal to zero otherwise. Finally, we measure social networks with the dummy variable *knowent,* which is equal to 1 if an individual knows someone who has started a business in the past two years; the variable is equal to zero otherwise. Although we are aware that these variables may not be truly exogenous with respect to the choice of starting a new business, they can be critical indicators of the impediments or the stimulators of business creation, and they can help explain the wide heterogeneity we see among business owners. In this chapter, given our focus on regulation, we will not account for the potential endogeneity of these variables. Appendix A includes the precise definition of all the variables. There are substantial differences in these variables among the countries. For example, the proportion of individuals that are not working is substantially higher in low-income countries than in higher-income countries. Similarly, the fraction of individuals with a college degree is much smaller in low-income countries than in other countries. Moreover, both social networks and fear of failure are much lower in low-income countries than in other countries. These statistics already point to potentially different types of entrepreneurship among countries, depending on the income level of each country.

Reliability of GEM Data

The GEM data have not been used extensively by academics yet, and not much is known about these data. Therefore, before describing our empirical work, we provide an overview of the quality of the data. First, we compare the GEM data with data from other surveys, and we review the comparisons of GEM data performed by other researchers (Reynolds et al. 2005; Acs, Desai, and Klapper 2008). Second, throughout the chapter, we show that the descriptive statistics on entrepreneurship in many of the countries covered by the GEM are consistent with the results reported in other studies on entrepreneurship. Third, for both the descriptive statistics and the econometric analysis, we check the robustness of our results across countries and/or groups of countries and across survey years.

One data set that reports information similar to the GEM is the Flash Eurobarometer Survey on Entrepreneurship collected by the European Commission.[14] While not all countries covered in the GEM are available in the Flash Eurobarometer, we can compare data among the countries common to both data sets, given that questions are rather similar between

14. See appendix C for a description of the variables computed using data from the Flash Eurobarometer Surveys.

the two surveys. Table 1.3 shows results for individuals living in countries that are surveyed both in the GEM in 2001 and/or 2002 (column [1]) and in the Flash Eurobarometer Survey in 2002, 2003, and/or 2004 (column [2]).[15] For each variable, we report the mean, its standard error, and the number of observations. The percentage of individuals involved in entrepreneurial activity is very similar in the two data sets (6.37 percent) when we use GEM data and 6.53 percent when we use data from the Flash Eurobarometer Surveys on Entrepreneurship), regardless of the significantly smaller sample surveyed by the European Commission, which is about one-third the size of the GEM sample. The percentage of individuals pursuing a business opportunity is equal to 4.93 percent in column (1) and 4.12 percent in column (2), while the percentage of individuals for whom entrepreneurship is a remedial activity is lower in the GEM data set (1.06 percent in column [1]) than in the Flash Eurobarometer Survey data (1.35 percent in column [2]). Note, however, that the sample size shrinks further in column (2), because information on individual motivation to participate in entrepreneurship is available only in the 2004 data collected by the European Commission.

We can also compare demographic characteristics, such as age, the percentage of males, the percentage of individuals who work, and the percentage of individuals who think that fear of failing could prevent them from starting a new business. Results in table 1.3 are very similar, regardless of the data set used for these variables, both when we look at the entire sample and when we average the characteristics among individuals who participate in entrepreneurial activities and among those who do not. The only exception is the variable measuring the percentage of individuals who think that fear of failing could prevent them from starting a new business. The average value is higher when we use data from the Flash Eurobarometer Surveys (44.99 percent) than when we use GEM data (34.85 percent). However, the difference between the percentage of individuals who think that fear of failing could prevent them from starting a new business and who are not entrepreneurs and those with the same beliefs but who are involved in an entrepreneurial activity is much closer in the two data sets: using GEM data, this difference is equal to 16.05 percent (35.89 – 19.84); using data from the Flash Eurobarometer Surveys, it is equal to 11.2 percent.

Reynolds et al. (2005) compare GEM national annual new firm estimates and new firm birth rates with data from the Official New Firm Census and data from the European Commission Report. They show that the *TEA* index and other entrepreneurship indices computed using GEM data are reliable and capture the creation of new firms on a scale comparable to that resulting from the use of other national administrative data sets.

15. Countries surveyed in both databases are Belgium, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, the United Kingdom, and the United States.

Table 1.3 **Comparisons between GEM data and Flash Eurobarometer data**

	Sample of countries surveyed in GEM also surveyed in Flash Eurobarometer (1)			Sample of countries surveyed in Flash Eurobarometer also surveyed in GEM (2)		
TEA (total entrepreneurial activity)	6.37			6.53		
	(0.08)			(0.16)		
	[88,812]			[24,526]		
TEAOPP (total opportunity entrepreneurial activity)	4.93			4.12		
	(0.07)			(0.19)		
	[88,812]			[11,161]		
TEANEC (total remedial entrepreneurial activity)	1.06			1.35		
	(0.03)			(0.11)		
	[88,812]			[11,161]		
	All	Entrepreneur	Nonentrepreneur	All	Entrepreneur	Nonentrepreneur
Age	40.30	37.91	40.46	40.99	37.86	41.21
	(0.04)	(0.15)	(0.04)	(0.08)	(0.27)	(0.08)
Percent	[88,812]	[5,586]	[83,226]	[24,526]	[1,603]	[22,923]
Percent Male	49.32	65.59	48.20	47.50	62.38	46.46
	(0.17)	(0.64)	(0.17)	(0.32)	(1.21)	(0.33)
	[88,812]	[5,586]	[83,226]	[24,526]	[1,603]	[22,923]
Percent Working	69.60	85.94	68.49	69.07	84.98	67.96
	(0.16)	(0.48)	(0.17)	(0.29)	(0.89)	(0.30)
	[82,465]	[5,140]	[77,325]	[24,385]	[1,598]	[22,787]
Percent Fear of failure	34.85	19.84	35.89	44.99	34.51	45.73
	(0.16)	(0.54)	(0.17)	(0.32)	(1.19)	(0.33)
	[85,721]	[5,477]	[80,244]	[24,020]	[1,579]	[22,441]

Notes: Standard errors of the mean in parentheses. Number of observations in square brackets. See appendix A and appendix C for variables' definitions.

Finally, Acs, Desai, and Klapper (2008) compare the GEM data with the World Bank Group Entrepreneurship Survey (WBGES) data set, which collected data on formal business registrations of limited liability corporations (LLCs) in eighty-four countries from 2003 to 2005. Specifically, Acs, Desai, and Klapper (2008) consider separately the two components of the *TEA* index previously defined (i.e., they distinguish individuals who are starting a new business—nascent entrepreneurs—from individuals who are owners and managers of a young firm—baby entrepreneurs) and calculate the spread between the nascent and baby entrepreneurship rates in the GEM (defined as the proportion of the adult population in each country that engages in nascent or baby entrepreneurship) and the percentage of individuals who have started a formal corporation. The authors report a number of differences in the two data sets: (a) GEM data show higher levels of early-stage entrepreneurship in developing economies than WBGES data; (b) WBGES business-entry data tend to be higher than GEM data for developed countries; and (c) a significantly negative relationship is found between administrative barriers to starting a business and entrepreneurship when WBGES data are used but not when GEM data are used. Several explanations are given for such differences, which in our view are very important in clarifying the differences among the two data sets but in no way suggest that one data set is of better quality than the other. First, Acs, Desai, and Klapper (2008) point out that while the WBGES only considers businesses that legally registered as limited liability corporations, GEM data consider a larger set of entrepreneurial activities, from businesses that operate in the formal sector but opt for a different legal status than an LLC, to businesses that can be part of the informal economy, to entrepreneurial initiatives that are at the very early stage and hence can potentially become businesses operating in the formal sector but do not yet actually do so. Such a range of possibilities is likely to be more relevant for developing than developed countries, given the extent of the informal sector. Second, the GEM measures the number of individual entrepreneurs, while the WBGES considers the number of businesses. Hence, the GEM can overlook the number of individuals who are involved in multiple new businesses. Third, the definition of baby entrepreneurs in the GEM considers data for forty-two months of activity, not for twelve months, but when one estimates the annual rate for the United States, they are of comparable magnitude to those recorded by the US Census. Fourth, especially in developed countries, firms may register several limited liability corporations to limit liability for different lines of businesses, helping to explain why for some countries, entrepreneurship rates computed using the World Bank data are higher than rates computed with GEM data.

We would like to offer an additional explanation. The GEM data allow a distinction between remedial and opportunity entrepreneurship. As we have discussed in the previous section, remedial entrepreneurship is more wide-

spread in developing than in developed countries, and remedial entrepreneurs are less likely to register a business as an LLC. This can offer another reason for higher entrepreneurship rates in developing countries when rates are computed using GEM rather than WBGES data. Finally, relative to the existence of a negative relationship between entry barriers and entrepreneurship rates, the results that follow show that a negative and statistically significant relationship can be found when one uses data from the GEM. However, it is important to consider opportunity and remedial entrepreneurship separately (see section 1.2.3) and/or to estimate the effect of regulation on entrepreneurship using micro- rather than macrodata. This allows researchers to control for other possible institutional and policy differences that exist among various developed and developing countries (see section 1.3).

To further examine the quality of the data, we have estimated the probability of starting a business as a function of a set of demographic characteristics that are available in the data (age, gender, employment status, education, income, etc.) country by country. For the subset of countries for which we have data in both 2001 and 2002, we also performed regressions by country and by year. For brevity, in table 1.4, we report results for only six countries: the United States; two upper-income countries—Canada and Italy; two middle-low-income countries—Brazil and China; and India, the only country in our sample classified in the low-income group. Results for the other countries in our sample are not reported but are available upon request. We have first compared the estimates using GEM data for the United States with estimates from other studies on entrepreneurship (see Hurst and Lusardi [2008]). Estimates are very similar for the United States, particularly regarding demographic variables such as gender and education. Estimates for other countries are similar to results reported by Djankov et al. (2008) for Brazil and by Djankov et al. (2006b) for China, particularly for variables such as social networks and attitudes toward risk. The importance of social networks in Italy is also highlighted in the work by Guiso and Schivardi (2006). Among the countries whose results are not reported, three countries—Russia, Poland, and Slovenia—display results that are different than other countries, but as reported in the robustness check at the end of this chapter, the inclusion or exclusion of these countries does not affect our main estimates. France also displays different estimates between 2001 and 2002, although we cannot exclude the possibility that they are genuine changes due to differences in macroeconomic conditions between the two years.

1.2.2 Regulatory Data

To perform our empirical work, we merge the microsurvey data just described with data on countries' institutional and regulatory environments. We follow the work of Loayza, Oviedo, and Serven (2004) and construct

Table 1.4 **Entrepreneurship and individual characteristics in selected countries**

	United States			Canada			Italy		
	TEA (1)	TEAOPP (2)	TEANEC (3)	TEA (4)	TEAOPP (5)	TEANEC (6)	TEA (7)	TEAOPP (8)	TEANEC (9)
Age	0.0019	0.0016	0.0004	–0.0013	–0.0013	0.0004	–0.0043	–0.0027	0.0022
	(0.99)	(0.89)	(0.61)	(–0.55)	(–0.71)	(0.47)	(–1.64)*	(–1.36)	(2.06)**
Age squared	–0.00003	–0.00003	–0.000006	0.000007	0.000007	–0.000005	0.000038	0.000024	–0.000028
	(–1.48)	(–1.39)	(–0.77)	(0.22)	(0.31)	(–0.50)	(1.18)	(0.98)	(–2.07)**
Male	0.0112	0.0071	0.0019	0.0219	0.0169	0.0012	–0.0086	0.0007	–0.0036
	(1.64)*	(1.14)	(0.84)	(2.51)**	(2.54)**	(0.36)	(–1.00)	(0.11)	(–0.92)
Not working	0.0076	–0.0044	0.0102	0.0072	–0.0220	0.0278	–0.0319	–0.029	0.0024
	(0.73)	(–0.46)	(3.01)***	(0.42)	(–1.75)*	(3.24)***	(–3.38)***	(–4.13)***	(0.56)
Students	–0.0209	–0.0164	–0.0012	–0.0292	–0.0291	0.0121	–0.0536	–0.0328	–0.0004
	(–1.49)	(–1.31)	(–0.23)	(–1.32)	(–2.06)**	(1.09)	(–4.55)***	(–3.70)***	(–0.05)
Retired disabled				–0.0286	–0.0145	–0.0076	–0.0512	–0.0299	
				(–1.93)*	(–1.21)	(–1.56)	(–2.97)***	(–2.38)**	
High school	0.0283	0.0423	–0.0039	–0.0097	–0.0124	0.0037	–0.0092	–0.0016	–0.0114
	(1.98)**	(2.86)***	(–1.36)	(–0.66)	(–1.09)	(0.67)	(–0.78)	(–0.17)	(–2.57)**
College	0.0266	0.0376	–0.0072	0.0039	0.0075	–0.0055	–0.0221	–0.0118	–0.0113
	(2.09)**	(3.03)***	(–2.31)**	(0.29)	(0.72)	(–1.05)	(–1.63)	(–1.09)	(–2.56)**
Knowent	0.0811	0.0703	0.0075	0.0892	0.0683	0.0128	0.0175	0.0105	0.0042
	(10.65)***	(10.06)***	(2.99)***	(8.88)***	(8.35)***	(3.47)***	(2.03)**	(1.63)	(1.10)
Skills	0.1196	0.1045	0.0115	0.0957	0.0746	0.0141	0.0846	0.0575	0.0091
	(14.91)***	(13.63)***	(4.91)***	(9.26)***	(8.59)***	(3.47)***	(8.57)***	(7.38)***	(2.30)**
Fearfail	–0.0064	–0.0100	0.0040	–0.0247	–0.0208	0.0023	–0.0253	–0.0185	–0.0036
	(–0.74)	(–1.24)	(1.55)	(–2.58)**	(–2.84)***	(0.61)	(–2.89)***	(–2.69)***	(–1.04)
Observations	7,673	7,673	7,673	3,840	3,840	3,840	2,815	2,815	2,582

(*continued*)

Table 1.4 (continued)

	Brazil			China			India		
	TEA (1)	TEAOPP (2)	TEANEC (3)	TEA (4)	TEAOPP (5)	TEANEC (6)	TEA (7)	TEAOPP (8)	TEANEC (9)
Age	0.0094	0.0060	0.0031	–0.0094	–0.0058	–0.0015	–0.0045	0.0019	–0.0061
	(2.44)**	(2.19)**	(1.19)	(–1.31)	(–1.32)	(–0.27)	(–0.96)	(1.37)	(–1.49)
Age squared	–0.00011	–0.00007	–0.00004	0.00012	0.00007	0.00003	0.00002	–0.00002	0.00005
	(–2.45)**	(–2.16)**	(–1.19)	(1.35)	(1.37)	(0.37)	(0.39)	(–1.32)	(0.84)
Male	–0.0129	–0.0020	–0.0091	–0.0268	0.0134	–0.0477	0.0106	0.0161	–0.0118
	(–0.70)	(–0.15)	(–0.77)	(–0.90)	(1.15)	(–1.76)*	(0.43)	(1.71)*	(–0.64)
Not working	–0.0888	–0.0470	–0.0358	–0.1001	–0.0296	–0.0763	–0.0557	0.0106	–0.0623
	(–3.87)***	(–2.82)***	(–2.30)**	(–3.90)***	(–1.93)*	(–3.77)***	(–2.08)**	(0.96)	(–3.00)***
Students	–0.0890	–0.0559	–0.0246	–0.0712	–0.0157		–0.0642	0.0080	–0.0501
	(–2.59)***	(–2.40)**	(–0.98)	(–1.39)	(–0.58)		(–2.00)**	(0.37)	(–2.61)***
Retired disabled	–0.0784	–0.0475	–0.0259	–0.1138	–0.0347				
	(–4.27)***	(–3.51)***	(–2.06)**	(–4.67)***	(–2.47)**				
High school	–0.0790	–0.0416	–0.0346	–0.0217	0.0016	–0.0210	0.0982	0.0419	0.0375
	(–1.77)*	(–1.24)	(–1.32)	(–0.71)	(0.13)	(–0.80)	(3.65)***	(3.41)***	(1.87)*
College	0.0122	0.0097	0.0005	–0.0624	0.0035	–0.0730	0.0881	0.0213	0.0610
	(0.36)	(0.40)	(0.02)	(–2.56)**	(0.25)	(–3.94)***	(2.91)***	(2.10)**	(2.36)**
Knowent	0.0734	0.0512	0.0192	0.0808	0.0270	0.0502	0.0108	0.0289	–0.0265
	(4.40)***	(4.26)***	(1.74)*	(2.87)***	(1.97)**	(2.06)**	(0.48)	(3.23)***	(–1.69)*
Skills	0.0911	0.0411	0.0474	0.1105	0.0697	0.0464	0.0973	0.0238	0.0583
	(5.50)***	(3.36)***	(4.31)***	(3.36)***	(4.62)***	(1.60)	(4.53)***	(2.90)***	(3.21)***
Fearfail	–0.0414	–0.0414	0.0025	–0.0085	0.0004	–0.0045	–0.0470	–0.0129	–0.0282
	(–2.57)**	(–3.51)***	(0.24)	(–0.29)	(0.03)	(–0.19)	(–2.58)***	(–2.42)**	(–1.91)*
Observations	1,854	1,854	1,854	1,782	1,782	1,475	1,771	1,771	1,771

Notes: Probit regressions including country fixed effects and a time dummy for 2001. Standard errors are clustered at the country level. Marginal effects (not coefficients) and *t*-statistics are shown in the tables. TEA = 1 if individuals are starting a new business or are owners and managers of a young firm, zero otherwise; TEAOPP = 1 if individuals are starting a new business or are owners and managers of a young firm to take advantage of a business opportunity, zero otherwise; TEANEC = 1 if individuals are starting a new business or are owners and managers of a young firm because they could find no better economic work, zero otherwise. See notes to table 1.2 and appendix A for the exact definition of the variables.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

indices on several aspects of market regulation.[16] In particular, we focus on entry regulatory indicators for the product markets, regulation of contract enforcement (indicators measuring the efficiency of the justice system in resolving legal disputes), and labor market regulation. While these aspects of regulation do not cover all regulatory and economic policies (e.g., taxes, tariff and nontariff barriers, safety and environmental standards) that can influence individual entrepreneurial behavior, they include some of the most important regulatory constraints across countries.

The data we use are from the following sources: the Doing Business Database (the World Bank Group), the Index of Economic Freedom (IEF; the Heritage Foundation), the International Country Risk Guide (ICRG; the Political Risk Services [PRS] Group), and Botero et al. (2004). Data from Doing Business refer to the year 2003, and data from Botero et al. (2004) refer to the year 1997; all other data are averages of all the available data points until the year 2000. Appendix A lists the exact source, time period, and definition of each regulatory variable used in the empirical analysis.

Because our indices of regulation combine several different variables, we standardize each variable available in the databases using the formula $(X_i - X_{\min})/(X_{\max} - X_{\min})$ when higher values of the variable X indicate heavier regulation and the formula $(X_{\max\, i} - X_i)/(X_{\max} - X_{\min})$ when lower values of the variable X indicate heavier regulation. Hence, each standardized regulatory variable is simply an index ranging from zero to 1, increasing with the amount of regulation. For each area of regulation, we construct a synthetic indicator of the tightness of regulation. Each synthetic indicator is the average of the standardized indices measuring regulation of the relevant area. The indices are described next.

Entry: The entry index measures the barriers and costs entrepreneurs face when they decide to create a new business. It is the average of the number of procedures that are officially required to start and operate a new business, the time and cost needed to complete such procedures, and a composite index measuring not only how easy/difficult it is to operate a business but also the degree of corruption in the government and whether regulation is applied uniformly to all businesses.

Contract: The contract enforcement index is an indicator that measures the efficiency of the justice system in resolving commercial disputes. It is the average of the number of procedures required to solve a dispute and of an index measuring the ability of the government to operate without dramatic changes in policy or interruptions of its services.

Labor: The labor index measures the difficulty for entrepreneurs of adjusting the labor force. It is the average of indices measuring the difficulty in hiring

16. We construct our own indices rather than using the ones provided to us by Loayza, Oviedo, and Serven (2004), because regulatory variables for eleven countries included in our sample are not available in Loayza, Oviedo, and Serven (2004).

and firing workers, the rigidity of labor contracts, and the percentage of the workforce affiliated with labor unions.

These indices are those used by Loayza, Oviedo, and Serven, (2004) although for a larger set of countries. Use of these indices allows us to compare our results to previous studies and to capture many different aspects of regulation in the three areas we consider. However, we also perform a set of regressions to examine the effect of each individual component. We report the results in section 1.3.6.

Table 1.5 reports the value of the synthetic indices of regulation for all countries in the total sample and for groups of countries. Several features are worth noting. First, the level of regulation is negatively related to the countries' income: countries in the low- and middle-low-income groups exhibit levels of regulation that are up to three times higher than the level of regulation in high-income countries. The ranking among groups of countries is quite similar for the entry and contract enforcement indices. The index measuring the regulation of labor shows that countries in the East Asia and Pacific region have the lowest level of regulation, while the level of regulation in OECD countries, and particularly in countries belonging to the European Union, is very close to that of Latin America, Eastern Europe, and Central Asia. Second, consistent with the results of several other papers,[17] when we group countries by their legal origin, countries with English legal origin are among those with the lowest levels of regulation, while countries with French and Socialist legal origin are among those with the highest levels of regulation.

Table 1.6 shows the correlation among the regulatory indices. There is a strong positive correlation between the *entry* and *contract* indices, while the correlation of these two indices and the *labor* index is lower. When we further look at the correlation among the components of each synthetic index, in all areas but the labor market, we find a positive correlation that ranges from a minimum of 38 percent to a maximum of 70 percent. However, for the labor market index, we observe a very low correlation between indicators of hiring and firing costs and union density, and in one case, the correlation is negative. Thus, regulation in the labor markets can have different effects than regulation in other markets.

Finally, given that we have a different sample, we computed the correlation of the indices we constructed with the ones of Loayza, Oviedo, and Serven (2004). The correlation is equal to 0.97 for the entry regulatory index, 0.80 for the contract enforcement regulation index, and 0.74 for the labor market regulation index. Hence, even though our sample of countries differs from that of Loayza, Oviedo, and Serven (2004), our indices are very similar.

17. A nonexhaustive list of papers relating countries' legal origins and their regulatory environments includes Djankov et al. (2002, 2003), Botero et al. (2004), and Klapper, Laeven, and Rajan (2006).

Table 1.5 Regulatory indices

	Entry (1)	Contract (2)	Labor (3)
Argentina	0.468	0.581	0.583
Australia	0.176	0.060	0.186
Belgium	0.392	0.155	0.356
Brazil	0.756	0.621	0.412
Canada	0.088	0.036	0.121
Chile	0.298	0.562	0.271
China	0.593	0.592	0.318
Croatia	0.574	0.402	0.631
Denmark	0.123	0.012	0.317
Finland	0.253	0.165	0.565
France	0.287	0.094	0.484
Germany	0.383	0.190	0.507
Hong Kong	0.076	0.249	0.112
Hungary	0.492	0.204	0.440
India	0.795	0.710	0.397
Ireland	0.202	0.060	0.411
Israel	0.212	0.265	0.369
Italy	0.383	0.459	0.510
Japan	0.332	0.079	0.249
Korea	0.450	0.333	0.389
Mexico	0.542	0.629	0.467
The Netherlands	0.294	0.095	0.418
New Zealand	0.101	0.167	0.105
Norway	0.251	0.044	0.570
Poland	0.448	0.528	0.330
Portugal	0.500	0.345	0.633
Russia	0.481	0.702	0.507
Singapore	0.098	0.251	0.053
Slovenia	0.449	0.341	
South Africa	0.304	0.300	0.446
Spain	0.565	0.291	0.578
Sweden	0.210	0.060	0.563
Switzerland	0.304	0.095	0.243
Taiwan	0.289	0.322	0.609
Thailand	0.349	0.354	0.211
United Kingdom	0.167	0.060	0.193
United States	0.141	0.036	0.025
All	0.320	0.231	0.363
Low income	0.795	0.710	0.397
Middle-low income	0.649	0.573	0.356
Upper-middle income	0.416	0.443	0.457
High income	0.262	0.142	0.338
OECD	0.262	0.120	0.344
EU	0.295	0.143	0.409
ECA	0.483	0.455	0.456
EAP	0.298	0.335	0.276
Latin America	0.547	0.601	0.455
English	0.219	0.170	0.226
Socialist	0.495	0.470	0.438
French	0.442	0.346	0.465
German	0.374	0.197	0.454
Scandinavian	0.212	0.069	0.507

Notes: Entry measures the barriers and costs entrepreneurs face when they decide to create a new business; Entry = (procedures + time + cost + regulation (IEF))/4. Contract measures the efficiency of the justice system in resolving commercial disputes; Contract = (procedures + quality of bureaucracy)/2. Labor measures the difficulty for entrepreneurs of adjusting the labor force; Labor = (hiring index + firing index + firing costs + rigidity of labor contracts + union density)/5. See also appendix A.

Table 1.6 Correlation among regulatory indices and the components of the indices

	Regulation			
	Entry	Contract	Labor	
Entry	1			
Contract	0.75	1		
Labor	0.50	0.27	1	
	Entry regulation			
	Procedures	Time	Cost	Regulation (IEF)
Procedures	1			
Time	0.70	1		
Cost	0.46	0.49	1	
Regulation (IEF)	0.38	0.47	0.52	1
	Contract enforcement regulation			
	Procedures		Quality of bureaucracy	
Procedures	1			
Quality of bureaucracy	0.50		1	
	Labor market regulation			
	Hiring index	Firing index	Firing cost	Rigidity labor contracts	Union density
Hiring index	1				
Firing index	0.47	1			
Firing cost	0.28	0.23	1		
Rigidity labor contracts	0.39	0.33	0.18	1	
Union density	0.01	0.11	–0.16	0.38	1

Notes: Entry measures the barriers and costs entrepreneurs face when they decide to create a new business; Entry = (procedures + time + cost + regulation (IEF))/4. Contract measures the efficiency of the justice system in resolving commercial disputes; Contract = (procedures + quality of bureaucracy)/2. Labor measures the difficulty for entrepreneurs of adjusting the labor force; Labor = (hiring index + firing index + firing costs + rigidity of labor contracts + union density)/5. See also appendix A.

1.2.3 Descriptive Statistics

We start the empirical analysis with some descriptive statistics. We first discuss the relationship between entrepreneurship and personal characteristics (table 1.7); we then turn to the relationship between entrepreneurship and countries' regulatory environments.

In table 1.7, columns (1) to (3), we compute average values of the individual characteristics described in table 1.2 separately for individuals who engage in entrepreneurial activity ($TEA = 1$) and for those who do not

Table 1.7 Entrepreneurship and personal characteristics

	TEA = 1 (1)	TEA = 0 (2)	Standard error of difference (3)	TEAOPP = 1 (4)	TEANEC = 1 (5)	Standard error of difference (6)
Age	37.50	39.50	0.12**	37.07	38.24	0.24**
Percent						
Male	64.84	48.08	0.48**	66.37	60.98	1.04**
Working	84.75	64.83	0.49**	86.46	80.24	0.86**
Students	2.12	4.99	0.22**	2.23	1.69	0.34
Retired and disabled	2.01	6.96	0.26**	1.92	2.18	0.32
Not working	11.13	23.22	0.43**	9.39	15.89	0.75**
High school	35.59	38.51	0.50**	35.43	34.75	1.12
College	37.39	29.76	0.48**	42.30	22.79	1.13**
Low income	24.20	28.20	0.54**	19.76	37.33	1.14**
Middle income	35.56	40.52	0.59**	34.79	37.78	1.31**
Upper income	40.24	31.28	0.55**	45.46	24.89	1.31**
Knows entrepreneur	62.67	32.38	0.45**	66.54	53.13	1.04**
Has skills	81.52	37.14	0.46**	84.59	74.22	0.84**
Fear of failure	21.87	34.74	0.46**	19.12	29.60	0.90**

Notes: TEA = 1 if individuals are starting a new business or are owners and managers of a young firm, zero otherwise; TEAOPP = 1 if individuals are starting a new business or are owners and managers of a young firm to take advantage of a business opportunity, zero otherwise; TEANEC = 1 if individuals are starting a new business or are owners and managers of a young firm because they could find no better economic work, zero otherwise. See notes to table 1.2 and appendix A for the exact definition of the variables.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

($TEA = 0$). We also test for the equality of means between entrepreneur types. Even though we only consider individuals in pre-retirement years (ages eighteen to sixty-four), the average age of entrepreneurs is lower by approximately two years than the average age of nonentrepreneurs (i.e., individuals who are not operating a new or young firm), and the difference is statistically significant at the 5 percent level. The percentage of males among entrepreneurs is higher than among nonentrepreneurs, as is the percentage of working individuals (85 percent of nascent entrepreneurs are working at the time of the interview, while only 64.8 percent of nonentrepreneurs are working). As far as individual education is concerned, the largest difference relates to the percentage of people holding a postsecondary degree—about 8 percent greater in the sample of entrepreneurs. Similarly, the percentage of high-income people starting a new business is 9 percent greater than that of people in the same income category who are not engaging in entrepreneurial activity. Finally, the percentage of individuals who know someone who has started a business in the recent past and the percentage of individuals who

think that they have the knowledge, skills, and experience to start a new business is significantly higher among entrepreneurs than among nonentrepreneurs. The opposite occurs for the percentage of individuals who think that fear of failing could prevent them from starting a new business. Note that in all cases, we can reject the null hypothesis of the test on the equality of the means of the two groups of individuals at the 5 percent level of significance.

We have conducted the same type of analysis comparing characteristics of different types of entrepreneurs. Results are reported in table 1.7, columns (4) to (6). On average, opportunity entrepreneurs are slightly younger than remedial entrepreneurs. Moreover, opportunity entrepreneurs are more likely to be male, to have a higher level of education and income, and to have more confidence in their skills and abilities and less fear of failure than remedial entrepreneurs. Consistent with the test results in table 1.7, columns (1) to (3), we can reject the null hypothesis of the equality of means in the two groups of individuals for almost all variables. For example, means are statistically different between the two groups for variables such as the percentage of people who work, the percentage of people with more than a college degree, and the percentage of those with low and high (but not middle) income.

Finally, we have repeated the analysis in table 1.7, dividing countries by income groups and geographical areas. Results, not shown but available upon request, are qualitatively identical to those just discussed.

We now turn to a cross-country analysis of entrepreneurship and regulation. We compute the proportion of opportunity entrepreneurs (*TEAOPP*) and remedial entrepreneurs (*TEANEC*) for each country in our sample and study the univariate relationship between the proportion of entrepreneurs in each country and the level of regulation, using the three indices we discussed in section 1.2.2. Figures 1.2 and 1.3 show the results for the group of high-income countries and middle- and low-income countries, respectively. We find a negative relationship between *TEAOPP* and all measures of regulation. Thus, higher levels of regulation are associated with lower rates of activity to pursue a business opportunity. This is true both in the high-income country group and in the low- and middle-income group, even though the magnitude of the effects differs in the two groups of countries. Findings are different for the other measure of entrepreneurial activity, *TEANEC*. We find a positive correlation between the indices of entry regulation and of contract enforcement regulation and *TEANEC* but a negative correlation between the level of regulation of labor markets and *TEANEC*. Thus, countries with more stringent regulation of entry, less efficient judicial systems, and less regulated labor markets exhibit higher remedial entrepreneurship rates. However, due to the small number of observations at the macrolevel (twenty-five for the high-income group and twelve for the low-, middle-

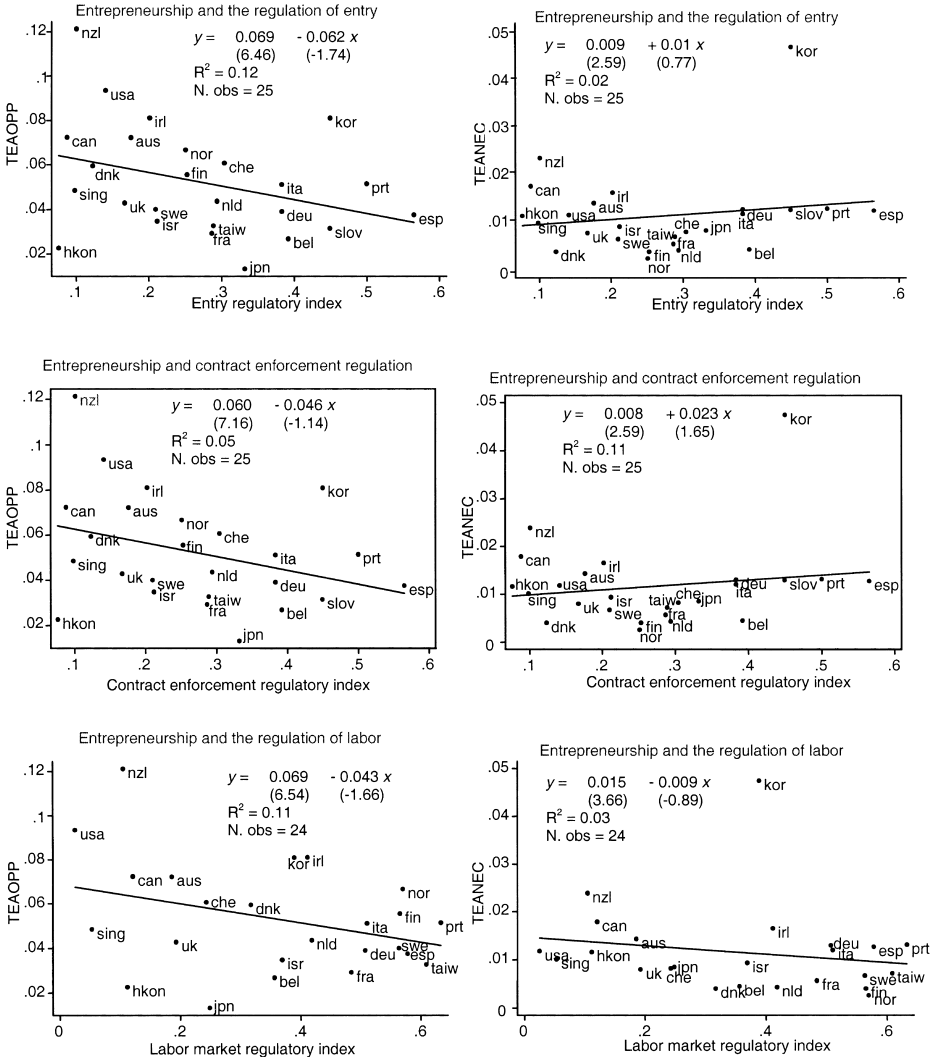

Fig. 1.2 Entrepreneurship and regulation: High-income countries

low, and upper-middle-income countries), the coefficients of the univariate regressions are often not statistically significant. This analysis shows that it is critically important to be able to differentiate between types of entrepreneurial activity. It also highlights that regulation may act as a detriment for the type of entrepreneurial activity—opportunity entrepreneurs—that is more likely to be a drive for economic activity and growth.

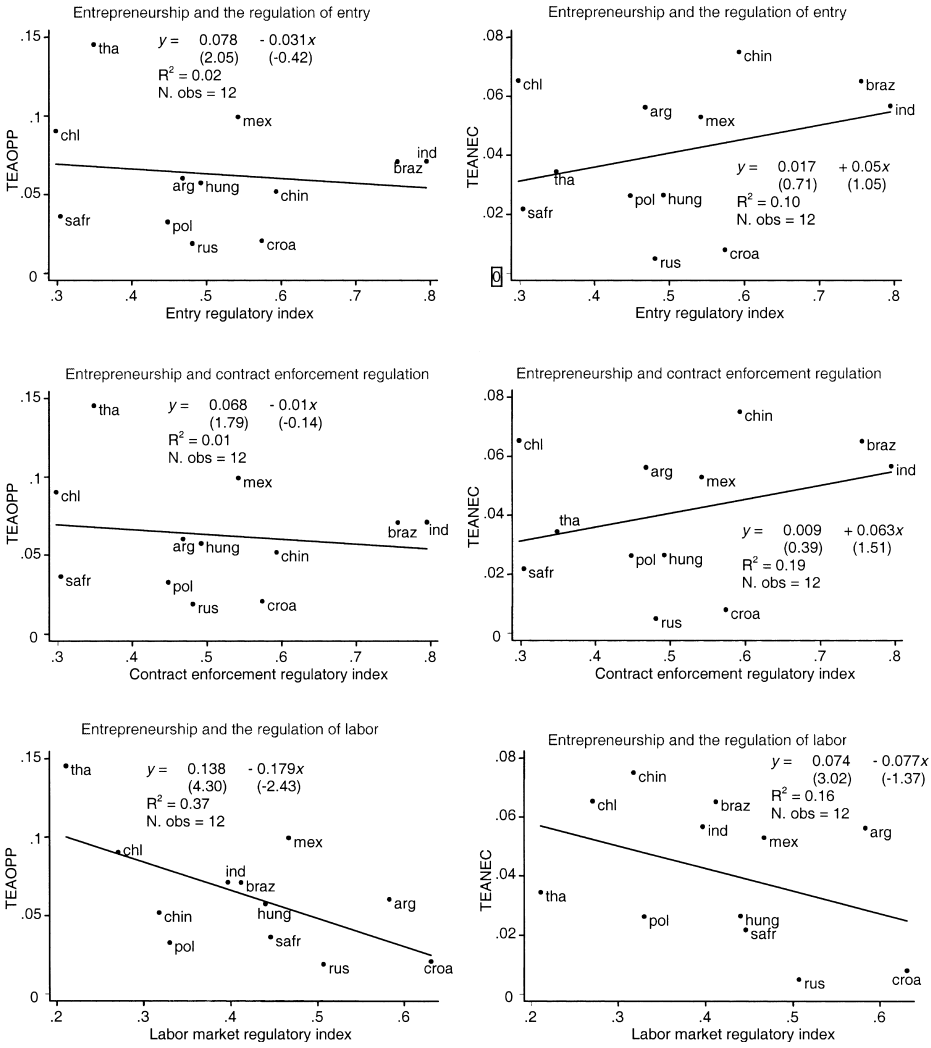

Fig. 1.3 Entrepreneurship and regulation: Middle- and low-income countries

1.3 Econometric Analysis

1.3.1 Methodology

We now turn to a more formal analysis of the effect of individual characteristics and regulation on entrepreneurship. For individual i in country j at time t, let us define the outcome of interest y_{ijt}, where y is one of the three measures of entrepreneurial activity: *TEA*, *TEAOPP*, or *TEANEC*. We estimate the following equation for y_{ijt}:

$$(1) \qquad y_{ijt} = \alpha_j + \beta_1 X_{ijt} + \beta_2 X_{ijt} R_j + \gamma_t + \varepsilon_{ijt},$$

where α_j is a vector of country dummies; X is a vector of variables measuring individual characteristics such as age, gender, employment status, education, income, the role of social networks, business skills, and fear of failure; R captures countries' regulatory and legal environments; and γ_t is a time dummy variable. Since the dependent variable is binary, we use probit estimation and correct the standard errors by clustering them at the country level.

Our sample includes many different countries whose macroeconomic and institutional characteristics (level of economic development, growth rates, level of taxation, and degree of openness, just to mention a few) can be correlated both with the entrepreneurship indices and with the regulatory variables. While we cannot separately account for each country's macroeconomic and institutional variables, we can control for countries' specific characteristics, including the level of the regulatory environment, by adding country fixed effects to our regressions. Because regulatory variables are country and time invariant, once we include α_j among our regressors, we can only measure the differential effect that personal characteristics have on the decision to engage in entrepreneurial activity because of cross-country differences in the regulatory and legal environment. In other words, we can only measure the effect of regulation via the interaction between countries' regulation and individual characteristics.

1.3.2 Entrepreneurship and Personal Characteristics

In table 1.8, we estimate the effect of individual characteristics on the indices of entrepreneurial activity—*TEA*, *TEAOPP*, and *TEANEC*. In columns (1) to (3), we exclude the variables measuring the income group to which the individual belongs. We include income dummies in columns (4) to (6). When we do so, the sample shrinks significantly, because the income data is not available for many countries.

The variable that has the largest effect on the likelihood of an individual becoming an entrepreneur is *skills,* a proxy for individual degree of self-confidence (or self-assessed skills and abilities). Ceteris paribus, when *skills* = 1, the probability of engaging in entrepreneurship increases by more than 8.5 percent in column (1) when considering *TEA*. The effects of *skills* are large both for opportunity and remedial entrepreneurs: estimates are 5.9 percent in column (2) and 1.5 percent in column (3), respectively.

Fear of failure, a proxy for individual attitudes toward risk, is another important variable and negatively affects entrepreneurship. Note that fear of failure affects opportunity entrepreneurs and our total index of entrepreneurship, but it is significant only at the 10 percent level for individuals for whom entrepreneurship is a remedial activity. Similarly, the effect of education on entrepreneurship depends on entrepreneurial type. The coefficients

Table 1.8 **Entrepreneurship and individual characteristics**

	TEA (1)	TEAOPP (2)	TEANEC (3)	TEA (4)	TEAOPP (5)	TEANEC (6)
Age	0.0020	0.0012	0.0006	0.0019	0.0012	0.0005
	(3.20)***	(3.03)***	(2.32)**	(2.38)**	(2.42)**	(1.39)
Age squared	–0.00003	–0.00002	–0.000008	–0.00003	–0.00002	–0.000006
	(–4.10)***	(–3.91)***	(–2.66)***	(–3.19)***	(–3.26)***	(–1.65)*
Male	0.0112	0.0082	0.0017	0.0116	0.0082	0.0017
	(5.67)***	(6.28)***	(1.97)**	(5.36)***	(5.51)***	(1.50)
Not working	–0.0235	–0.0150	–0.0045	–0.0231	–0.0134	–0.0055
	(–6.20)***	(–7.22)***	(–2.96)***	(–5.00)***	(–5.49)***	(–3.00)***
Students	–0.0295	–0.0169	–0.0071	–0.0280	–0.0146	–0.0080
	(–7.68)***	(–7.63)***	(–3.88)***	(–5.08)***	(–4.21)***	(–3.86)***
Retired disabled	–0.0287	–0.0167	–0.0067	–0.0270	–0.0147	–0.0070
	(–5.70)***	(–4.08)***	(–4.44)***	(–3.91)***	(–2.86)***	(–2.86)***
High school	0.0029	0.0062	–0.0020	0.0034	0.0058	–0.0013
	(1.13)	(3.42)***	(–1.69)*	(1.05)	(2.70)***	(–0.83)
College	0.0028	0.0102	–0.0058	0.0010	0.0071	–0.0051
	(0.88)	(5.83)***	(–4.34)***	(0.27)	(3.38)***	(–2.62)***
Knowent	0.0429	0.0304	0.0056	0.0435	0.0293	0.0068
	(14.63)***	(15.95)***	(5.43)***	(14.33)***	(15.70)***	(5.03)***
Skills	0.0848	0.0591	0.0148	0.0867	0.0604	0.0160
	(29.02)***	(25.58)***	(16.14)***	(25.54)***	(24.09)***	(15.54)***
Fearfail	–0.0200	–0.0152	–0.0012	–0.0201	–0.0147	–0.0016
	(–9.19)***	(–9.07)***	(–1.64)*	(–7.30)***	(–7.32)***	(–2.14)**
Lowestinc				0.0066	0.0004	0.0038
				(1.71)*	(0.16)	(2.12)**
Upperinc				0.0069	0.0065	–0.0022
				(2.01)**	(2.38)**	(–1.62)
Observations	118,525	118,525	118,525	83,397	83,397	83,397

Notes: Probit regressions including country fixed effects and a time dummy for 2001. Standard errors are clustered at the country level. Marginal effects (not coefficients) and *t*-statistics are shown in the tables. TEA = 1 if individuals are starting a new business or are owners and managers of a young firm, zero otherwise; TEAOPP = 1 if individuals are starting a new business or are owners and managers of a young firm to take advantage of a business opportunity, zero otherwise; TEANEC = 1 if individuals are starting a new business or are owners and managers of a young firm because they could find no better economic work, zero otherwise. See notes to table 1.2 and appendix A for the exact definition of the variables.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

of the dummy variables *high school* and *college*[18] are both positive and statistically significant when we estimate equation (1) for *TEAOPP*, while both are negative and statistically significant for *TEANEC*. This may explain why evidence of the effect of education on entrepreneurship in the literature

18. The dummy variable *high school* is equal to 1 if the individual has a high school degree and to zero otherwise. The dummy variable *college* is equal to 1 if the individual has at least a college degree and to zero otherwise.

is rather mixed when using a measure of entrepreneurship that does not account for individual motivation to become an entrepreneur (see, for example, Blanchflower [2004]). These findings again highlight the importance of distinguishing between types of entrepreneurial activity.[19]

Entrepreneurship is also affected by social networks. In all specifications, the coefficient of this variable is positive and statistically significant at the 1 percent level. The probability of becoming involved in an entrepreneurial activity when knowing someone who has started a business increases by 3 percent for opportunity entrepreneurs and by 0.5 percent for remedial entrepreneurs. Other authors have found evidence of the importance of social networks and social capital on entrepreneurship (see, for example, Djankov et al. [2005, 2006a, 2006b], Guiso, Sapienza, and Zingales [2004], and Nanda and Sorensen [2008]). Our work adds to this literature by highlighting that networks are an important factor, particularly for specific entrepreneurial types.[20]

Turning to the effect of variables measuring individual status in the workforce, people who do not work, students, and retired and disabled individuals are less likely to become entrepreneurs than individuals who work. This is true both for remedial entrepreneurs and opportunity entrepreneurs. We also find evidence of a nonlinear effect for age: while the coefficient of the linear term is positive and statistically significant, the coefficient of the square term is negative and statistically significant. The magnitude of the coefficients implies that the probability of starting a new entrepreneurial activity increases with age for individuals younger than thirty-two in column (1), younger than twenty-nine in column (2), and younger than forty in column (3), and decreases with age afterward. Finally, men are more likely than women to pursue entrepreneurial activity; this is true both for necessity and opportunity entrepreneurs.

In columns (4) to (6), we control for the dummy variables *lowestinc, middleinc,* and *upperinc.* These indicators are equal to 1 if an individual's income is in the lowest, middle-, or upper-third income percentile of their country's income distribution, respectively, and equal to zero otherwise. We find a nonlinear relationship between the composite index *TEA* and individual income. The probability of starting a new business is higher for individuals in both the lowest and the upper-income groups. This nonlinearity captures the different effect income has on entrepreneurial type. For *TEAOPP*, the coefficient of the variable *lowestinc* is not statistically significant, while that of *upperinc* is positive and statistically significant. For

19. As highlighted by Mondragón-Vélez and Peña in chapter 3 of this volume, some forms of entrepreneurship are simply a subsistence activity. Since there is little transition out of this type of business activity into business ownership, policymakers should carefully consider policies that promote remedial entrepreneurship.

20. Estimating the impact of peer effect on entrepreneurship is complex, and other studies were able to take account of the endogeneity of peers (see Nanda and Sorensen [2008] and their discussion on the difficulty of estimating peer effects). Since we only have a cross-section of data, we cannot address this problem in our empirical analysis.

TEANEC, the coefficient of the variable *lowestinc* is positive and statistically significant, while that of *upperinc* is negative and not statistically significant. Thus, again, it is crucial to be able to distinguish between individual motivations to become entrepreneurs. Also, while income is an important control, the estimates of the other variables do not change significantly when adding income dummies to the regression.[21] This provides further evidence of the robustness of our estimates, since the sample reduces considerably when adding income dummies.

There are other potential determinants of entrepreneurship that previous studies have considered such as wealth, family background, optimism, and other sociological and psychological characteristics (see, for example, Blanchflower [2004], De Mel, McKenzie, and Woodruff [chapter 2 in this volume], Djankov et al. [2008], Fairlie and Robb [2007], and Puri and Robinson [2006]). Unfortunately, we do not have information about these variables in this survey and cannot account for them in our empirical work.

1.3.3 Entrepreneurship and Regulation

We now consider the effects of regulation by interacting the synthetic indices—*entry, contract,* and *labor*—with the vector of individual characteristics. Because the indices are highly correlated, we consider each regulatory index separately. Results are reported in table 1.9; they refer to the specifications in which we exclude income dummies. We discuss specifications that include income dummies in section 1.3.7.

Columns (1) to (3) report the results for the regulation of entry. The parameter of interest is β_2. Negative values of β_2 in equation (1) indicate that heavier regulation of entry reduces the effect of personal characteristics on the likelihood to engage in entrepreneurship when β_1 in equation (1) is positive and reinforces the effect of personal characteristics when β_1 is negative. For example, while the probability of engaging in entrepreneurship is higher for individuals who know someone who has started a business recently (i.e., those for whom *knowent* = 1), in countries where entry is more heavily regulated, the effect of social networks is much reduced. To evaluate its magnitude, we calculate the marginal effect due to a change in the variable *knowent* from zero to 1 in two hypothetical countries: one in which the entry regulatory index is equal to zero (the index minimum value) and one in which the index is equal to 1 (the index maximum value). Using the estimates reported in column (1), we find that the probability of becoming an entrepreneur in these two different countries changes from 6 percent to 1.8 percent. Thus, regulation substantially curbs the positive effect of social networks on entrepreneurship. A similar effect also occurs when we distinguish opportunity entrepreneurs from necessity entrepreneurs. Consider first the

21. The coefficients of the variables *age, male,* and *high school* in column (6) become insignificant. The coefficient of the variable *fear fail* becomes significant at the 5 percent level in column (6).

Table 1.9 **Entrepreneurship and regulation**

	R = Entry TEA (1)	*R* = Entry TEAOPP (2)	*R* = Entry TEANEC (3)	*R* = Contract TEA (4)	*R* = Contract TEAOPP (5)	*R* = Contract TEANEC (6)	*R* = Labor TEA (7)	*R* = Labor TEAOPP (8)	*R* = Labor TEANEC (9)
Age	0.0022	0.0013	0.0007	0.0021	0.0012	0.0007	0.0025	0.0015	0.0007
	(3.78)***	(3.37)***	(3.64)***	(3.39)***	(2.96)***	(3.48)***	(3.64)***	(3.54)***	(2.77)***
Age squared	–0.00003	–0.00002	–0.000008	–0.00003	–0.00002	–0.000009	–0.00003	–0.00002	–0.000008
	(–4.11)***	(–3.95)***	(–3.05)***	(–4.11)***	(–3.82)***	(–3.25)***	(–4.24)***	(–4.15)***	(–2.6)***
Male	0.0164	0.0076	0.0056	0.0141	0.0076	0.0046	0.0125	0.0066	0.0038
	(4.31)***	(2.77)***	(3.92)***	(5.44)***	(3.94)***	(4.30)***	(3.01)***	(2.46)**	(2.35)**
Not working	–0.0058	–0.0091	0.0043	–0.0125	–0.0107	0.0007	–0.0100	–0.0068	–0.0015
	(–0.78)	(–1.72)*	(1.41)	(–2.44)**	(–3.41)***	(0.29)	(–1.17)	(–1.73)*	(–0.31)
Students	–0.0148	–0.0112	0.0009	–0.0218	–0.0145	–0.0034	–0.0201	–0.0155	0.0055
	(–1.60)	(–1.86)*	(0.15)	(–3.79)***	(–3.98)***	(–1.07)	(–1.51)	(–2.14)**	(0.96)
Retired disabled	–0.0259	–0.0153	–0.0059	–0.0240	–0.0144	–0.0051	–0.0285	–0.0162	–0.0067
	(–2.74)***	(–1.95)*	(–2.48)**	(–3.53)***	(–2.77)***	(–2.31)**	(–2.48)**	(–1.91)*	(–2.7)***
High school	–0.0036	0.0024	–0.0056	0.0016	0.0037	–0.0033	–0.0002	0.0053	–0.0038
	(–0.48)	(0.49)	(–2.52)**	(0.38)	(1.17)	(–2.07)**	(–0.03)	(1.16)	(–2.6)***
College	0.0011	0.0072	–0.0084	0.0038	0.0082	–0.0067	0.0034	0.0103	–0.0074
	(0.14)	(1.61)	(–3.43)***	(0.84)	(2.68)***	(–4.19)***	(0.61)	(2.54)**	(–5.7)***
Knowent	0.0601	0.0399	0.0082	0.0537	0.0356	0.0088	0.0616	0.0426	0.0082
	(12.73)***	(11.09)***	(4.32)***	(15.99)***	(14.43)***	(6.59)***	(12.34)***	(12.01)***	(5.11)***
Skills	0.0972	0.0701	0.0144	0.0938	0.0672	0.0145	0.0864	0.0609	0.0130
	(24.95)***	(21.95)***	(11.52)***	(27.58)***	(24.19)***	(12.45)***	(15.83)***	(19.49)***	(7.24)***
Fearfail	–0.0151	–0.0117	0.0021	–0.0170	–0.0137	0.0017	–0.0104	–0.0090	0.0030
	(–3.83)***	(–3.94)***	(1.55)	(–5.13)***	(–5.36)***	(1.85)*	(–3.04)***	(–3.53)***	(2.64)***
R · Age	–0.0009	–0.0005	–0.0003	–0.0005	–0.0001	–0.0002	–0.0013	–0.0009	–0.0002
	(–1.22)	(–0.88)	(–0.85)	(–1.00)	(–0.56)	(–1.01)	(–1.46)	(–1.46)	(–1.22)
R · Male	–0.0184	0.0016	–0.0114	–0.0153	0.0018	–0.0104	–0.0043	0.0044	–0.0058
	(–1.75)*	(0.21)	(–2.85)***	(–1.78)*	(0.29)	(–3.04)***	(–0.44)	(0.62)	(–1.74)*

(*continued*)

Table 1.9 (continued)

	R = Entry TEA (1)	R = Entry TEAOPP (2)	R = Entry TEANEC (3)	R = Contract TEA (4)	R = Contract TEAOPP (5)	R = Contract TEANEC (6)	R = Labor TEA (7)	R = Labor TEAOPP (8)	R = Labor TEANEC (9)
R · Not working	–0.0639	–0.0237	–0.0245	–0.0519	–0.0227	–0.0186	–0.0466	–0.0299	–0.0095
	(–3.07)***	(–1.45)	(–3.47)***	(–3.35)***	(–1.94)*	(–2.98)***	(–2.26)**	(–2.68)***	(–0.87)
R · Students	–0.0801	–0.0342	–0.0332	–0.0553	–0.0194	–0.0217	–0.0519	–0.0100	–0.0434
	(–2.73)***	(–1.57)	(–2.49)**	(–2.90)***	(–1.34)	(–2.48)**	(–1.14)	(–0.37)	(–3.4)***
R · Retired disabled	–0.0166	–0.0095	–0.0039	–0.0386	–0.0213	–0.0100	0.0006	–0.0010	0.0012
	(–0.61)	(–0.44)	(–0.51)	(–2.08)**	(–1.81)*	(–1.13)	(0.02)	(–0.04)	(0.11)
R · High school	0.0205	0.0114	0.0104	0.0070	0.0104	0.0045	0.0076	0.0019	0.0047
	(0.82)	(0.71)	(1.64)*	(0.34)	(0.84)	(0.82)	(0.59)	(0.17)	(1.22)
R · College	0.0034	0.0080	0.0095	–0.0048	0.0071	0.0039	–0.0036	–0.0012	0.0054
	(0.13)	(0.65)	(1.01)	(–0.24)	(0.75)	(0.53)	(–0.27)	(–0.13)	(1.35)
R · Knowent	–0.0421	–0.0228	–0.0061	–0.0373	–0.0184	–0.0092	–0.0406	–0.0258	–0.0059
	(–3.85)***	(–2.78)***	(–1.27)	(–4.09)***	(–2.78)***	(–2.42)**	(–3.41)***	(–3.60)***	(–1.24)
R · Skills	–0.0273	–0.0227	0.0004	–0.0270	–0.0235	0.0003	–0.0027	–0.0032	0.0032
	(–2.68)***	(–2.35)**	(0.15)	(–2.54)**	(–2.58)***	(0.12)	(–0.21)	(–0.37)	(0.87)
R · Fearfail	–0.0170	–0.0130	–0.0089	–0.0125	–0.0066	–0.0095	–0.0306	–0.0205	–0.0110
	(–1.45)	(–1.42)	(–2.55)**	(–1.26)	(–0.86)	(–3.90)***	(–3.08)***	(–2.57)**	(–4.1)***
Observations	118,525	118,525	118,525	118,525	118,525	118,525	116,978	116,978	116,978

Notes: Probit regressions including country fixed effects and a time dummy for 2001. Standard errors are clustered at the country level. Marginal effects (not coefficients) and *t*-statistics are shown in the tables. TEA = 1 if individuals are starting a new business or are owners and managers of a young firm, zero otherwise; TEAOPP = 1 if individuals are starting a new business or are owners and managers of a young firm to take advantage of a business opportunity, zero otherwise; TEANEC = 1 if individuals are starting a new business or are owners and managers of a young firm because they could find no better economic work, zero otherwise. Entry measures the barriers and costs entrepreneurs face when they decide to create a new business; Entry = (procedures + time + cost + regulation (IEF))/4. Contract measures the efficiency of the justice system in resolving commercial disputes; Contract = (procedures + quality of bureaucracy)/2. Labor measures the difficulty for entrepreneurs of adjusting the labor force; Labor = (hiring index + firing index + firing costs + rigidity of labor contracts + union density)/5. See notes to table 1.2 and appendix A for the exact definition of the variables.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

former (see column [2]). The probability to engage in entrepreneurship for individuals who know someone who has recently started a new business is higher by 4 percentage points than for individuals who do not know entrepreneurs if they live in a low-regulation country (a country in which *entry* = 0). However, individuals who know people who are entrepreneurs have only a 1.7 percent higher probability to become entrepreneurs than individuals for whom *knowent* = 0 if they live in a high-regulation country (a country in which *entry* = 1). Hence, the positive effect of social capital on entrepreneurship is reduced by more than half if *entry* changes from zero to 1. For necessity entrepreneurs (see column [3]), the marginal effect due to a change in the variable *knowent* from zero to 1 is equal to 0.8 percent when *entry* = 0, and it is reduced to 0.2 percent when *entry* = 1. Hence, the positive effect of social networks on entrepreneurship is almost eliminated when going from low- to high-regulation countries (*entry* changes from zero to 1).

Regulation also diminishes the effect of *skills.* Individuals who report having business skills (i.e., those for whom *skills* = 1) are less likely to engage in new entrepreneurial activity when entry regulation is more stringent. This effect is entirely driven by individuals who engage in entrepreneurship to pursue a business opportunity. In fact, the coefficient of the interaction term *entry* · *skills* is not statistically significant in column (3), but it is statistically significant at the 5 percent level in column (2).

Tougher entry regulation also decreases the probability of starting new entrepreneurial activity for individuals who do not work and for students, a finding that has important policy implications. Consider, for example, Italy and the United States, whose values of the entry regulation index are 0.38 and 0.14, respectively. An American who does not work faces a lower probability of engaging in entrepreneurship than an American who is employed; the estimate is –1.47 percent [–0.0058 – (0.064 · 0.14)]. The same figure is much higher for Italians who do not work; it is –3.01 percent [–0.0058 – (0.064 · 0.38)]. Thus, individuals who do not work are two times less likely to start a new business than individuals who do work if they live in Italy rather than in the United States. More generally, the average value in the sample of the index of entry regulation is equal to 0.32, and the standard deviation is equal to 0.17. Thus, individuals who do not work are 2.6 percent less likely to become entrepreneurs than individuals who work. A 1 standard deviation increase in the index reduces this number to 3.7 percent. Finally, individuals who want to pursue a business opportunity and do not have a job are less likely to engage in entrepreneurship than individuals who work by 1.7 percent in countries in which *entry* = 0.32. This number becomes 2 percent if *entry* increases by 1 standard deviation. For necessity entrepreneurs who do not have a job, the probability of starting a new business is not statistically different than for those who work if there are no regulatory constraints on entry. However, if entry is constrained in their country, these entrepreneurs find it more difficult to start a new business.

Our estimates are in line with the results in Klapper, Laeven, and Rajan (2006). They find that relative to the high-entry industries in the United States, in highly regulated countries, a lower number of new firms enter these industries. Ciccone and Papaioannou (2006) also find slower entry in expanding industries in countries where it takes longer to comply with procedures required to open a new firm.

Our other indices of regulation show similar results. When we interact personal characteristics with the *contract* index, which measures the efficiency of the judicial system in resolving commercial disputes, we find estimates similar to those reported in column (1); see columns (4) to (6). Thus, contract regulation can also curb the effects of skills, social networks, and labor force status. A country's legal environment also plays an important role in individual decisions to engage in entrepreneurship, and this is especially true for those individuals who wish to pursue a business opportunity. The economic magnitude is also relevant. For example, while the probability of engaging in entrepreneurship is higher for individuals who know someone who has started a business recently (i.e., those for whom *knowent* = 1), in countries where the legal system is more regulated, the effect of social networks is much reduced. We calculate again the marginal effect due to a change in the variable *knowent* from zero to 1 in two hypothetical countries: one in which the contract regulatory index is equal to zero (the index minimum value) and one in which the index is equal to 1 (the index maximum value). Using the estimates reported in column (4), we find that the probability of becoming an entrepreneur changes by 3.1 percent. Thus, this different type of regulation also curbs the positive effect of social networks on entrepreneurship. Using data from Eastern and Western European firms, Desai, Gompers, and Lerner (2003) also find that industries' entry rates are higher in countries in which courts are fair and impartial, even though this result seems to be driven by Eastern and Central European countries, not by Western European ones.

When we investigate the effect of labor market regulation on the determinants of entrepreneurship (see columns [7] to [9]), we find that as for the other two indices, labor market regulation curbs the effects of social networks. The effect is statistically significant for opportunity entrepreneurs, a finding that can have important implications for public policy. Moreover, the interaction term *fear fail* · *labor* is statistically significant for every measure of entrepreneurship we use, while it was not in the other two indices of regulation. Thus, ceteris paribus, in countries that heavily regulate the labor market, individuals' risk-taking attitudes seem to play a more important role than in countries with less labor market regulation.[22]

22. Our findings about the negative effects of regulation are consistent with the results by Mullainathan and Schnabl (see chapter 5 in this volume). They examine regulation within one country and show that tighter regulation hinders entrepreneurship.

1.3.4 Additional Robustness Checks

Our results are robust to a variety of additional specification changes. In what follows, we discuss several extensions of our models. For brevity, results are not reported but are available upon request.

First, we interact the components of each synthetic index of regulation with the vector of individual characteristics. Our goal is to investigate whether a particular aspect of regulation in each of the areas we consider is driving the results reported in table 1.9. For all of the synthetic indicators, we find that the components of the indices generally have similar effects on entrepreneurship, even though some components have a larger and more significant effect through some personal characteristic variables than through others.

Second, we include an income variable (aggregated in broad groups) among the regressors in table 1.9. Our results are the same overall. In the regressions in which we interact the indices of entry and contract enforcement regulation with personal characteristics, we find evidence that regulation also has an effect through the age variable, but the coefficients of the interaction terms between all the regulatory indices and *skills* are not statistically significant.

Third, we estimate the specifications in table 1.9 separately for 2001 and 2002 data for the sample of countries for which we have data for both years.[23] We find no evidence of relevant changes between regressions for 2001 and 2002 and results in table 1.9.

Fourth, we check that our results do not hinge on data for a particular country. We exclude one country at a time and reestimate the specification used in table 1.9. Results are qualitatively the same, even when excluding Russia, Poland, and Slovenia, whose data may be of poorer quality, as previously discussed.

Finally, we estimate equation (1) for subgroups of countries. Specifically, we consider the specifications in table 1.9 for high-income countries and the other countries (i.e., countries with low, middle-low and upper-middle income). We find a stronger effect of labor regulation in the wealthier countries than in the others, but in general, results do not change substantially.

1.3.5 Instrumental Variables Estimation

A potential problem of the estimates just reported is that the underlying variables that may be driving entrepreneurship in a country (e.g., an educational system that encourages individual responsibility or an extensive welfare system that insulates against unemployment and health risks) may also be driving the regulatory system in that country. Thus, the relationship

23. Data for Portugal are not available in 2002. Data for Switzerland, Chile, Thailand, China, Taiwan, Hong Kong, Croatia, and Slovenia are not available in 2001.

between entrepreneurship and regulation may simply be the result of these omitted variables. Alternatively, it could be that the desire to achieve a certain level of entrepreneurship in a country shapes regulation in that country. In other words, the causality may go from entrepreneurship to regulation rather than the other way around. This problem may be less relevant in our empirical work, since we only look at the interaction of regulation with individual characteristics rather than simply looking at the effect of regulation on entrepreneurship. In this section, we tackle these problems by using instrumental variables (IV) estimation.

Our instruments need to be correlated with regulation but uncorrelated with the error term. We use countries' legal origins as instruments. Several papers have shown that the current regulatory environments correlate with each country's legal tradition; for example, countries with English legal origin are among those with the lowest level of regulation, while countries with French and Socialist legal origin are more heavily regulated. Because countries' legal origins have been transplanted through conquest and colonization that occurred centuries ago, legal origin is unlikely to be correlated with omitted variables that influence individuals' decisions to begin new entrepreneurial activity in 2001 or 2002.

We follow the existing literature and group countries with English (common law), French (civil law), Socialist, German, and Scandinavian legal origins. We estimate equation (1), instrumenting the variable R with the indicator variables that measure countries' legal origins. Results are reported in table 1.10. Note that coefficient estimates are included in table 1.10, while marginal effects are reported in all the other tables of the chapter; hence, the numbers in the tables are not directly comparable. The estimates continue to confirm the results reported in table 1.9. Both entry and labor market regulation curb the effects of social networks. Contract regulation also curbs the effects of social networks, primarily for opportunity entrepreneurs. Moreover, entry and contract regulation strengthens the effects of risk aversion, thus discouraging entrepreneurship—in particular, remedial entrepreneurship. Finally, note that for the specifications for *TEA* and *TEAOPP*, the *p*-value of a Wald test on the exogeneity of the regressors does not reject exogeneity. Thus, our estimates in table 1.9 do not seem to be biased due to a potential endogeneity problem.

1.4 Conclusions

In this chapter, we use GEM data from thirty-seven countries to estimate the differential effect that individual characteristics such as work status, education, and attitudes toward risk have on entrepreneurship because of cross-country differences in regulatory constraints. Using our data set, we can distinguish between different types of entrepreneurs; that is, those who enter entrepreneurship to pursue a business opportunity versus those who

Table 1.10 **Entrepreneurship and regulation: Instrumental variables (IV) estimation (weighted data)**

	R = Entry TEA (1)	*R* = Entry TEAOPP (2)	*R* = Entry TEANEC (3)	*R* = Contract TEA (4)	*R* = Contract TEAOPP (5)	*R* = Contract TEANEC (6)	*R* = Labor TEA (7)	*R* = Labor TEAOPP (8)	*R* = Labor TEANEC (9)
Age	0.0020	0.0014	0.0004	0.0019	0.0012	0.0006	0.0022	0.0016	0.0004
	(2.20)**	(2.39)**	(0.80)	(1.91)*	(1.94)*	(1.08)	(2.47)**	(2.79)***	(0.88)
Age squared	–0.0000	–0.0000	–0.0000	–0.0000	–0.0000	–0.0000	–0.0000	–0.0000	–0.0000
	(2.64)**	(2.88)***	(1.62)	(2.69)**	(2.82)***	(1.70)*	(3.10)***	(3.37)***	(1.91)*
Male	0.0254	0.0158	0.0079	0.0207	0.0127	0.0074	0.0241	0.0145	0.0064
	(4.03)***	(3.19)***	(2.04)**	(3.94)***	(2.93)***	(2.32)**	(3.53)***	(2.60)**	(2.16)**
Not working	–0.0071	–0.0098	0.0038	–0.0149	–0.0106	–0.0029	–0.0165	–0.0134	–0.0014
	(0.51)	(1.15)	(0.45)	(1.22)	(1.53)	(0.38)	(1.03)	(1.40)	(0.15)
Students	–0.0212	–0.0187	–0.0006	–0.0291	–0.0233	–0.0034	–0.0286	–0.0231	–0.0027
	(1.64)	(1.81)*	(0.07)	(2.40)**	(2.48)**	(0.51)	(1.44)	(1.73)*	(0.19)
Retired disabled	–0.0318	–0.0288	0.0037	–0.0322	–0.0265	–0.0003	–0.0373	–0.0316	0.0001
	(1.81)*	(1.85)*	(0.71)	(2.17)**	(1.91)*	(0.09)	(1.76)*	(1.67)	(0.02)
High school	0.0153	0.0177	–0.0022	0.0110	0.0114	0.0001	0.0063	0.0153	–0.0089
	(1.21)	(2.26)**	(0.26)	(1.35)	(1.93)*	(0.01)	(0.52)	(1.96)*	(0.91)
College	0.0134	0.0148	–0.0027	0.0098	0.0115	–0.0023	0.0054	0.0169	–0.0144
	(0.96)	(1.90)*	(0.27)	(1.10)	(2.04)**	(0.33)	(0.39)	(2.22)**	(1.43)
Knowent	0.0915	0.0838	0.0009	0.0764	0.0680	0.0034	0.1074	0.0948	0.0052
	(7.84)***	(7.82)***	(0.18)	(7.48)***	(7.37)***	(0.89)	(10.81)***	(11.42)***	(1.06)
Skills	0.1029	0.0865	0.0099	0.1042	0.0871	0.0109	0.1039	0.0779	0.0207
	(5.90)***	(5.94)***	(1.44)	(7.70)***	(7.46)***	(2.57)**	(5.19)***	(4.93)***	(2.10)**
Fearfail	–0.0191	–0.0236	0.0061	–0.0205	–0.0241	0.0049	–0.0220	–0.0220	0.0022
	(2.78)***	(3.95)***	(2.98)***	(3.82)***	(5.15)***	(2.89)***	(3.07)***	(3.72)***	(0.74)
$R \cdot$ Age	–0.0009	–0.0010	0.0007	–0.0004	–0.0003	0.0006	–0.0008	–0.0009	0.0007
	(0.66)	(0.89)	(1.08)	(0.34)	(0.38)	(0.95)	(0.58)	(0.87)	(0.98)
$R \cdot$ Male	–0.0373	–0.0132	–0.0187	–0.0321	–0.0056	–0.0242	–0.0272	–0.0070	–0.0115
	(1.80)*	(0.87)	(1.27)	(1.35)	(0.33)	(1.36)	(1.50)	(0.46)	(1.32)

(*continued*)

Table 1.10 (continued)

	R = Entry TEA (1)	R = Entry TEAOPP (2)	R = Entry TEANEC (3)	R = Contract TEA (4)	R = Contract TEAOPP (5)	R = Contract TEANEC (6)	R = Labor TEA (7)	R = Labor TEAOPP (8)	R = Labor TEANEC (9)
$R \cdot$ Not working	–0.0760	–0.0326	–0.0409	–0.0727	–0.0417	–0.0285	–0.0402	–0.0178	–0.0221
	(1.60)	(1.25)	(1.37)	(1.59)	(1.74)*	(0.86)	(0.83)	(0.66)	(0.86)
$R \cdot$ Students	–0.0970	–0.0525	–0.0409	–0.0930	–0.0510	–0.0390	–0.0647	–0.0332	–0.0304
	(1.96)*	(1.60)	(1.41)	(1.81)*	(1.46)	(1.31)	(1.02)	(0.85)	(0.73)
$R \cdot$ Retired disabled	–0.0121	0.0250	–0.0492	–0.0158	0.0224	–0.0515	0.0078	0.0342	–0.0341
	(0.25)	(0.63)	(2.41)**	(0.33)	(0.54)	(2.70)**	(0.14)	(0.76)	(1.56)
$R \cdot$ High school	–0.0427	–0.0405	–0.0036	–0.0420	–0.0304	–0.0150	–0.0124	–0.0282	0.0152
	(1.29)	(1.93)*	(0.15)	(1.42)	(1.50)	(0.73)	(0.46)	(1.53)	(0.73)
$R \cdot$ College	–0.0390	–0.0076	–0.0264	–0.0373	0.0042	–0.0385	–0.0120	–0.0137	0.0110
	(0.94)	(0.31)	(0.84)	(0.97)	(0.17)	(1.32)	(0.37)	(0.68)	(0.48)
$R \cdot$ Knowent	–0.1004	–0.1116	0.0251	–0.0735	–0.0865	0.0247	–0.1292	–0.1255	0.0098
	(3.01)***	(3.69)***	(1.75)*	(1.86)*	(2.54)**	(1.72)*	(5.13)***	(6.04)***	(0.78)
$R \cdot$ Skills	–0.0112	–0.0401	0.0344	–0.0215	–0.0600	0.0454	–0.0121	–0.0096	–0.0011
	(0.24)	(1.07)	(1.64)	(0.43)	(1.44)	(2.40)**	(0.26)	(0.26)	(0.05)
$R \cdot$ Fearfail	–0.0325	–0.0052	–0.0269	–0.0381	–0.0027	–0.0340	–0.0215	–0.0102	–0.0124
	(1.49)	(0.30)	(3.32)***	(1.52)	(0.13)	(4.26)***	(1.14)	(0.68)	(1.51)
Observations	118,525	118,525	118,525	118,525	118,525	118,525	116,978	116,978	116,978

Notes: IV regressions including country fixed effects and a time dummy for 2001. Standard errors are clustered at the country level. Instruments for the regulatory variable R are dummy variables measuring English (common law), French (civil law), Socialist, German, and Scandinavian legal origin. Coefficients and t-statistics are shown in the tables. TEA = 1 if individuals are starting a new business or are owners and managers of a young firm, zero otherwise; TEAOPP = 1 if individuals are starting a new business or are owners and managers of a young firm to take advantage of a business opportunity, zero otherwise; TEANEC = 1 if individuals are starting a new business or are owners and managers of a young firm because they could find no better economic work, zero otherwise. See notes to table 1.2 and appendix A for the exact definition of the variables.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

enter entrepreneurship because they could not find better work. We also use different measures of regulation, from measures of regulation in the product markets to regulation in the labor markets and the legal system.

We find evidence that regulation plays a critical role in the individual decision to start a new business, particularly for individuals who engage in an entrepreneurial activity to pursue a business opportunity. The variables through which regulation affects entrepreneurship are social networks, working status, business skills, and attitudes toward risk. Specifically, regulation curbs the effects of social networks and business skills, while it strengthens the effects of risk aversion. Moreover, those who do not work are less likely to become entrepreneurs in countries with high levels of regulation. Our results are robust to a variety of robustness checks.

This is one of the few studies that performs a microanalysis of the determinants of entrepreneurship and the effect of regulation in a large cross-section of countries. While our approach does not allow us to measure the total effect of regulation, we can measure the effect of regulation on individual characteristics, which has important implications for public policy.

Appendix A

Variables Used in the Empirical Analysis

Entrepreneurship Indices (Source: Global Entrepreneurship Monitor [GEM])

- *TEA* = 1 if individuals are starting a new business or are owners and managers of a young firm, zero otherwise.
- *TEAOPP* = 1 if individuals are starting a new business or are owners and managers of a young firm to take advantage of a business opportunity, zero otherwise.
- *TEANEC* = 1 if individuals are starting a new business or are owners and managers of a young firm because they could find no better economic work, zero otherwise.

Individuals' Characteristics (Source: Global Entrepreneurship Monitor [GEM])

- *AGE* = age of the individual at the time of the interview.
- *MALE* = 1 if male, zero otherwise.
- *WORKING* = 1 if individual works at the time of the interview, zero otherwise.
- *STUDENTS* = 1 if individual is a student at the time of the interview, zero otherwise.
- *RETIRED DISABLED* = 1 if individual is retired or disabled at the time of the interview, zero otherwise.

- *NOT WORKING* = 1 if individual does not work (and he or she is not a student nor a retired or disabled individual) at the time of the interview, zero otherwise.
- *HIGH SCHOOL* = 1 if individual has a high school degree, zero otherwise.
- *COLLEGE* = 1 if individual has at least a college degree, zero otherwise.
- *KNOWENT* = 1 if the person knows someone who has started a business in the recent past, zero otherwise.
- *SKILLS* = 1 if the person thinks he or she has the knowledge, skills, and experience to start a new business, zero otherwise.
- *FEARFAIL* = 1 if the person's fear of failing could prevent him or her from starting a new business, zero otherwise.
- *LOWESTINC* = 1 if individual's income is in the lowest thirty-third income percentile of his or her country's income distribution, zero otherwise.
- *UPPERINC* = 1 if individual's income is in the upper thirty-third income percentile of their country's income distribution, zero otherwise.

Regulatory Indices (Various Sources)

- *ENTRY* measures the barriers and costs entrepreneurs face when they decide to create a new business; *ENTRY* = (procedures + time + cost + regulation [IEF])/4.
- *PROCEDURES* = number of procedures that are officially required to start and operate a new business. (Source: Doing Business Database [World Bank Group] 2003.)
- *TIME* = time in calendar days needed to complete procedures that are officially required to start and operate a new business. (Source: Doing Business Database [the World Bank Group] 2003.)
- *COST* = cost (measured as a percentage of the country's income per capita) needed to complete procedures that are officially required to start and operate a new business. (Source: Doing Business Database [the World Bank Group] 2003.)
- *REGULATION* (*IEF*) = composite index measuring not only how easy/difficult it is to operate a business but also examining the degree of corruption in the government and whether regulation is applied uniformly to all businesses. (Source: Index of Economic Freedom [the Heritage Foundation]; variable name in IEF database: regulation, average 1995 to 2000.)
- *CONTRACT* measures the efficiency of the justice system in resolving commercial disputes; *CONTRACT* = (procedures + quality of bureaucracy)/2.
- *PROCEDURES* = number of procedures required to solve a dispute. (Source: Doing Business Database [the World Bank Group] 2003.)

- *QUALITY OF BUREAUCRACY* = index measuring the ability of the government to operate without dramatic changes in policy or interruptions of its services. (Source: International Country Risk Guide [the PRS Group]; variable name in ICRG database: bureaucracy, average 1984 to 2000.)
- *LABOR* measures the difficulty for entrepreneurs of adjusting the labor force. *LABOR* = (hiring index + firing index + firing costs + rigidity of labor contracts + union density)/5.
- *HIRING INDEX* = index measuring the availability of term contracts for temporary/permanent tasks, the maximum cumulative duration of term contracts, and the ratio of the minimum wage for a trainee or first-time employee to the average value added per worker. (Source: Doing Business Database [the World Bank Group] 2003.)
- *FIRING INDEX* = index measuring whether redundancy is disallowed as a basis to fire a worker, the need for the employer to notify a third party and/or to get approval from a third party when firing one redundant worker and/or a group of more than twenty redundant workers, whether the law requires the employer to consider retraining or reassignment before firing a redundant worker, and whether priority rules apply for redundancies and reemployment. (Source: Doing Business Database [the World Bank Group] 2003.)
- *FIRING COST* = index measuring the cost in weekly wages of advance notice requirements, severance payments, and penalties due when terminating a redundant worker. (Source: Doing Business Database [the World Bank Group] 2003.)
- *RIGIDITY LABOR CONTRACTS* = index measuring whether night and/or weekend work is unrestricted, whether the workweek can consist of 5.5 days and/or can be extended to fifty hours or more (including overtime) for two months a year, and whether paid annual vacation is twenty-one working days or fewer. (Source: Doing Business Database [the World Bank Group] 2003.)
- *UNION DENSITY* = percentage of total workforce affiliated with labor unions in 1997. (Source: Djankov et al. [2004].)

Countries' Groups

- *LOW INCOME* includes India. (Source: World Bank's classification; available at: www.worldbank.org/data/countryclass/classgroups.htm.)
- *MIDDLE LOWINC* includes Brazil, China, and Thailand. (Source: World Bank's classification; available at: www.worldbank.org/data/countryclass/classgroups.htm.)
- *UPPER MIDDLE INC* includes Argentina, Chile, Croatia, Hungary, Mexico, Poland, Russia, and South Africa. (Source: World Bank's classification; available at: www.worldbank.org/data/countryclass/classgroups.htm.)
- *HIGH INCOME* includes Australia, Belgium, Canada, Denmark, Fin-

land, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, the Netherlands, Norway, New Zealand, Portugal, Singapore, Slovenia, Spain, South Korea, Sweden, Switzerland, Taiwan, the United Kingdom, and the United States. (Source: World Bank's classification; available at: www.worldbank.org/data/countryclass/classgroups.htm.)
- *OECD* includes Australia, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, Norway, New Zealand, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States.
- *EU* includes Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.
- *ECA* includes Croatia, Hungary, Poland, Russia, and Slovenia.
- *EAP* includes China, Hong Kong, Singapore, South Korea, Taiwan, and Thailand.
- *LATIN AMERICA* includes Argentina, Brazil, Chile, and Mexico.

Legal Origin

- *ENGLISH* includes Australia, Canada, Hong Kong, India, Ireland, Israel, New Zealand, South Africa, Singapore, Thailand, the United Kingdom, and the United States. (Source: Djankov et al. [2003].)
- *SOCIALIST* includes China, Croatia, Hungary, Poland, Russia, and Slovenia. (Source: Djankov et al. [2003].)
- *FRENCH* includes Argentina, Belgium, Brazil, Chile, France, Italy, Mexico, the Netherlands, Portugal, and Spain. (Source: Djankov et al. [2003].)
- *GERMAN* includes Germany, Japan, Switzerland, South Korea, and Taiwan. (Source: Djankov et al. [2003].)
- *SCANDINAVIAN* includes Denmark, Finland, Norway, and Sweden. (Source: Djankov et al. [2003].).

Appendix B

GEM Questionnaire Questions

The following are the questionnaire questions that the GEM coordination team uses to generate the variables *TEA*, *TEAOPP*, and *TEANEC*. Questions are from the 2002 data documentation manual. Questions asked in 2001 were exactly the same, even though the numbering of the questions changes. The methodology followed to construct the indices is based on procedures previously used in the US Panel Study of Entrepreneurial Dynamics, and

it is described in detail in the 2001 and 2002 Adult Population Surveys data documentation and in Reynolds et al. (2005).

- 1. Which of the following would apply to you? (Possible answers: yes, no, don't know, refused.)
- 1a. You are, alone or with others, currently trying to start a new business, including any self-employment or selling any goods or services to others.
- 1b. You are, alone or with others, currently trying to start a new business or a new venture for your employer—an effort that is part of your normal work.
- 1c. You are, alone or with others, currently the owner of a company you help manage, self-employed, or selling any goods or services to others.
- If "yes" or "don't know" to question 1a or question 1b, ask question 2a. If "yes" or "don't know" to question 1c, ask question 3a.
- 2a. Over the past twelve months have you done anything to help start a new business, such as looking for equipment or a location, organizing a start-up team, working on a business plan, beginning to save money, or any other activity that would help launch a business?
- 2b. Will you personally own all, part, or none of this business?
- 2d. Has the new business paid any salaries, wages, or payments in kind, including your own, for more than three months?
- 2d1. What was the first year the owners received wages, profits, or payments in kind?
- 2g. Are you involved in this start-up to take advantage of a business opportunity or because you have no better choices for work?
- 3a. Do you personally own all, part, or none of this business?
- 3c. What was the first year the owners received wages, profits, or payments in kind? (Payments in kind refers to goods or services provided as payments for work rather than cash.)
- 3g. Are you involved in this firm to take advantage of a business opportunity or because you have no better choices for work?

The following are the questionnaire questions used to define the variables *knowent, skills*, and *fear fail,* respectively. Questions are from the 2002 data documentation manual. Questions asked in 2001 were exactly the same, even though the numbering of the questions changes.

- 1. Which of the following would apply to you? (Possible answers: yes, no, don't know, refused.)
- 1g. You know someone personally who started a business in the past two years.
- 1i. You have the knowledge, skill and experience required to start a new business.
- 1j. Fear of failure would prevent you from starting a business.

Appendix C

Flash Eurobarometer Surveys

The questions from the Flash Eurobarometer Surveys used to generate the variables *TEA_Euro*, *TEAOPP_Euro*, and *TEANEC_Euro* in table 1.3, column (2) are as follows:

1. Have you started a business recently or are you taking steps to start a new one? Possible answers: (a) It never came to my mind. (b) No, but you are thinking about it. (c) No, you thought of it and you had already taken steps to start a business but gave up. (d) Yes, you are currently taking steps to start a new business. (e) Yes, you have started or taken over a business in the last three years which is still active today. (f) Yes, you started or took over a business more than three years ago and it is still active. (g) No, you once started a business, but currently you are no longer an entrepreneur (business has failed, business was sold or the interviewee has retired). (h) Don't know.
2. All in all, would you say you started, or are starting, your business because you saw an opportunity or you started it out of necessity? Possible answers: (a) You started it because you came across an opportunity. (b) You started it because it was a necessity. (c) Both. (d) Don't know.

To create variables consistent with the ones in the GEM, the indices *TEA_Euro, TEAOPP_Euro,* and *TEANEC_Euro* in table 1.3, column (2) are defined as follows:

- *TEA_Euro* = 1 if individuals replied "Yes, you are currently taking steps to start a new business" or "Yes, you have started or taken over a business in the last three years which is still active today" to question 1, zero otherwise.
- *TEAOPP_Euro* = 1 if individuals replied "Yes, you are currently taking steps to start a new business" or "Yes, you have started or taken over a business in the last three years which is still active today" to question 1 and if individuals replied "You started it because you came across an opportunity" to question 2, zero otherwise.
- *TEANEC_Euro* = 1 if individuals replied "Yes, you are currently taking steps to start a new business" or "Yes, you have started or taken over a business in the last three years which is still active today" to question 1 and if individuals replied "You started it because it was a necessity" to question 2, zero otherwise.

The question from the Flash Eurobarometer Surveys used to generate the variable *FEAR OF FAILURE_Euro* in table 1.3, column (2) is the following: "Do you strongly agree, agree, disagree, or strongly disagree with the following opinion? One should not start a business if there is a risk it might

fail." *FEAR OF FAILURE_Euro* measures the percentage of people who strongly agree or agree with this opinion.

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