The Impact of the Financial Crisis on New Firm Creation

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Abstract: We use panel data on the number of new firm registrations in 95 countries to study the impact of the business environment and 2008 financial crisis on new firm creation. The data show that dynamic business creation occurs in countries that provide entrepreneurs with a stable legal and regulatory regime, fast and inexpensive business registration process, more flexible employment regulations, and low corporate taxes. The data also show that nearly all countries experienced a sharp drop in business entry during the crisis. This drop is more pronounced in countries with higher levels of financial development and countries more affected by the crisis.

JEL Classification: G18, G38, L51, M13
Key Words: Entrepreneurship, Economic Development, Business Environment

1. Introduction

Entrepreneurship is essential for the continued dynamism of the modern market economy and a robust entry rate of new businesses can foster competition and economic growth (Klapper, Laeven and Rajan, 2006; Djankov, La Porta, Lopez de Silanes and Shleifer, 2002). Entrepreneurial activity can also contribute to employment generation. For instance, in the United States, young firms accounted for nearly all net job creation between 1980 and 2005 (Haltiwanger, et al.; Strangler and Litan, 2009). In the wake of the 2009-09 financial crisis, a better understanding of new firm creation, and its relationship with macroeconomic indicators and the local business environment, can help policymakers working towards economic recovery.

This paper uses a panel dataset for 95 countries on the number of newly registered limited liability firms to study the dynamics of entrepreneurial activity. The 2010 World Bank Group Entrepreneurship Snapshots (WBGES) offer a unique methodology for collecting comparable, international data on new business creation. Data is collected directly from the Registrar of Companies, which is the entry point for entrepreneurs joining or transitioning to the formal sector. We use the data to study the relationship between the regulatory environment, institutional quality, and entrepreneurship.

We find that the ease of starting a business, country-level governance and corporate tax rate are significant indicators of new firm registrations, even after controlling for the overall level of economic development. These results are consistent with prior work on the efficient allocation of inputs and other resources to entrepreneurial activities (Jovanovic, 1982) and the impact of regulatory reform and institutional quality (Mullainathan and Schnabl, 2009; Demirguc-Kunt, Love, Maksimovic, 2006).

The main contribution of our paper is in studying the impact of the 2008/09 global financial crisis on new firm creation. We find that with the onset of the financial crisis, new

1

business creation slowed down, first in developed countries and then in the rest of the world, paralleling the spread of the crisis. We also find that more developed countries as well as countries that were more severely affected by the crisis have experienced sharper declines in new business registrations during the crisis. Finally, we find that countries with more developed financial markets have experienced larger contractions in new firm creation, most likely because of the credit crunch that has characterized this crisis. This finding is consistent with Rajan and Zingales (1998) sector-level work on the relationship between financial dependence and growth.

Existing cross-country measures of entrepreneurial activity are limited, but what does exist demonstrates that much can be learned about the relationship between entrepreneurship and economic growth through the development of longitudinal data sets (Wennekers et al., 2005). Cross-country data has been used to demonstrate a U-shaped relationship between new firm creation and levels of economic development (Stel, Carree, and Thurik, 2005). Furthermore, from an evolutionary economics perspective, research suggests that disparities in economic growth between advanced and less developed countries can narrow owing precisely to the growth of entrepreneurial activity (Galor and Stelios, 2006). On a country-level, Haltwinger, et al (2009) use U.S. Census data to demonstrate that young firms, not small firms as is commonly believed, are the principal force behind both gross and net job creation. We are not aware of any other longitudinal, cross-country studies that examine the impact of the 2008-2009 financial crisis on entrepreneurial activity.

The paper proceeds as follows: Section 2 discusses the survey methodology; Section 3 summarizes the data; Section 4 discusses our empirical results; and Section 5 concludes.

2. Survey Methodology

2.1 Defining Entrepreneurship

In order to measure entrepreneurship and make the data comparable across countries, we developed a methodology that can be consistently applied across heterogeneous legal regimes and economic systems. Previous efforts have been made in this regard, but the great majority focused solely on the developed world, and did not take into account differences in legal systems, sectors, and economic structures (see United Nations, 2005).

The concept of entrepreneurship lacks a common language. Joseph Schumpeter defined entrepreneurship as "the assumption of risk and responsibility in designing and implementing a business strategy or starting a business" (Schumpeter, 1911). J.W. Gough stated that entrepreneurship "refers to a person who undertakes and operates a new enterprise or venture, and assumes some accountability for the inherent risks" (Gough, 1969). The entrepreneurial process centres on the discovery, creation, and profitable exploitation of markets for goods and services. Therefore, for the purposes of the analysis in this study, entrepreneurship is defined as:

> *The activities of an individual or a group aimed at initiating economic enterprise*
> *in the formal sector under a legal form of business.*

Notably, this definition excludes informal sector initiatives. The exclusion is based on the difficulties of quantifying the number of firms in the informal sector, rather than on its relevance for developing economies (Nielson and Plovsing, 1997). The only way to measure the informal sector is through economic censuses, which due to their high costs are infrequently collected.

Following a definition of entrepreneurship, we create a standard unit of measurement. Generally, entrepreneurial activities are carried out in the form of "businesses." However, due to

the lack of a universally agreed upon definition of what constitutes a business, agencies have formulated either an economic, statistical or legal definition. For instance, the U.S. bases its business statistics on establishments, Canada reports Average Labor Units (ALU), while countries reporting to Eurostat and UNECE use various measures including legal (enterprises), geographical (local unit), and activity-based (kind of activity unit) for their business statistics. [1] As a result, the proposed unit of measurement must take into account the availability of the data, its consistency across countries, its relevance to entrepreneurship and focus on the formal sector. As such, the WGBES gathers data on corporations, which we define as *private companies with limited liability*. Notably, this is the same definition used by the World Bank's Doing Business report. It is also the most prevalent business form in most economies around the world (Doing Business, 2010).

"Limited liability" is a concept whereby financial liability of the members is limited to the value of their investment in the company. It is a separate legal entity which has its own privileges and liabilities. While the laws on business registration may vary greatly across countries, the approach to legal entities is largely uniform: any business with a unique legal entity (or "corporate personhood") separate from its owners must be registered.[2]

2.2 Sample Selection

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[1] US Census Bureau: http://www.census.gov/econ/www. Also see Longitudinal Employment Analysis Program (LEAP) of Statistics Canada: http://strategis.gc.ca/epic/site/sbrp-rppe.nsf/en/rd00827e.html. Eurostat definition is from council Regulation (EEC) No 696/93 of 15 March. UNECE terminology on Statistical Metadata is from United Nations Statistical Commission.

[2] We collect information on all corporations regardless of their economic or employment size, since in many countries neither financial information nor the number of employees is collected, making it impossible to identify firm size.

As discussed in the last section, the WBGES is not a comprehensive study of all registered firms. In order to provide harmonized, comparable data across countries, certain exclusions have been made, as described below.

a. Formal Sector firms: This study is limited to the formal private sector. We omit firms that operate informally because business registries are unable to provide accurate cross-country tallies of these firms. This is an important caveat, as there is a strong and inverse relationship between the size of the informal economy (defined by Schneider, 2007, as a percentage of GDP) and our variable of interest: new business density (Figure 1), defined as the ratio of newly registered firms per 1000 of working age population.
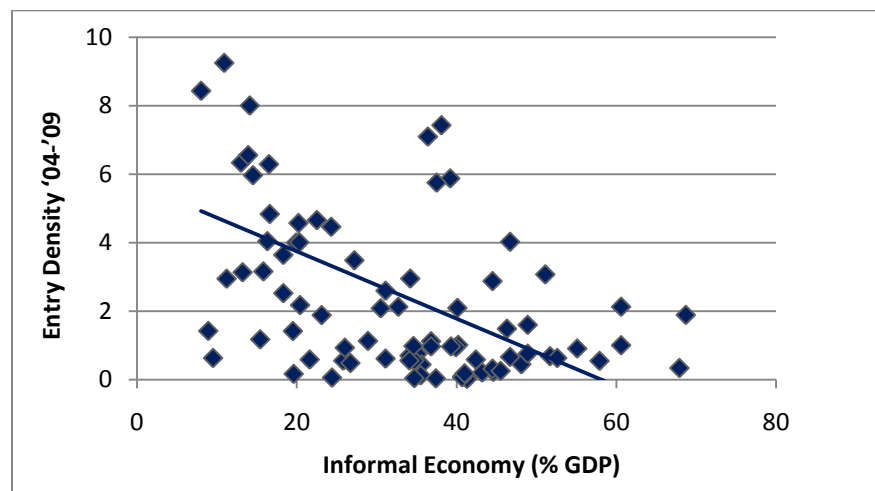
Figure 1: Entrepreneurship and Informality

b. New Firms: The database does not include the number of total or closed firms, since most countries do not accurately collect data on total 'active' or 'inactive' firms. Therefore, we are concerned that the stock number of total firms includes many closed firms that did not formally de-register. Furthermore, the process to remove inactive firms varies widely across countries: For example, in Sweden, firms are removed from the registry if they do not submit financial

statements and an audited account within eleven months of the end of the financial year; Austria and Slovakia remove firms that fail to file financial reports for two consecutive years; while other countries report that firms are never removed from the registry. Consequently, to maintain comparability across countries, we use only the number of newly registered firms (i.e. flow rather than stock). This exclusion prevents us from calculating entry rates (new firms normalized by total firms) or firm turnover (new plus closed firms normalized by total firms).

c. Limited Liability Companies: As previously discussed, partnerships and sole proprietorships are not considered in our analysis as these types of entities differ substantially with respect to their definition and regulation worldwide. For instance, several legal systems do not require these entities to be registered for statistics or tax purposes (e.g. New Zealand and Peru,). We therefore focus solely on limited liability companies.

d. Exclusion of off-shore financial centers: Data collected from countries categorized as offshore financial centers by the IMF[3] are excluded from our analysis since registered entities may not fit our definition of "entrepreneurship". The information provided by these countries likely reflects a nontrivial number of shell companies, defined as companies that are registered for tax purposes, but are not active businesses. The case of the British Virgin Islands provides a sharp illustration of the distorting effects of offshore financial centers. In 2007, the country had 77,022 newly registered corporations, which translates to approximately four new firms for each working age individual.

2.3 Data Sources

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[3] The complete list of excluded countries can be found at: http://www.imf.org/external/pubs/ft/wp/2007/wp0787.pdf, Table 10

Data was collected from official government sources around the world. Thus, our data is not based on surveys or estimations. In 70 percent of countries data was collected directly from the Registrar of Companies,[4] which is generally the government entity responsible for recording and maintaining information on new and existing firms. Data for other countries was collected from national statistical offices and chambers of commerce. For two countries (the United States and India) data was purchased from D&B because nationally representative business registry data on corporations was otherwise unavailable.[5]

Respondents completed either paper or electronic surveys. The database was checked for consistency across countries and over time. Quality assurance measures included comparing data to any published official data and/or related country case studies.

3. Data and Summary Statistics

3.1. Entrepreneurship and the business environment

The analysis in our paper focuses primarily on one country-level indicator: Entry Density, calculated as the number of newly registered limited-liability firms in the corresponding year as a percentage of the country's working age population (ages 15-65), normalized by 1,000. We first summarize the data by region (Figure 2). The data show significant disparities across regions, ranging from an entry density of 0.58 in Sub-Saharan African (SSA) countries to 3.89 in industrialized countries (IND). In other words, there are on average about four limited-liability firms registered annually per 1,000 working age individuals in industrialized countries, as compared to less than one firm per 1,000 individuals in developing countries. This translates

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[4] Also called Incorporation Offices (US), Companies Registration Offices (IR), Companies House (UK), Business Register (AU), Mercantile Registries (SP), Public Registries of Property and Commerce (MEX), Registry of Commerce (FR), etc.
[5] The complete list of sources is available upon request.

roughly to an average of 55,000 newly registered limited-liability firms per year in Industrialized countries, relative to about 35,000 in Latin America, 14,000 in South Asia, and 9,000 in Sub-Saharan Africa.
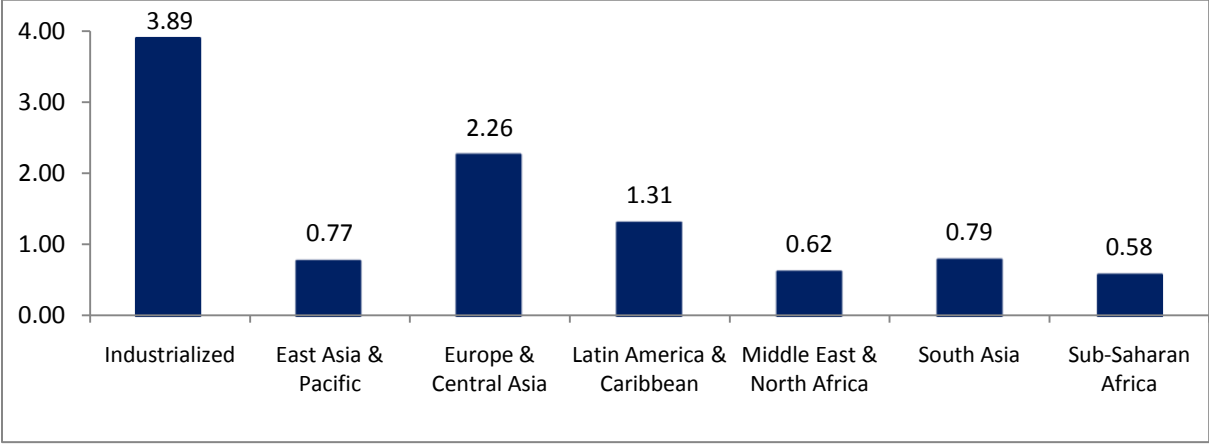
Figure 2: Entry Density by Region, 2004-2009 Averages

There is a large variation in Entry Density across income groups as well: upper-middle income countries average 2.43, as compared to 0.77 in lower-middle income countries, and 0.33 in low income countries (Figure 3).[6] This translates annually to approximately 44,000 new limited-liability registrations in upper-middle income countries, 12,000 in lower-middle income countries, and 3,500 in low-income countries.
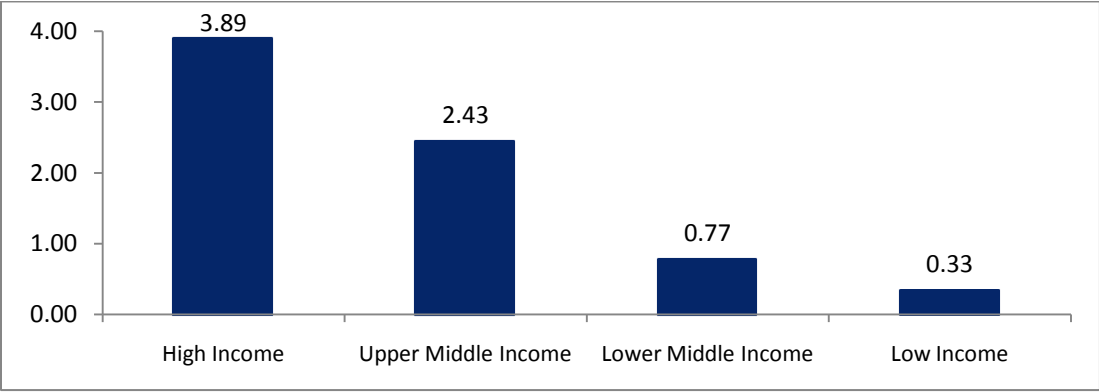
Figure 3: Entry Density by Income Group, 2004-2009 Averages

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[6] Income groups according to 2010 World Bank classifications (based on 2008 GNI per capita).

We supplement our entry density data with a panel of explanatory country-level variables. First, we include macroeconomic measures (World Bank-World Development Indicators, 2010): GDP per capita, constant US$ 2000 and domestic credit provided to the private sector as a percentage of GDP. We find a strong correlation between entrepreneurship and economic development (Figure 4). As predicted by earlier studies on the relationship between financial development and economic growth (Demirguc-Kunt and Maksimovic, 2004; Rajan and Zinagles, 1998), we also see that firm creation is higher in countries with greater financial sector development, as measured by bank credit to GDP.
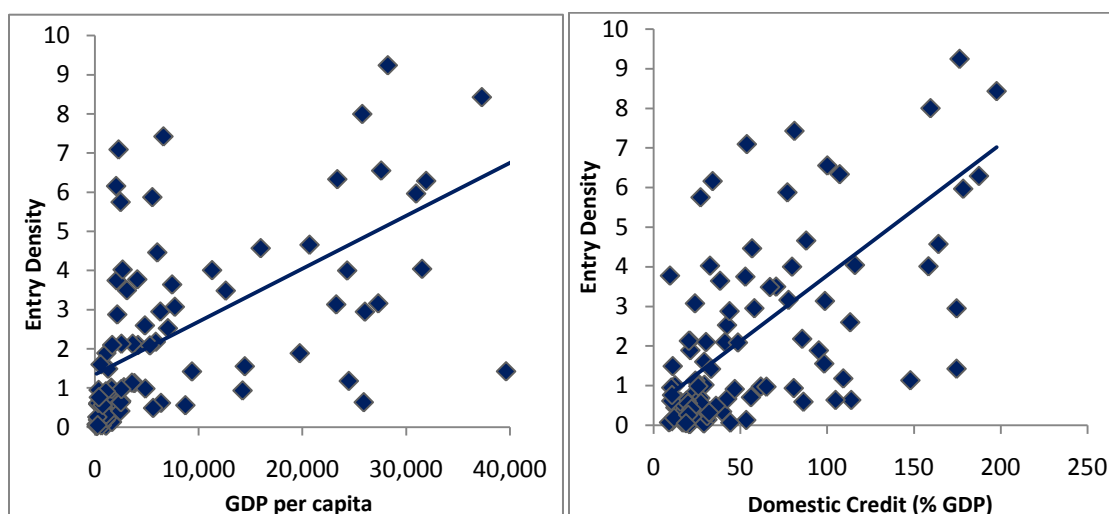
Figure 4: Entry Density and Economic and Financial Development

Next, we include measures of the strength of the business environment and barriers to entry. We employ four Doing Business (World Bank, 2010) indicators.[7] The first indicator, Starting Costs, captures all official fees and additional fees for legal and professional services involved in incorporating a business, and is measured as a percentage of the economy's income per capita. The second indicator is the number of Procedures necessary to incorporate a business.

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[7] The complete Doing Business database and additional details on its methodology is available at: www.doingbusiness.org.

Third, Starting Days, measures the time required to start a business, which is defined as the number of days that incorporation lawyers indicate is necessary to complete all required procedures with minimum follow-up with government agencies and no extra payments. Forth, we include Employment Rigidity, which is itself an average of three sub indices: Difficulty of Hiring, Rigidity of Hours, and Difficulty of Redundancy. The index and sub indices take values of 0 to 100, with higher values indicating more rigid regulation, e.g. countries where it is more difficult to fire redundant workers.

We also include measures of country-level governance (Kauffman, et al., 2009), which we predict are positively related to new firm creation. We include Voice and Accountability, Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption, and an aggregate Governance Composite.[8] All risk ratings are on a scale of -2.5 to 2.5, with higher values indicating less risk.

In addition, we include the Corporate Tax Rate for 77 countries from KPMG (KPMG, 2009). Consistent with previous literature, we predict that a higher corporate tax rate discourages formal sector participation and registration (Da Rin, Di Giacomo, and Sembenelli, 2010).[9]

The final dataset includes 514 observations from 95 countries over the six-year period 2004 to 2009. Data is not available over the complete period for all countries. The period 2004 to 2009 is used in the analysis because it provides the most complete sample. Entry days, entry procedures and GDP per capita are logged. Since we use one-year lagged values for all control variables in the multivariate analysis, the summary statistics for all variables but Entry Density, represent values for the period 2003 to 2008 (Table 1). Univariate results show a strong correlation between all of our variables of interest and Entry Density (Table 2). In addition,

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[8] Complete data is available at: info.worldbank.org/governance/wgi/index.asp.
[9] Complete data is available at http://www.kpmg.com.sg/publications/Tax_CorporateIndirectTaxRateSurvey.pdf.

many of our control variables are significantly correlated with each other. For this reason we do not include multiple variables simultaneously in the regressions. However, because many of the control variables are also correlated with GDP per capita, we control for GDP per capita in all regressions.

3.2 Entrepreneurship and the financial crisis

Business Entry, for the most part, has been increasing gradually between 2004 and 2007 (Figure 5).[10] Looking at an even longer horizon, new limited-liability firm creation in high-income countries increased from less than 3 percent in 2002 to about 4.5 percent in 2008 (not shown). With the onset of the financial crisis in 2008, however, the trend reversed and Entry Density declined. While the drop appears to be most pronounced for high and upper-middle income countries, a closer look at other income groups shows that the crisis also impacted new business entry in other countries, though notably, entry density generally did not decrease in many lower income countries until 2009. For example, in the United Kingdom, the number of newly registered limited-liability firms steadily declined from 449,700 in 2007 to 372,400 in 2008 and 330,100 in 2009. In comparison, new firm registrations in Madagascar were 1,050 in 2007 and 1,183 in 2008, and then declined to 724 in 2009.

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[10] Entry Density data is trimmed for outliers at 1% and 99%.
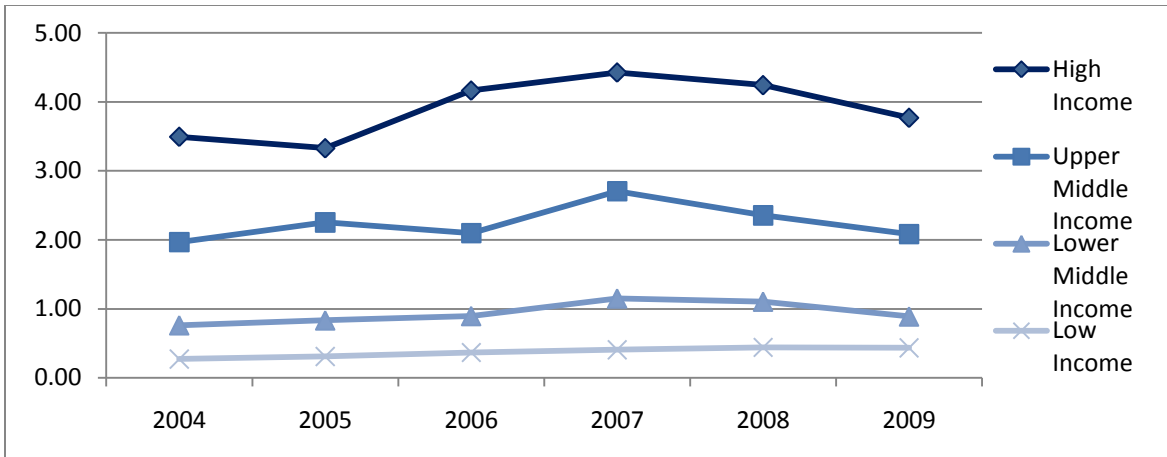
Figure 5: Entry Density by Region, 2004-2009

We also calculate the one-year growth rate of new firms from 2005 to 2009 (Figure 6).[11] The data show that a period of high-growth in entrepreneurship (2005 to 2007) was followed by a quick and sharp drop in new firm creation, and by 2009, the impact of the crisis can be seen across all income-groups.
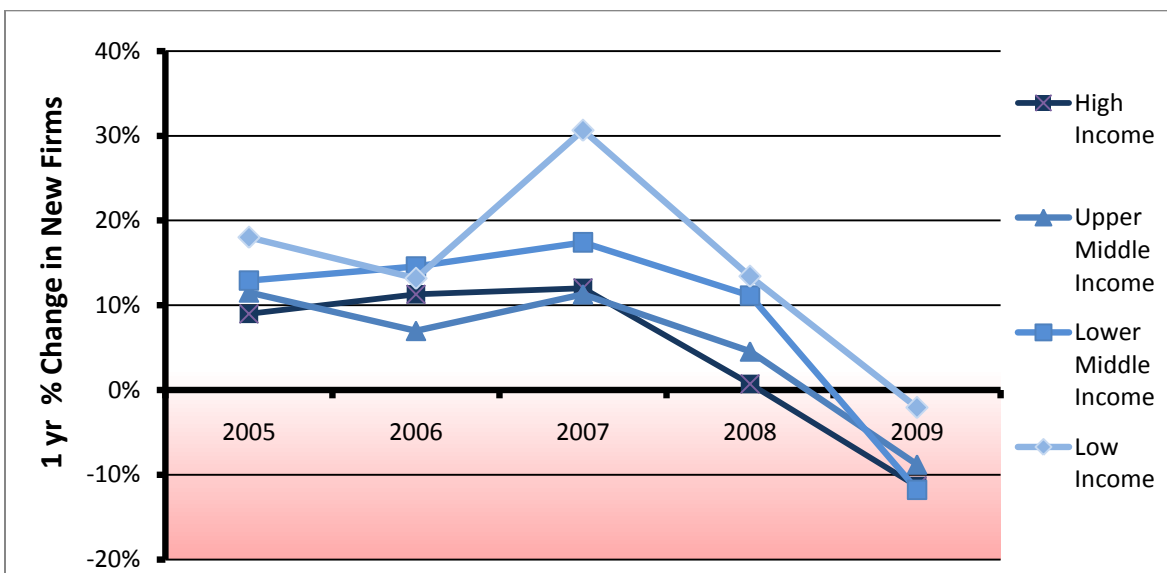
Figure 6: One-Year Growth (Percent Change) in New Firms, by Income Group, 2005-2009

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[11] One year growth rates are trimmed for outliers at 5% and 95%.

12

4. Results

4.1 Cross-country relationships between the business environment and new firm creation.

We begin by formally testing the relationship between *Entry Density* and our measures of the business environment and governance. This first set of regressions addresses the question whether or not a better business environment and stronger governance are associated with the subsequent entry of new formal businesses. The dependent variable is the five-year average of *Entry Density* (2005-2009) and we include explanatory variables from 2004. Thus, we estimate the cross-sectional regressions of the form:

$$\text{Entry Density\_(average:2005-2009)}_i = \alpha + \beta_1 \, (\text{BE\_2004})_i + \beta_2 \, (\text{Log GDPPC\_2004})_i + \varepsilon_I \quad (1)$$

BE stands for various business environment and governance measures described in the last section. Because we are interested in the effect of the existing business environment on subsequent business registrations, the timing of our right hand side and left hand side variables is important. Our goal here is to abstract from year to year variations and business cycle effects and study the long-term consequences of a better business environment. Therefore, our dependent variable is a five year average of Entry Density (2005-2009), which we regress on 2004 values of control variables. Because of the differences in timing, the endogeneity concerns are mitigated, as it is unlikely that the business environment in 2004 would be a function of subsequent (i.e. 2005-2009) business registration. To make sure that the results are indeed related to a better business environment, rather than an overall level of development in a country, we include log GDP per capita in all regressions, which is also measured in 2004, prior to the period over which entry density is calculated. This is a cross-sectional regression, which we estimate by OLS with robust standard errors.

13

The results for business environment variables are presented in Table 3, Panel A, and the results for governance indicators are presented in Table 3 Panel B. GDP per capita is significantly positive in all specifications, suggesting that the overall level of development is a significant predictor of subsequent business registration. We find that Starting Costs, Starting Days, and Starting Procedures have a negative and significant relationship with the subsequent growth of new businesses: a faster and simpler registration process results in greater new business creation. Employment Rigidity is negative, but not significant. Financial Development is positive but not significant despite the strong unconditional correlation.[12] Finally, the tax rate has important implications for new business registrations. We find that the higher the tax rate, the less formal business registration. This is expected, since taxes represent the main cost of becoming registered, versus operating in the informal economy. The higher these costs, the less incentive firms have to register.

In Table 3, Panel B, we see that almost all governance measures are significant predictors of subsequent new business registration. The most significant of the sub-components are regulatory quality and government effectiveness. These two variables have the highest coefficient values and lowest p-values of all subcomponents. This result supports our earlier findings on the effect of the business environment and once again underscores the importance of regulatory quality for new business creation. Rule of law, Corruption, and Voice and Accountability are all important predictors of governance as well. Because of the high correlation in these variables we do not include them all together. Note, however, that we are controlling for the overall level of economic development, so the impact of governance is in addition to the positive impact that overall economic development has on business registrations.

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[12] If log GDP per capita is excluded from this regression, we find that financial development is positive and strongly significant at 1% level. The rest of the results in Table 3 and 4 are not sensitive to exclusion of log GDP per capita.

4.2 Within country variation in the business environment

In the previous section we explored the long-term consequences of a better business environment and governance and found them to have a significant impact on subsequent business creation. In essence our previous results highlighted cross-country differences in the business environment. In recent years, many countries have undertaken business environment reforms, which consist of major changes in the way businesses are registered or closed. In this section we investigate the impact of reforms on new business registrations. To do this we change our methodology from long-term cross-country impact to short-term within country variation, exploiting the unique panel nature of our data. In other words, we estimate the following model:

$$\text{Entry Density}_{it} = \alpha_i + \beta \, \text{BE}_{it-1} + \text{Log(GDPPC)}_{it-1} + \delta_t + \varepsilon_{it} \qquad (2)$$

What distinguishes Model 2 from Model 1 is that this second model is estimated on panel data (using full sample data for 2004 to 2009) which allows us to include country fixed effects to control for any unobservable time-invariant country characteristics. We also add time dummies to capture global macroeconomic variables, such as oil price, interest rates, etc. To reduce endogeneity concerns, we include one year lags of business environment variables. However, most of our results are not sensitive to using lags.[13] We estimate this model by country and year fixed effects regressions with errors clustered on the country level to capture any serial correlation of errors within country.

Results are presented in Table 4. We find that reforms to the business environment have a predicted significant impact on new business registration. Thus, improvements (i.e. reductions) in starting days, procedures or employment rigidity all result in increased business registrations.

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[13] While endogeneity concerns are not completely eliminated with the inclusion of one year lags, using lagged regressors has an additional benefit that it allows us to include year 2009 in the regressions as the GDP data and governance indicators are not yet available for 2009 as of this draft.

With respect to governance indicators, we find that neither variable is significant in fixed effects model. Our explanation for this finding is that governance is a slow moving variable and improvements in governance can only be observed over longer time horizons. Our time frame is only six years, which might be insufficient to register any significant within country variation in governance indicators. This does not invalidate our earlier conclusion that governance has a significant positive long term impact on subsequent business registrations.

The corporate tax rate and financial development are also not significant in the fixed effects model, likely for the same reasons we discussed above for governance indicators.

4.3 The impact of the crisis on new business creation

In this section we formally investigate the relationship between crisis and new firm registration that we presented graphically earlier in the paper. These graphs show a decline in Entry Density that was visible in 2008 and 2009 for high income countries and in 2009 for middle and low income countries. Here we formally investigate if this decline is statistically significant. In addition, we observe a steady increase in new business registrations prior to the crisis in all groups of countries. Here we also formally investigate if this positive trend is statistically significant. We use the following model:

$$\text{Entry Density}_{it} = \alpha_i + \beta_1 \text{ Crisis}_t + \beta_2 \text{ Trend }_{it} + \varepsilon_{it} \qquad (3)$$

The difference between Model 3 and Model 2 is the introduction of a trend variable in place of year dummies. The trend variable helps us isolate the impact of the crisis event from long term trends. The trend variable is defined as a linear trend, with 2004 taking value of one, 2005 a value of two, and so on.

16

Because our new firm data is flow data, i.e. it contains the number of new firms registered over the full year, the data for 2008 may not yet pick up the impact of the crisis, which did not hit many of the countries in our sample until the last quarter of 2008 (after Lehman Brother's bankruptcy in September 2008). In addition, variations in the time required to register a business – which varies from a few days to many months across countries in our sample – will delay the impact of the crisis. For instance, firms that are recorded as registered in 2008 most likely filed their registration papers before the last quarter of 2008 (since it takes time for the registration process to be completed). Therefore, we use two crisis dummies separately to identify the years 2009 and 2008. As before, we estimate this model using country fixed effects regressions with errors clustered on the country level to capture any serial correlation of errors within country.

The results are presented in Table 5. The first column estimates this regression on the full sample, including a crisis-2009 dummy and a linear trend variable. We find that the trend is positive, confirming that on average entry density has been increasing over time, as shown in earlier graphs. In column 2, we add a second crisis-2008 dummy to measure the impact of the early stage of the crisis. We find it also significant, but much lower in magnitude: the dummy for 2009 has a magnitude of 0.77, while dummy for 2008 has a magnitude of 0.25. This confirms our visual observation that the impact of the crisis was much more pronounced in 2009.

When we split the sample for high versus low and middle income countries (columns 3 and 4 report the sample of high income countries and columns 5 and 6 report the sample of low and middle income countries) we find that the magnitude of the trend variable is almost twice as large in the sample of high income countries. In other words, before the crisis hit, new firm creation was more dynamic in higher income countries. We also observe that the magnitude of

17

the effect of the crisis is larger in the high income sample, i.e. the coefficient on the crisis-2009 dummy in the high income sample (column 4) is 1.2, which is about twice as large as the coefficient for the sample of low and middle income countries (column 6). Thus, higher income countries have suffered more pronounced declines (relative to trend) in new business registration as a result of the crisis.

4.4 Heterogeneous effects of the crisis

Here we further investigate whether the crisis had a differential effect on different groups of countries. While above we observed the crisis to be more severe in higher income countries, here we investigate whether high income is a proxy for other important country characteristic. To do this we modify Model 3 by adding the interactions of the crisis variables with pre-crisis country level characteristics:

$$\text{Entry Density}_{it} = \alpha_i + \beta_1 \text{ Crisis}_t + \beta_2 \text{ Crisis}_t * X_i + \beta_3 \text{ Trend }_{it} + \varepsilon_{it} \qquad (4)$$

In this model X_i are country-level characteristics observed before the onset of the financial crisis. Because the crisis occurred in 2008, we use the average of 2004 to 2007 to measure pre-crisis country characteristic. Note that because X_i is time-invariant, the level is subsumed into country fixed effects and only interaction with crisis is included in the regressions. We focus on two pre-crisis country characteristics: income level (Log GDP per capita) and financial development (i.e. domestic credit to GDP), both measured as averages over 2004 to 2007, i.e. representing pre-crisis levels rather than year to year variations. Interactions of crisis and pre-crisis levels of GDP and/or financial development (i.e. β_2 coefficient) show whether countries with different income levels or different levels of financial development

18

reacted differently to the crisis. Again, we estimate this model with country fixed effects regression with errors clustered on country level to capture any serial correlation of errors within country.

The results are presented in Table 6. In column 1 we add the interaction of the crisis with log GDP per capita and find that this interaction is significantly negative, confirming our prior observation that countries with higher GDP per capita experienced sharper declines of new registrations during the crisis. This is expected since the crisis primarily originated in developed countries and hence developed countries were most affected by the crisis. In column 2 we add interactions of the crisis and financial development and find this variable to also be very significant. One feature of the crisis was its severe impact on the functioning of financial markets, which resulted in a credit crunch and credit rationing. It is not surprising that countries in which financial markets played a larger role in the domestic economy would experience sharper contractions in new firm creation during the crisis. One plausible channel for this is through firm's access to external finance, which is more important in countries with higher level of financial development (Rajan and Zingales, 2008). For instance, the financial crisis might have a greater impact on entrepreneurship in countries where new firms are more dependent on bank financing.

It is commonly observed that financial development is highly correlated with the level of overall development in a country. For example, in our data the correlation is 0.72 (Table 2). Next we investigate which result dominates – the financial development or the income level - by including two interactions simultaneously in column 3. We find that financial development remains significantly negative, while GDP per capita is no longer significant. This suggests that

earlier results showing that the crisis more significantly affected more developed countries was in fact capturing the impact of the crisis on countries with deeper financial markets.

Finally, we explore whether the variation in the severity of the crisis has affected new firm creation in different countries. For example, Calderon and Didier (2009) estimate an index of "turbulence" which measures the degree to which a country has been affected by the crisis. We use their index of "financial turbulence" which is a principal component of three measures: (a) variation in the real effective exchange rate in March 2009 (% year-on-year), (b) rate of change in the aggregate stock price index in March 2009 (% year-on-year), and (c) change in the country credit rating from Institutional Investor (variation in March 2009 vis-à-vis March 2008). Here we test whether the degree of "turbulence" has a significant impact on new business creation in a country. To do that, we add an interaction of our crisis dummy and the degree of turbulence (which is time invariant since it only measures the overall response of a country to crisis). In other words we use the degree of crisis severity as a country-level variable (denoted as X_i) in model 4. Higher values of the turbulence index indicate the country was *less* affected by the crisis. We find that this turbulence measure has a significant impact on new business registration (column 4) even while controlling for the interaction with financial development. The financial development interaction remains significant, despite a drop in the number of observations. That is, countries that have been more affected by the crisis (as indicated by a lower index of turbulence) have experienced sharper declines in their new business registrations. Finally, we run a specification in which we include log GDP per capita, financial development and turbulence with crisis (model 5) and find the results to be unchanged.

To summarize, we find that the current financial crisis has negatively affected new business creation and that this effect was larger in countries with more developed financial

markets and countries that have experienced more economic and financial "turbulence" as a result of the crisis. The decline in new limited-liability registrations was more pronounced in 2009 than in 2008 and was more significant in higher income countries.

5. Conclusion

We use panel data on the number of new firm registrations in 95 countries to study the impact of the 2008-09 financial crisis on new firm creation. The data show that dynamic business creation occurs in countries that provide entrepreneurs with reduced red tape and a stable investment climate. The data also show that nearly all countries experienced a sharp drop in business entry during the crisis, and that the degree to which the crisis impacted new firm creation is highly correlated with measures of crisis severity. We also find that the crisis had a more negative impact on new business creation in countries with higher levels of financial development. These results can help guide effective policymaking and deliver new capabilities for identifying the impact of reforms.

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Table 1: Definitions and Summary Statistics, Panel of 95 Countries, 2004-2009

Description	N	Mean	SD
Entry density, defined as new firms registered per working age population (normalized by1,000) (*World Bank Entrepreneurship Snapshots, 2010*)	508	2.09	2.19
Log GDP per capita (*WB-WDI, 2010*)	508	7.93	1.53
World Bank: Domestic credit to private sector (% GDP) (*WB-WDI, 2010*)	490	55.78	49.14
Cost of starting a business (% of income) (*Doing Business, 2009*)	474	26.18	33.70
Log of days to start a business (*Doing Business, 2009*)	502	3.31	0.83
Log of procedures to start a business (*Doing Business, 2009*)	502	2.13	0.45
Rigidity of employment index (0-100) (*Doing Business, 2009*)	502	30.35	15.89
Governance Composite (*Kauffman, et al., 2009*	507	0.10	0.85
Voice & Accountability (*Kauffman, et al. , 2009*)	507	0.11	0.92
Political Stability (*Kauffman, et al. , 2009*)	507	-0.08	0.85
Government Effectiveness (*Kauffman, et al. , 2009*)	507	0.19	0.94
Regulatory Quality (*Kauffman, et al. , 2009*)	507	0.21	0.86
Rule of Law (*Kauffman, et al. , 2009*)	507	0.05	0.93
Control of Corruption (*Kauffman, et al. , 2009*)	507	0.09	0.97
Corporate Tax Rate (*KPMG, 2009*)	77	27.45	7.60

Table 2: Correlation matrix

All variables are defined in Table 1.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Entry Density (1)	1												
Log GDP per capita (2)	0.60*	1											
Starting Cost (3)	-0.48*	-0.60*	1										
Starting Days (4)	-0.38*	-0.36*	0.32*	1									
Starting Procedures (5)	-0.61*	-0.51*	0.40*	0.68*	1								
Employment Rigidity (6)	-0.11	-0.13	0.28*	0.18*	0.20*	1							
Governance Composite (7)	0.63*	0.85*	-0.48*	-0.41*	-0.66*	-0.07	1						
Voice and Accountability (8)	0.58*	0.78*	-0.41*	-0.26*	-0.52*	-0.00	0.92*	1					
Political Stability (9)	0.51*	0.68*	-0.35*	-0.32*	-0.53*	-0.08	0.84*	0.72*	1				
Government Effectiveness (10)	0.62*	0.86*	-0.50*	-0.47*	-0.67*	-0.10	0.97*	0.87*	0.74*	1			
Regulatory Quality (11)	0.66*	0.82*	-0.43*	-0.38*	-0.60*	-0.05	0.96*	0.90*	0.74*	0.94*	1		
Rule of Law (12)	0.59*	0.82*	-0.48*	-0.45*	-0.66*	-0.09	0.98*	0.85*	0.81*	0.96*	0.92*	1	
Control of Corruption (13)	0.59*	0.83*	-0.45*	-0.42*	-0.65*	-0.08	0.97*	0.86*	0.79*	0.96*	0.90*	0.97*	1
Domestic Credit / GDP	0.49*	0.72*	-0.39*	-0.40*	-0.47*	-0.14	0.74*	0.64*	0.50*	0.79*	0.73*	0.77*	0.76*

Table 3: The impact of the Business Environment on New Firm Creation

All variables are defined in Table 1.The dependent variable is the five year average of Entry Density, 2005 to 2009. All explanatory variables are as of 2004. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel A: Business Environment Indicators

Variables	1	2	3	4	5	6
Starting Cost (2004)	-0.007**					
	[0.020]					
Log Starting Days (2004)		-0.490*				
		[0.066]				
Log Starting Procedures (2004)			-2.073***			
			[0.000]			
Employment Rigidity (2004)				-0.006		
				[0.668]		
Financial Depth (2004)					0.006	
					[0.440]	
Corporate Tax Rate (2004)						-0.085**
						[0.013]
Log GDP per capita (2004)	0.713***	0.767***	0.558***	0.854***	0.729***	1.002***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Constant	-3.194***	-2.188	2.277	-4.397***	-3.851***	-3.548*
	[0.010]	[0.123]	[0.136]	[0.000]	[0.000]	[0.057]
Observations	88	88	88	88	90	58
R-squared	0.379	0.388	0.486	0.364	0.35	0.416
Adjusted R-squared	0.364	0.373	0.474	0.349	0.335	0.395

Panel B: Governance Indicators

Variables	1	2	3	4	5	6	7
Governance Composite (2004)	1.038***						
	[0.007]						
Voice & Accountability (2004)		0.628**					
		[0.023]					
Political Stability (2004)			0.429				
			[0.132]				
Government Effectiveness (2004)				0.939***			
				[0.005]			
Regulatory Quality (2004)					1.235***		
					[0.001]		
Rule of Law (2004)						0.633**	
						[0.039]	
Control of Corruption (2004)							0.624*
							[0.068]
Log GDP per capita (2004)	0.360**	0.558***	0.698***	0.356**	0.281*	0.543***	0.532***
	[0.037]	[0.000]	[0.000]	[0.031]	[0.078]	[0.000]	[0.002]
Constant	-0.789	-2.339**	-3.308***	-0.847	-0.309	-2.169**	-2.100*
	[0.549]	[0.038]	[0.005]	[0.486]	[0.797]	[0.045]	[0.096]
Observations	91	91	91	91	91	91	91
R-squared	0.409	0.393	0.378	0.408	0.442	0.388	0.389
Adjusted R-squared	0.396	0.379	0.364	0.395	0.429	0.374	0.375

Table 4: The Impact of Business Environment Reform on New Firm Creation

All variables are described in Table 1. This table uses an unbalanced six-year panel dataset of 95 countries for 2004 to 2009. The dependent variable is annual entry density. All models include country and year fixed effects, and standard errors clustered at the country-level. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Variables	1	2	3	4	5	6
Lagged Starting Cost	0					
	[0.774]					
Lagged Log Starting Days		-0.220*				
		[0.065]				
Lagged Log Starting Procedures			-0.577***			
			[0.008]			
Lagged Employment Rigidity				-0.012**		
				[0.042]		
Lagged Governance Composite					-0.39	
					[0.443]	
Lagged Financial Depth						-0.001
						[0.842]
Lagged Log GDP per capita	0.205	0.122	0.094	0.137	0.287	0.061
	[0.751]	[0.863]	[0.881]	[0.824]	[0.628]	[0.926]
Constant	0.212	1.646	2.35	1.093	-0.427	1.397
	[0.967]	[0.771]	[0.638]	[0.822]	[0.927]	[0.788]
Observations	502	502	502	502	507	490
R-squared	0.956	0.957	0.957	0.956	0.956	0.955
Adjusted R-squared	0.945	0.946	0.946	0.945	0.945	0.944

Table 5: The impact of the Crisis on New Firm Creation

This table uses an unbalanced six-year panel dataset of 95 countries for 2004 to 2009. The dependent variable is annual entry density, defined in Table 1.   "Trend" is a linear trend variable equal to 1 in 2004, equal to 2 in 2005, etc., "Crisis Dummy, 2009" is equal to 1 in 2009 and 0 otherwise; "Crisis Dummy, 2008" is equal to 1 in 2008, and 0 otherwise. All models include country fixed effects and standard errors clustered at the country-level. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

	1	2	3	4	5	6
Variables	Full sample		High Income		Low/Middle Income	
Crisis Dummy-2009	-0.570***	-0.774***	-0.905***	-1.210***	-0.436***	-0.582***
	[0.000]	[0.000]	[0.002]	[0.007]	[0.001]	[0.004]
Crisis Dummy-2008		-0.254***		-0.398*		-0.178*
		[0.009]		[0.104]		[0.069]
Trend	0.147***	0.199***	0.242***	0.317***	0.107***	0.144***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]
Constant	1.636***	1.531***	3.178***	3.027***	1.016***	0.939***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	516	516	150	150	366	366
R-squared	0.955	0.956	0.935	0.937	0.942	0.943
Adjusted R-squared	0.945	0.946	0.92	0.922	0.929	0.929

Table 6: Heterogeneous responses to crisis

This table uses an unbalanced six-year panel dataset of 95 countries for 2004 to 2009. Variables are defined in Table 1. The dependent variable is annual entry density. "Trend" is a continuous variable equal to 1 in 2004, equal to 2 in 2005, etc., "Crisis Dummy, 2009" is equal to 1 in 2009 and 0 otherwise. "Financial Turbulence" is an index that measures the degree to which a country has been affected by the crisis; a lower number indicates greater crisis intensity (Calderon and Didier, 2010). All models include country fixed effects and standard errors clustered at the country-level. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Variables	1	2	3	4	5
Crisis Dummy, 2009	0.281	-0.318**	-0.506	-0.229	-0.816
	[0.481]	[0.022]	[0.198]	[0.260]	[0.154]
Crisis09 *Log GDP per capita (2004-2007)	-0.110**		0.027		0.079
	[0.048]		[0.662]		[0.283]
Crisis09* PC/GDP per capita (2004-2007)		-0.005**	-0.006**	-0.006**	-0.007***
		[0.011]	[0.039]	[0.014]	[0.009]
Crisis09 *Financial Turbulence (2009)				0.383**	0.375**
				[0.026]	[0.034]
Trend	0.150***	0.150***	0.151***	0.176***	0.176***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Constant	1.653***	1.648***	1.666***	2.138***	2.138***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	510	510	504	332	332
R-squared	0.955	0.956	0.956	0.955	0.955
Adjusted R-squared	0.945	0.946	0.946	0.944	0.944