High Growth Entrepreneurship: A Multi-Level Perspective on Firm Growth and Growth Policy

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Abstract

Entrepreneurship is the force that drives economic, social and technical progress. A small percentage of firms (5%) is responsible for a disproportionately large amount of net job creation (>50%). Named *high growth firms*, these successful enterprises have been in the spotlight of research looking into the key drivers of firm growth and growth policy.

This dissertation explores high growth from multiple perspectives: at the level of the firm, by understanding how the definition of a high growth firm impacts its characteristics and expected performance over time; at the local level, by isolating the effect of political connections of firm performance and firm entry; and at the macro level, by observing the evolution of entrepreneurship during transition.

The first study finds that most HGFs are unable to maintain high growth rates for long, but do register lower volatility in growth rates and a higher chance of survival. Results on growth volatility and persistence vary significantly with the specific definition of "high growth" used as well as with the specific variable used to measure growth (e.g., revenue, employees, profit, productivity). These findings have direct implications for growth policies and programs that depend on identifying HGFs.

The second study indicates a strong significant effect of political alignment on revenue growth and firm entry. Larger firms take advantage of political connections for performance gains, while small firms are negatively impacted. Furthermore, alignment reduces entry into entrepreneurship by 8-11%. These findings establish political alignment and local-level business-politics collusion as important dynamics to consider when evaluating entrepreneurship policy in developing countries.

The third study describes the interdependence between entrepreneurship, institutions, and transitions. The case of Romania shows that the beginning of transition was characterized by an initial explosion of newly created private enterprises, followed by a declining trend in enterprise creation and, recently, by a new increase in entrepreneurship activity.

To conclude, this work contributes new perspectives towards a better understanding of high growth firms and growth policy. Policy implications are targeted towards transition and developing economies that have seen little representation in literature. The goal is to enable successful high growth policies across multiple levels.

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1 Introduction

Capitalist societies revolve around a few core principles of market dynamics: firm entry, growth, and exit determine the players that are active in the market; trade, competition and regulation are the forces that select the winners and losers. The more profitable and productive the economic agents are, the more wealth is being distributed in the economy. In essence, economic growth is the aggregate of individual firm growth.

Research in economics, innovation, strategy, and entrepreneurship has tackled each of these forces in the context of firm growth. What determines growth? How can we make firms and economies more suitable for growth? One of the first theories was proposed by Schumpeter (1934), who is considered the father of modern entrepreneurship research. "Creative destruction" is the process of reallocating resources (capital, employees, customers) from incumbents to innovative, disruptive startups. In the absence of innovation, the market would form a "circular flow" that exists in equilibrium. The entrepreneur is the hero who detects inefficiencies and, moving against the circular flow, enters the market to correct them, by introducing a new product, process, market, source of supply or industry organization. Therefore, new firms enter with a competitive advantage, while old ones operate under well-established practices with high inertia that makes them unable to adapt rapidly to changing market conditions. Old firms die, new firms grow and become more efficient incumbents, and the cycle repeats indefinitely. Ultimately, entrepreneurs are the key drivers of economic growth, by continuously increasing productivity through innovation.

Schumpeter's view is still very much valid today, maybe even more so. We observe industry disruptions on global scales, for example sharing-economy startups - Uber attempts to replace the taxi industry, while Airbnb takes on the traditional hotel business, and blockchain technology enables decentralized digital assets and financial marketplaces. The "creative destruction" process becomes evident in the light of recent backlash against these highly influential startups. The "circular flow" is massive, resistant to change and determined to block the entry of innovative competitors. If successful, entrants will dramatically reshape their industries and become the new dominant players.

In the same time, we are aware that a large proportion of new firms close in the first years of activity (only about 50% survive 5 years or more; from Small Business Administration reports). Therefore, not all entrepreneurs become agents of change, as Schumpeter would have us hope for. The factors that influence the entrepreneur's ability to transform his endeavor into a highly-growing, million-dollar business, are varied. These factors are related to the founding person or team - education, prior experience, motivation, personality, or the ability as entrepreneur and manager -, to the firm - size, age, industry, location, productivity, innovation, entrepreneurial orientation, or general strategy -, or to the ecosystem in which the business operates - regulatory environment, support structures, political context available financing, entrepreneurship policies and programs, or the entrepreneurial culture.

The businesses that succeed tend to have a significant impact on national economic growth. It has been shown that a small proportion of firms account for the majority of net employment growth (Acs, Parsons, & Tracy, 2008; Shane, 2009; Henrekson & Johansson, 2010; Stangler 2010), result confirmed with multiple combinations of countries, industries and definitions. In other words, only a handful of firms, named high growth firms (HGFs) or gazelles[1], are responsible for economic growth, by creating the majority of new jobs in the economy (in net terms, equal to the difference between jobs added and jobs destroyed). Following a power law distribution, this special category of firms represents only 5-10% of existing or newly created enterprises. "This concentration of impact potential is one of the more widely accepted 'truths' in entrepreneurship research and policy" (Autio & Rannikko, 2016).

This overwhelming consensus (Henrekson & Johansson, 2010; Mason & Brown, 2013) infused a change of perspective into policy research and practice. Shane (2009), in his piece contentiously titled "Why encouraging more people to become entrepreneurs is bad public policy," suggested that resources should be divested from creating more firms to creating "high quality, high growth" firms. This view is reinforced by reports from international policy research organizations, such as the OECD (Bosma & Stam, 2012), the Kauffman Foundation (Stangler, 2010) or Nesta UK (Brown et al., 2014). Government policies should be designed to support feeble enterprises and foster high growth. Good policies are rare, but can play a crucial role in the economic development of a country (see Jamaica vs Singapore example in Lerner, 2010).

[1] Gazelles has been increasingly used to refer to young high growth firms, at most 5 years old. To avoid any confusion, we will clearly distinguish between the two.

However, as Mason & Brown (2013) notice, Shane does not provide specific recommendations on what policy makers can actually do in this respect. They go further and note that in general research has concluded that HGF policies are needed, yet the proposals have been "bland," (Mason & Brown, 2013) lacking the depth to be of any help in defining these high growth initiatives. Most of current entrepreneurship policy is focused around promoting technology ventures or encouraging more people to become entrepreneurs. There are reasons to consider both efforts misdirected if the goal was high growth: HGFs are present in all industries and do not emerge exclusively or even disproportionately from high-tech sectors (Acs, Parsons & Tracy, 2008; Henrekson & Johansson 2010); more entrepreneurs does not imply more HGFs, if their motivation is not aligned - for example, necessity entrepreneurship or less educated founders have lower probabilities of success (Baptista, Karaöz, & Mendonça, 2014). Academic publications are starting to document successful programs for high growth firms, for example the NIY Programme in Finland (Autio & Rannikko, 2016) or the VINN NU subsidy program in Sweden (Soderblom et al, 2015). Lessons learned from these applications, together with a deeper understanding of HGF characteristics, should pave the way for more targeted recommendations in the future.

This dissertation adds to the existing knowledge of firm growth, high growth firms, and growth policy with three studies tackling the important gaps in current literature. It consistes of three papers. The first explores the incongruence in HGF definitions across studies and compares multiple specifications in order to evaluate the effect of the definition type on sustainable growth, volatility, and survival. The second paper observes the political context at local level, targeting unanswered questions about the influence of politics on firm growth and entrepreneurial entry. The third paper examines how entrepreneurship evolves in ecosystems where the market dynamics are not well established. Considering Romania as post-communist transition economy, the case study analyzes in depth the main characteristics of entrepreneurship during the 1991-2011 period and identifies key determinants. The final chapter summarizes the policy implications resulting from these three studies on firm-level growth, local-level entrepreneurship, and macro-level performance.

2 High and Sustainable Growth: Persistence, Volatility, and Survival in High Growth Firms

In most developed countries, high growth firms (HGFs) are disproportionately responsible for net job creation, yet there is little information about how well such firms sustain their performance over time. Using GMM on a panel of 79,200 Romanian firms from 2000-2012, this chapter evaluates the extent to which high growth firms register stable and sustained growth over time, accounting for a variety of definitions for "high growth" that have been used in academic and policy literatures. Results indicate that HGFs are unable to maintain high growth rates for long, but do register lower volatility in growth rates and higher chances of survival. Results on growth volatility and persistence vary significantly with the specific definition of "high growth" used as well as with the specific variable used to measure growth (e.g., revenue, employees, profit, productivity). These findings have direct implications for growth policies and programs that depend on identifying HGFs.

2.1 Introduction

High growth firms (HGFs) account for a disproportionately large amount of net job growth (>50%) in developed economies, even though they represent a small percentage of the total population of firms (<5%). Multiple studies have confirmed this relation, leading to a general consensus that understanding high growth firms is important for understanding national economic growth (reviews in Henrekson and Johansson 2010; Daunfeldt, Elert, and Johansson 2013). Policy-makers might better encourage economic development if they are able to identify, select, and support firms that are more likely to create, maintain, and nurture jobs for a sustained period of time. Helping *create* such firms with policy is an even broader goal (Acs and Szerb 2007). Consequently, entrepreneurship policy has shifted focus from creating *more* firms (increasing entrepreneurship) to creating *better* firms (increasing *high growth* entrepreneurship) (Shane 2009; Stangler 2010; Bosma and Stam 2012; Brown *et al.* 2014), hoping to facilitate economic growth.

Early studies of firm growth and entrepreneurship proposed the idea that entrepreneurs enter the market to correct inefficiencies, and succeed if they are able to capture resources from incumbents, simultaneously creating new firms and destroying old ones in an evolutionary process of "creative destruction" (Schumpeter 1934). Because of their young age and fresh take on the market, these successful startups end up being more productive (Lopez-Garcia and Puente 2009), more innovative (Sena, Hart, and Bonner 2013), and more adaptable (Smallbone *et al.* 1995). Although persistent superior performance is difficult to achieve under the pressure from the market (Wiggins and Ruefli 2002; 2005), firms that experience sustained high growth over time might be the strongest contributors to economic development.

There are a number of challenges that prevent firms from maintaining high growth rates over time. They must adapt their organizational structure to rapid expansion (Baum *et al.* 2001), address cash flow constraints (Oliveira and Fortunato 2006), cope with market regulation (Davidsson and Henrekson 2002; Acs and Szerb 2007), and defend against aggression from incumbents reacting to loss of market share (Porter 2008). Ultimately, the success of the firm is a function of the structure of the market, the strategy of the firm, and the resources available. For example, in a very competitive environment – common to new industries – firms rely on their competitive advantage to quickly capture market share from competitors before their momentum disappears (D'aveni 2010).

Another factor that determines whether firms will persistently yield high growth is the underlying definition of a high growth firm. The existing definitions can be grouped into two categories, where high growth is determined by performance either in consecutive time periods (Type 1), or over the entire time period (Type 2). An example of Type 1 definition is the one initially proposed by Birch, where a firm is classified as high growth if it experiences 20% yearly growth for at least 3 consecutive years (Birch 1979). A Type 2 example is selecting high growth firms as being among the top 5% of firms ranked by the difference in growth between the final and initial values. The different calculation methods imply that Type 1 HGFs are likely to have more predictable year-on-year growth, with lower volatility, while Type 2 HGFs will include one-time, non-replicable growth events, which inflate the average rate.

This research aims to understand how sustainable (or sustained) is high growth for firms that achieve such status. Additionally, we explore how the results depend on the definition and firm characteristics. We use a unique dataset on Romanian private enterprises between 2000-2012. Firm information includes demographic characteristics (size, age, industry, location) and balance sheet details (revenue, profit, assets, debt, equity). The analysis focuses on the indicators that were identified as most common in the literature - revenue, employees, profit, and labor productivity[2] - and uses multiple measures to verify consistency (absolute, relative, and index). High growth firms are selected using the Type 1 and Type 2 definitions, and future performance of each cohort is observed in terms of measures of sustained growth: persistence, volatility, and survival. We report the results by categories of size, revenue, age, and industry.

The Romanian context offers a unique opportunity to study a period with high growth, dynamic markets, and external shocks in a developing economy. The majority of the decade from 2000-2010 is characterized by high GDP growth in Romania, averaging over 6% for 2000-2008. In 2007, Romania joined the European Union, following a period of market reforms dictated by the EU requirements. In 2009, the global financial crisis severely affected the economy (-7% drop in GDP), leading to a 2-year recession period. The high variability in the environment conditions creates an opportunity to study how high growth firms evolve and adapt. Moreover, as previous studies of HGFs have been limited almost exclusively to developed

[2] Throughout the paper, "productivity" refers to labor productivity, measured as Revenue/Employees.

countries, findings from Romania create an opportunity to evaluate the applicability of existing results in settings with less developed infrastructure.

The nature of the HGFs identified in our sample is expected to be influenced by the structure of the Romanian economy, where small, family firms, with less than 10 employees are predominant (~70%). Nevertheless, this is common for European countries, and is comparable to the Swedish data used in previous high-growth firm studies, where the size distribution of firms is similar (Shepherd and Wiklund 2009; Daunfeldt *et al.* 2013). The significant difference is anticipated in the industrial composition. Romanian firms are more likely to be involved in less-knowledge-intensive services and low- and medium-tech manufacturing compared to more developed Western economies. The level of R&D spending and innovation capability is much lower in Romania (Radosevic, 2004), where the free-market framework is still in development as the country entered post-communist transition.

This work is structured as follows: Section 2 introduces the theoretical background on high growth firms and sustainable growth; Section 3 describes the sample selection and the methodology for selecting high growth firms and observing their performance in measures of sustainable growth; Section 4 illustrates and discusses the results for each measure; the paper concludes with Section 5, summarizing the implications of this study for growth policy and indicating the current limitations and proposing future directions for this field of research.

2.2 Theoretical background

2.2.1 Defining high growth firms

There are a number of reasons to expect the definition of HGFs to matter. First of all, the indicator (revenue, employees, profit, productivity, etc.) plays a key role, as there is no perfect correlation between two of them (Shepherd and Wiklund 2009). For example, revenue growth and employment growth are expected to show a lagged relationship, with firms more likely to grow in size in the period after it experienced revenue growth (Delmar 2003; 2006). In the case of productivity, Penrose (1959) observed that an increase in employees led managers to spend resources on unproductive tasks, resulting in a trade-off between employment and productivity growth. This suggests that firms with high employment growth may have low or negative productivity growth. On the other hand, evolutionary models of firm growth suggest that in a survival of the fittest world, the most productive firms will grow the fastest (Daunfeldt *et al.*

2013). Haltiwanger (2011) discusses the relationship between productivity and reallocation, emphasizing that business entry, exit, expansion and contraction, will lead to resources being reallocated to the most productive firms, resulting in a high correlation between size and productivity (more pronounced in Western economies like US, Germany, lower in Eastern European countries like Romania).

There are also multiple ways of measuring growth. The simplest and most widely used are the absolute (nominal change) and relative values (percentage change). However, absolute values favor large companies, which are more likely to have substantial changes in amount, while percentages are biased towards smaller firms. Two alternatives were proposed to address these issues: the Birch Index (hereafter just index) (Birch 1979), calculated by multiplying the absolute and relative values, and log-difference, the change in consecutive period log values. The index scales the absolute value to reflect the differences in initial size, while the log transformation normalizes relative growth rates. Log-differenced values can induce stationarity in longitudinal and time series data under the assumption that growth is a non-stationary stochastic process with trend (Bottazzi *et al.* 2007; Coad 2009).

On top of the large variety of growth measures, there are also several definitions for identifying high growth firms. Birch (1979), introduced the term "gazelle"[3] while referring to firms "growing at least 20% yearly for at least 3 consecutive years, with a base year revenue of at least $100,000" as being high growth. OECD and the EU (Eurostat 2007) have adapted this definition to account for variations around the 20% threshold by selecting firms that achieve a yearly average of 20% over 3 consecutive years, with at least 10 employees in the base year. Nevertheless, most studies take the more simplistic approach of selecting the top X% growing firms over the study period of Y years, where X can be 1, 3, 5 or 10% and Y usually varies between 1 and 7 years. The present paper will use Birch's proposal with yearly 20% growth for 3 years as an example of Type 1 definition, and Top 5% over the 4-year period for Type 2, and analyze the sensitivity of the results to the thresholds.

Previous research looking at the inconsistency of definitions across studies finds that different definitions select different firms. Delmar (2003) examined the growth of Swedish firms using 19 indicators of growth (e.g.: average annual change, standard deviation of relative

[3] The term "gazelle" has been predominantly used in recent literature to refer to young HGFs, less than 5 years old. We will make the distinction when necessary in order to avoid confusion.

change, number of growth years), classifying high growth firms into seven categories based on their patterns of growth. This author finds that firms classified as high growth according to one criterion are not high growth according to others, indicating that whether a firm is considered high growth is "very dependent on the growth measure used" (Delmar 2003). Shepherd and Wiklund (2009) examined the correlation between absolute and relative growth in five indicators (sales, employees, profit, asset, and equity) using all firms registered in Sweden between 1994 and 1998. They found that some pairs of growth measures show high correlations in the same time period (e.g.: absolute sales and absolute employees), while others did not (e.g.: relative sales and relative assets). Finally, Daunfeldt *et al.* (2013) proposed two new growth measures, value added and labor productivity, comparing them to traditional measures in both relative and absolute terms. Using the same context of Swedish firms, and selecting HGFs as the top 1% highest growing in a 3-, 5-, or 7-year timeframe, they found that firms selected on employment growth were inversely correlated with those selected on productivity growth. This suggests that policies promoting employment growth might come at the cost of reduced labor productivity growth, and vice versa.

2.2.2 Characteristics of high growth firms

The relationship between firm growth and size is usually interpreted in the context of Gibrat's Law, which states that growth is independent of size. There is evidence both for and against it (overviews of literature in Sutton 1997; Lotti *et al.* 2003; Acs *et al.* 2004), with results depending on the characteristics of the firm sample. When considering only large established corporations in manufacturing, there is significant support for the law. However, when introducing small firms into the sample, studies find that larger firms grow slower than smaller ones (Acs *et al.* 2004). In the manufacturing sector, growth (in terms of employees) is a requirement for avoiding failure, while in services, firms remain viable and can prosper even in the absence of growth. While small firms have been more commonly shown to have a higher frequency of HGFs, more recent reports indicate that high growth enterprises are present in all size categories (Acs *et al*. 2008). The results are inconclusive, possibly reflecting the use of different definitions.

Firm age, rather than firm size, is more commonly considered a determinant of rapid growth, with the majority of studies reporting that older firms experience slower growth (Dunne

and Hughes 1994; Daunfeldt *et al*. 2013). For example, Haltiwanger (2011) has shown that when controlling for age, the previously significant effects of size disappears. Another key finding is that the net effect of job creation and job destruction from startups remains positive. Additionally, small businesses that are not recent entrants have negative net job creation, thus indicating that a small firm is more likely to be a HGF if it is also young. Controlling for age leads to a reduction and even reversal of the negative relationship between size and net growth (larger firms have higher growth, given same age) due to high exit rates in small, young firms. We expect different HGF definitions and measures to have a significant impact on the structure of the subset of selected firms, therefore we propose the following:

Hypothesis 1. *The characteristics of a cohort of High Growth Firms depend on the definition, indicator, and measure used. We expect HGFs to be over-represented by:*

a. *Larger firms in Absolute measures, and Smaller firms in Relative measures*
b. *Larger firms in terms of Employees and Revenue, Smaller firms in Productivity indicators*
c. *Younger firms*
d. *High-tech firms*

Hypothesis 2. *Due to an inverse relationship between Employment and Productivity, we expect HGF cohorts selected based on productivity growth to register the opposite results and characteristics compared to those selected on Employees.*

2.2.3 Sustainable growth

We operationalize sustainable growth with a combination of three indicators: growth persistence (the correlation of growth rates over time); growth volatility (the standard deviation of growth); and firm survival (the last year the firm was present in the sample).

Persistence. Growth persistence is the autocorrelation coefficient of annual growth rates, calculated by regressing growth on previous period growth. Early studies indicated that large firms tend to have a positive autocorrelation of annual growth rates of about +30% (Ijiri and Simon 1967; Singh and Whittington 1975). Newer studies on larger samples found smaller magnitudes for the autocorrelation coefficient (Dunne and Hughes 1994), or even negative values (Goddard *et al*. 2002; Bottazzi *et al*. 2007), leading to the conclusion that firm growth becomes a zero mean random process after controlling for size and age (Holzl 2014). According

to Parker *et al.* (2010), sustained growth for a longer period requires the timely adaptation of a firm's organization and strategies; otherwise, fast-growing firms remain one-hit wonders. Coad and Holzl (2010) summarize that the growth of small firms is erratic, characterized by negative autocorrelation, while larger firms experience a much smoother growth, with positive persistence. Holzl (2014) studied the persistence, survival, and growth of Austrian HGFs, asking whether HGFs are one-hit wonders or sustainable growth companies. In his study, the answer depended on the definition used: OECD HGFs are unlikely to repeat a high growth event, while Birch Index HGFs are more persistent. Summarizing, we expect Type 1 definitions to be more likely to select larger firms that experience higher positive persistence, and Type 2 smaller firms, with zero or negative persistence. Firms in high-tech sectors experience more turbulence due to higher capital requirements, compared to services. We propose that, on average, high performance is an indicator of good product-market fit and strong management in HGFs compared to non-HGFs, thus HGFs will maintain a higher growth persistence.

Hypothesis 3. *High Growth Firms are more likely to have higher positive persistence of growth rates in periods after identification, compared to non-HGFs, with variation according to definitions and characteristics:*

a. Higher in Type 1 definitions, compared to Type 2
b. Higher for Absolute measures, Lower for Relative
c. Higher for Employees/Revenue, Lower for Productivity
d. Higher for Larger firms
e. Higher for Older firms
f. Lower for High-tech

Volatility. Volatility is closely related to persistence, as firms with high growth in one period of time may register low or negative growth in the next period (Delmar 2003). Volatility in firm growth is strongly connected with industry volatility and life cycles (Baptista and Karaoz 2011). The early, high growth, stages of an industry are characterized by high "replacement" entry and exit, with a stream of new firms trying their luck, while at later stages incumbents are displaced by new, more productive entrants. Growth in volatile industry environments may reflect managerial ability to make quick decisions, rather than a stable competitive advantage (Barringer *et al.* 2005). Volatile environments mean that highly productive, innovative firms may not survive because of a single bad decision while lower quality firms that are lucky to

survive longer learn from experience and improve organizational capabilities, becoming more productive. This implies that high volatility is positively related to higher chances of firm closure and that the surviving high growth firms will have lower future volatility compared to non-HGFs. In order to be selected as HGFs, firms must be active for a minimum period of time (4 years), which already eliminates many fragile young firms. Combined with the learning effect, HGFs will overall have lower volatility than non-HGFs. We expect the stability imposed by Type 1 definitions to reflect in a lower level of volatility, compared to Type 2. The variations on characteristics follow similar assumptions as in the case of persistence.

Hypothesis 4. *High growth firms are more likely to have lower volatility of growth rates in periods after identification, compared to non-HGFs, with variation according to definitions and characteristics:*

a. *Lower in Type 1 definitions, compared to Type 2*
b. *Lower for Absolute measures, Higher for Relative*
c. *Lower for Employees/Revenue, Higher for Productivity*
d. *Lower for Larger firms*
e. *Lower for Older firms*
f. *Higher for High-tech*

Survival. Firm survival is a central concern in the context of sustainable high growth, as firms will stop contributing to economic development once they shut down. Industrial organizations research (Gort and Klepper 1982; Klepper 1996) suggests that industries abide by a predictable evolution pattern, with massive entry in the early stages, followed by a shakeout period characterized by high exit rates and industry consolidation. As high growth firms are on average the result of more innovative, more persistent, and more adaptive approaches, they are more likely to be the survivors of such shakeout periods. Therefore, HGFs will survive longer than other firms. If lower volatility leads to higher survival, and we expect Type 1 HGFs to have lower volatility, they will also have higher survival rates. Larger firms are also in a more stable position to survive longer. High-tech firms should have higher survival rates, despite the high volatility, due to an embedded higher level of innovation (Agarwal and Gort 1996).

Hypothesis 5. *Volatility is negatively related to survival rates: Higher volatility leads to higher probability of exit.*

Hypothesis 6. *High growth firms are more likely to have higher survival rates in*

periods after identification, compared to non-HGFs, with variation according to definitions and characteristics:

a. *Higher in Type 1 definitions, compared to Type 2*
b. *Higher for Absolute measures, Lower for Relative*
c. *Higher for Employees/Revenue, Lower for Productivity*
d. *Higher for Larger firms*
e. *Lower for Older firms*
f. *Higher for High-tech firms*

In summary, high growth firms that have a combination of consecutive period rapid growth, positive autocorrelation coefficient, low volatility, and survive longest should be the most likely candidates for sustainable economic impact. We test whether this connection exists in the setting of the Romanian economy, across the different definitions of HGFs. We expect disproportionately better results for Type 1 definitions, absolute measures, Employees/Revenue indicators, and larger firms, with conflicting results for categories of age and industry.

Hypothesis 7. *High growth firms register higher growth "sustainability" – characterized by higher persistence, lower volatility and higher survival – when compared to non-HGFs, with variation according to definitions and characteristics:*

a. *Higher in Type 1 definitions, compared to Type 2*
b. *Higher for Absolute measures, Lower for Relative*
c. *Higher for Employees/Revenue, Lower for Productivity*
d. *Higher for Larger firms*

2.3 Data and methodology

2.3.1 Dataset description

The sample frame consists of Romanian firms active in the period 2000-2012. These data account for 1.1 million firms (about 70% of the population) and 6.7 million observations. The dataset is structured as a longitudinal panel, with multiple observations for each firm, one for each year of activity. The variables include demographics, constant over time (registration year, location, industry), and yearly financial reports (revenue, profit, employees). Firms in the database are coded to ensure anonymity. The database was assembled and provided by a private

company[4] that aggregates firm information from official sources related to the Romanian government, including the Ministry of Finance, the Registry of Commerce, and the National Agency of Fiscal Administration.

The scope of the paper is restricted to private enterprises, registered in Romania as limited liability companies ("SRL", equivalent to similar international denominations - "LLC", "Sarl", "GmbH"), representing 97% of all active firms. In order to avoid non-representative organizations with large government or export contracts, our analyses consider only small and medium enterprises (SMEs), excluding firms that at the beginning of the period (year 2000) have over 250 employees (0.3% of the total). Selection of high growth firms requires at least 3 growth periods, thus only firms active during each of the first 4 years are included (2000-2003). Furthermore, we fix the conditions for both selection and observation by ignoring any firms that entered the market after 2000. There are 233k firms that fit these restrictions.

We include only firms that have complete, consecutive-year information for Revenue, Employees, and Profit. The final sample consists of 79,200 firms and 861,000 observations. Due to the restrictions imposed (limited liability private SMEs, active for 4 years, no entry), our selection eliminates many of the outliers and data collection errors. This ensures a reliable comparison between HGFs and non-HGFs active in the same period and following the same restrictions. Summary statistics in the entry year (2000) for the original sample (239,000 firms in 2000) and the selected sample (79,200 firms) can be observed in the tables below. The samples have comparable statistics, with the final selection being better performing at the median, but with lower averages, due to outliers with high influence in the original sample (for example a maximum of 220k employees).

[4] SC BORG Design SRL, website www.listafirme.ro.

Table 2-1 Summary statistics for the original sample for all firms in entry year (2000)

	Age	Revenue	Employees	Profit	Productivity
Mean	6.4	588271	22.6	4340	49607
Min	1	.111	1	-8.63e+08	.165
Max	10	5.82e+09	220127	3.39e+08	6.13e+07
P25	4	9806	2	-692	8115
Median	7	39659	3	259	18219
P75	9	159677	7	3657	42454
Std. Dev.	2.7	1.67e+07	674.5	2939724	256540
Observations	238965	210221	155501	224028	153760

Table 2-2 Summary statistics for the final selected sample for all firms in entry year (2000)

	Age	Revenue	Employees	Profit	Productivity
Mean	6.67	457437	8.9	22229	55127
Min	1	6	1	-2.82e+07	.6
Max	10	2.40e+08	249	3.25e+07	6.13e+07
P25	5	30294	2	-662	10209
Median	7	91078	4	1257	22043
P75	9	291807	8	9872	49844
SD	2.56	2180707	18.66	317016	279424
Observations	79232	79232	79232	79232	79232

2.3.2 Selection strategy

The 13 years of data are divided into a 4-year period for *selection* (2000-2003) and an *observation* period for the remaining 9 years (2004-2012). During selection, we classify firms as high growth according to each of the HGF definitions, then we track performance of the resulting 20 cohorts. We apply the Birch definitions for Type 1, together with the top 5% growing firms in the selection period as an example of Type 2. Multiple growth measures are

compared - absolute, relative (percentage or logarithmic[5]), and index (absolute ∗ relative), in order to evaluate the sensitivity of the results to measurement choices. Our growth values report total growth at the level of the enterprise, the dataset does not distinguish between organic and acquired growth, or between various establishments of the same enterprise. We believe this limitation is minimal in the context of the Romanian economy, where mergers and acquisitions and SMEs with multiple establishments are rare. The OECD definition is included as a comparison benchmark for Type 1 and Type 2, being a special case that combines both situations[6].

2.3.3 Empirical strategy

Definitions are compared with respect to performance in measures of sustainable growth: persistence, volatility and survival. Variables for Revenue, Employees and (gross) Profit are provided by the dataset, while (labor) Productivity is calculated as the ratio between Revenue and Employees. All financial measures are converted to constant 2013 US dollars by using the yearly consumer price index provided by the Romanian National Institute of Statistics, and the average exchange rate for the year 2013. Results are reported both in aggregate and separated by size, age and industry, considering the entry values in year 2000[7].

Persistence. For calculating persistence, we define the autoregressive model of the growth rate with one lagged period as a dependent variable (AR(1)). After estimation, the autocorrelation coefficient (α) indicates the persistence of the growth rate from one period to the next. Growth rate is defined as the difference in logs for both Revenue and Employees, in line

[5] Percentage and log difference select the same firms, so we only report them once as the relative measure.
[6] OECD is a superset of Birch (it includes all Birch firms), and in the same time it is based on a total growth rate (at least 72% over the period), and not a yearly rate, thus being Type 2. Due to less restrictive selection rules, OECD HGFs are more numerous, reaching up to 12% in our sample. However, the standard OECD requires firms to have more than 10 employees, which would exclude 80% of our firms. We adapt it for the Employment indicator according to Clayton *et al.* (2013), by imposing an increase of at least 8 employees over 4 years for the firms that have less than 10 employees in the start year.
[7] We use 4 categories of sizes based on employment (1, 2-9, 10-19, 20-249 employees), and on revenue (4 quantiles of revenue), 2 categories of age (young (gazelles), ≤ 4 years, and old, > 4 years), and 4 industry types grouped according to NACE v2 (high and medium-high tech, medium-low and low tech, knowledge intensive (KI) services, less KI services; two industry groups are excluded and analyzed separately - wholesale & retail trade, and construction & utilities (electricity, gas, water, and waste management)). Size is the number of employees, Age - the difference between current year and the reported founding year, and Industry - the NACE v2 2-digit code. Additionally, we use location as a control, a categorical variable for the 8 development regions of Romania, as defined by the government: North-East, South-East, South, South-West, West, North-West, Center, Bucharest.

with the growth literature. The log transformation stabilizes the variance and the first difference removes time trends, inducing stationarity in our series. We include the factor variables for Size, Revenue Quantiles, Industry, Location, and Age as controls, alongside an identifier of the period (year dummies) and the continuous Year variable to reflect a trend (replaces the constant). However, all controls except for the Year and the Year dummies disappear in the differenced model, as they are constant for each firm.

$$GrowthRate(Revenue) = Log(Revenue_t) - Log(Revenue_{t-1})$$
$$GrowthRate(Employees) = Log(Employees_t) - Log(Employees_{t-1})$$

Autoregressive model:

$$GrowthRate_{i,t} = \alpha * GrowthRate_{i,t-1} + \beta * Controls + \gamma * t + \delta_t + \eta_i + v_{it}$$
$$\Delta GrowthRate_{i,t} = \alpha * (\Delta GrowthRate_{i,t-1}) + \gamma + \Delta\delta_t + \Delta v_{it}$$

Where:

α - autoregressive coefficient

Controls - vector of factor variables

β - vector of coefficients for the controls

t - the Year variable (2004..2012)

δ_t - year dummies

η_i - firm fixed effect

v_{it} - idiosyncratic error term

Due to the inclusion of a lagged dependent variable in the model, using traditional estimation methods such as OLS or fixed effects will induce major biases in the coefficients (positive omitted variable bias for OLS, negative Nickell bias for fixed effects (Nickell 1981). We estimate the autoregressive model using both the instrumental variables approach proposed by Anderson and Hsiao (1982), and the difference GMM method (Arellano and Bond 1991). The model is valid only over the observation period (2004-2012). The equation is restricted to the group of interest each time, therefore measuring the persistence only between the firms from the

same cohort. Additional conditions are included to separate values for categories of size, age, and industry.

Volatility. Volatility is measured as the standard deviation of the growth rate (Easterly, Islam and Stiglitz 2001). Under the assumption of stationarity, the standard deviation is a consistent measure for the variability of growth over time. Firm volatility is averaged for the observation period (from 2004 until the firm exits) and an aggregate comparison is made between the median volatility for each cohort of HGFs. Values are separated into 20 quantiles in order to observe the distribution of firms and the relationship between volatility and exit.[8]

Survival. Survival, or rather exit through closure, is indicated by the last year the firm was present in the sample. We also considered as closed the firms that have stopped reporting information even though they are still in the dataset (have missing data for all consecutive years until the end of the timeframe). We use a standard survival model to illustrate the results, reporting both the percentage of HGFs exiting compared to non-HGFs, and the estimated median lifespan, as predicted by the survival regression. We estimate the model for each cohort separately to obtain comparable values between definitions. The hazard ratio (ratio of the hazard rates for the case of being selected as HGF, versus not selected) is used to predict the median time-to-failure. The dataset includes information about the status of the firm at the time of the last update, which we use to exclude exit via mergers or acquisitions when reported as such.

2.4 Results

2.4.1 Selection of high growth firms

The evolution of each cohort of high growth firms depends on its composition. In turn, the composition is determined by the rules used for selection, in terms of definition, indicator and measurement. We observe the variations in group characteristics across categories of size, age, industry, and revenue quantiles.

Size. Firms with less than 10 employees represent about 80% of the HGFs selected with the Type 1 (Birch) and OECD definitions. The proportion is lower when using Employees as the indicator, 70% for Birch, and 50% for OECD. In the case of the Type 2 definitions (Top 5%), the ratio is highly influenced by the measurement: for absolute values, small firms account for

[8] We ran root-mean-square error (RMSE) regressions as a check.

40% of the cohort, while selection on relative growth increases the representation to 90%. The specific indicator used plays a role in determining the distribution. Small firms are more likely to have higher Absolute Productivity growth, but lower Absolute Employment growth.

Revenue Quantiles. Many of the HGF definitions impose a minimum starting revenue restriction. For example, the original Birch (Type 1) definition required at least $100k (Birch 1979). To paint the complete picture, we treat revenue as another measure of size, separated into quantiles, without eliminating any firms[9]. The results follow a distribution similar to the size categories based on employees, with small firms (in terms of Revenue) being more representative for Productivity growth, and large firms for Employment growth. Type 2 definitions are strongly influenced by the measurement type, with absolute values favoring larger firms and relative values favoring smaller firms.

Age. We consider young firms (or gazelles) the ones that are at most 4 years old at the start of the selection period (year 2000). The ratio of young firms ranges between 25-50%, depending on the combination of definition, indicator, and measure. Regardless, young firms are over-represented as HGFs, considering that there are 22% young firms in the sample. Revenue and Employees growth is disproportionately located in young firms (38% and 43% for Type 1, 43% and 40% for Type 2 Index), while Profit growth is a measure more favorable for older firms. Absolute values tend to disadvantage young firms, with lower representation than in Relative and Index terms, which is due to the fact that young firms are also more likely to be small. The results confirm the existing consensus that age is more important than size in the growth of revenue and employees, with gazelles being key performers in their respective cohorts.

Industry. Even though technology-based firms represent only 17% in the overall sample, they are over-represented in the highest growing firms in terms of Revenue, Employees, and Profit. The proportion reaches a maximum of 40% when measuring Top 5% Absolute growth. On the other hand, Productivity growth is more representative for services companies, with a maximum of 75%, above the sample rate of 67%. For Type 2 HGFs, Relative measures reduce

[9] At the start of the period, in year 2000: 1st quantile: 0-$30k, mean $15k, median $14k; 2nd quantile: $30k-$90k, mean $56k, median $54k; 3rd quantile: $91k-$290k, mean $168k, median $157k; 4th quantile: $291k-$240M, mean $1.6M, median $695k.

the discrepancies between industry types. The nature of the high-tech vs. services industries defines the firm's demand for increase in revenue and labor, or increase in productivity.

The variations in size, age, and industry of the firms selected by different combinations of definition, indicator, and measure suggests that the label *high growth firm* has been applied too loosely in the context of firm growth. The percentage of firms that are simultaneously selected in two groups usually ranges between 20-40%, while in some cases the sets are almost completely disjoint (Employees vs. Productivity). The correlation between Type 1 and Type 2 (Index) selections can be observed in **Figure 2-1**. Our results support Hypotheses **1** and **2**.

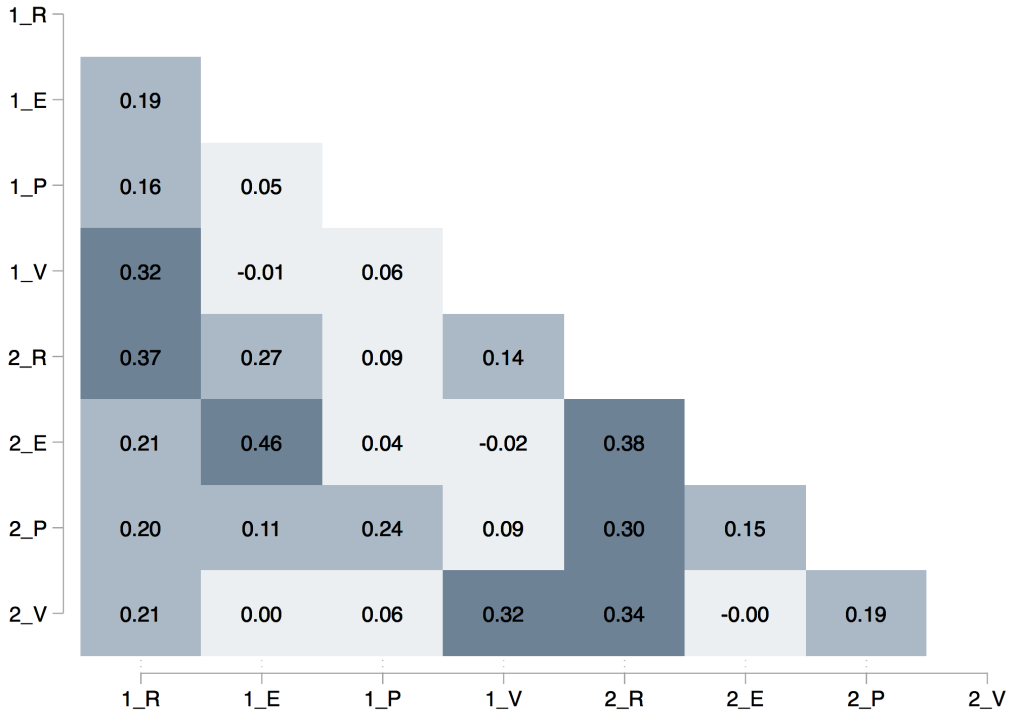


Figure 2-1 Correlation of selection between Type 1 and Type 2 definitions, for all indicators - Revenue (R), Employees (E), Profit (P), and Productivity (V).

Type 1 uses the Birch definition, and, in this instance, Type 2 uses Top 5% for the Index measure. The correlation coefficient is calculated for only one year, 2003. The results for using Top 5% with Absolute and Relative measures are similar to the ones presented here for Index.

	SELECTION		AGE	EMPLOYEES				REVENUE				INDUSTRY					
DEFINITION	Number HGFs	% HGFs	% Age<5	1	2-9	10-19	20-249	Q1	Q2	Q3	Q4	High Tech	Low Tech	KIS	Less KIS	W. & R. Trade	Con. & Util.
	in 2000	in 2000	in 2000	% out of HGFs				% out of HGFs				% out of HGFs					
ALL FIRMS	79,232	-	22.3%	16.9%	62.1%	11.7%	9.4%	25.0%	25.0%	25.0%	25.0%	1.4%	15.3%	8.2%	14.5%	44.8%	15.8%
T1 - Revenue	5,065	6.4%	37.7%	22.3%	58.6%	10.9%	8.2%	37.1%	21.6%	19.4%	21.9%	2.2%	18.7%	9.3%	16.7%	41.1%	12.1%
T1 - Employees	1,554	2.0%	43.4%	10.7%	58.8%	16.8%	13.7%	8.4%	16.8%	27.3%	47.6%	3.3%	28.3%	6.0%	12.2%	33.3%	16.8%
T1 - Profit	2,690	3.4%	25.6%	20.3%	63.0%	9.3%	7.5%	23.5%	29.1%	26.2%	21.2%	2.2%	16.3%	13.8%	11.9%	45.4%	10.4%
T1 - Productivity	2,178	2.7%	29.5%	14.9%	68.6%	9.1%	7.4%	54.2%	20.9%	14.7%	10.1%	1.0%	15.2%	10.5%	18.2%	40.3%	14.8%
OECD - Revenue	12,596	15.9%	32.7%	20.8%	59.1%	11.2%	9.0%	33.6%	21.8%	21.3%	23.3%	1.7%	17.7%	9.1%	15.7%	43.8%	11.9%
OECD - Employees	3,451	4.4%	37.1%	6.3%	45.3%	25.2%	23.3%	5.7%	11.7%	24.6%	58.0%	3.6%	30.6%	5.8%	11.1%	32.5%	16.5%
OECD - Profit	4,677	5.9%	25.6%	19.1%	62.1%	10.3%	8.6%	19.7%	27.7%	27.8%	24.8%	2.0%	15.4%	12.6%	11.7%	47.5%	10.7%
OECD - Productivity	6,656	8.4%	26.4%	13.4%	66.5%	10.6%	9.5%	44.0%	24.1%	17.6%	14.3%	1.3%	15.7%	9.5%	18.1%	42.1%	13.3%
T2 - Revenue - Absolute	3,961	5.0%	33.1%	4.6%	33.9%	22.8%	38.8%	2.0%	3.7%	10.7%	83.6%	3.3%	20.6%	4.3%	10.0%	46.3%	15.5%
T2 - Revenue - Relative	3,961	5.0%	46.8%	35.9%	54.0%	5.9%	4.1%	62.9%	19.6%	11.8%	5.7%	2.1%	19.2%	11.2%	16.2%	32.5%	18.7%
T2 - Revenue - Index	3,961	5.0%	43.1%	15.7%	45.5%	16.8%	22.0%	19.8%	14.3%	18.2%	47.7%	3.1%	21.1%	6.1%	11.5%	40.5%	17.7%
T2 - Employees - Absolute	3,764	4.8%	33.2%	3.2%	24.1%	21.7%	51.0%	4.5%	7.5%	18.0%	70.0%	3.7%	37.1%	6.9%	9.6%	21.6%	21.2%
T2 - Employees - Relative	3,197	4.0%	44.7%	45.9%	44.7%	5.8%	3.6%	23.5%	25.3%	24.9%	26.4%	2.4%	22.9%	9.0%	13.1%	32.1%	20.4%
T2 - Employees - Index	3,922	5.0%	40.6%	19.4%	40.1%	15.1%	25.4%	11.0%	16.0%	23.4%	49.6%	3.2%	31.7%	7.3%	11.1%	26.1%	20.6%
T2 - Profit - Absolute	3,961	5.0%	32.7%	6.6%	36.4%	19.3%	37.6%	4.9%	9.0%	18.9%	67.2%	4.5%	24.1%	10.9%	11.5%	31.3%	17.7%
T2 - Profit - Relative	3,961	5.0%	26.8%	26.1%	63.5%	6.5%	3.9%	40.1%	30.5%	19.9%	9.4%	1.8%	17.0%	13.5%	15.8%	37.5%	14.5%
T2 - Profit - Index	3,961	5.0%	32.8%	17.7%	52.4%	12.3%	17.6%	22.8%	22.5%	22.5%	32.2%	3.2%	21.0%	13.8%	14.5%	30.3%	17.2%
T2 - Productivity - Absolute	3,961	5.0%	32.2%	16.2%	60.5%	13.4%	10.0%	12.9%	17.7%	27.0%	42.5%	1.6%	9.7%	6.1%	11.3%	57.8%	13.6%
T2 - Productivity - Relative	3,961	5.0%	37.7%	21.7%	63.7%	7.5%	7.1%	65.1%	18.5%	10.4%	5.9%	1.5%	15.9%	11.4%	16.7%	35.1%	19.4%
T2 - Productivity - Index	3,961	5.0%	36.8%	20.1%	62.3%	9.4%	8.2%	38.4%	20.9%	20.1%	20.6%	1.5%	13.0%	8.5%	14.0%	46.1%	17.0%

Figure 2-2 Distribution of firms by Age, Size, Revenue Quantiles, and Industry in percentages of the total. The highest value for each column is highlighted in green, and the lowest in red.

2.4.2 Sustainability of growth

Persistence

Growth persistence reflects the ability of the HGF to keep its upward momentum after selection. We observe negative persistence coefficients across the board, with averages ranging between 0 and -10%. The only significant positive value is for Birch Revenue in the GMM estimation, of about 7%. The Arellano-Bond test for serial correlation gives non-significant results for the second and third lag in almost all cases (exceptions for Type 2 Productivity on Log Employees), suggesting that autocorrelation in errors does not pose a problem in our specification of the model. The main conclusion is that firms are likely to alternate a year of growth with a year of losses. We expect the results to also be influenced by the financial crisis, which imposed a loss on the majority of firms in year 2009, and a slow recovery afterwards. The lack of significance remains when disaggregating into subsets on size, age, and industry.

The lack of persistence in HGFs is confirmed when observing the yearly median growth for each group. After high positive rates in the initial selection years, the values are converging towards zero in the observation period, with a negative spike in the year of the financial crisis. Furthermore, we identify the firms from the initial HGF cohort that remain in the topmost quantile in terms of log growth for each year, and this persistence in representation also tends towards zero. Therefore, we find no support for Hypothesis **3**. This is consistent with results from Daunfeldt & Halvarsson (2015) that consider HGFs to be "one-hit wonders".

Table 2-3 Estimations of the AR(1) model using IV method. The model is estimated only for the years 2004-2012, and for each cohort individually.

(a) Log Revenue

	All Firms	Birch	OECD	Top5 A	Top5 R	Top5 I
Revenue	-0.0639***	0.0371	0.000687	0.0164	-0.0740***	-0.0129
	(0.00419)	(0.0216)	(0.0127)	(0.0251)	(0.0151)	(0.0184)
Observations	544493	39513	97755	31726	28016	30430
Employees	-0.0639***	0.0335	0.0246	-0.00390	-0.0440*	-0.0290
	(0.00419)	(0.0300)	(0.0227)	(0.0197)	(0.0179)	(0.0183)
Observations	544493	12378	27590	29195	23606	29959
Profit	-0.0639***	0.0127	-0.0149	-0.0729***	-0.0559***	-0.0747***
	(0.00419)	(0.0217)	(0.0169)	(0.0169)	(0.0135)	(0.0152)
Observations	544493	21269	36909	31264	29378	30659
Productivity	-0.0639***	0.0147	0.00714	-0.0294	-0.102***	-0.0775***
	(0.00419)	(0.0258)	(0.0159)	(0.0167)	(0.0162)	(0.0171)
Observations	544493	15484	48303	28607	26558	27462

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

(b) Log Employees

	All Firms	Birch	OECD	Top5 A	Top5 R	Top5 I
Revenue	-0.0764***	-0.0415***	-0.0565***	-0.0141	-0.0353**	-0.0189
	(0.00273)	(0.0100)	(0.00669)	(0.0206)	(0.0119)	(0.0156)
Observations	544493	39513	97755	31726	28016	30430
Employees	-0.0764***	-0.00247	0.00000256	-0.0560**	-0.0951***	-0.0728***
	(0.00273)	(0.0231)	(0.0195)	(0.0175)	(0.0130)	(0.0143)
Observations	544493	12378	27590	29195	23606	29959
Profit	-0.0764***	-0.0928***	-0.0911***	-0.00361	-0.0693***	-0.0466***
	(0.00273)	(0.0149)	(0.0116)	(0.0175)	(0.0122)	(0.0142)
Observations	544493	21269	36909	31264	29378	30659
Productivity	-0.0764***	-0.0212	-0.0297***	-0.0402***	-0.0564***	-0.0455***
	(0.00273)	(0.0148)	(0.00896)	(0.0117)	(0.0109)	(0.0107)
Observations	544493	15484	48303	28607	26558	27462

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

Table 2-4 Estimations of the AR(1) model for Log Revenue growth, using GMM method

(a) Log Revenue

	All Firms	Birch	OECD	Top5 A	Top5 R	Top5 I
Revenue	-0.0866***	0.0728***	0.0246*	0.00154	-0.0786***	-0.0286
	(0.00375)	(0.0156)	(0.0101)	(0.0180)	(0.0160)	(0.0164)
Observations	544493	39513	97755	31726	28016	30430
Employees	-0.0866***	0.0119	0.0134	-0.00180	-0.0487**	-0.0286
	(0.00375)	(0.0235)	(0.0167)	(0.0163)	(0.0157)	(0.0152)
Observations	544493	12378	27590	29195	23606	29959
Profit	-0.0866***	-0.0133	-0.0208	-0.0817***	-0.0654***	-0.0764***
	(0.00375)	(0.0162)	(0.0134)	(0.0143)	(0.0130)	(0.0139)
Observations	544493	21269	36909	31264	29378	30659
Productivity	-0.0866***	0.0177	0.0320*	-0.0545***	-0.126***	-0.0986***
	(0.00375)	(0.0205)	(0.0134)	(0.0151)	(0.0147)	(0.0153)
Observations	544493	15484	48303	28607	26558	27462

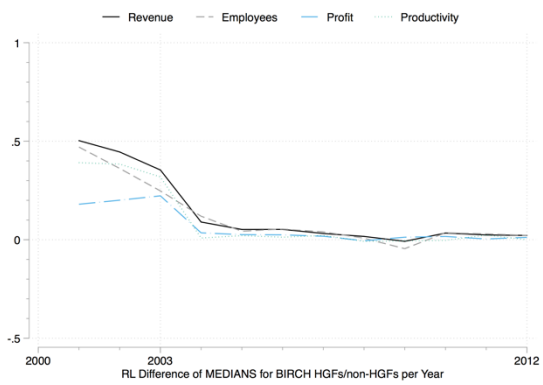
Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

(b) Log Employees

	All Firms	Birch	OECD	Top5 A	Top5 R	Top5 I
Revenue	-0.0870***	-0.0374***	-0.0621***	0.0249	-0.0452***	-0.00717
	(0.00247)	(0.00952)	(0.00602)	(0.0217)	(0.0105)	(0.0155)
Observations	544493	39513	97755	31726	28016	30430
Employees	-0.0870***	0.0256	0.0438**	-0.0119	-0.0763***	-0.0333
	(0.00247)	(0.0221)	(0.0167)	(0.0203)	(0.0156)	(0.0175)
Observations	544493	12378	27590	29195	23606	29959
Profit	-0.0870***	-0.0764***	-0.0856***	0.0192	-0.0633***	-0.0267*
	(0.00247)	(0.0125)	(0.00990)	(0.0163)	(0.0102)	(0.0124)
Observations	544493	21269	36909	31264	29378	30659
Productivity	-0.0870***	-0.0427**	-0.0469***	-0.0428***	-0.0672***	-0.0495***
	(0.00247)	(0.0132)	(0.00792)	(0.0101)	(0.00964)	(0.00926)
Observations	544493	15484	48303	28607	26558	27462

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

(a) Type 1 (Birch)



(b) Type 2 (Top 5%)

Absolute Index Relative

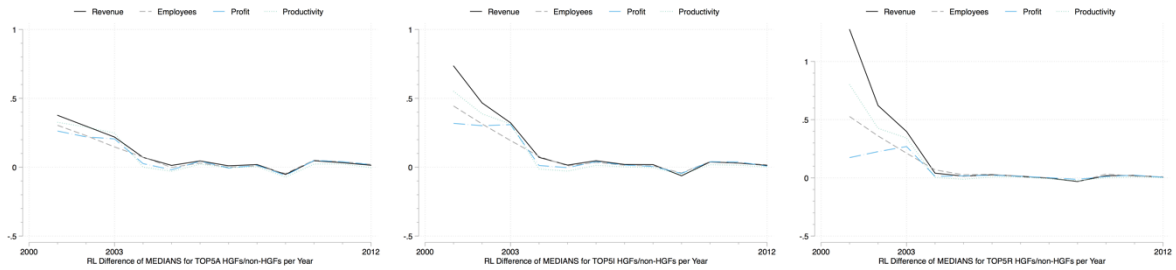
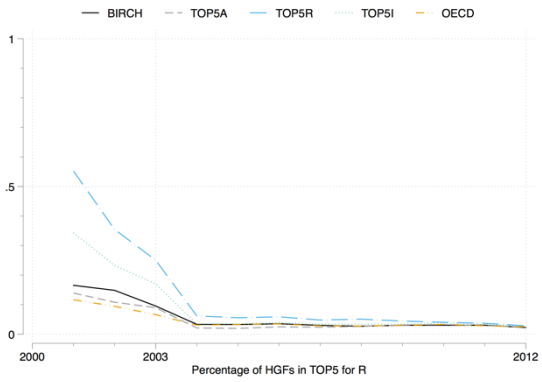
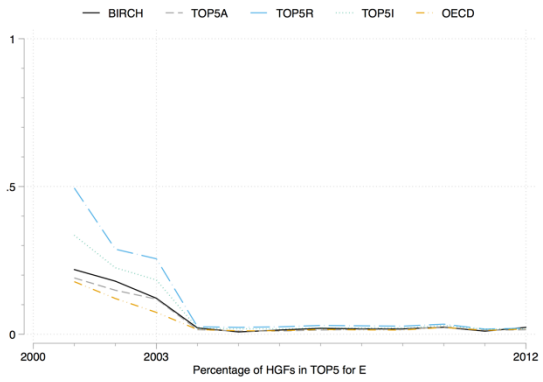


Figure 2-3 Difference in Medians of Log Revenue growth rates for HGFs compared to non-HGFs in each cohort of Type 1 (a) and Type 2 (b), yearly for all indicators.

(a) Revenue



(b) Employees



(c) Productivity

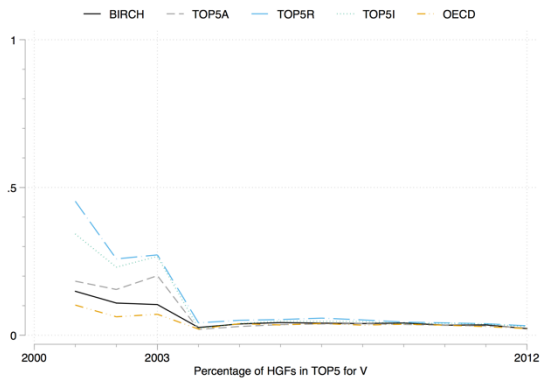


Figure 2-4 Percentage of HGFs that are included in the 1st Quantile (Top 5%) of growth in each year, for (a) Log Revenue, (b) Log Employees, and (c) Log Productivity. The percentage is calculated from the total number of HGFs for each cohort.

Volatility

Median volatility for a cohort of HGFs illustrates the level of growth variability that an average firm in that group is expected to show over a 9-year period, ignoring outliers on both sides. We observe a difference in medians that ranges from -30% to +30% when comparing the 20 selections of HGFs to the corresponding non-HGFs. The best performing definition is Type 2 on Absolute Revenue, while the worst values are for the Relative measure and the Productivity indicator.

However, the difference is not uniformly distributed across volatility quantiles. HGFs tend to be more concentrated in the lower half, while also showing smaller median volatility for the top half. The pattern of volatility distribution varies between Type 1 and Type 2 definitions, as we can see in **Figure 2-5**. In case (a), HGFs and non-HGFs have almost equal values in the first 7 quantiles, with the difference increasing as the quantiles increase. On the other hand, in case (c), Type 2 firms show almost constant difference over all quantiles.

We conclude that low volatility is indeed a characteristic of high growth firms, in support of Hypothesis **4**. The exception remains selection on Productivity, which will guarantee to select firms that are more volatile than the average. This is a reasonable result, in the sense that Productivity growth depends on the increase in the ratio of two measures, Revenue/Employees, and not necessarily an increase in both of them. A firm can still have a productivity increase even if the Revenues are falling, if it reduces its size by enough to keep the ratio higher than the previous period. Considering the patterns observed, Type 1 definitions are more reliable to select firms with lower volatility. Type 2 firms selected on Relative and Index yield results that are higher or equal to non-HGFs, thus Absolute growth appears to be the most consistent measure. After dividing the cohorts into additional layers of size and industry, it is observed that median volatility decreases with size, both in employees and in revenue, and is higher for firms active in high-tech industries. The illustrations are focused on Revenue growth. However, the results for Log Employees are almost identical, with the values being on average smaller by 20%, as firms can experience years with no change in the number of employees.

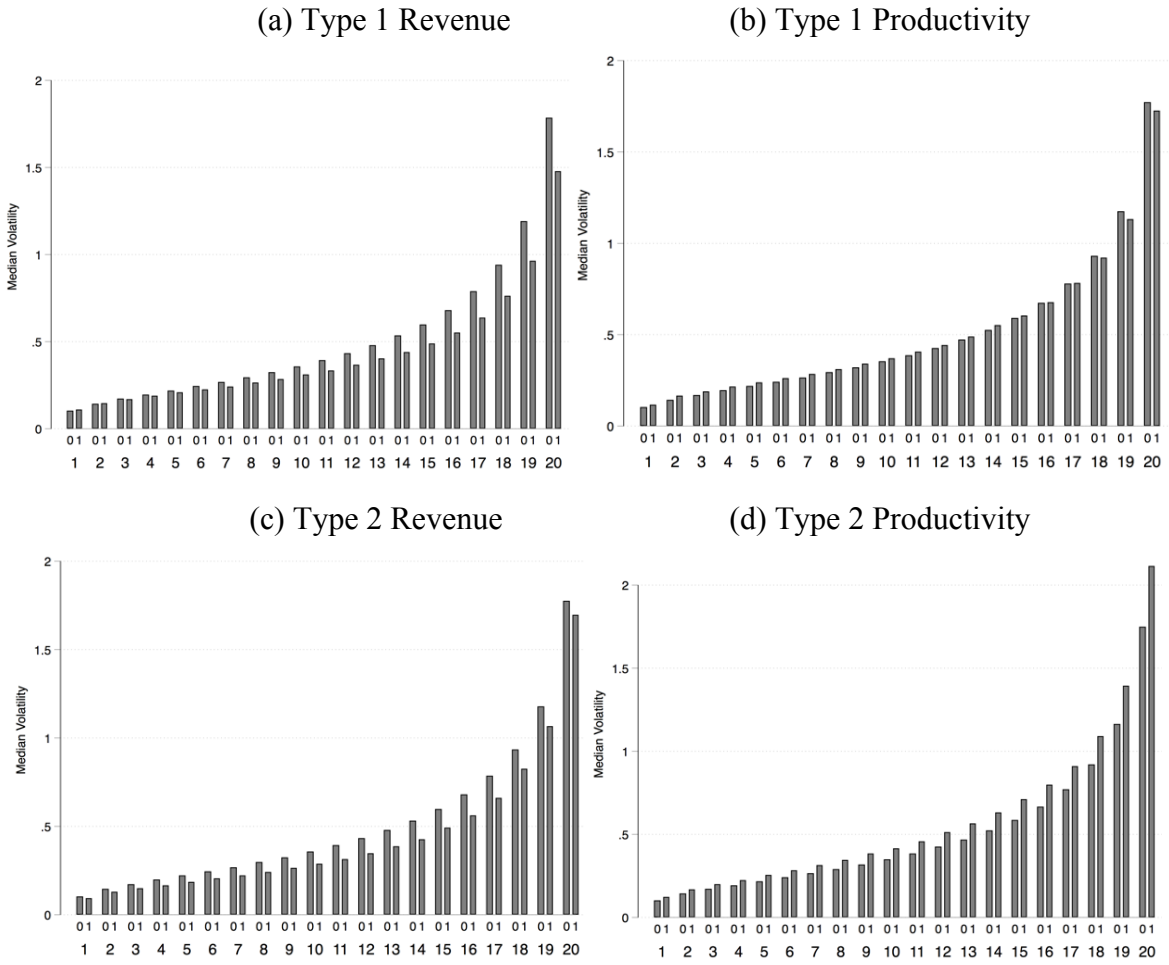


Figure 2-5 Median Volatility for Revenue Growth by Quantile (20), separated by HGFs (1) and non-HGFs (0), for selection on Revenue and Productivity, Type 1 and Type 2

Survival

Survival rates of HGFs are significantly higher than non-HGFs across all variations, with a maximum of 74% survival (24% exit), compared to the non-HGF rate of 53% (47% exit). The difference in percentages ranges from 14-21% in most situations, but it disappears to almost zero when using Productivity as indicator, or Relative measures. The combination of Relative Productivity is the only scenario that has higher percentage of exiting firms than non-HGFs, by 4%. There is no clear winner between the Type 1 and Type 2 HGFs. Exit percentages are lower for Type 2 on Revenue and Profit when using Absolute measures, whereas Type 1 has lower values for Employees.

Larger size and higher revenue correlates with better survivability. Predicting the median exit time using the survival model described in Section 3.3, firms with 1 employee have an average expected life of 10 years, which increases to 12 years for the next size group, 2-9 employees, to 15 years for 10-19 employees, and 17 years for 20-249 employees. An identical trend is observed over the four quantiles of revenue. High tech firms achieve the highest estimated values for life-span, with a record of 26 years for Top 5% Absolute Revenue. Across all definitions, the high-tech industries are consistently better performing, achieving the highest difference in survivability from non-HGFs, and positive values even in the case of Productivity. In terms of age, older firms appear to have a slightly higher survival rate, but only by 1-7%.

In conclusion, the probability of HGFs to survive longer the market is significantly higher than non-HGFs, unless they are selected on Productivity. Larger firms, and firms in high tech sectors, have lower risk of exit. We find support for Hypothesis **6**, except for item (a), as the difference is not significant.

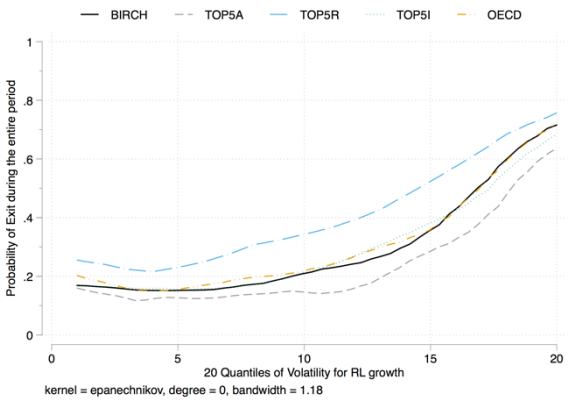
DEFINITION	EXIT PERCENTAGE			PREDICTED MEDIAN LIFESPAN		
	HGFs	non-HGFs	% Difference	HGFs	non-HGFs	% Difference
T1 - Revenue	31.8%	46.9%	-15.2%	12.8	9.7	31.0%
T1 - Employees	27.9%	46.3%	-18.5%	15.3	10.0	53.0%
T1 - Profit	29.5%	46.5%	-17.1%	14.5	9.8	46.9%
T1 - Productivity	44.3%	46.0%	-1.7%	10.7	10.0	6.5%
OECD - Revenue	32.7%	48.5%	-15.7%	12.7	9.2	37.9%
OECD - Employees	27.2%	46.8%	-19.6%	15.6	9.9	58.1%
OECD - Profit	29.3%	47.0%	-17.7%	14.4	9.7	48.5%
OECD - Productivity	41.7%	46.3%	-4.7%	11.0	9.9	11.9%
T2 - Revenue - Absolute	25.9%	47.0%	-21.1%	16.8	9.8	71.2%
T2 - Revenue - Relative	44.4%	46.0%	-1.7%	10.3	10.1	2.1%
T2 - Revenue - Index	32.4%	46.7%	-14.3%	14.0	9.9	41.8%
T2 - Employees - Absolute	31.1%	46.7%	-15.6%	14.0	9.9	41.0%
T2 - Employees - Relative	38.6%	46.3%	-7.7%	11.6	10.0	16.1%
T2 - Employees - Index	33.7%	46.6%	-12.9%	13.1	9.9	31.4%
T2 - Profit - Absolute	27.4%	46.9%	-19.5%	16.9	9.8	72.2%
T2 - Profit - Relative	38.7%	46.3%	-7.7%	11.7	10.0	17.2%
T2 - Profit - Index	32.1%	46.7%	-14.6%	14.0	9.9	41.7%
T2 - Productivity - Absolute	40.2%	46.3%	-6.0%	11.8	10.0	18.7%
T2 - Productivity - Relative	49.9%	45.7%	4.1%	9.2	10.1	-9.2%
T2 - Productivity - Index	45.6%	46.0%	-0.4%	10.3	10.1	2.2%

Figure 2-6 Survival percentages and predicted median lifespan for all HGF definitions

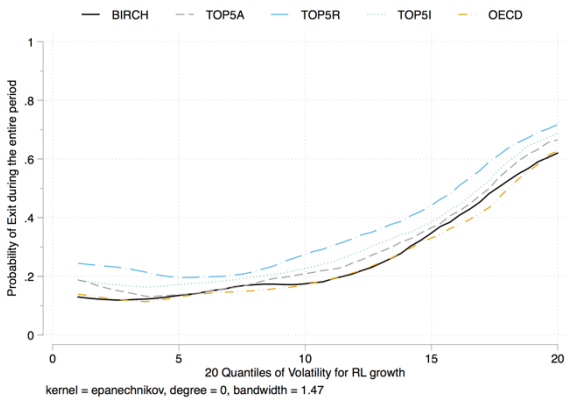
Volatility and Survival

Fluctuations in performance create uncertainty about the future, and thus increase the risk of failure. We test this assumption with a local polynomial smooth graph that calculates the probability of exit for each quantile of volatility (20). We observe an increasing trend that is valid for both Revenue and Employees growth (Fig. 6), with exit rates reaching 80% for the top 5% most volatile firms. This analysis shows strong support for Hypothesis **5**.

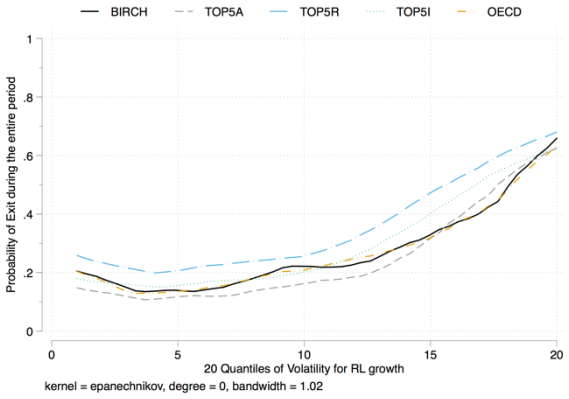
(a) Revenue



(b) Employees



(c) Profit



(d) Productivity

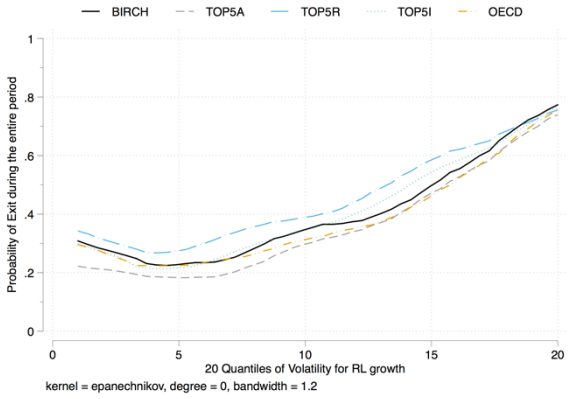
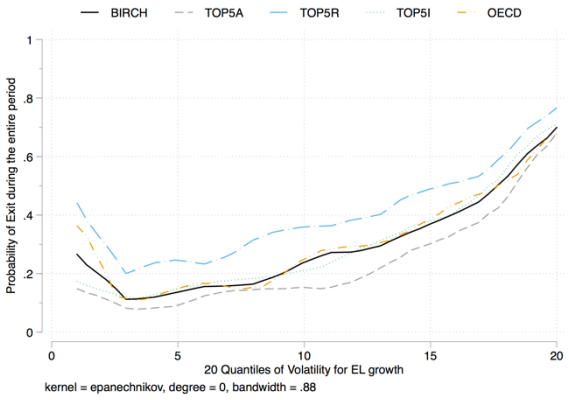


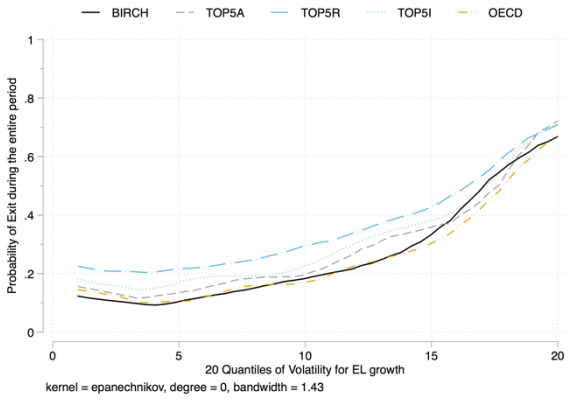
Figure 2-7 Exit probability by Quantiles of Volatility, for Log Revenue growth for each of the 20 definitions by indicator: Revenue (a), Employees (b), Profit (c), and Productivity (d).

Figure 2-8 Exit probability by Quantiles of Volatility, for Log Employees growth for each of the 20 definitions by indicator: Revenue (a), Employees (b), Profit (c), and Productivity (d). The higher exit rate in 1st Quantile for Log Employees compared to Log Revenue is due to high exit rates of firms that keep their size constant while other indicators increase. This is most pronounced when measuring Productivity.

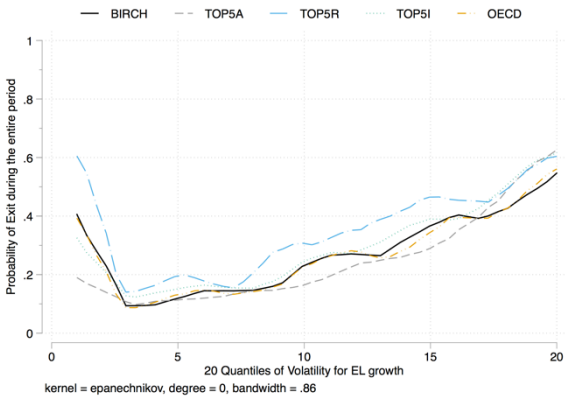
(a) Revenue



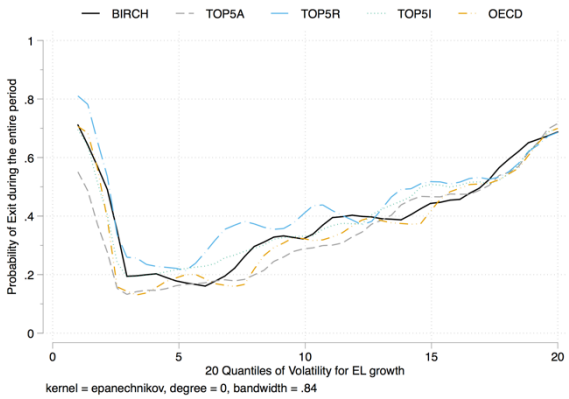
(b) Employees



(c) Profit



(d) Productivity



2.5 Conclusion

High growth firms have been under spotlight in the recent years, yet there are few consistent results on the expected future performance of HGFs. Furthermore, there is high inconsistency in the definitions and measures used, with studies choosing from a large range of possible options, depending on the constraints of the data. This paper explores characteristics of sustainable growth at the intersection of three variables - persistence, volatility, and survival - and in the context of multiple variations of HGF definitions.

The study selected 20 cohorts and observes their performance during a future period. The result suggests that HGFs generally have lower volatility and higher survival rates, but no greater persistence in growth. Larger firms are better performing in these measures, while high tech sectors are over-represented and survive longer as HGFs. Importantly, using Relative measures or Productivity as indicator leads to the disappearance of the differences between HGFs and non-HGFs, and even reversal, with HGFs being worse performing than non-HGFs. We found that results depend on the definition, measure, and indicator used, with HGF having on average better characteristics of sustainability than non-HGFs, with the exception of Productivity measures, in support for the combination of Hypothesis **2** and **7**. Furthermore, performing a sensitivity analysis on the selection thresholds[10] reveals that the more stringent the selection is, the higher the difference between definitions, indicators and measures, thus strengthening the results presented so far. From all possible combinations, we recommend avoiding Relative as a measure and (labor) Productivity as an indicator for selecting high growth firms.

Our results have a number of practical implications for design of government policies fostering entrepreneurship (see, for instance, Leitão and Baptista, 2009). Firstly, we have confirmed that Productivity and Employment growth are negatively related, as suggested by theory. This implies that if one is targeting productivity growth, it should consider the side-effects with respect to employment growth and the sustainability of the firms, and vice versa. A viable extension of this study is to consider under which circumstances a firm can achieve a sustainable increase in performance, while also improving its technological factor (productivity). For example, by defining HGFs on multiple dimensions, different aspects of growth can be

[10] 10% and 30% instead of 20% yearly growth for Birch, Top 1% and Top 10% instead of Top 5% for Type 2.

captured. Acs, Parsons and Tracy (2008) made an interesting suggestion in this regard with their proposal of a "high-impact firm" concept. The correlation of measures suggests that index values for employees or revenues should be preferred to absolute or percentage values. Additionally, a longer observation period could potentially reveal that firms that initially experience high Revenue or Employment growth subsequently enter a second stage characterized by Productivity increases. This would have a direct contribution towards economic development, and thus consolidate the recommendation that HGF selection should focus on Revenue or Employees, and not Productivity.

The lack of growth persistence suggests that HGFs are not able to maintain the same level of high growth in the future. Growth is non-linear and there is high replacement in the HGF cohorts every year. This has important consequences for the field, as it puts under scrutiny the importance of HGFs for economic growth, considering that their performance does not persist over time. If HGFs change every period and are dependent on the conditions of the timeframe, how can policy makers design programs that support the "correct" firms? There is already an ardent debate in the literature on the topic of *picking winners*, and if indeed the winners change every year, high growth policies must be neutral in their selection over time. One alternative is to avoid direct grants and subsidies to the firms, and focus on eliminating market friction with respect to regulation, bureaucracy, and access to finance, enabling the HGFs to self-select into a more (or less) sustainable path. Reducing labor restrictions and the cost of employment for the firm would reduce black market jobs, reduce unemployment, and spur the growth in Absolute Employees, of course at the expense of high Productivity statistics. Another mechanism would be the establishment of globally available resources for young businesses that can help manage the volatility associated with high growth – consulting offices for financial, legal, marketing, sales and other business-related aspects. This would create a platform for increasing the Absolute Revenue numbers, leading to higher quality HGFs.

Inevitably, the dataset used imposes a number of limitations on our analysis and results. Missing information has limited the number of firms available for analysis. Additionally, the implied restrictions on sample selection leads to a non-random sample. Firms have to be active for at least 4 years in order to be available for HGF selection, therefore results are biased towards survivors, which represent a high-performing sub-sample of firms. Secondly, we do not directly account for macroeconomic events or trends, and the economic crisis that happened in the

middle of the observation period of our study can distort the findings. Finally, we expect the Romanian economy to have special structural characteristics (corruption, labor laws) that would limit direct comparison with other results. High growth firms are likely to have unobserved growth determinants that are specific to the Romanian context.

This study has illustrated the variation in subsequent performance of HGFs based on different definitions. We argue that policy makers should be aware of the relationship between HGFs definition and growth characteristics. Hopefully, the results presented in this paper provide initial guidance, not only for policy makers, but also for researchers in the field. Accepting that not all high growth firms are created equal, we can continue our exploration of the key influencing factors for high performance.

3 Politics, Entrepreneurship, and Firm Performance in Cities

This chapter analyses the impact of political alignment between local and central governments on city-level entrepreneurship and economic performance. Using the setting of Romania during 2000-2011, a transition economy with weak institutions and major institutional change enforced by the European Union integration, the results indicate a strong significant effect of alignment on revenue growth and firm entry. Larger firms take advantage of political connections for performance gains, while small firms are negatively impacted. Furthermore, alignment reduces entry into entrepreneurship by 8-11%. These findings establish political alignment and local-level business-politics collusion as important dynamics to consider when evaluating entrepreneurship policy in developing countries.

3.1 Introduction

Evidence on the impact of cities in the development of human capital, skills, and creativity has been steadily accumulating in academic literature over the last decade (Glaeser & Mare, 2001; Florida, 2005; Florida, Mellander, & Stollarick, 2008; Glaeser & Resseger, 2010; Glaeser, Ponzetto & Tobio, 2014; Florida, 2014). The topic is becoming increasingly relevant, as the United Nations estimates that 54% of the world's population lived in urban areas in 2014 (up from 30% in 1950), a number that is projected to reach 66% by 2050 (United Nations, 2014). Recent open borders and free trade agreements among large blocks of countries, such as the European Union, have promoted inter-city competition for creative individuals and entrepreneurs. In this context, local authorities, policies, and networks are reshaping the nature of economic development, reinforcing the need for research that combines economics, urban development, and political economy to better understand the interdependence between cities and local and regional development.

Prior work has shown a strong link between a city's per-capita income and population growth (Kuznets & Murphy, 1966; Chenery, Syrquin, & Elkington, 1980; Jones & Koné, 1996; Fay & Opal, 2000; Henderson, 2010). Following seminal research by Jacobs (1969), many researchers have concluded that cities represent a vital source of economic growth (Lucas, 1988; Quigley, 1998; Duranton, 2000; Fujita & Thisse, 2002), focusing on the enhanced industrial efficiency and productivity that results from geographical agglomeration of individuals and businesses. The likely mechanisms include economies of scale, knowledge spillovers, lower information and transaction costs, stronger competition, and the existence of a wider pool of high-skilled workers.

One of the most important elements linked with the growth and economic success of cities and regions is the level of entrepreneurial activity. Glaeser, Rosenthal, & Strange (2010) suggest that regions with a higher supply of entrepreneurs – therefore with more small firms – tend to attract new ventures due to agglomerative spillovers like input sharing, labor pooling, and the opportunity to learn from their neighbors in the same or a related industry. Empirical analysis on startup location from Figueiredo, Guimarães & Woodward (2002) illustrates that the preference for agglomeration in the entrepreneurs' home region derives from exploitation of local access to sources of capital and specialized labor (Dahl & Sorenson, 2009; Michelacci &

Silva, 2007), while Buenstorf & Klepper (2009, 2010) relate local agglomeration with the generation of employee spinoffs by successful local incumbents. Feldman & Zoller (2012) and Kemeny, Etheridge, Feldman, & Zoller (2015) highlight the value of local social and professional networks in generating a greater local supply of entrepreneurs. According to Chinitz (1961), New York's greater success, as opposed to Pittsburgh, is linked to a more abundant supply of entrepreneurship. Entrepreneurs often influence the fate of a local economy, while they are also influenced by the local features, creating a virtuous circle that places entrepreneurship at the heart of local development (Glaeser, Rosenthal & Strange, 2010). Consequently, investigating the growth of regions and cities is an important undertaking, especially for developing countries.

Regional performance in terms of employment growth has been consistently found to be highly correlated with the presence of a multitude of small firms, and therefore with entrepreneurship (see for example Acs & Armington, 2006; Feldman, Francis, & Bercovitz, 2005; Glaeser, 2007; Rosenthal & Strange, 2010; Chatterji, Glaeser, & Kerr, 2014). Glaeser, Kerr, & Ponzetto (2010) proposed a model to test several possible origins for this stylized fact and found empirical support for Chinitz (1961), who claimed that the supply of entrepreneurs differs across space. Despite the abundance of arguments explaining disparities in the supply of entrepreneurs between cities and regions, and evidence showing the positive effect of start-ups on subsequent local employment and productivity growth (see, for instance, Fritsch & Mueller, 2004; Baptista, Escária, & Madruga, 2008; Aghion, Griffith, Howitt, & Prantl 2004; 2009), it remains unclear how entrepreneurship makes cities grow, and what factors make entrepreneurship thrive at city level.

In particular, explanations referring to local politics and policies are often disregarded by the literature and empirical evidence supporting this relationship is scarce, despite its potential explanatory power. Given the importance of the urban environment in economic development, there has been surprisingly little research examining city-level government institutions and economic development. It is the purpose of the present paper to contribute towards filling this void.

Corruption, cronyism, and political interests often influence local development policy initiatives, as well as institutional mechanisms, especially in developing economies like the Eastern European countries. Yet Eastern European cities seem to have the largest

entrepreneurship rates in Europe (García, 2014). Political misalignment between local and national government can lead to delay and bottlenecks, while aligned cities would receive favors. A study on political turnover in Ukraine has shown that productivity of firms increased by more than 15% in regions most supportive of the new president, compared to those most against, in the three years following the election (Earle & Gehlbach, 2015). This suggests the existence of interdependence between political power of public institutions and performance of the private sector, leading us to consider that the economic output of cities in developing economies is significantly dependent on the political alignment of local and national governments.

The case of Romania is particularly interesting. Exiting 42 years of communist rule in 1989, the Romanian economic and political situation remains affected by the structure imposed under the communist regime, even after 27 years of free-market democracy. This period combined major international achievements, such as entering NATO in 2004 and the European Union in 2007, with a plethora of corruption scandals and regressive policies. Romania maintains its designation of transition economy, as it has not managed to fully achieve the expected post-communist strength of the rule of law, justice system, and independent state. Similarly, it remains a developing country, competing with Bulgaria for the last position in most economic indicators of the European Union. This situation has generated an excellent growth opportunity, with Romania rapidly catching up with the other countries in the region (e.g. Poland, Hungary), following significant financial support from the EU. The economy experienced high GDP growth before and after the financial crisis, consistently reporting the highest rates in Europe, with 6-8% in 2006-2008 and more recently 4.8% in 2016 (World Bank, 2017) and 4-5% expected yearly for 2017-2019 (European Commission, 2017). This influx of wealth equally created a setting that fostered illegal behavior for individuals in positions of power. Crimes such as favoritism in EU fund allocation, rigged auctions for public contracts, or preferential avoidance of regulations and fines, escaped unpunished in a politically-influenced justice system. Romanian industrial production capacity has been decimated after the rushed (and debatably illegal) privatization of the major state-owned factories. Whether by necessity or opportunity, entrepreneurship (and self-employment) emerged as a career alternative, Romanian economy constantly maintaining high firm creation rates, with high percentage of young firms achieving high growth (Mitusch & Schimke, 2011). Taking into consideration these elements, we believe the setting of post-communist Romania gives an excellent framework for

investigating the relationship between politics, entrepreneurship, and growth.

The paper explores the influence of local government in Romanian cities by examining whether firms have increased performance in cities where local leaders are members of the national governing party. City mayors, often holding majority control over the city council as well, have direct decision power over allocating budgets, approving local investments, or selecting contractors, which is immediately reflected in the smaller-scale economies of non-capital cities. Access to the flow of capital positions city mayors and local political leaders as "gatekeepers" in redistributing public spending towards private businesses. There is a strong incentive to pick favorites under the prospect of receiving in return money, favors, or political support for re-election.

While these local political dynamics are likely to occur independently of the political party controlling local governments, we expect political alignment to create a stronger power position for the aligned politicians. Support (or lack thereof) from national-level institutions is often used as a selling or threatening point in the public-private business relationships. Leadership positions for all institutions are appointed politically following each election cycle. Furthermore, a significant part of local budgets is subject to redistribution from central government, which in the case of non-alignment can be delayed, subjected to additional oversight, or not granted in full.

We also anticipate that collusion between politics and business at local level has a negative impact on entrepreneurial entry rates, by increasing real or perceived barriers to entry, as authorities are more likely to protect local incumbents from market instability brought about by increased competition that could lead to increases in unemployment rates in the short run (Fritsch & Mueller, 2004; Baptista, Escária, & Madruga, 2008).

Individuals considering entrepreneurial entry will perceive political capital (i.e. networks with local authorities) as a necessary requirement for establishing local enterprises (Elfring & Hulsink, 2003; Greve, 1995; Kim & Aldrich, 2005; Stuart & Sorenson, 2007). Local competition is stifled with unfair advantages and local monopolies in high revenue industries (Cox, 1993; Yeung, 2000). Overall, entrepreneurial culture in developing and transition societies is reduced due to the perception that business success without political support is unachievable. In a 2001 World Bank survey on the perceived level of corruption in Romania (Anderson et al., 2001), 53% of enterprises responded that all or almost all of the parliament officials are corrupt, 41%

agreed to the statement for local elected officials, and 34% for local administration. In the same survey, 28% of enterprises reported they encountered bribery during the past 12 months and deemed it necessary.

Empirical findings from a combined firm and city panel dataset on 91 Romanian cities between 2000-2011 indicate that our hypotheses are strongly supported. There is a significant effect of political alignment, in favor of large firms, and to the disadvantage of small firms. Average growth rates are 4% higher for large firms (100-250 employees) in aligned cities. In the same time, entrepreneurial entry is 11% lower when considering new firms per last year's active population, and 8% for new firms per existing firm stock.

Next section discusses in more detail the interdependence between entrepreneurship and local development, and how local-level politics is expected to drive firm performance and city entrepreneurship.

3.2 Theoretical background

3.2.1 Impact of entrepreneurship on local development

Linking entrepreneurial activity and local employment growth is an important theme for economic development literature. Acs & Armington (2004) use data on 394 local economic areas and six industrial sectors in the U.S., and find that differences in the level of entrepreneurial activity are positively associated with variations in employment growth rates. Glaeser, Kerr, & Kerr (2015) use historical mines as an instrument for entrepreneurship in U.S. cities and find a persistent link between entrepreneurial activity and city employment growth, suggesting that entrepreneurship plays a key role in modern urban growth. Glaeser, Kerr, & Ponzetto (2010) reach a similar conclusion, revealing that a 10% increase in the number of firms per worker in 1977 is correlated with a 9% increase in employment growth in 1977-2000.

Clear empirical proof for the positive impact of new firm formation on local-level employment has been relatively scarce for other countries than the U.S (Fritsch & Mueller, 2004). Ashcroft & Love (1996) find a strong association between firm formation and net employment change in Great Britain during the 1980s, and Mueller, Van Stel, & Storey (2008) show that new firm formation has a positive impact in high enterprise counties of Great Britain, and a negative impact in low enterprise counties. Davidsson, Lindmark, & Olofsson (1994) use

data on the case of Sweden and find that small firms are an important contribution to new jobs, while firm formation has a significant impact on regional economic well-being. Andersson & Noseleit (2008) also use data on Sweden between 1994 and 2004, looking at the effect of start-ups on employment growth and finding both a direct and an indirect positive effect. In the case of Portugal, Baptista, Escária, & Madruga (2008) also find direct and indirect effects of new business formation on economic growth, with the indirect effect being at least as important as the direct one. Focusing on West German planning regions during 1986-89, Fritsch (1997) does not find a significant relationship between entrepreneurship and employment growth.

Other papers suggest that the creation of new firms can also have a negative impact on regional employment, and that these indirect effects, which stem from the crowding-out of competitors and the increase of competitiveness, are of greater magnitude than the direct positive effects on employment at regional level (Fritsch & Mueller, 2004). Audretsch & Fritsch (2002) argue that the lack of clarity regarding how the creation of new firms influences regional development may stem from the long time-lags of the effects, while the existence of such lags is confirmed by Van Stel & Storey (2002) in their analysis of British regions. As explained by Baptista & Preto (2011), there is a common pattern found in many studies investigating the link between firm formation and employment growth: first, the creation of new firms has a small direct positive effect on employment, followed by a negative effect generated by the crowding out of inefficient firms, and then by another positive indirect effect that emerges as the consequence of the growth of successful entrants.

Using other measures for regional economic development, results suggest the same positive relation between entrepreneurship and the growth of regions. Audretsch, Belitski, & Desai (2015) employ data on 127 European cities between 1994 and 2009 and examine the link between new start-ups and economic development measured GDP per capita in PPP in these cities, finding that there is an immediate positive impact of new start-ups on the economic development in cities of various sizes. Audretsch & Keilbach (2002) introduce ‘entrepreneurship capital’ in the context of a production function model estimated for German regions, proving that entrepreneurship capital is an important element influencing the productivity and output of regions. Aghion, Griffith, Howitt, & Prantl (2009) connect firm entry with productivity growth by showing that incumbents in technologically advanced industries will increase their innovation

to counter the threat of new entrants, while entry will have the opposite effect in laggard industries because it reduces returns to innovation.

3.2.2 Impact of local development on entrepreneurship

Social interaction inside cities promotes the flow of ideas, resulting in an environment that fosters learning, innovation, and productivity (Jacobs 1969, 1984; Glaeser et al., 1992). Marshal (1920) argues that idea flow enhances innovation, implying that entrepreneurs will come together and learn from each other, while Jacobs (1969) emphasizes that new ideas are the source of entrepreneurship. The ability to easily generate and transfer new ideas is one of the main benefits of agglomeration, as argued, for instance, by Saxenian (1996), who discusses how Silicon Valley was created as a result of the unobstructed flow of ideas. Glaeser & Kahn (2001) highlight that skill-intensive industries are relatively centralized because of the importance of idea flows in dense urban centers, while Carlino, Chatterjee, & Hunt (2007) illustrate that employment density in cities is positively related to per capita invention rate.

Glaeser & Kerr (2009) study local determinants of manufacturing startups across U.S. cities and industries, finding that demographics and local customers and suppliers have limited explanatory power, while new firms seem to prefer locating in areas with many small suppliers. Their empirical analysis also reveals that abundant workers in relevant occupations are also a strong predictor of firm entry. The size of the city is also important, with larger cities being favorable to firms that could benefit from economies of scale, which also protect lenders and workers (Helsley & Strange, 1990). Duranton & Puga (2001) develop a discussion on diversification vs. specialization of cities, and argue that depending on the stage of a product's life cycle, one type of city or another will be chosen. Diversified cities are suitable for early stages, while specialized cities are preferred for mass-production. Entrepreneurship also follows natural cost advantages, i.e. natural environments more suitable for a specific business, which may also lead to higher entry rates (Ellison & Glaeser, 1999; Glaeser & Kerr, 2009).

Apart from the positive effects of agglomeration, literature has focused on additional explanations for differences in the level of entrepreneurial activity. Acs & Armington (2004b) find that firm formation rates in the U.S. differ with the proportion of adults with college degrees, especially for those industries where the founders are required to hold a college degree.

Glaeser (2007), Combes & Duranton (2006), and Dahl & Klepper (2007) confirm that labor supply plays a critical role in driving entrepreneurship, as entrepreneurial activity increases in places with an appropriate labor force, while Helsley & Strange (2010) argue that in order to foster entrepreneurship there must be a complementarity between the skills of the entrepreneur and the local resources.

Another factor influencing entrepreneurial activity refers to entrepreneurial culture. Whether it refers to a reduced fear of failure (Landier, 2005), or to the fact that the existence of a strong entrepreneurial sector encourages further entry as it supports the development of an adequate context (Glaeser & Kerr, 2009), researchers describe how certain cities simply share an entrepreneurial culture (see, for instance, Saxenian, 1996 for Silicon Valley, or Lamoreaux, Levenstein, & Sokoloff (2004) for Cleveland at the beginning of the 20th century). Empirical evidence in this respect has been provided by Davidsson (2006), who investigates values and beliefs considered to be connected to entrepreneurial intention among the population of six regions within Sweden, finding that, although not very large, cultural differences exist and affect the regional rates of new firm formation.

Similarly, local social networks represent a driving factor for entrepreneurial activity. There is ample evidence that social capital shapes and influences entrepreneurial ecosystems (Stuart & Sorenson, 2007), through various mechanism: knowledge diffusion, access to financial capital, access to human capital, geographic clustering, to name a few. Even more so, specific individuals inside the network have been identified as possessing critical roles, referred to as gatekeepers or dealmakers (Feldman & Zoller, 2012). Feldman & Zoller (2012) observe how the local presence of such dealmakers is a strong indicator of higher startup rates and more successful entrepreneurship. While the role of the dealmaker can vary in size and scope, from being just an "information broker" to actively shaping the network structure as a "network architect", from introducing new knowledge to enabling access to venture capital investors, the term usually refers to individuals that are active in business and entrepreneurial networks, centrally connected to a large number of firms in the same time. Politicians and political leaders are rarely included in the discussion, as they are expected to keep a safe distance from the free-market activities. Throughout this paper, the term "gatekeepers" will be used to refer to individuals in public leadership position that have the power to influence the stream of capital and opportunities from public budgets to private enterprises.

3.2.3 Impact of local policies and politics on local-level entrepreneurship

How local public policies and programs influence entrepreneurial activity is an important topic yet less explored in literature. Becker & Henderson (2000) have documented the unintended consequences of an air quality regulation involving the annual designation of county air quality attainment status in the U.S., whose negative effects involved a shift in the industrial structure towards less regulated firms, and a decrease in firm birth. Using county-level data for the New York State between 1980-1990, List et al. (2006) also find that environmental regulation strongly reduces the formation of new plants, influencing their location decision. Similarly, Bertrand & Kramarz (2002) investigate zoning regulation in French retail trade. Since 1947, in France the creation or extension of a large retail store has to be approved by regional zoning boards, whose prohibitive approval decisions and deterrence of entry reduce new firm entry and increase large retail chains' concentration, with negative effects on employment growth. Moreover, local sales tax rates also influence the location of retail activity (Agrawal, 2016).

If, in certain situations, public policy discourages entrepreneurship, the lack of public intervention may also have negative consequences on entrepreneurial activity. Hymel (2009) documents the negative impact of traffic congestion on employment growth in the U.S., concluding that policies focused on improving public infrastructure can encourage the development of local economies. Sweet (2011) shows that congestion slows down the growth of cities, inhibits agglomeration economies, and shapes economic geographies. Rosenthal and Ross (2010) look at the impact of violent crime on firms' location and entrepreneurship in five U.S. cities, arguing that local rates of violent crime influence the location of businesses, leading to one location decision or another also depending on the type of industry. The fact that neighborhood conditions affect firm relocation has also been acknowledged by Weterings (2012), who analyses this phenomenon using data on firm relocations between 1999 and 2006 in the Netherlands.

In most instances, policies are encouraging business entry and entrepreneurial activity, with entrepreneurship policy receiving special attention (Gilbert, Audretsch, & McDougall, 2004; Audretsch, Grimm, & Wessner, 2004; Leitão & Baptista, 2009). High levels of decentralization enable local leadership to define independent short-, medium-, and long-term strategies for turning local advantages into unique national and global competitive positioning.

Feldman & Martin (2005) synthesize the concept of "constructing jurisdictional advantage," observing how closely it resembles the process of securing competitive advantages in the corporate world. Local jurisdictions are under the control of local political leaders (mayors, city councils, state governors), who have incentives to push forward growth agendas for pleasing the constituents, gaining political capital, or increasing visibility. This is observed globally with bold policy agendas ("Imagine Boston 2030"; "Sustainable Sydney 2030"; similar plans released for most major cities, and even medium and smaller ones), and with local initiatives that are specifically targeted on entrepreneurship.

Motoyama *et al.* (2016) provide an interesting study of the development of a local entrepreneurial culture, by examining the case of Chattanooga's (Tennessee) mayor promoting innovation through public-private collaboration. A dedicated task force ("Chattanooga Forward Task Force") commissioned by the mayor was responsible with identifying and implementing growth policies adapted to local resources, leading to the creation of the "Enterprise Center", a semi-public entity that manages the Innovation District. After being named "the dirtiest city in the US" in the 1960s and 70s, Chattanooga managed to rebound, and is now an attractive migration destination for high-quality, entrepreneurial people.

The situation stands differently when the local policies are determined less by a public-benefit growth strategy and more by political allegiances and personal gains. This is often the situation in developing, emerging, and transition economies, where weak institutions are unable to guarantee private rights and entrenched political figures dominate the flow of capital, with the power to affect the free market. Corruption is a mighty force in low-income developing countries due to established cultural norms and high regulatory burdens that create opportunities for rent seeking by "gatekeepers" (Feldman & Zoller, 2012). Moreover, such societies are also inclined to use the exchange of favors as a valuable currency in the daily business and private activity, especially in smaller, provincial, non-capital cities, where social networks are tight and include relatively few wealthy enterprises and entrepreneurs. Even in established economics we observe a strong indication that local growth strategies are the product of networking between politicians and businessmen, where the institutional complicity between local governments and industry associations serves as a conduit for local political and economic strategies, as discussed in the case of Austin, Texas (Smilor, Gibson, & Kozmetsky, 1989; Long 2009), and the industrial districts in Italy (Pyke, Becattini, & Sengenberger, 1990; Trigilia, 1986; You & Wilkinson, 1994;

Camuffo, 2003). In the case of Italy, the strong social and political context, defined by the regional political subculture, the strong kinship network, and the important role of small artisans and unions in the local community, had a direct impact on the evolution of industrial districts. When the collaboration between local government and local incumbents turns to cronyism and protectionism, as it is likely to be the case in a transition economy with weak institutions, it leads to organizational inertia and barriers to entry that have a negative impact on growth.

Few works have focused on the effect of politics on local-level entrepreneurship, particularly in transition countries. Evidence on the role of politics for entrepreneurial success has been provided by Earle & Gehlbach (2015), who analyzed the impact of political turnover on economic performance in Ukraine, as a result of the unanticipated political change brought about by the 2004 Orange Revolution. They show that the productivity of firms in the regions that were most supportive of the new regime increased by over 15% in the first three years after the revolution, compared to the productivity of firms in most of the regions against it. Diwan, Keefer, & Schiffbauer (2016), conduct a similar analysis with data on 385 politically connected firms in Egypt under the Mubarak regime. Here, policy shift in early 2000s in Egypt fostered the expansion of crony activities, allowing the entry of crony firms into new sectors.
Researchers have explored the benefits of political alignment between local and central public administration showing that politics are often used as criteria for the allocation of funds and other benefits from the central government to cities and regions, albeit the implications of this issue for entrepreneurial activity can be drawn only indirectly, from the impact on other entrepreneurship determinants. For instance, Miguel & Zaidi (2003) present evidence that education funding can be higher in districts controlled by the governing party in the case of Ghana, which has a direct impact on human capital, while Brollo and Nannicini (2011) argue that, in Brazil, municipalities that support the president receive more funds for infrastructure financing in periods before elections.

3.2.4 Political alignment, city entrepreneurship and firm performance

This paper seeks to expand current understanding on the influence of politics on city entrepreneurship and firm performance. We explore the notion of political alignment between local and central governments as it directly involves the channeling of resources, power projection, and legitimacy from national to local level. Political alignment can translate into

higher local budgets, more investments, new development projects, faster approvals, lower bureaucracy, direct entry to Ministries, and similar advantages. If there is a financial benefit for the local budget from being aligned, our assumption is that the additional funding will be reinvested in the local infrastructure (even if not in its entirety), thus having a direct or indirect impact on the growth of the local economy. On a personal level, businessmen in aligned cities are more likely to find the right connection, either locally or nationally via a local relation, and open the door to new growth channels for their business: tax incentives, building permits, real estate development. With easier access to financial and political capital, we expect aligned cities to have better performance on average, meaning higher average growth rates for incumbent firms.

Hypothesis 1 (H1): *A city's political alignment has a positive effect on the growth performance of established firms.*

In order to fully take advantage of such opportunities, the firm requires an established infrastructure and a non-trivial absorptive capacity (Zahra & George, 2002). In general, newly created enterprises will be too volatile, too constrained, too "new" (Freeman, Carroll, & Hannan, 1983; Singh, Tucker, & House, 1986) to effectively conspire with local elected officials for private gain, compared to older incumbents. Additionally, it is expected that a fraction of established local business leaders played a role in supporting the politicians during their election campaigns before reaching the current leadership positions. For those that have a vested interested in the political game, their newly appointed "gatekeeper" friends are now in the position of having to repay their debt.

Therefore, our second hypothesis is that political alignment will benefit first and foremost firms that: 1. are large enough to manage expansion; and 2. have been large enough to support political candidates. Local government will care more about a firm the greater the volume of employees so as to avoid political instability brought about by unemployment. Moreover, the longer a firm is active in the local ecosystem, the more time it has to increase its legitimacy (Delmar & Shane, 2004). Obtaining legitimacy with external stakeholders reduces the hazard of exit, with local government being an important stakeholder.

Hypothesis 2 (H2). *A city's political alignment has a disproportionate positive effect on the growth performance of larger and older firms.*

The theoretical framework presented so far suggests that political alignment will drive up firm revenue growth, especially for larger firms. Such established firms can invest their gains into strengthening their competitive position towards new entrants, projecting a stronger market position. Additionally, in case there are incumbent firms that are receiving direct favors from local political connections, it would result in unfair advantages that distort the natural market dynamics. We expect these anti-competitive practices to translate in monopoly positions and aggressive expansion at local and regional levels in most developing and transition economies. Entrepreneurial culture would suffer as well, especially in places where it is incipient, with would-be entrepreneurs being discouraged by the image of a corrupt ecosystem eroding social trust in institutions (Welter, 2012). This increases barriers to entry (which can be real or perceived), leading to a reduction in entrepreneurial entry. As a result, we expect political alignment to have a significant negative effect on firm entry.

Hypothesis 3 (H3): *A city's political alignment has a negative effect on city-level entrepreneurial entry rates.*

Upcoming section will introduce the political context of Romania during 2000-2011, our empirical setting for evaluating the impact of political alignment.

3.3 Political context in Romania

The evolution of Romanian politics is a worthy case study in itself. The country has been struggling to escape from the shadow of the communist remnants - the conservative mentality, the institutional inertia, or the ubiquitous political apparatus - and it can be argued that it has not yet succeeded. The middle-aged employed tax-payers have not fully healed the scars of the bloody revolution, while the majority of the retired population is nostalgic about the security of the state-controlled existence. This clash of social classes can be seen in the political spectrum as well, with liberal-democrats targeting business owners and educated income earners, and social democrats appealing to pensioners as a massive unitary voter base. However, their policies do not follow the standard expectations. Liberals have increased taxes in parallel with adopting austerity measures after the financial crisis, while the socialists have been more pro-business and recently issued multiple tax reductions. The irregularity of Romanian politics, coupled with the highly fluctuating macro-economic situation during 2000-2011 leads to an attractive setting for evaluating the role of politics in local development and economic growth.

Romania is governed as a semi-presidential, representative democratic republic with the prime minister being the head of government and the president the head of state. The prime minister is appointed by the president, but voted in by the bi-cameral parliament. Legislative elections for parliament and local administrations occur every 4 years, with a summer session for local elections (May/June) and a winter session for the parliamentary elections (December). The election rounds relevant for our dataset are 2000, 2004, and 2008. Presidential elections are offset since 2004, when the presidential term was from 4 to 5 years. Political parties often organize coalitions before the elections to combine their voter base. If the winning party does not have majority (i.e. won <50% of the seats), multiple parties will associate after the elections to form the government.

Local elections will elect separately (separate ballots in the same time) the members of the county council, the county council president, the local council, and the city mayor. It is possible to have the mayor and the council majority be from different parties, nevertheless this is a rare scenario due to the user base being inclined to vote for the same party in both elections. Romania is territorially subdivided into 41 administrative counties that are managed by county

councils and a county council presidents (similar to US state governors). County administration is seated in the county capital with is usually its largest city.

Initial years after 1989 have been highly unstable, as the country was experiencing an abrupt socio-economic transition from communism to democracy. However, during the 2000-2011 timeframe we are analysis, there have been only 4-5 major parties with enough political support to consistently win representation in the parliament:

- Left-wing conservative Social Democrat Party (PSD), which is considered the successor of the Communist Party that ruled Romania for 42 years. PSD attracts a constant voting base of 40-45%, skewed towards older and rural population.
- Right-wing liberal National Liberal Party (PNL) is the only party with a strong political tradition before the communist era. PNL was originally founded in 1875, dismissed in 1947, and re-established in 1990. In recent years, it has seen a decline due to poor leadership, with voter share ranging widely between 15% and 35%.
- Centre-right conservative (Liberal) Democratic Party (PD / PD-L) is another right-wing party that has been first in partnership and afterwards in conflict with PNL. They united and won the elections in 2004 as a coalition. Afterwards they separated and a PNL splinter group merged with PD to form PDL. Ultimately, after the demise of its leader and Romanian two-term president Traian Basescu, it fully merged into PNL in 2014.
- Hungarian ethnical minority party Democratic Union of Hungarians in Romania (UDMR) with a constant ethnical base of 6-7%.

It should be mentioned that political ideologies are less strict for Romanian political parties than is traditionally expected. As example, during the 2012 election, the largest left-wing party (PSD) and the largest right-wing party (PNL) formed a majority coalition that received 58% of the popular vote.

For the 3 time periods contained in our analysis timeframe the ruling parties were PSD for 2001-2003, PNL (+PD) for 2005-2007, and PDL for 2009-2011. During 2005-2007, we consider both PNL and PDL as being aligned with the central government since they have entered the elections as a single party, and only later separated. UDMR is treated as always aligned because it has joined the governing coalition after every election since 1996. We test alternative specifications of the alignment variable that would be subject to interpretation (e.g. UDMR as not aligned; PD as not aligned) and the results remain consistent.

We continue with presenting the dataset on Romanian firms and cities, the selection strategy for constructing the sample, and the empirical strategy for testing the hypotheses.

3.4 Data and methods

3.4.1 Firm and city multi-level panel

The data used in the present research were obtained from multiple publicly available sources on the characteristics of firms, cities, and election results. The resulting multi-level firm and city panel allows us to test our hypotheses on firm performance and city-level entrepreneurial entry. The original firm-level dataset includes 1.1 million firms and 6.7 million observations for the period 2000-2012, with detailed information on firm demographics and financial measures. It was obtained from a private company that aggregates public information about Romanian firms from official sources, such as the Ministry of Finance, the Registry of Commerce, and the Official Monitor. Observations with missing information on employees, revenues, or industry represent about 30% of the sample and are excluded since our variables of interest cannot be computed. These missing data are concentrated in firms from the that have exited (closed, suspended, or liquidated). These observations would not have been included in our sample selection that considers only firms active for the entire period.

Our sample timeframe consists of 3 periods: (1) 2001-2003; (2) 2005-2007; (3) 2009-2011. The years when elections take place (2000, 2004, 2008) are not taken into consideration for the alignment measure, because local and central government elections take place at different times during the year, resulting in variation during the year. Growth rate and firm entry for 2001, 2005, and 2009 will still be computed using the firm-level data from the previous year in order to avoid losing additional degrees of freedom.

Election results are collected from public information available from the Romanian Electoral Authority (RO AEP). Data is available for all local administrative units (UATs), of which 308 are identified as “cities” or “municipalities” (larger cities) based on the 2000 designation. City status has been updated over time for UATs that pass the population threshold, and since 2006 the number stands at 320. In our selection, we consider the highest achieved level during the observed time period (2000-2011). National ruling party is coded as the political party of the prime-minister, which is, as mentioned, PSD for Period 1, PNL+PDL for Period 2, and

PDL for Period 3. Except these three, local parties can also be UDMR, Independent, or Other. City-level statistical information on population is appended from the public portal of the Romanian National Institute of Statistics (INS). We do not include the capital city Bucharest in our analysis due to its disproportionate economy compared to the rest of the country and its administrative division into six separate sectors.

3.4.2 Measures

Firm performance is measured as the year-on-year growth rate for log revenues. The original values for revenue have been converted from local currency into constant 2013 USD, using the consumer price index (CPI) reported by INS, and the average currency conversion rate for 2013. Firm size categories are coded based on the number of employees reported during that year: (1) 1-9 employees; (2) 10-49 employees; (3) 50-99 employees; (4) 100-249 employees. This corresponds to the standard classification of small and medium enterprises (SMEs). We split the largest group with an additional cut at 100 employees to increase resolution for larger firms. We report in Appendix B the sensitivity analysis for using a different cutting point for group (3) (e.g. 50-80, 50-120).

Entrepreneurial entry is calculated in two ways to ensure the variation in city size is accounted for in a comparable way, with both the stock of firms and population. A firm is marked as newly created if during its first observation in the sample, the official registration year matched the current year of the observation, or if the difference is one year. If firms register in year T (e.g. December), but only start and report their activity in year T+1, they are marked as new for year T+1. The number of new firms are then summed per city and year. Our first measure divides the total number of new firms in a city by the total number of firms in the previous period present in our sample (i.e. firm stock, similarly aggregated by city and year); the second, by the active population in the previous year (i.e. number of employed individuals in that city, as reported by INS).

Political alignment is derived from matching the party affiliation of the winners of local elections (city mayor) with those of national elections (prime minister). We use the mayor in order to determine the political orientation of local level leadership, as the mayor holds most of the decision-making power. Similarly, we use the party affiliation of the prime minister to indicate the ruling party, since the prime minister would not be confirmed without a majority of

parliamentary votes. The political alignment measure is represented as an indicator variable for whether the party of the mayor is identical to the party of the prime minister in a certain year. In case a smaller party has joined the governing coalition during that period, we correct the indicator manually and mark it as aligned.

3.4.3 Selection strategy

After matching the firm panel with the election results using a unique city-year identifier, the remaining sample consists of 261,299 firms from 91 cities. Our firm category of interest is SMEs that have demonstrated an inclination towards growth. We model that by eliminating firms that have a maximum of one employee across their entire activity, which we believe to be a vehicle for self-employment (as opposed to genuine firms). We also exclude firms that at any point have crossed the 250-employee barrier for being considered SME. Firms must have at least 2 periods in the sample in order to calculate growth rate. The final sample consists of 203,603 firms with 959,559 observations over 9 years for the 3 periods.

For measuring the effect on firm performance, we select a sub-sample that has complete information for the entire 12-year timeframe (2000-2011), implying constant 9 observations for each firm (sub-sample referred to as N12). The N12 sub-sample contains 25,418 firms. Results remain consistent when using the entire sample for growth rates, and even indicate higher effects due to higher growth rates of newer firms. We report N12 results as they enable higher comparability between cities due to the constant firm sample, but we also include the alternative results in Appendix B. To calculate entry rates, we use the entire sample, which includes 87,209 new firms, and aggregate the values for each city-year, resulting in a city-level panel, with 91 cities and 9 observations per city.

3.4.4 Summary statistics

Table 3-2 presents summary statistics for firm growth, with values separated by political alignment and firm size categories. **Table 3-2** reports similar statistics for entry rates. Cities can change alignment after the two elections (2004 and 2008), therefore we include a summary of the number of aligned and non-aligned cities for each period.

Table 3-1 Summary statistics for Log Revenue Growth, separated by political alignment and firm size categories. Alignment at firm level is subject to change every 3 years and size category every year.

dlnR	Non-Aligned	Aligned	Total
		All Firms	
Mean	0.01534	0.00721	0.01156
Standard Error	0.00142	0.00150	0.00103
Firms (Period 1)	13,950	11,468	
Firms (Period 2)	13,107	12,311	25,418
Firms (Period 3)	13,806	11,612	
Observations	122,589	106,173	228,762
		Firm Size 1-9	
Mean	0.00292	-0.0047	0.00063
Standard Error	0.00180	0.00192	0.00131
Observations	84,478	72,959	157,437
% from All Firms	68.9%	68.7%	68.8%
% from Total 1-9	53.7%	46.7%	100%
		Firm Size 10-49	
Mean	0.03819	0.02858	0.03371
Standard Error	0.00236	0.00248	0.00171
Observations	32,592	28,511	61,103
% from All Firms	26.6%	26.8%	26.7%
% from Total 10-49	53.3%	46.7%	100%
		Firm Size 50-99	
Mean	0.07156	0.05248	0.06277
Standard Error	0.00729	0.00694	0.00507
Observations	3,819	3,263	7,082
% from All Firms	3.1%	3%	3.1%

% from Total 50-99	54%	46%	100%
		Firm Size 100-249	
Mean	0.06771	0.08831	0.07716
Standard Error	0.00894	0.01152	0.00716
Observations	1,700	1,440	3,140
% from All Firms	1.38%	1.36%	1.37%
% from Total 100-249	54.1%	45.9%	100%

Table 3-2 Summary statistics for city alignment and entry rates. Entry rates are calculated both on previous year firm stock and active population. Entry rate by active population is reported multiplied by 100, meaning number of new firms created for each 100 employed citizens in previous time period.

	Non-Aligned	**Aligned**	**Total**
Cities (Period 1)	39	52	91
Cities (Period 2)	47	44	91
Cities (Period 3)	53	38	91
Observations	417	402	819
	Entry Rate (Stock)		
Mean	0.0962	0.0971	0.0967
Standard Error	0.00255	0.00271	0.00186
Mean (log)	-2.4836	-2.4774	-2.4805
SD (log)	0.0266	0.0279	0.0192
	Entry Rate (Active Population)		
Mean	0.328	0.333	0.331
Standard Error	0.00827	0.00974	0.00637
Mean (log)	-1.27	-1.30	-1.285
SD (log)	0.0297	0.0349	0 .0228

3.4.5 Empirical strategy

Identifying the independent impact of politics poses a significant empirical challenge. The primary concern is endogeneity, where city and firm-level growth rates determine political outcomes, rather than the other way around. For example, the voters in lower income areas may be more inclined to vote for left-wing policies. Endogeneity can also come from the connection between electoral campaigns and funding from private enterprises. Companies may choose to support a political party that they believe will yield the best outcome for their industry based on the expected policies of that party. Similarly, large business owners that are involved politically at national level would be incentivized to direct their investments in cities where their aligned political party is in control.

Unfortunately, we are unable to control for this type of endogenous policy choice, meaning that a key assumption is that elections are random events that are determined by processes other than city and firm-level growth. The electoral process in Romania has functioned surprisingly well during its short tenure as a democracy[11].

We are able to eliminate many time-invariant unobserved variables that can directly or indirectly impact firm growth or entrepreneurial entry by using a multi-level fixed effects model that includes firm fixed effects (FE) to account for firm unobservables such as management quality, year FE for global and national economic situation, industry FE for industry-specific growth factors, city FE for city characteristics such as infrastructure or quality of human capital, and local party for party-specific policies. We also include time trends for industry and firm to model their lifecycle.

Our main model is represented in equation (1), where the dependent variable $\Delta\text{Log(Revenue)}_{ijklt}$ is the log growth rate for firm revenues, and ALIGN is the political alignment variable. The indexes are i for firm, j for industry, k for city, l for local party, and t for years), with f_i, v_j, w_k, z_l, u_t being the fixed effects for firm, industry, city, local party, and year respectively, c_{jt} the firm time trend, d_{it} the industry time trend, and ε_{ikt} the remaining idiosyncratic error. We use the iterative methodology for N-level fixed effects initially proposed

[11] At the moment of writing, there is no evidence of voter fraud, voter manipulation, or other illegal campaign activities that would undermine this assumption of exogeneity. For full disclosure, as of 2017 there are pending criminal investigations concerning illegal activities during the 2009 presidential election.

by Guimarães & Portugal (2010), and refined and implemented by Correia (2015). Standard errors are corrected for non-independence and heteroscedasticity by clustering by firms in the firm-level panel and on cities in the city-level panel.

$$\Delta Log(Revenue)_{ijklt} = \beta * ALIGN + f_i + v_j + w_k + z_l + u_t + c_{it} + d_{jt} + \varepsilon_{ijkt} \qquad \textbf{(1)}$$

To test **H2**, we extend **(1)** with the interaction effects between the ALIGN variable and the categorical variable for firm size. Firm size categories are added to capture the average growth for each category. The model also includes a dummy variable for whether the city has population over 200,000, to test if there is a significant difference between smaller and larger cities. $\boldsymbol{V}$ denotes the vector of fixed effects for a simplified notation.

$$\Delta Log(Revenue)_{ikt} = \beta * ALIGN + \alpha * FirmSize + \gamma * (ALIGN * FirmSize) + \\ + \eta * (ALIGN * City200K) + \boldsymbol{V} \qquad \textbf{(2)}$$

We apply the same strategy for estimating entrepreneurial entry. Because in this case the panel is reduced to city-level, the vector of fixed effects is reduced. The model includes fixed effects for city, local party, and year. The same model is run separately for entry rate on stock and entry rate on active population.

$$Log(EntryRate)_{klt} = \beta * ALIGN + w_k + z_l + u_t + \varepsilon_{klt} \qquad \textbf{(3)}$$

3.5 Results

3.5.1 Firm performance

Table 3-3 Effect of political alignment on Log Revenue Growth Rate. Models adding step-by-step fixed effects for year-industry (1), city (2), local party (3), firm (4), and firm trends (5).

	(1)	(2)	(3)	(4)	(5)
ALIGN	**-0.00868*** **	**-0.0130*** **	**-0.0175*** **	**-0.0175*** **	**-0.0159*** **
	(0.00192)	(0.00258)	(0.00320)	(0.00320)	(0.00459)
Observations	228,762	228,762	228,762	228,762	228,762
R-squared	0.065	0.065	0.065	0.158	0.268
Year-Industry FE	YES	YES	YES	YES	YES
City FE	NO	YES	YES	YES	YES
Local Party FE	NO	NO	YES	YES	YES
Firm FE	NO	NO	NO	YES	YES
Firm Trends	NO	NO	NO	NO	YES

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Political alignment shows a significant negative effect on firm revenue growth, result consistent in all model specifications (**Table 3-3**). The model that accounts for most fixed effects, model (5), indicates that average growth rates for firms in cities that have the mayor of the same party as the prime minister will be 1.6% [SE=0.4%] lower compared to cities that are non-aligned. While the size of the effect is rather low, the strong significance represents clear evidence that political alignment plays a role in shaping growth performance. More importantly, the sign would suggest that **H1** is not supported, and quite to the contrary, it is reversed. Alignment reduces firm performance; therefore, non-aligned cities are more likely to have higher economic output.

Table 3-4 Effect of political alignment on Log Revenue Growth Rate, accounting for firm and city size categories. Models adding step-by-step the interactions between alignment and city (2), firm (3), both (4) size categories. Firm size of 1-9 employees is the omitted category. All fixed effects included in all models.

	(1)	(2)	(3)	(4)
ALIGN	-0.0175***	-0.0166***	-0.0190***	-0.0180***
	(0.00320)	(0.00392)	(0.00368)	(0.00433)
FirmSize10-49			0.0378***	0.0378***
			(0.00546)	(0.00546)
FirmSize50-99			0.0600***	0.0600***
			(0.0131)	(0.0131)
FirmSize100-249			0.0837***	0.0837***
			(0.0191)	(0.0191)
ALIGN * FirmSize10-49			0.00205	0.00203
			(0.00545)	(0.00545)
ALIGN * FirmSize50-99			0.0142	0.0142
			(0.0130)	(0.0130)
ALIGN * FirmSize100-249			**0.0402****	**0.0402****
			(0.0196)	(0.0196)
ALIGN * CitySize>200K		-0.00210		-0.00224
		(0.00552)		(0.00552)
Observations	228,762	228,762	228,762	228,762
R-squared	0.158	0.158	0.159	0.159
Year-Industry FE	YES	YES	YES	YES
City FE	YES	YES	YES	YES
Local Party FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 3-4 looks to further explain this finding by separating the effect of alignment by firm and city sizes. Due to firm fixed effects, size categories are identified only for the firms that have changed category over the years, and it can happen irregularly over the period of 9 years. Therefore, we use the specification (4) from **Table 3-4**, without the firm time trend. Column (2) indicates that the dynamics of political alignment are not significantly different in larger cities compared to smaller cities. Column (3) includes the four categories of firm size and their interaction with alignment (smallest category is omitted, thus condensed in the ALIGNED effect). **H2** propositioned that incumbent firms will have higher political capital and would be in a better position to take advantage of growth opportunities (Li, Meng, Wang, & Zhou, 2008). This is strongly supported by the result with a 4% [SE=2%] higher growth rate for the largest aligned firms (100-250 employees) compared to non-aligned ($t = 2.05$; $p = 0.04$). The middle size categories show a non-significant interaction effect, suggesting that medium firms are not participating in the conversion of local political access into private gains. As firms grow bigger, they will become better connected locally, and increase their ability to profit from these connections. The smallest (and most numerous) firms are at a disadvantage and are hurt by alignment; they prefer the non-aligned environment with less public-private collusion for growth. The results for H1 and H2 can be reconciled by taking into consideration the uneven size distribution of firms, highly skewed towards the smallest category. With 70% of firms in the smallest category (<10 employees) and only 1% in the largest category, the general result is driven by the negative effect on small firms. Ultimately, political alignment has a negative effect on the large majority of very small firms, and a positive effect on only a handful of very large ones, which we speculate to be best aligned with the local political context. Column (4) combines (2) and (3) and shows no differences in the results.

Additionally, we complement the analysis with a difference-in difference model that includes the interaction effect between alignment and post-election period for each of the two election cycles (pre/post 2004; pre/post 2008). It does not show any significant effect of becoming aligned post-election. This strengthens the findings by indicating that election cycles are not driving the result, nor is the political platform of the ruling political party, since it changed during each period.

Finally, we have evaluated whether there is an endogenous selection bias of better firms locating or relocating in cities that have better political support, in expectation of a performance

bump. We compute the correlation between the alignment variable and the firm fixed effect, as an indicator of firm quality, and observe no evidence of that (r=-0.0058). Results are robust to alternative specifications and inclusion/exclusion of cities and firms from the sample.

3.5.2 City entrepreneurship

Table 3-5 Relationship between political alignment and entrepreneurial Entry Rate, calculated as new firms per last year firm stock (A), or as new firms per last year employed population (B). Models adding step-by-step the fixed effects for year (1), city (2), and party (3).

A. Entry Rate (Stock)

	(1)	(2)	(3)
ALIGN	**-0.00638**	**-0.0751****	**-0.0826****
	(0.0325)	(0.0316)	(0.0397)
Observations	818	818	818
R-squared	0.680	0.784	0.787
Year FE	YES	YES	YES
City FE	NO	YES	YES
Party FE	NO	NO	YES

B. Entry Rate (Active Population)

	(1)	(2)	(3)
ALIGN	**0.0106**	**-0.0865****	**-0.113****
	(0.0503)	(0.0429)	(0.0540)
Observations	818	818	818
R-squared	0.631	0.820	0.824
Year FE	YES	YES	YES
City FE	NO	YES	YES
Party FE	NO	NO	YES

The results are much more compelling when observing entrepreneurial entry. Alignment causes a reduction in the rate of new firms by 8-11% [SE=4-5%], depending on the definition used. This finding confirms **H3** and supports the theory that aligned cities create a political climate that negatively affects the local entrepreneurial culture and distorts the perception of a free-market business environment. Less firms are being created, and even when they are created, they are expected to have lower growth on average. The interaction effect with city size is again not significant (not reported here).

3.6 Mechanisms and interpretation

We analyze our results from the perspective of existing literature and propose new theoretical concepts that can better explain the impact of politics.

3.6.1 City mayors as gatekeepers of capital

Developing and transition economies have high public-private interdependencies. In the case of transition countries, one reason is that, as the name suggests, the industries and markets and are in transition from state-owned to private. Initial transition periods are defined by large-scale forced privatization efforts that are, more often than not, inside arrangements between political representatives and their business associates. In the same time, bureaucracy and regulatory

burden is costly and it generates high uncertainty, increasing the incentives for circumventing the rules if possible, and nurturing high and persistent levels of corruption. We will have a separate look at corruption below.

Another reason is that (small) developing countries and their cities have low economic influence, especially in inner non-capital cities. In an environment characterized by lower technological levels, lower export capability, and lower income levels, entrepreneurial ventures are more strictly confined to their local markets and local sources of capital. Limited availability of local capital restricts firm entry and growth and emphasizes the importance of personal connections with financiers. Furthermore, it establishes the state as being the largest source of capital, due to its "limitless" budget compared to private sources.

In this context, we ascertain that city mayorship is a powerful position and allows incoming mayors to place themselves as "gatekeepers of capital". Following the "dealmaker" theory presented earlier, we observe that business networks and political networks are strongly interconnected, with politicians often being wealthy industrialists and vice versa. Furthermore, there is a very high financial incentive for political leaders to take advantage of their "gatekeeper" role to secure contracts for friendly businesses, not enforce regulations, or foster anticompetitive practices, against the ethical considerations. The distinct "gatekeeper" terminology is introduced to reflect the impermanence of this status, which only lasts for the duration of the tenure as local political leader. The "keeper" can change after an election, while the "gate" to public funds remains in the same place.

3.6.2 Corruption as mediator

The "gatekeeper" concept devolves into the more fundamental element of real or perceived corruption. Whether or not the political alignment of the city mayor affects firm growth and entrepreneurship (excluding all other factors such as local policies or party ideology) is a function of whether the mayor is involved in illegal favoritism on capital redistribution, and/or whether the general population and the business environment perceives this relationship to exist.

If success is perceived to be conditional on having strong political connections, private individuals that are considering entry into entrepreneurship but do not possess such connections will be discouraged from entry. Our result identifies a substantial difference of 10%, meaning 1 in 10 potential entrepreneurs will delay or avoid entry due to the political context. Moreover, the

fact that large firms are benefiting economically in aligned cities, with higher average growth rates, increases barriers to entry in the industries where such firms are local leaders. The majority of gains in firm performance is captured by the top 1% of firms, suggesting a compounding effect over time. The lower expected return reduces the financial incentives for employees to turn entrepreneurs.

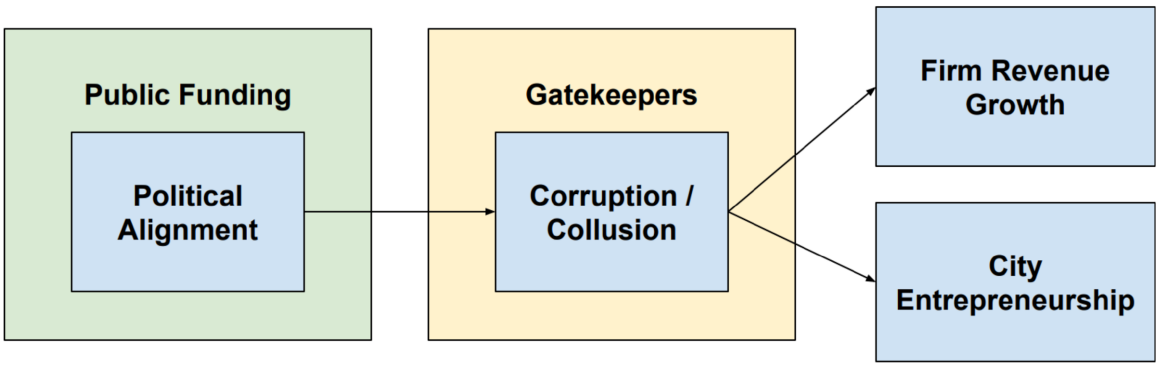


Figure 3-1 Theoretical framework of the effect of political alignment on firm growth and city entrepreneurship.

3.6.3 Public policy implications

The negative impact of local-central political alignment on growth and entrepreneurship has wide-ranging policy implications, from identifying, to preventing, to eliminating the causes and effects of public office meddling into the free market of private enterprises. We discuss three policy suggestions with examples: increasing transparency in the redistribution of funds from the central budget; enabling the anonymous reporting of corrupt and anti-competitive practices; promoting best practices and global cooperation for improved city-level governance.

Public acquisitions correspond to 14-18% on average of the yearly national budget. This capital represents the largest source of discretionary funds for local administration, and is the most liable for allocation by collusion. In 2002, Romania launched an electronic system for public acquisitions (SEAP), with the goal of increasing transparency of public spending. By 2009, only 15% of public acquisitions were being transacted on the platform (Dumitrache, 2010). Nevertheless, it was estimated that this translated into 1.1 billion euros in savings for public administrations (licitatie-publica.ro, 2016). By 2016, the transaction volume reached 50% and in June 2016, the parliament passed a law to force 100% of direct purchases to be listed on SEAP. On top of budget savings and transparent public acquisitions, such a system increases

competitiveness of local enterprises at the national level, reducing the reliance on small local markets or local "gatekeepers". While major concerns still exist about the impartiality of auctions in the SEAP system, this example suggests that the anticipated collusion between politicians and business for public budget allocations can be addressed and diminished.

In recent years, Romania has experienced a sharp increase in the effectiveness of fighting corruption, and indirectly corruption-prone mentality. The National Anti-corruption Agency (DNA) has been successfully pursuing several major cases of corruption. In the 2015 activity report (PNA.ro, 2015), it reported 1250 cases of corruption sent to trial, out of which 27 were high level officials (prime minister, ministers, senators, and congressmen) and over 100 were mayors and local council presidents. The value of bribes received totaled 430 million USD. In 2016 (PNA.ro, 2016), the report marked a slight increase in the numbers – 1271 new cases, with 30 dignitaries and 47 mayors, and almost 700 million USD total value of damages. Additionally, DNA achieved 879 definitive convictions on past cases. The publicity around DNA and several high-profile cases sends a strong message towards improving the business culture. The higher perceived risk of illegal activity while in office leads to less cases of public-private collusion both at local and national level.

The final example relates to the opening discussion on increased decentralization. With cities having more and more economic and social strength, organizing city-level economies becomes equally challenging and vital as national ones. Intercity organizations such as the Global Parliament of Mayors (GPM), the US Conference of Mayors, or the Covenant of Mayors in Europe, are reinforcing this idea by illustrating the benefits of inter-city cooperation and common policy directions. While most city-level actions resulting from such organizing has been surrounding climate change issues, additional agenda points could be foreseen, such as promoting local entrepreneurship, or reducing corruption. Examples of successful policies and programs can be shared between cities, improving the overall quality of local-level policymaking, and can be highly valuable for cultural change especially in emerging economies. It is worth mentioning the case of Mayor Tri Rismaharini of Surabaya, Indonesia, nominated by Fortune Magazine for World's Best Mayor in 2015. During her tenure, she turned Surabaya into a booming center for creative industry entrepreneurship. New entrepreneurship programs empowered more than 5,000 women to build their own enterprises, in low-tech industries such as fashion, food, or handicrafts, and established the first city-level tech startup incubator in

Indonesia for creative entrepreneurship. In the words of Benjamin Barber, founder of GPM, "our new international is inter-urban (Varinsky, 2016)."

3.7 Conclusion

The paper brings into attention political alignment as determinant of entrepreneurship and city growth. We contribute to the existing theory by illustrating how politics plays a key role in local business ecosystems, particularly in developing and transition economies. Moreover, we provide a solid empirical analysis in a research domain where data on developing and transition economies is rare. Results indicate a significant negative impact of alignment, both for firm performance in terms of revenue growth, and for city entrepreneurship entry in terms of the rate of new firm creation. We theorize that the there is a connection between politically-enabled access to capital and higher form growth, especially for large established firms, and a further link with lower entry rates, due to perceived higher barriers of entry. We introduce the concept of "gatekeepers" to describe this dynamic. While this paper focuses on developing and transition economies, we predict our theory and results to not be confined to developing countries and to transition periods.

Political alignment at city or regional level can bring policy changes that foster or stifle growth, through regulation, tax incentives, entrepreneurship programs, and more. The increased decentralization of policy-making is also increasing competition between cities to attract both the creation of startups and the relocation of established firms. A relevant example is the bidding war for Amazon's second headquarter location during 2017. We aim to raise awareness of local-level political impact on policies for stimulating entrepreneurship and economic growth, and the policy implications of tackling this issue. In the specific case of corruption effects, recent policy examples from Romania can serve as suggestions for actively targeting corruption and business-politics collusion.

We recognize several limitations of the paper, mainly concerning the data available for the empirical analysis. Without direct evidence on public-private collusion between individuals, we can only hypothesize that there is a connection. However, data from the DNA case files could be used to construct empirical evidence. Additionally, a measure of city corruption, for example the number (or the value) of DNA cases per city, would be beneficial to test the mediating

relationship of corruption. Nevertheless, such data is not easily available in order to continue this direction of research.

Future research can expand this multi-level analysis to the individual level, combining the results of this paper with a social networks perspective that includes details about the individuals and firms involved in the local business-politics ecosystems. Separately, we mention several improvements in the Romanian politico-economic environment that happened after the timeframe available for analysis. It would be interesting to observe the evolution of the political alignment effect over time, and whether it disappears with time as city administrations become less corrupt, which is what our theory would suggest. An analysis using data from the SEAP system is feasible, and can indicate whether the increased transparency of public acquisition has reduced the alignment effect.

4 The Rise and Fall, and Rise, of Entrepreneurship in Post-Communist Romania: A Case Study on the Institutional Challenges of Entrepreneurship in Transition

This chapter explores the evolution of entrepreneurship in Romania during the transition from communism to free market and European Union membership. It seeks to explain the institutional elements that influenced this evolution, either by encouraging or obstructing the development of the entrepreneurial backbone of the economy. Our theoretical framework describes the interdependence between entrepreneurship, institutions, and transitions. The case of Romania shows that the beginning of transition was characterized by an initial explosion of newly created private enterprises, followed by a declining trend in enterprise creation and, recently, by a new increase in entrepreneurship activity. We explain how this fluctuation corresponds to a transitioning in the type of entrepreneurship as well, from Kirznerian, opportunity-driven, to Schumpeterian, innovation-driven.

4.1 Introduction

The fall of communism and the transition of the economies in Central and Eastern Europe and Central Asia was a complex, unique and very significant event in recent economic history (Estrin et al., 2007; EBRD, 2016). All of the previously centrally-planned economies found themselves entering a rapid democratization and liberalization process, which continued for almost three decades with varying degrees of success. At the beginning of this process, the main focus of policymakers has been macroeconomic stabilization, privatization, liberalization, and general macroeconomic reforms. Only later did researchers and policy-makers shift their attention to issues such as institutional change and transition of government. It was initially believed that the most important task in transition was to decide upon the degree or sequencing of market-oriented reforms, yet transition has proven to be a more complex issue, where institutional developments played a substantial role in the success or failure of this transformation process (Belitski & Korosteleva, 2011).

A key aspect in this process is the creation of state institutions that support the well-functioning of markets. On one hand, the state must step down and make room for the market forces to control the economic activity of the country, yet, on the other hand, it needs to step in by providing the set of rules required for the development of a strong private sector. As Shleifer (1997) argues, economic performance in these countries is strongly influenced also by the transition of their governments, and not only by the transition of their economic systems. Against this backdrop, entrepreneurship has proven to be a crucial element for transition, both as an outcome, as well as a means for countries to develop and advance towards a mature market economy. New firms were the creators of jobs, providers of (previously scarce) goods, and main opponents of state monopoly (McMillan & Woodruff, 2002), representing the main driver of transition and reform (McMillan & Woodruff, 2002; EBRD, 2016; Smallbone & Welter, 2001). However, while it was a very important element in transition, entrepreneurship also faced barriers. The culture and mentality during the communist period, where entrepreneurship was illegal (in Soviet Union since 1917 and in Central and Eastern Europe since 1945), was strongly against entrepreneurial activity, and the public perception made little distinction between entrepreneurs and criminals (Estrin, Meyer & Bytchkova, 2008). This view perpetuated after the

fall of communism, continuing to influence governments and people in transition (Marot 1997; Glas, Drnovsek & Mirtic, 2000; Smallbone & Welter, 2001).

The present paper is motivated by the importance and the difficulty of entrepreneurship in transition, by the fact that transition provided entrepreneurs with unique challenges, but also with unique opportunities. We believe it would be insightful to research a situation where encouraging entrepreneurship was, simultaneously, crucial but extremely difficult. Moreover, given the importance placed by recent literature on institutions and institutional change in transition, along with their influence on entrepreneurship activity in general, we have chosen to analyse entrepreneurship activity in transition through an institutional lens.

Our paper illustrates the case study of Romania as an example of a transition country in Eastern Europe. Transition in Romania followed, in general, the same pattern as in other countries in the region, yet it had its own unique features and particularities when it comes to the development of entrepreneurship that are worth investigating, as we explain in the next sections. The goal of this study is to describe the post-communist institutional context in Romania and follow its impact on entrepreneurship, isolating the mechanisms through which institutions affected both the creation of new firms and the growth potential of existing enterprises.

The rest of the paper is structured as follows: Section 2 presents the review of literature on transition, entrepreneurship and institutions, while section 3 introduces the case study of Romania by describing the initial context and evolution of entrepreneurship and key institutions during the country's transition. Section 4 explains the mechanisms that influenced entrepreneurship in transition and the role of institutions in this process, while Section 5 summarizes the learning points of our case study, discussing what policies encourage or hinder entrepreneurship in transition. Section 6 concludes.

4.2 Literature review

Since the fall of the communist regime in Central and Eastern Europe and Central Asia, researchers sought to understand what helps countries transition to a market economy and what prevents them from doing so. The literature on transition economies is vast, with a range of perspectives on this process, from debates on macroeconomic reforms, privatization strategies and enterprise restructuring (see Havrylyshyn & McGettigan, 1999 and Djankov & Murrell, 2002 for reviews of literature), to analyses of softer issues such as institutional change as another key dimension of transition (e.g. Dewatripont & Roland, 1996) and, in general, explanations accounting for growth in transition countries (see Havrylyshyn, 2001 for a literature review). Much attention has been given, for instance, to the role of initial conditions (Merlevede, 2000; De Melo et al., 2001), or to the debate on the proper speed and sequencing of reforms, with advocates of "shock therapy" versus supporters of "gradual reform" (see for instance Popov, 2000, 2007; Hoen, 1996). However, relatively less has been discussed on the role of entrepreneurship in transition and the activity of entrepreneurs in this turbulent environment (Manolova & Yan, 2002; Szerb & Trumbull, 2016). This is a shortcoming that our paper tries to address.

The first part of this section presents the literature on the link between institutions and transition, while the second part explains what researchers concluded so far on the interplay between institutions and entrepreneurship. The third part discusses entrepreneurship in transition, and the section concludes by putting together the three key elements, namely institutions, transition and entrepreneurship.

4.2.1 Transition and institutions

Douglass North, the founding father of new institutional economics, defines institutions as "the rules of the game in a society" (North, 1990) or as "humanly devised constraints that structure political, economic, and social interaction" (North, 1991). Institutions are well-established practices and patterns of behavior, either formal (laws, regulations etc.) or informal (culture, religion etc.). According to Fogel *et al*. (2008), government can be considered an institution, as it is in charge of creating and enforcing many 'the rules of the game'. Consequently, the word 'institutions' represents a synonym for 'the rules existing in a society' that influence economic

interactions between agents (Fogel et al., 2008). These rules include government, behavior patterns, and constraints on behavior imposed in a formal way, i.e. by the state, or in an informal way, through social norms and practices.

Transition economies need to build institutional systems that support a market economy from very little institutional infrastructure (Estrin et al., 2009), as few of the legal and institutional structures remaining from the communist regime could act as a foundation for entrepreneurial activity (Estrin, Meyer & Bytchkova, 2008). Consequently, institutional building and reform has been seen as the key element of transition (Shleifer, 1997; Kolodko, 2000), and it is defined as "the creation of laws and legal institutions that protect private property, enforce contracts between private parties, but also limit the ability of officials to prey on private property", as well as "the creation of regulatory institutions that deal with competition, securities markets, banking, trade, patents and so on."

The reform of institutions and, in general, the reform of the government itself, is essential for the economic transition of countries, as well as for their democratization and political transformation (Shleifer, 1997). Despite macroeconomic reforms, a failed institutional reform can hinder transition. As explained by Roland (2001), liberalization, stabilization and privatization reforms do not deliver the expected, successful results if not grounded in proper institutions. Many other scholars (such as Dewatripont & Roland, 1996; Moers, 1999; Kolodko, 2000; Djankov et al., 2003; Havrylyshyn & Van Rooden, 2003; Fischer & Sahay, 2004; Beck & Laeven, 2006; Murrell, 2006) acknowledge the role of institutions for economic growth in transition countries, explaining how they provide the fundamental structure for a market economy.

From the definition of institutional transformation provided by Shleifer (1997) and presented above, we can summarize the characteristics of a successful institutional transition:

1) guarantee property rights and their enforcement;
2) ensure the enforcement of contracts through a strong judicial system;
3) restrict government's ability to pray on the private sector, for instance through corruption and demands of informal payments;
4) support free competition on the market;
5) support free trade;
6) support the development of a strong financial sector.

Beck and Laeven (2006) provide empirical evidence supporting the importance of institutions for growth in transition. They consider six institutional dimensions as being the most important to assess the quality of the institutional setting in the transition context (inspired from Kaufman, Kraay and Mastruzzi, 2003):

1) voice and accountability;
2) government effectiveness;
3) rule of law;
4) regulatory quality;
5) absence of corruption;
6) political stability.

However, in practice, the development of market-supportive institutions proved to be a challenging task for transition countries. Institutional reform is a difficult task and only few countries achieved quick success, as changing the rules that govern the interplay between different actors encounters serious resistance (Johnson, McMillan & Woodruff, 2000). Estrin *et al.* (2009) notice that transition economies are, as many other developing countries, characterized by many elements rather associated with a "weak" institutional environment, such as poorly conceived and/or ineffectively enforced property rights, or insufficiently developed capital markets. In addition, there are still many informal practices reminiscent of the communist period that, in combination with weak or partially-developed market institutions, may determine entrepreneurs to develop a counterproductive behavior in order to offer a proper response to such challenges (Estrin, Meyer & Bytchkova, 2008).

4.2.2 Institutions and entrepreneurship

Institutions are not only relevant for successful transition, they have been proven to play a crucial role in shaping the entrepreneurial activity in a general context. Research efforts led by Baumol (1990) and North (1990, 1994) hold that institutions may both enhance or constrain entrepreneurial activity, as they are the rules governing "the game" where organizations and entrepreneurs are "the players". As highlighted by Wennekers & Thurik (1999), institutions affect both the supply and the demand of entrepreneurs, through their influence on economic behavior and transactions.

Williams & Vorley (2015) demonstrate the link between institutions and entrepreneurship by investigating the impact of formal and informal institutions on entrepreneurship in Bulgaria. They find that, despite the reform of formal institutions, there exists an 'institutional asymmetry' between formal and informal institutions, hampering productive entrepreneurship. In the case of Russia, the empirical work of Aidis, Estrin & Mickiewicz (2008) shows that the country's institutional environment is detrimental to entrepreneurship development, explaining why the level of entrepreneurial activity in Russia is relatively low. The same conclusion is drawn also by Vorley & Williams (2016), who analyze the case of Romania and Bulgaria arguing that a weak institutional environment limits entrepreneurial planning, aspirations, and ambition. However, the same conclusion is reached not only when analyzing transition countries. For instance, using a sample of 34 developing and developed countries, Stephen, Urbano & van Hemmen (2005) provide empirical evidence illustrating the importance of institutions in promoting entrepreneurial activity. Using data from 44 developing and developed countries, Aidis, Estrin & Mickiewicz (2009) also offer empirical evidence supporting that formal institutions significantly influence entrepreneurship levels. Acs, Desai & Hessels (2008) provide a general discussion about the importance of institutions as part of the environment affecting entrepreneurship.

Conversely, firms can also influence the rules governing the economy, turning them to their own advantage at the expense of other entrepreneurs or the entire society, for instance through state capture, influence, and administrative corruption (Hellman, Jones & Kaufmann, 2000). In addition, entrepreneurship conducted at an informal level due to the weakness of existing rules generates an increase perception of corruption and lack of trust in public institutions (Wallace and Latcheva, 2006), which further reinforces the poor quality of the institutional environment.

Transition and entrepreneurship are deeply linked, as entrepreneurship is a defining element for a market economy. Therefore, most of the institutions influencing transition in general are also among the key institutions influencing entrepreneurial activity. For instance, Aidis, Estrin & Mickiewicz (2009) argue that the most important institutions that enhance entrepreneurship activity are:

1) The rule of law, and
2) Limits to the state sector

At the same time, Fogel *et al.* (2008) also develops a list of the key institutions shaping the economic environment where entrepreneurs operate, which includes:

1) Rules, regulations, property rights and their enforcement;
2) The quality of government;
3) The distribution of control over corporate assets;
4) Culture;
5) Very basic institutions such as universal basic education, diversity, openness to the outside world

In addition, according to Estrin, S., Meyer, K. E., & Bytchkova, M. (2008), the institutions most likely to affect the efforts of entrepreneurs are:

1) The quality of commercial code;
2) The strength of legal enforcement;
3) Administrative barriers;
4) Extra-legal payments;
5) Lack of market-supporting institutions.

Wennekers *et al.* (2005) also list relevant institutions encouraging the creation of new firms as:

1) Fiscal legislation (tax rates and tax breaks);
2) The social security system;
3) Administrative requirements for starting a business.

Finally, the institutional context determines the quality of entrepreneurial activity. Baumol (1990) highlights the influence of institutions on the allocation of entrepreneurial efforts between productive, unproductive or destructive activities. Murphy, Shleifer and Vishny (1993) explain that corruption makes talent shift away from productive entrepreneurial activities to unproductive rent-seeking ones, while Basu, Estrin & Svejnar (2005) also indicate that if the institutional context is weak, then entrepreneurs might become involved in unproductive practices, such as corruption. Indeed, when financial and legal institutions are inefficient and not properly enforced, entrepreneurs are more likely to engage in corrupt practices, which become justifiable when they see illegal business activities as a widespread business practice (Tonoyan et al., 2010).

4.2.3 Entrepreneurship and transition

Entrepreneurship is an essential driver in the development of the private sector during transition (EBRD, 2016; Estrin, Meyer & Bytchkova, 2008; Williams & Vorley, 2015), being vital for wealth creation and economic progress in transition countries (Ovaska & Sobel, 2005). SMEs are often regarded as the backbone of the economy, their emergence and growth being important both at the beginning of transition (Smallbone & Welter, 2001), as well as in its advanced stages (Aidis, 2005). Indeed, as highlighted also by McMillan and Woodruff (2002) and Tyson, Petrin & Rogers (1994), the degree of success of a transition economy was mostly influenced by the performance of its entrepreneurs and restructuring of its entrepreneurial sector.

On one hand, the importance of entrepreneurship for transition stems from the ability of new firms to fosters the reallocation of resources towards more productive usages, which represents a key part in the transition process (Estrin, Meyer & Bytchkova, 2008). On the other hand, entrepreneurial activity is considered by many economists an engine of economic growth (see Wennekers & Thurik,1999 for a literature review; also Audretsch & Thurik, 2003; Carree & Thurik, 2005; Keilbach & Lehmann, 2006; Acs, Desai & Hessels, 2008), while economic growth in itself has been much needed and extremely important during the transition process given the strong drop in GDP levels experienced by countries at the beginning of transition (Shleifer & Treisman, 2014). As Acs (2006) explains, entrepreneurship implies the creation of new businesses which, in turn, create new jobs, a stronger competition, and more productivity through technological change. Entrepreneurship is important for economic growth also because it encourages innovation (Wong, Ho & Autio, 2005) and influences a country's competitive advantage (Porter, 1990). Conversely, the level of economic development also affects entrepreneurship, as empirical research uncovers a U-shaped relationship between the level of economic development and the rate of nascent entrepreneurship (Wennekers et al., 2005). Indeed, the findings of (Van Stel, Carree & Thurik) confirm that the effect of nascent entrepreneurship on economic growth depends on the level of income per capita.

Despite its importance, the strength of entrepreneurial activity in transition was different from one country to another, depending on the 'baggage' inherited from the communist regime, and the development path chosen by each country (Aidis, 2005). In countries where it was more difficult and risky, it was because of price volatility, unfair competition from state-owned firms,

corrupt bureaucrats, unreliable courts and unavailability of finance that opening a business was more challenging than it usually is (McMillan & Woodruff, 2002). Moreover, empirical research also shows that the institutional environment in transition countries is unpredictable, hostile and inefficient, which hinder the creation of new and small businesses (see examples of literature in Manolova & Yan, 2002).

Tyson, Petrin & Rogers (1994) suggest that governments in transition countries should implement policies that use all possible sources of entrepreneurship and establish a proper macroeconomic context, including a strong property-rights framework. At the same time, Ovaska & Sobel (2005) analyse what institutions and policies are most correlated with promoting entrepreneurship in transition by using a sample of ten Baltic and Central European countries, and find that the list of key factors influencing entrepreneurial activity in this context includes:

1) credit availability
2) contract enforcement
3) low government corruption
4) sound monetary policy
5) policies (e.g. low regulations and taxes) that promote economic freedom,

with credit availability and government corruption affecting more the creation of small firm rather than that of large ones. In the same note, examining the institutional environment in Bulgaria, Manolova & Yan (2002) find that the most important institutional players in transition are lawmakers, tax collection agencies, and authorities responsible for issuing permits and licenses. Moreover, they also argue that the institutional environment in Bulgaria is corrupt, unpredictable and hostile.

4.2.4 Reinforcing effects

As we have already seen, market-supportive institutions are more difficult to be built in transition, but institutional quality is essential for the development of entrepreneurial activity which, in turn, represents a key driver of transition. There exists, therefore, a "vicious circle" between the three elements that are strongly linked to each other. As noted by Aidis, Estrin and Mickiewicz (2007), institutional weakness makes entrepreneurial activity lower in transition

countries, as there exists evidence proving that the previous regime left behind a legacy of weak institutions affecting especially entrepreneurship levels (Johnson, McMillan & Woodruff, 2000). As such, researchers investigating entrepreneurship in transition began to increasingly take into account the quality of the institutional environment, an approach that proved to be of great value (Williams & Vorley, 2015).

In transition, the low quality of the institutional environment has sometimes represented a source of barriers to entry that prevented entrepreneurs from taking advantage of newly emerged opportunities (Estrin, Meyer & Bytchkova, 2008). Or it has created a void stemming from the underdevelopment of formal rules, which has been filled by informal ones, enhancing the risk and uncertainty affecting entrepreneurs (Puffer, McCarthy & Boisot, 2010). And faced with unstable, incoherent regulations, along with a hostile, corrupt institutional environment, entrepreneurs in transition were forced to respond in an unproductive manner, for instance through short-term orientation and opportunism, as explained by Manolova & Yan (2002). Examples of low quality institutions include, for instance, legislation that does not ensure an adequate protection of property rights and does not help entrepreneurs settle disputes, as explained by Manolova & Yan (2002) in the case of Bulgaria, or inefficient rules governing the financial market that led to unavailability of finance especially for small firms, as exemplified by Smallbone and Welter (2001) with cases from Czech Republic and Poland.

4.3 Case study: Romania

4.3.1 Context of Romania in 1990

Romania is one of the Eastern European states that experienced communist ruling with the end of World War II. After more than four decades, communism collapsed in Romania in December 1989, following a short period of violent civil unrest that ultimately culminated with the trial and execution of Romania's dictator. While the new context brought many opportunities, and created possibilities unheard of before, it also fostered, in the beginning, political and economic instability, along with many other turbulences.

The beginning of Romania's transition was characterized by very bad macroeconomic conditions, such as a strong economic recession, and very high inflation, creating additional risks for entrepreneurs in an already uncertain environment. This was, in fact, a typical feature for all transition countries in Eastern Europe and Former Soviet Union. However, compared to the fast reformers such as Poland or Czech Republic, Romania, along with other countries that proceeded much slowly, was in worse macroeconomic shape (Shleifer, 1997).

In Romania, the GDP suffered a sharp decrease in the first three years after transition, such that its value in 1992 was only 3/4 of its value in 1989. However, after three years of consecutive decrease, the economy started to recover, yet not for too long. While in other countries, such as Poland, economic growth remained on a positive trend after the initial period of recovery, in Romania it registered again negative values starting from 1997, after a growth period of 4 years between 1993 and 1996. It regained its ascendant trend only in 2000, and remained positive until the beginning of the economic crisis in 2009. However, the GDP reached the 1989 level again only around 2004 - a fact referred to by analysts as 'the lost decade'. The Romanian local currency rapidly lost its value following the price liberalization that occurred right after the fall of the communist regime. In Romania, inflation rate registered levels higher than 100% between 1991-1994 and in 1997. Although not reaching such extreme values in the rest of the period, inflation continued to represent a problem throughout the entire first decade of transition.

Table 4-1 Main macroeconomic indicators in Romania in 1989-2001

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
GDP (billions constant LCU at 2016 prices)	262.3	247.6	215.6	196.7	199.7	207.6	222.4	231.0	219.9	215.3	214.4	219.6	231.9
GDP growth (annual % y-o-y)	-	-5.5	-13.1	-8.7	1.5	3.9	7.1	3.9	-6.1	-4.8	-1.2	2.3	5.6
GDP (% of 1989 value)	100	94.5	82.2	75.0	76.1	79.1	84.8	88.1	82.8	78.8	77.9	79.6	84.1
Inflation rate (annual % y-o-y)	1.1	5.1	170.2	210.4	256.1	136.7	32.3	38.8	154.8	59.1	45.8	45.7	34.5

Source: UN Data, National Institute of Statistics, and own calculations

http://data.worldbank.org/indicator/NY.GDP.MKTP.KN?locations=RO&view=chart

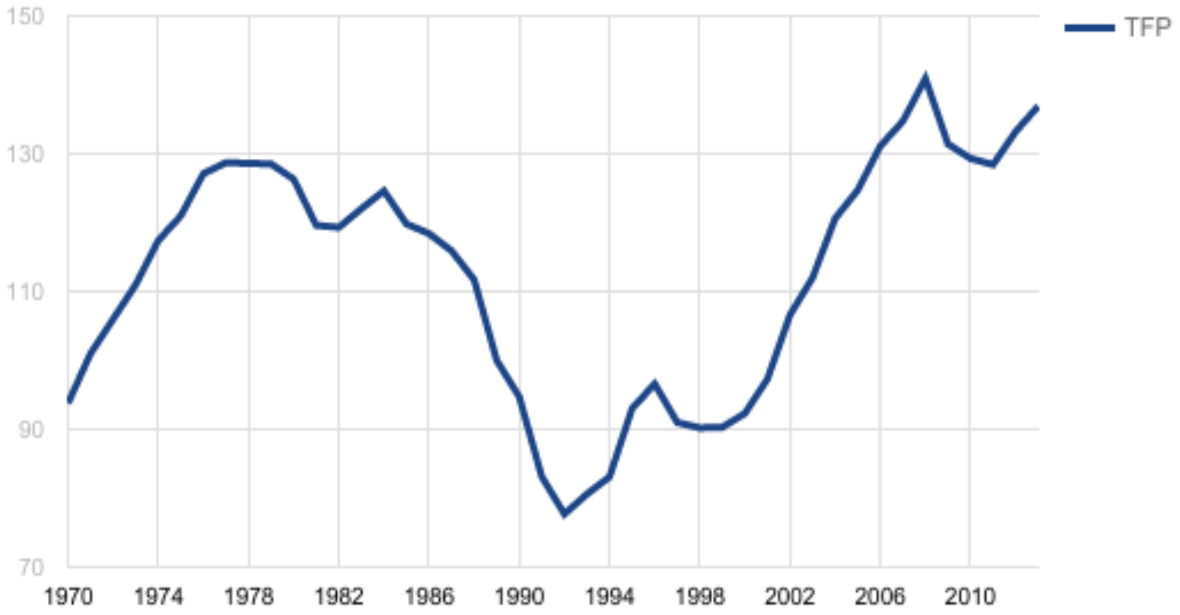
http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=RO&view=chart

http://cursdeguvernare.ro/romania-dupa-25-de-ani-i-evolutia-reala-a-pib-cresterea-economica-si-deceniul-pierdut.html

http://www.insse.ro/cms/ro/content/ipc-serii-de-date

In addition, the fall of communism left behind an inefficient production structure and lack of productive efficiency, innovation and technical progress. In fact, as argued by Estrin *et al.* (2007), the inability of the regime to encourage innovation and support technical progress was one of the main causes of its collapse. For instance, in agriculture, the average level of corn production in 1989 was around 2.700 kg/ha, while the one in 2013 was almost 4.500 kg/ha; the average level of potatoes production was approximately 11.000 kg/ha in 1989, while the one in 2013 was almost 16.000 kg/ha. While central planners were able to use incredibly high levels of labor and investment as inputs, increasing the level of outputs proved to be more problematic. In Romania, total factor productivity decreased by more than 25% in the last decade of communism, and by another quarter in the first three years of transition. It then started to increase since 1993, suggesting the emergence of technical innovation and the gradual improvement of the production structure, but managed to completely surpass its 1989 level only in 2002. In 2006, it reached for the first time a value that is higher than any of the values registered during communism.

The level of imports also suggests the existence of low factor productivity during communism. As explained by Angelucci (2002), in Romania and Bulgaria the increase in import competition is correlated with a lower total factor productivity, pointing out that foreign firms are more competitive than local ones, most probably due to a technological gap. Statistical records on Romania suggest that between 1948-1981 the country mostly had a trade deficit, with instances in which imports surpassed exports. For instance, trade deficit was 3 times higher in 1978 and 8 times higher in 1980 compared to 1964. This suggests that exported goods started to gradually lose their added value, while imported ones were technologically superior.



Source: Penn World Tables 9.0
https://fred.stlouisfed.org/series/RTFPNAROA632NRUG#0

Figure 4-1 Total Factor Productivity at Constant National Prices for Romania (1989=100)

At the beginning of transition there were very few firms in Romania, most of them considerably large and almost all owned by the state. During communism, there has been a bias towards heavy industry, and the production was concentrated in a few big enterprises, with almost half of production taking place in firms with at least 3,000 employees (Pop, 2006). Estimations point out that a total number of 7726 enterprises were privatized in Romania during transition, yet only 22.32% of them are still active and employ more than 10 people. Currently, there still exist 616 state-owned enterprises in Romania, while the government is minority or majority shareholder for another 312 companies. This suggests that, at the beginning of transition, the Romanian economy included a total of approximately 8600 firms.

Before the fall of the communist regime, private property was strictly forbidden in Romania. In fact, while other communist countries allowed for the existence of some SMEs, in countries like Romania SMEs simply did not exist (Kolodko, 2000). Opening a private firm only became possible in January 1990, with the adoption of Decree Law no. 54 that allowed for the

establishment of private small businesses (Pistrui, Welsch and Roberts, 1997). In 1990 only 81 private firms were officially registered, and a sharp increase in the number of new businesses started only in 1991. However, despite the general anti-entrepreneurship mentality characterizing former communist states, many Romanians were enthusiastic at the idea of becoming entrepreneurs. A study conducted by Pistrui, Welsch and Roberts (1997) reveals that in 1990 over 50% of those included in the investigation claimed that they wanted to open their own business.

4.3.2 Entrepreneurship in the '90s

The quantitative analysis of entrepreneurship in post-communist Romania is a challenging task, with data for the early 1990s being scarce and often unreliable. The only available indicator for entrepreneurship activity in Romania before 1995 is the annual number of registered firms, defined as *the total number of firms that have been registered in the Register of Commerce, at the request of the firm's representative, during that year*. The registration represents a mandatory procedure for the existence of every firm to become official, and must be conducted by self-employed people, individual enterprises, family enterprises, and firms. It does not need to be conducted by those holding a so-called "liberal profession", such as architects, doctors, lawyers, translators etc. that open an individual office, therefore they are not included in this number. The yearly evolution of the number of registered firms for the period 1991-2016 is illustrated below.

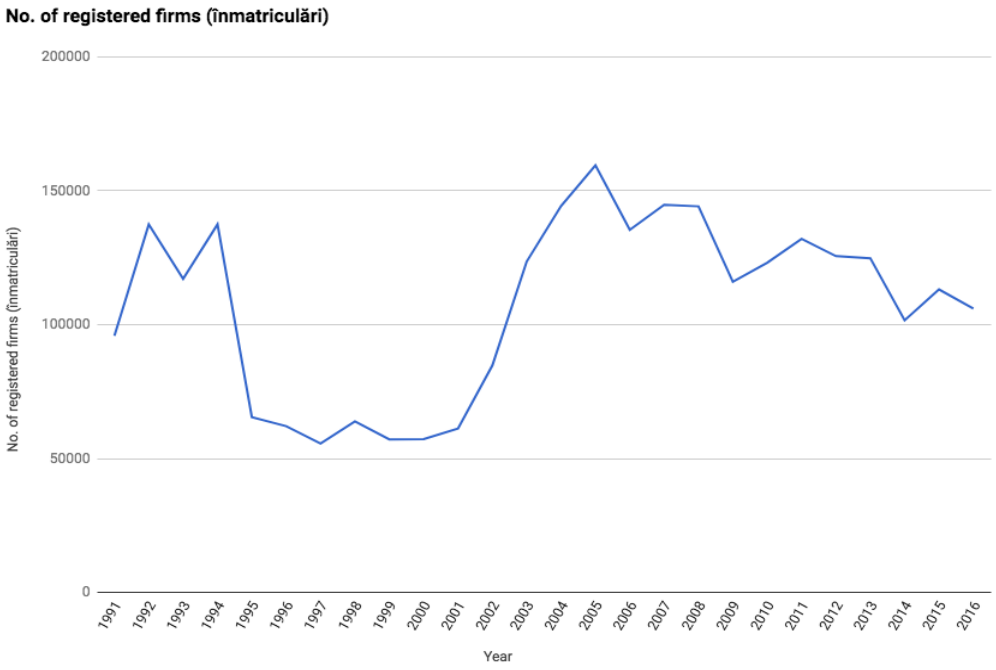


Figure 4-2 Number of registered firms per year, 1991-2016 (Registry of Commerce)

During the first few years after the fall of communism, the annual number of registered firms raised from almost 100,000 in 1991, to more than 135,000 in 1994. This can be considered the first rise of entrepreneurship in Romania. The initial context triggered, in Romania, and exponential growth of enterprises, as entrepreneurs were driven by the rush to capture immediate opportunities in a newly opened market. This rise in entrepreneurship was chaotic and mainly driven by a strong increase in consumer demand for new (imported) goods previously unavailable. Stan (1995) explains that, at the beginning of 1990, the policies introduced by the incumbent government in an attempt to restore living standards resulted in an explosion of consumption, a strong decrease of investment and industrial production, and a significant increase in imports. Moreover, as highlighted by Pistrui, Welsch and Roberts (1997), the previous centralized system did not have the knowledge or resources to engage in many industries, generating unsatisfied demand that firms were now seeking to meet. Entrepreneurship in the early transition consisted mostly in pure trade, with little to no innovation. Given the lack of macro stability and weak macroeconomic context characterizing Romania at the beginning of the '90s, firms couldn't focus on long-term growth and make long-term commitments, so they tried to seize short-term, immediate gains easy to grasp quickly,

which came mostly in the form of trade arbitrage and the opportunity to gain from price differences rather than on innovation. Along with the abundance of market opportunities, the initial rise in entrepreneurship was also driven by the lack of government regulations, which allowed for practically any business to be possible.

At the beginning of transition in Romania, the new opportunities encouraged entrepreneurship based on arbitrage. As explained by Estrin, Meyer & Bytchkova (2008) and Vorley & Williams (2016), these newly emerged entrepreneurs can be considered Kirznerian-type entrepreneurs, i.e. entrepreneurs that identify and take advantage of opportunities to supply scarce goods and services following the elimination of entry barriers (Kirzner, 1973), restoring the equilibrium between supply and demand.

Pistrui, Welsch and Roberts (1997) investigate the portrait of Romanian entrepreneurs at the beginning of transition and conclude that Romanian entrepreneurial activity is primarily based on people's desire for security, freedom and family well-being, and their wish to develop new business or products ideas comes only second in the ranking of entrepreneurial motives. Therefore, the first rise in entrepreneurship in Romania was more necessity-driven than opportunity-driven, such that people chose to become entrepreneurs because they lacked other alternatives, and not necessarily because they had innovative ideas that they couldn't wait to put in practice. Aidis (2005) explains in more detail this difference, arguing that business owners in transition countries can be considered 'proprietors' rather than 'entrepreneurs': proprietorship implies generating profit for survival such that all profits are consumed, while entrepreneurship implies reinvesting the surplus generated aiming for business growth.

However, the initial rise is followed by a period of sharp decrease, the annual number of registered firms in 1995 being more than 50% lower than the one in 1994. The same decline is mirrored also by the overall annual stock of active enterprises (regardless of their year of creation), with almost 390,000 active enterprises in 1994, and only a bit over 325,000 active enterprises in 1997 (data is not available for 1995 and 1996). Kontorovich (1999), Radaev (2003) and Aidis (2005) point out that the majority of transition economies experienced this decline in entrepreneurship activity. As firms lacked financing and were facing an unstable macroeconomic environment, their expansion and grown was difficult to support, while they were facing a stronger competitive pressure following price and trade liberalisation. Moreover, short-term arbitrage opportunities became less profitable once the gap between supply and demand has been

closed, so many firms were shut down or deterred from entering the market in the first place. After the '94-'95 fall entrepreneurship activity stabilises, remaining relatively constant until 2001, with around 60,000 new firms registered each year.

As it will be argued in section 3.4, this fall in entrepreneurial activity can also be, in part, explained by the poor institutional quality. While in the very first years after the end of the communist regime the new institutions there was not too much regulation and a new political hierarchy was just beginning to take shape, later the institutions have become more defined and regulation more extended, but most of the times with a negative influence upon entrepreneurial activity because of the poor quality of the rules. Also, with time, political elites managed to capture the state and use their power to create policy for their own advantage. This idea is also supported by Radaev (2003) and Aidis (2005), who argue that the decline in entrepreneurship activity is, among others, explained by more rigid regulation and weak institutional environment. Murrel (2006) advances the same argument, explaining that, at the beginning of transition, even if effective institutions were lacking, the new small businesses could quickly grasp the short-term opportunities that appeared, as, for instance, these businesses developed their own self-enforcing agreements, used physical possession to solve conflicts related to property rights, and self-financed thus not needing corporate governance institutions. However, he argues, sustained long-term growth is different, and requires the existence of institutions that are efficient in supporting non-self-enforcing agreements, protecting property rights without possession, and allowing firms to expand more than they could only by self-financing.

4.3.3 Entrepreneurship during 2002-2016

Starting with 2001, entrepreneurship activity in Romania rises again, reaching its highest value in 2005, when almost 160,000 firms have been registered. The literature argues that, in the case of transition countries, the second stage of entrepreneurship development corresponds to the emergence of Schumpeterian-type entrepreneurship, focused on promoting innovation, technical progress, capital accumulation and growth, unlike the first wave of entrepreneurs that were rather focused on reaping immediate gains from trade arbitrage (Estrin, Meyer & Bytchkova, 2008; Vorley & Williams, 2016).

However, this was not the case in Romania, at least not before 2005. While trade enterprises represented 68% in 1994 but only 35% in 2014, suggesting that, in time, Romanian

businesses moved beyond simple trade (Neagu, F., Dragu, F., & Costeiu, A. (2016), over 80% of Romanian firms in 2005 were non-innovator firms (European Commission, 2006). Moreover, between 1999 and 2004, private sector's R&D expenditures registered only a very small increase, from 0.2% of GDP in 1999 to 0.28% of GDP in 2004, representing a bit over 432 thousand RON (expressed in 2016 prices), while enterprises remained reluctant to shift towards an innovative behavior (European Commission, 2006, and author's calculations). We can rather talk about innovation-based entrepreneurship in Romania as starting to be encouraged after 2005, when R&D in the country registered a key turning point. Since 2005, public funds allocated to R&D increased dynamically, from 0.26% of GDP in 2005 until almost 1% of GDP in 2009, the year when the economic recession started (European Commission, 2006). As shown by Figure 2 in Avram, Avram & Avram (2014), private sector's spending on R&D started to show a stronger increase also around 2004-2005.

Another possible way to analyse how much Kirznerian-type and how much Schumpeterian-type was entrepreneurship during different phases of Romania's transition is by looking at the evolution turbulence rate on the market. Turbulence refers to the dynamics of exit and entry, being computed as the difference of the number of firms who entered and exited the market, relative to the total stock of active enterprises in the previous year. This ratio can be considered a tool to analyse the evolutionary process through which the market eliminates unsuccessful firms and preserves successful ones: new firms force the exit of the unsuccessful existing ones, while the vacuum that remained after the exit of unsuccessful firms is perceived as an opportunity attracting new entrants (Baptista & Karaöz, 2011). Therefore, turbulence can be seen as another way to measure 'creative destruction'.

In the case of Romania, data availability allows us to compute the turbulence rate starting with 1998, and we can notice the following evolution:

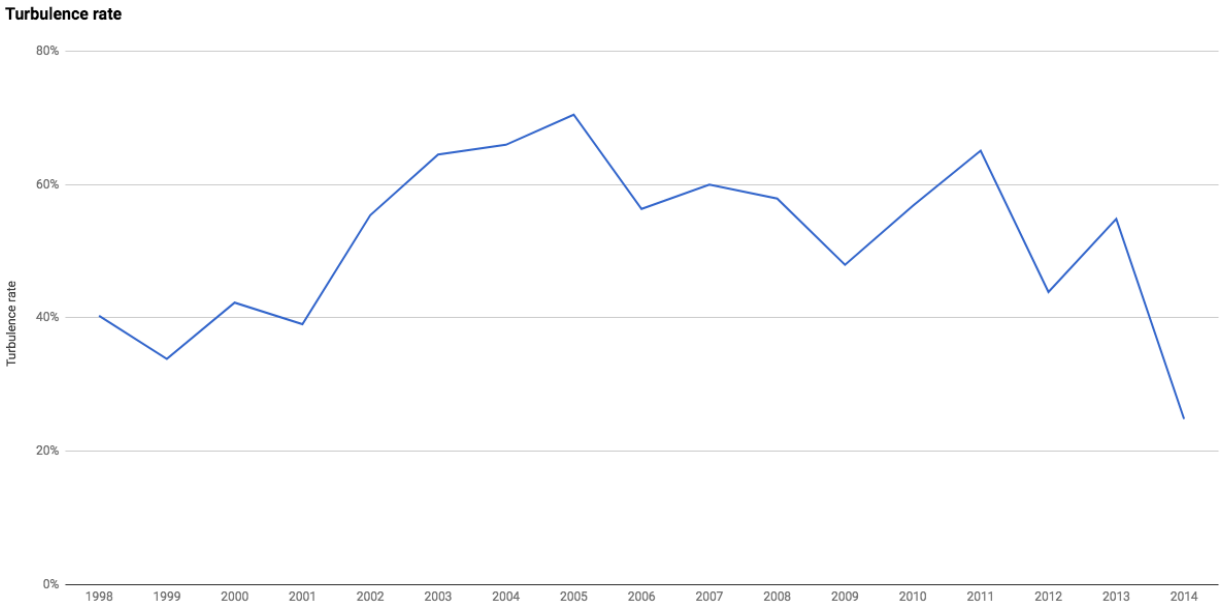


Figure 4-3 Turbulence rate, 1998-2014, calculated

In the period 1998-2001 turbulence is around 40%, while the rate increases sharply starting with 2002, reaching its maximum value of 70% in 2005. Afterwards it falls below 60% in 2006 and, since then, continues on a general descendant trend, despite oscillating between increasing and decreasing between two consecutive years.

However, the second rise in entrepreneurship activity around the 2000s can be explained by the fact that the economy finally recovered from the initial macroeconomic hardships and income levels increase, making it is easier to accumulate or borrow financial resources that can be directed towards opening a business. Moreover, in this new economic setting business risks are lower and prices can now be used to convey accurate information about supply and demand, allowing for the emergence and long-term growth of more firms. But this increase in entrepreneurship activity was possible also because market institutions become more mature and developed, on the backdrop of Romania's firm intentions to access the European Union. Indeed, literature on transition highlights that, in general, EU accession has served as an anchor for reform for Central and Eastern European countries, creating an impetus for legal and institutional change (Baldwin, Francois, and Portes, 1997), and a sustained progress in the business

environment of these countries, as opposed to the path followed by Former Soviet Union countries (Estrin, Meyer & Bytchkova, 2008).

Romania became a member of the EU on January 1st, 2007, yet it expressed its intentions to join the EU since 1995, begun the accession process in 1998 and started accession negotiations in 2000. As one of the criteria that had to be fulfilled by Romania in order to become an EU member state was the existence of stable institutions and a functional market economy, this constrained policy-makers to focus on institutional reform and improvement. Although slow, progress was not completely absent. For instance, Cojanu *et al.* (2005) note that, in its pre-accession period, Romania registered an improvement of the business environment, although it is not mirrored by a superior position in the rankings conducted in this field. The US government considered Romania to be a functioning market economy even from March 2003, while the 2003 Regular Report of the European Commission highlighted that Romania can be considered a functioning market economy as long as it continues to make good progress (Papadimitriou and Phinnemore, 2008).

Since 2005, although the year-on-year evolution of the annual number of registered firms oscillates between being positive and negative, the general trend is, again, a decreasing one. It is somehow expected that Romania's EU accession in 2007 will trigger a decrease in local entrepreneurship activity, as now entrepreneurs have to face an increased level of competition on the domestic market. Sharper competition is generated, on one hand, by the entrance of new foreign competitors for whom access to the local market becomes easier and, on the other hand, by the emergence of new export opportunities for local entrepreneurs, in favor of big producers that benefit from economies of scale crowding out small suppliers (Aidis, 2005). Moreover, the decrease in entrepreneurial activity can also be explained by the emergence of the economic recession, with a GDP decrease in 2009 of 7,1% compared to the previous year.

As it can be noticed from the following figure, the evolution of the annual number of registered firms is mirrored also by the overall annual stock of active enterprises, which starts rising in 2001 and falling in 2009, therefore lagging 1-3 years behind. This suggests that the second rise in entrepreneurship activity is also supported when looking at other available indicators.

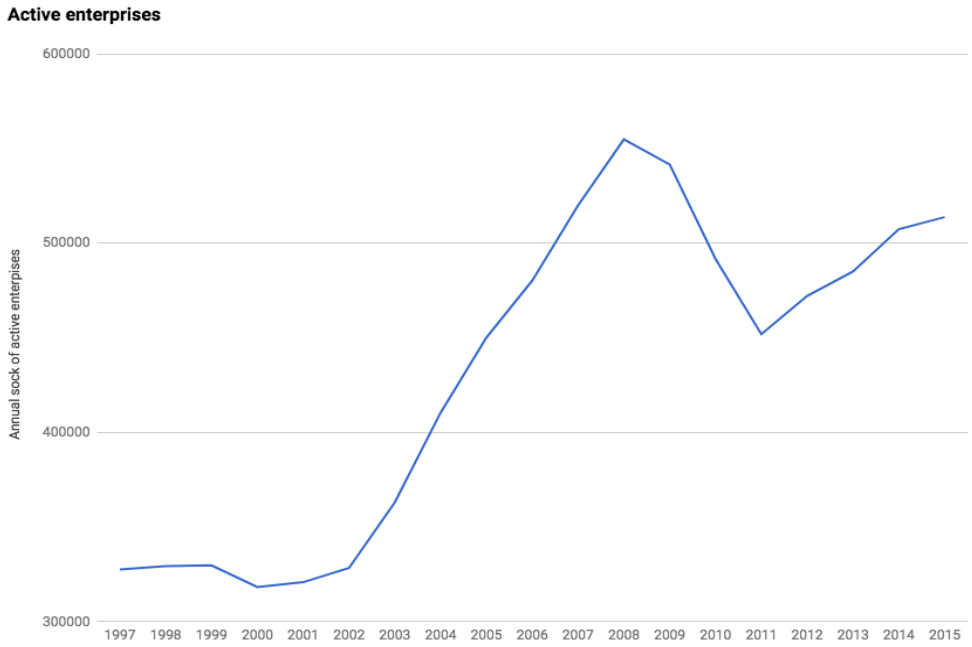


Figure 4-4 Number of registered active enterprises per year, 1997-2015

4.4 Discussion and conclusion

The case study observed the Romanian institutional environment as it transitioned from communism to free market democracy. Focusing on entrepreneurial activity, data shows a pattern of evolution as the country moves through difference stages of development. An initial explosion of firm creation immediately after Revolution is driven by a chaotic environment with almost inexistent institutions (except from what remained in place from the communist times). Extreme inflation rates and the harsh macroeconomic context forces a large share of the population to search for income opportunities in arbitrage and small import trade (e.g. sweets, clothes). At the level of the general population, there is little innovation or understanding of entrepreneurial activity beyond simple commerce of goods to capitalize on a price difference. For a select few, this period results in massive gains from privatization of state-owned enterprises and restitution of expropriated lands and real estate. Such dealings resulted in damages of hundreds of millions of dollars for the Romanian state, gains distributed to a handful of businessmen closely connected to the politicians that filled the power vacuum.

This apparent entrepreneurial enthusiasm is curtailed when reality sinks in. After a few years of confusion, the dust settles and the situation of Romania gains some clarity. However, it does not come with good news. Weak institutions are not able to guarantee the enforcement of policies such as property rights, regulations, judicial system, monetary policies, and similar. The resulted uncertainty in the business environment has a negative effect on the decision to engage in entrepreneurship. Moreover, it makes it easier for incumbents to maintain monopoly positions, and to further increase the entry barriers for new entrants. Firm entry drops by more than 50% in 1995, keeping a low level for the next 5 years. It took more than a decade for the economy to recover and free-market forces to be strong enough to fuel a sustainable economic growth.

The inflexion point in the economic growth is in 2002, when both firm creation and real GDP growth experience a steep upward slope. We connect this upturn with external factors that impose major structural changes internally. Romania's ascension to NATO and the European Union establishes an external accountability framework that drives internal policies for liberalization, justice system, taxation, and more. Westward alignment improves the quality of internal institutions, and the perceived stability increases internally, the desire to participate in the economic activity, and externally, the attractiveness of Romania for foreign direct investment and capital influx. As a result, entrepreneurial activity is influenced positively not only from access to capital, investments, and markets, but also from the shift in the type of entrepreneurship from opportunistic, arbitrage-driven, unproductive, to a productive, market-driven, innovation-led, Schumpeterian entrepreneurial activity.

Furthermore, this association with global networks plays an important role in increasing stability on a geopolitical level. Romania's position at the border of the established Western economies with the Eastern bloc under heavy Russian influence was definitely the major attraction point for receiving the invitation. We observe several other countries in very similar political and economic situations as former communist, transition, developing economies - Georgia, Armenia, Kazakhstan, Belarus, etc - that are at an earlier stage in the process. It can be argued that their development delay is due to more independence from the West, which in the context of weak institutions and instability fosters political favoritism, cronyism, and corruption. Our case study on Romania can provide learning points to countries in similar situations.

5 Discussion & Conclusion

The fastest growing economies are located in majority in Asia, Africa, and Central America. Of course, the main reason for their high levels of growth is the large difference to the technological frontier of the richest countries that they can recover. Most if not all of these countries are labeled as "developing" or third-world. They lack proper infrastructure, established institutions, and a strong rule of law, which impacts the risk and uncertainty of the economic activity and how growth is distributed across the participants. Due to the same reasons, data collection is cumbersome and research studies are less prevalent in developing countries compared to the Western economies in Europe and US, with limited empirical results.

The goal of this dissertation is to study high growth in the context of a developing economy. We observe Romania, which experienced transition from communisms to free-market democracy during 1990-2012. A combination of firm-level, city-level, and macro-data, allows us to explore elements of growth from each of these perspectives. Results indicate that firms are not able to main consistent high growth rates over time, even though firms that are successful and experience a period of high growth will have a higher probability of survival long-term. Secondly, political networks have a strong influence on the allocation of resources at local level, and directly impact firm performance, with the top 1% largest firms being able to capture gains in the detriment of smaller ones, as a result of their established position in the network and their ability to support local political leaders. Similarly, entrepreneurial culture is hindered by perceived collusion, and firm entry will be reduced in local environments where politicians are able to exert more control. The relation of politics and growth is illustrated in a broader context of a transition economy with weak institutions in a deep-dive case study on Romania's evolution in the post-communist period. Data shows period of growth and decline in the entrepreneurship rate that coincides with external factors such as the ascension to the European Union.

To summarize the contribution of our work, we discuss high growth entrepreneurship and relevant policy, by focusing on the following questions:

- Should the government intervene? If yes, how?
- What can we do if the government interventions are driven by corruption?
- Are these policy discussions applicable to other countries?

5.1 Firm-level policies

The study on high growth firms comes with mixed findings. On one hand, the persistence of high growth rates is minimal, supporting the hypothesis that HGFs are one-hit wonders and they change from year to year. In the same time, HGFs have lower volatility and higher survival, which can imply that either initial growth translates into investment that reduces risk of exit, or that management quality that resulted in HGF status also leads to better performance over time.

From a policy perspective, the fact that firms constantly come and go from the HGF status would suggest that governments should not focus on identifying the next "unicorns" (firms with a market valuation of more than $1 billion). The role of the government in the ecosystem is to establish an efficient infrastructure that enables the free market to make these selections naturally. Since only a few years, there is a huge global supply of government funding for entrepreneurship programs, as governments become more and more aware of the economic benefits of entrepreneurship. Optimal funding allocations should consider investing these resources in infrastructure, which can mean: reducing bureaucracy costs for small firms, enabling global networks for trade (import/export), educational resources for accounting and financial management, educational resources for accessing European Union funds, and similar. Furthermore, the government should recognize the industries with a national competitive advantage, and create "centers of excellence" that aggregate and further augment these industries. Romania is well positions in IT and automotive.

As a policy example, Romania introduced a new government program in 2017 called "Start-up Nation" that goes in the opposite direction. It gives direct financial support of $50,000 to 10,000 newly created enterprises that will create at least 2 jobs over the next 3 years. It was generally perceived negatively, being labelled as social welfare for entrepreneurs. Nevertheless, it received huge interest, with 20,000 applications.

Policy recommendations

- Avoid programs that target firms individually, and focus on improving infrastructure
- Enable internationalization of local businesses
- Reduce bureaucratic processes for small firms
- Double down on the core differentiator of the economy – in the case of Romania it can be the IT and automotive sectors

5.2 Corruption and growth

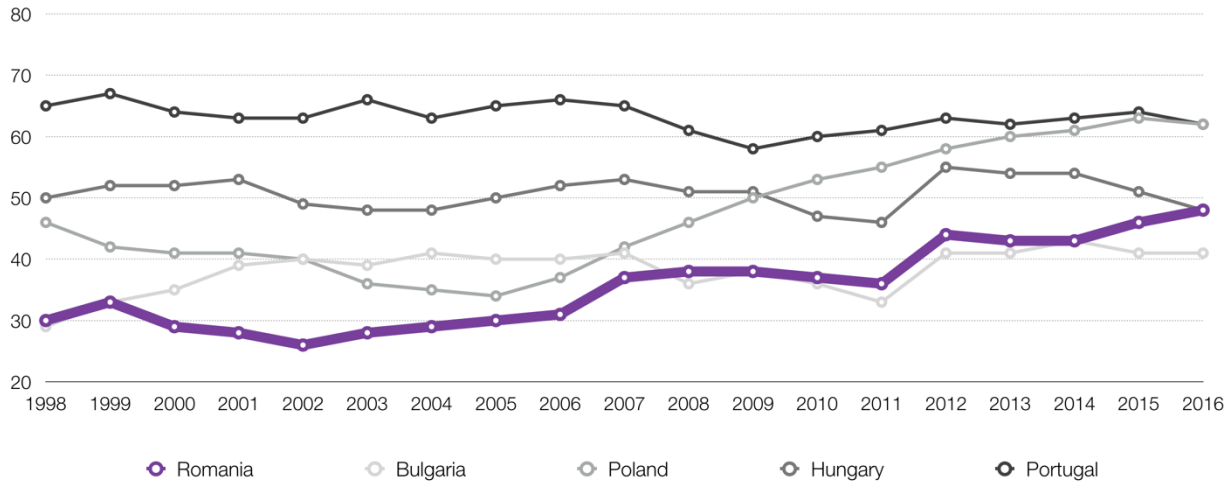


Figure 5-1 Corruption Perception Index (CPI) 1997-2016 for Romania, Bulgaria, Poland, Hungary, and Portugal. Source: Transparency International

One of the key challenges that developing countries have to overcome is corruption. Corruption, or lack of integrity, has a strong negative correlation with GDP per capita. The poorer people are, the more likely they are to resort to unproductive activities such as rent seeking. Examples of corruption, in the context of business activities, include: funneling of public funds to friendly enterprises, threatening or eliminating competition, avoiding costs of abiding by regulation with a fraction of the cost in bribes, and more.

The relationship between growth and corruption goes both ways. Corruption negatively impacts growth by stifling free competition, allocating resources based on favoritism, and reducing entrepreneurial culture due to a perceived unfairness of the market. On the other side, economic growth reduces corruption by increasing the average income and reducing poverty and the need for illegal income. Consequently, a better developed economy will increase pressure and leverage on stabilizing the institutional environment.

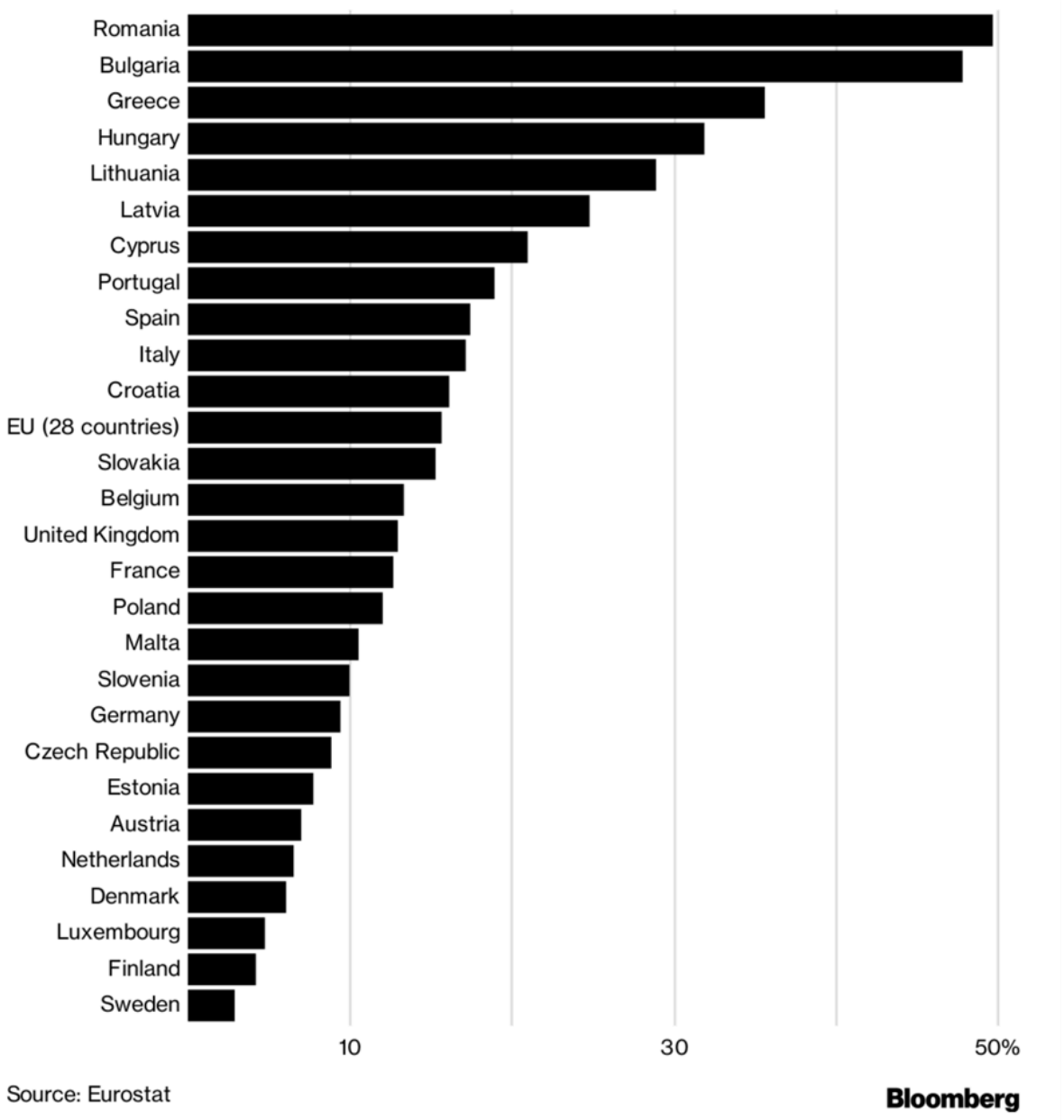
Corruption can have additional side-effects that will impact the development of a country in medium and long term. As an example, “brain drain” is the phenomenon of highly skilled, highly educated professionals emigrating in search of better income opportunities. Former communist countries have entered free-market with a large supply of well-trained technical human capital and faced a shock of chaos and instability. The entire region, Romania included,

suffered from massive emigration towards the West. With human capital an important factor in the success of entrepreneurial activity, the overall quality of the supply of entrepreneurs suffered as a result.

Nevertheless, growth does not directly imply reduction in poverty and increase in average income. As seen in **Figure 5-2**, Romania is the European country with the highest levels of material and social deprivation, while also being the highest growing economy.

Policy recommendations

- Increase transparency in the public acquisition process
- Publicly prosecute corruption activity, especially related to the business environment
- Reduce side-effects of corruption, for example incentivizing high quality human capital to remain in the country
- Implement social policies for equalizing the distribution of growth



Source: Bloomberg. (2017). “EU's Fastest Growth Rate Masks Deepest Level of Deprivation”

Figure 5-2 Share of population living in material and social deprivation

5.3 Other transition economies

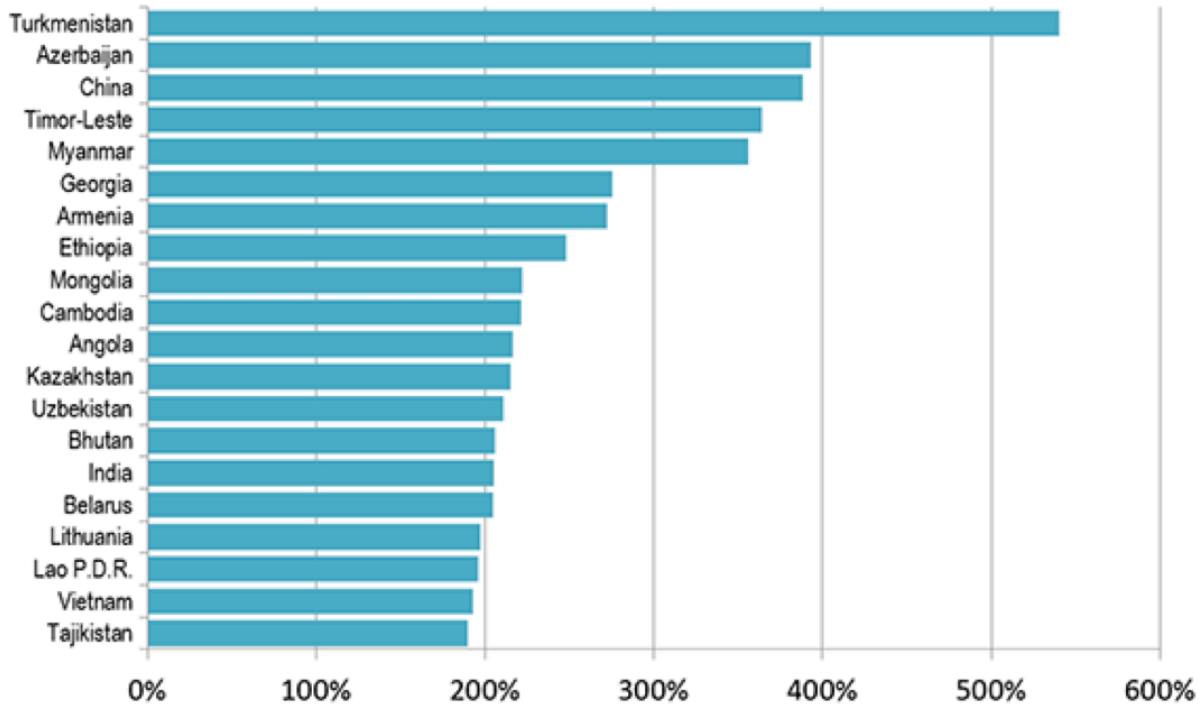


Figure 5-3 Countries with the fastest GDP growth between 2000 and 2015

The story of growth in Romania, as told by the studies included in this thesis, can serve as one of the building blocks in the research corpus on transition economies. Close neighbors like Bulgaria have shared similar stories (Williams & Vorley, 2015), while others are finding themselves at difference stages of development in the process. The institutional environment is a key factor for the success of transition (Aidis, Estrin & Mickiewicz, 2009) and recognizing and measuring elements like corruption, political influence, inequality of growth distribution serves as a benchmark for the efficiency of the process. We believe that countries like Georgia, Armenia, Azerbaijan, Kazakhstan follow a similar development trajectory, and their association will global networks of trade and influence will play a role in the internal and regional stability.

5.4 Conclusion

Our work explores the concept of High Growth Entrepreneurship in the context of a developing, transition economy, Romania. We observe key features at the level of the firm, at local city-level, and at national/macro level. We recognize limitations in addressing these points due to restricted availability of data and resources, and we are hopeful that continued research activity in this topic will bring a much needed understanding of the dynamics of growth in the developing world. The world is growing, on multiple levels – demographic, economic, technological - and entrepreneurship remains the most viable vehicle for distributing growth globally through innovation and efficiency. The goal of our research in this domain is to inform policies for High Growth Entrepreneurship that are inclusive, sustainable, and multi-level.

A. Appendix for Chapter 2

A.1. Additional figures

	LOG REVENUE				LOG EMPLOYEES			
	GROWTH		VOLATILITY		GROWTH		VOLATILITY	
DEFINITION	z Statistic	Probability of HIGHER Growth	z Statistic	Probability of LOWER Volatility	z Statistic	Probability of HIGHER Growth	z Statistic	Probability of LOWER Volatility
T1 - Revenue	81.26	34.1%	12.53	5.3%	42.84	17.5%	3.88	1.6%
T1 - Employees	26.48	19.6%	6.07	4.5%	48.57	34.9%	4.02	3.0%
T1 - Profit	36.05	20.4%	13.22	7.6%	15.57	8.6%	4.32	2.5%
T1 - Productivity	41.39	26.0%	-3.14	-2.0%	-13.77	-8.4%	-7.40	-4.8%
OECD - Revenue	101.47	28.5%	21.02	6.0%	52.84	14.4%	7.46	2.1%
OECD - Employees	31.56	15.9%	12.80	6.5%	61.46	30.0%	11.58	5.9%
OECD - Profit	38.69	16.8%	20.53	9.0%	18.28	7.7%	8.85	3.9%
OECD - Productivity	56.33	20.8%	3.30	1.2%	-20.94	-7.5%	-4.59	-1.7%
T2 - Revenue - Absolute	42.60	20.0%	15.22	7.3%	36.87	16.9%	17.65	8.4%
T2 - Revenue - Relative	52.74	24.8%	-12.66	-6.1%	31.55	14.4%	-11.95	-5.8%
T2 - Revenue - Index	53.58	25.2%	2.29	1.1%	41.00	18.8%	3.08	1.5%
T2 - Employees - Absolute	26.47	12.8%	8.53	4.2%	45.41	21.3%	5.80	2.8%
T2 - Employees - Relative	28.94	15.1%	-4.13	-2.2%	51.76	26.2%	-8.06	-4.3%
T2 - Employees - Index	31.83	15.1%	2.13	1.0%	55.06	25.3%	*-1.56*	*-0.7%*
T2 - Profit - Absolute	37.05	17.4%	3.46	1.7%	25.44	11.6%	12.40	5.9%
T2 - Profit - Relative	42.66	20.1%	-3.02	-1.4%	14.90	6.8%	-4.03	-1.9%
T2 - Profit - Index	48.72	22.9%	-3.72	-1.8%	26.05	11.9%	*0.82*	*0.4%*
T2 - Productivity - Absolute	40.87	19.2%	-4.75	-2.3%	-9.67	-4.4%	-9.06	-4.4%
T2 - Productivity - Relative	45.45	21.4%	-18.38	-9.0%	-9.21	-4.2%	-17.77	-8.7%
T2 - Productivity - Index	45.01	21.2%	-13.54	-6.6%	-13.03	-6.0%	-16.78	-8.2%

Figure A-1 Ranksum test for Growth and Volatility, testing the hypothesis that the distribution of HGFs and non-HGFs is the same, for all 20 cohorts, using the Wilcoxon rank-sum test, also known as the Mann-Whitney two-sample statistic.

The "Probability" column estimates the likelihood of a random draw from the first population to be larger than a random draw from the second population. For Growth, HGFs are the first population, for Volatility the order is reversed. The table shows the difference from an equal 50%-50%. The nonparametric equality-of-medians test also confirmed the results, not reported here.

Alternative specifications for sensitivity analysis:

- Type 1 – Birch – 20% growth each year for 3 years
  - 10% growth each year
  - 30% growth each year

- Type 2 – Top 5%
  - Top 1%
  - Top 10%

	BIRCH 10% / TOP 10%			BIRCH 20% TOP 5%			BIRCH 30% TOP 1%		
DEFINITION	2000	2012	% Exited	2000	2012	% Exited	2000	2012	% Exited
T1 - Revenue	9023	6203	31%	5065	3456	32%	2894	1921	34%
T1 - Employees	4037	2904	28%	1554	1121	28%	624	448	28%
T1 - Profit	3579	2542	29%	2690	1897	29%	2069	1460	29%
T1 - Productivity	4237	2481	41%	2178	1214	44%	1192	637	47%
T2 - Revenue - Absolute	7923	5697	28%	3961	2934	26%	792	605	24%
T2 - Revenue - Relative	7923	4626	42%	3961	2204	44%	792	440	44%
T2 - Revenue - Index	7923	5351	32%	3961	2678	32%	792	502	37%
T2 - Employees - Absolute	7283	5044	31%	3764	2593	31%	780	539	31%
T2 - Employees - Relative	7923	4855	39%	3197	1963	39%	725	413	43%
T2 - Employees - Index	7923	5232	34%	3922	2600	34%	792	509	36%
T2 - Profit - Absolute	7923	5462	31%	3961	2876	27%	792	605	24%
T2 - Profit - Relative	7923	4857	39%	3961	2430	39%	792	474	40%
T2 - Profit - Index	7923	5322	33%	3961	2690	32%	792	557	30%
T2 - Productivity - Absolute	7923	4737	40%	3961	2368	40%	792	466	41%
T2 - Productivity - Relative	7923	4055	49%	3961	1986	50%	792	376	53%
T2 - Productivity - Index	7923	4381	45%	3961	2156	46%	792	405	49%

Figure A-2 Selection and exit rates for the default and alternative specifications of Type 1 and Type 2 definitions

DEFINITION	MEDIAN VOLATILITY		
	BIRCH 10% TOP 10%	BIRCH 20% TOP 5%	BIRCH 30% TOP 1%
T1 - Revenue	0.31	0.32	0.33
T1 - Employees	0.31	0.32	0.32
T1 - Profit	0.30	0.30	0.31
T1 - Productivity	0.35	0.38	0.41
T2 - Revenue - Absolute	0.31	0.30	0.29
T2 - Revenue - Relative	0.41	0.42	0.43
T2 - Revenue - Index	0.34	0.35	0.38
T2 - Employees - Absolute	0.33	0.33	0.32
T2 - Employees - Relative	0.37	0.38	0.39
T2 - Employees - Index	0.35	0.35	0.37
T2 - Profit - Absolute	0.36	0.34	0.33
T2 - Profit - Relative	0.37	0.38	0.39
T2 - Profit - Index	0.37	0.38	0.40
T2 - Productivity - Absolute	0.37	0.38	0.43
T2 - Productivity - Relative	0.44	0.47	0.51
T2 - Productivity - Index	0.41	0.43	0.49

Figure A-3 Median Volatility for Log Revenue for the default and alternative specifications of Type 1 and Type 2 definitions

A.2. Model specifications

A.2.1. Dynamic Panel Data

AR(1) Model $y_{it} = \alpha y_{i,t-1} + \beta X_{it} + \delta_t + \eta_i + v_{it}$

$y_{i,t-1}$ - lagged dependent variable (one period)

α - autoregressive coefficient

βX_{it} - vector of exogenous variables with coefficients

δ_t - time effects

η_i - panel fixed effects

v_{it} - idiosyncratic error (exogenous shock)

Assumptions:

- Error components $E[\eta_i] = E[v_{it}] = E[\eta_i v_{it}] = 0$
- Sequential exogeneity $E[y_{i,t-1} v_{it}] = 0$
    - Serially uncorrelated shocks $E[v_{it} v_{is}] = 0$
    - Predetermined initial conditions $E[y_{i0} v_{it}] = 0$

Estimation:

- OLS is inconsistent and biased upward
- Fixed Effects (FE/LSDV) is inconsistent and biased downward
    - Called Nickell bias (Nickell 1981), estimated ~= $-(1 + \alpha)/(T - 1)$
- First Difference is also inconsistent in OLS
- Instrumental variables are used to make it consistent

Data transformation:

- Log
    - Stabilizes the variance, reduces heteroskedasticity
- Difference
    - Removes the trend in non-stationary series

Approaches for consistent estimation:

- LSDV Bias Correction (Kiviet 1995)
- Instrumental Variable (Anderson and Hsiao 1982)
- Generalized Method of Moments (Arellano and Bond 1991)

A.2.2. Instrumental Variables (IV) Model – Two-stage Least Squares

IV model replaces an endogenous variable with an instrument that is uncorrelated with the error.
Instrumental variable:

- Correlated with a regressor (X) Cov (Z,X) != 0
- Uncorrelated with the error (ε) Cov (Z,ε) = 0

Anderson-Hsiao Estimation – uses a first-difference (FD) approach to the AR(1) model and instruments $\Delta y_{i,t-1}$ with 2nd lag, either level ($y_{i,t-2}$; preferred) or difference ($\Delta y_{i,t-2}$).

$\Delta y_{it} = \alpha \Delta y_{i,t-1} + \Delta v_{it}$

1st stage $\Delta y_{i,t-1} = \beta_1 y_{i,t-2} + \varepsilon$

2nd stage $\Delta y_{it} = \alpha \Delta y_{i,t-1} + \Delta v_{it}$

Z can be $\boldsymbol{y}_{-2}$ or $\Delta \boldsymbol{y}_{-2}$

$$\widehat{\Delta \boldsymbol{y}_{-1}} = Z\left(Z'Z\right)^{-1} Z'\Delta \boldsymbol{y}_{-1}$$

$$\hat{\alpha}_{AH} = \left(\widehat{\Delta \boldsymbol{y}'_{-1}}\widehat{\Delta \boldsymbol{y}_{-1}}\right)^{-1} \widehat{\Delta \boldsymbol{y}'_{-1}}\Delta \boldsymbol{y}$$

Stata command:

- ivreg2 D.RL D.(year year_20*) (DL.RL = L2.RL) if year>2003 & IS_BIRCH_R, robust cluster(newid) nocons
- Includes a differenced Year trend and Year indicators >2004
- Clustered at firm-level
- Robust errors

Controls that are eliminated in the differenced equation:

- Size categories in 2000
- Revenue categories in 2000
- Industry categories

- Region
- Gazelle indicator

A.2.3. Generalized Method of Moments (GMM) Model

GMM finds estimates that satisfy moment conditions in the sample

- Moment (orthogonality) conditions $E[z_i u_i]=0$

Difference GMM (Arellano & Bond, 1991)

$$\hat{\boldsymbol{\beta}}_{GMM} = \arg\min_{\beta} \boldsymbol{b}_N(\boldsymbol{\beta})' W_N \boldsymbol{b}_N(\boldsymbol{\beta}) \qquad \mathsf{W_n} = \left(\frac{1}{N}\sum_{i=1}^{N} \mathbb{E}[\boldsymbol{z}_i u_i u_i' \boldsymbol{z}_i']\right)^{-1}$$

$$\mathbb{E}[Z_i' \Delta \boldsymbol{v}_i] = 0, \text{ where } \quad Z_i = \begin{pmatrix} y_{i0} & 0 & 0 & 0 & \dots & 0 & 0 & \dots & 0 \\ 0 & y_{i0} & y_{i1} & 0 & \dots & 0 & 0 & \dots & 0 \\ \vdots & \vdots & \vdots & \vdots & \ddots & \vdots & \vdots & \dots & \vdots \\ 0 & 0 & 0 & 0 & \dots & y_{i0} & y_{i1} & \dots & y_{iT-2} \end{pmatrix} \text{ and } \Delta \boldsymbol{v}_i = \begin{pmatrix} \Delta v_{i2} \\ \Delta v_{i3} \\ \vdots \\ \Delta v_{iT} \end{pmatrix}$$

Specification tests:

- Conditions — Sargan/Hansen Overidentifying Restrictions Test
- Validity — Sargan Test and Hausman Test
- Serial correlation — Arellano-Bond Test

Stata command:

- xtdpd l(0/1).RL year_20* if year>2003, dgmmiv(RL, lag(2 .)) div(year_20*) two vce(robust)
    - GMM IVs : 2nd lag of the dependent variable
    - Standard IVs : Year indicators >2004
    - Two-step estimation
    - Robust errors

A.2.4. Survival Model

Survival function:

$$S(t) = \Pr\{T \geq t\} = 1 - F(t) = \int_t^{\infty} f(x)dx,$$

which gives probability of being alive just before duration t, or more generally, the probability that the event of interest (firm exit) has not occurred by duration t.

Hazard function:

$$\lambda(t) = \lim_{dt \to 0} \frac{\Pr\{t \leq T < t + dt | T \geq t\}}{dt}.$$

$$\lambda(t) = \frac{f(t)}{S(t)},$$

The hazard rate, or the rate of occurrence of the event at duration t, equals the density of events at t, divided by the probability of surviving to that duration without experiencing the event.

Expectation of Life
(expected value of T, or mean μ)

$$\mu = \int_0^{\infty} S(t)dt.$$

Weibull model

$$S(t) = \exp\{-(\lambda t)^p\}$$

$$\lambda(t) = p\lambda(\lambda t)^{p-1},$$

Hazard ratio Hazard (non-HGFs) / Hazard (HGFs)

B. Appendix for Chapter 3

Table B-1 Comparison of estimation results with different cutoff points for the firm size categories.

Model 1 implies category 3 as 50-80 employees and category 4 as 80-250 employees.
Model 2 implies category 3 as 50-100 employees and category 4 as 100-250 employees.
Model 3 implies category 3 as 50-120 employees and category 4 as 120-250 employees.

	(1)	(2)	(3)
1.ALIGN	-0.0180***	-0.0180***	-0.0180***
	(0.00433)	(0.00433)	(0.00433)
2.FS80	0.0378***		
	(0.00546)		
3.FS80	0.0567***		
	(0.0134)		
4.FS80	0.0799***		
	(0.0171)		
1.ALIGN#2.FS80	0.00199		
	(0.00545)		
1.ALIGN#3.FS80	0.0121		
	(0.0139)		
1.ALIGN#4.FS80	**0.0332****		
	(0.0156)		
1.ALIGN#1.S2	-0.00222	-0.00224	-0.00226
	(0.00552)	(0.00552)	(0.00552)
2.FS100		0.0378***	
		(0.00546)	
3.FS100		0.0600***	
		(0.0131)	
4.FS100		0.0837***	
		(0.0191)	
1.ALIGN#2.FS100		0.00203	
		(0.00545)	
1.ALIGN#3.FS100		0.0142	
		(0.0130)	
1.ALIGN#4.FS100		**0.0402****	
		(0.0196)	
2.FS120			0.0378***
			(0.00546)
3.FS120			0.0595***
			(0.0129)
4.FS120			0.0928***
			(0.0220)

1.ALIGN#2.FS120			0.00209
			(0.00545)
1.ALIGN#3.FS120			0.0199
			(0.0124)
1.ALIGN#4.FS120			**0.0286**
			(0.0253)
Observations	228,762	228,762	228,762
R-squared	0.159	0.159	0.159
Year-Industry FE	YES	YES	YES
City FE	YES	YES	YES
Local Party FE	YES	YES	YES
Firm FE	YES	YES	YES

Table B-2 Regression results for firm performance when including the entire sample

VARIABLES	(1) dlnR	(2) dlnR	(3) dlnR	(4) dlnR	(5) dlnR
ALIGN	-0.0120*** (0.00185)	-0.0132*** (0.00258)	-0.0204*** (0.00316)	-0.0211*** (0.00337)	-0.0129*** (0.00486)
Observations	839,347	839,347	839,347	808,091	808,091
R-squared	0.031	0.031	0.031	0.283	0.593
Year-Industry FE	YES	YES	YES	YES	YES
City FE	NO	YES	YES	YES	YES
Local Party FE	NO	NO	YES	YES	YES
Firm FE	NO	NO	NO	YES	YES
Firm Trends	NO	NO	NO	NO	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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