Hidden entrepreneurship: Multilevel analyses of the determinants and consequences of entrepreneurial employee activity

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Hidden entrepreneurship: Multilevel analyses of the determinants and consequences of entrepreneurial employee activity

Verborgen ondernemerschap: Multilevel analyses van de determinanten en consequenties van ondernemende activiteit door werknemers

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To my parents

Voor mijn ouders

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Enjoy reading!

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Utrecht, December 2017

Table of contents

List of tables

List of figures

1 Introduction

Entrepreneurship is increasingly gaining attention, both in popular press and scientific research. Governments all over the world design policies to promote and facilitate it. This is mainly due to the widespread belief that entrepreneurship enhances growth. However, the available empirical evidence is not as unambiguous as one would expect. The supposed positive effect of entrepreneurship, if any, highly depends on the type of entrepreneurship and the institutional context it is subject to, recent studies show (e.g., Bjørnskov & Foss, 2013; 2016; Boettke & Coyne, 2009).

When talking about entrepreneurship, one usually refers to those who (intend to) set up or already own-manage an independent business (Gartner, 1990). Such independent entrepreneurs or (solo) self-employed work for their own risk and reward (Jensen & Meckling, 1976; Knight, 1921). In the empirical literature, common ways to operationalize entrepreneurship include industry shares of small firms, the number of (new) businesses, and self-employment or business ownership rates (e.g., Parker, 2009; Reynolds et al., 2005; Van Stel, 2006). However, the widely adopted definition of entrepreneurship proposed by Shane & Venkataraman (2000) – that is, the discovery, evaluation and exploitation of opportunities to create future goods and services (p. 218) – is not limited to individuals who set up independent businesses. In fact, any individual in wage employment may also behave entrepreneurial for his or her employer. This notion has already been put forward in early work by Schumpeter (1942) and many others since then (e.g., Hellmann, 2007; Pinchot, 1985), but remains underexposed in the empirical literature that links entrepreneurial activity to economic growth (Wennekers & Thurik, 1999).

Hitherto, entrepreneurial activity by employees is a largely neglected form of entrepreneurship in cross-national settings. By focusing on independent types of entrepreneurial activity, this literature overlooks an important alternative way of new value creation (Bjørnskov & Foss, 2016; Foss & Lyngsie, 2014). In brief, entrepreneurial employees take the lead in the development of new business activities

for their employer (Bosma et al., 2013b). It appears to be a relatively frequent type of entrepreneurial activity in developed countries (Bosma et al., 2012a; Kelley et al., 2016), and seems to be performed more often by ambitious and highly educated individuals (Bosma et al., 2011). Entrepreneurship inside established organizations, also often referred to as *intrapreneurship* (e.g., Antoncic & Hisrich, 2001; 2003), is therefore central to this dissertation.

We first aim to identify key formal and informal institutional determinants of intrapreneurship, after which we move on to its economic consequences. While there has been extensive research on macro level determinants and consequences of independent entrepreneurship (e.g., Arin et al., 2015; Terjesen et al., 2016; Valdez & Richardson, 2013), none of these studies have incorporated entrepreneurial activities by employees.[1] Instead, we explicitly consider intrapreneurship as part of the overall entrepreneurial activity in society, and investigate how various institutions drive the allocation of entrepreneurial individuals across new and already established organizations (or, entrepreneurship and intrapreneurship, respectively). Moreover, surprisingly few studies link the determinants of entrepreneurial activity, entrepreneurial activity itself, and its macro level consequences in a unified framework, partly because it is "… a highly complex undertaking that has been hampered by the absence of unified theorizing and useful data sources" (Bjørnskov & Foss, 2016: 292). As Parker (2009) states, "… the economics of entrepreneurship analyzes how economic incentives affect entrepreneurial behavior, and how entrepreneurial behavior in turn affects the broader economy" (p. 4). This is exactly what this dissertation aims to achieve, whilst incorporating intrapreneurship as an additional way to behave entrepreneurially.

The study of entrepreneurial activities does not seem to fit into traditional economic thought. Economists assume perfect information and competition, and typically analyze the inevitable equilibria that arise. We know, however, that entrepreneurial individuals are inherently uncertain about prices

[1] Henceforth, we refer to independent entrepreneurship as entrepreneurship. Entrepreneurship inside established organizations is referred to as intrapreneurship. Together, entrepreneurship and intrapreneurship are denoted entrepreneurial activity in society. Section 1.5 further clarifies the use of terminology and the operationalization of the different concepts used in this dissertation.

of goods and services that they still have to bring to market. In doing so, they continuously try to exploit opportunities that challenge the status quo. As a consequence, the phenomenon of entrepreneurship has long been neglected in economic modeling, as sharply identified and explained by William Baumol (Baumol, 1968). However, modern economic research recognizes irrational behavior like over-optimism and other cognitive biases, acknowledges the existence of imperfect information and competition, and takes *equilibrium* as a dynamic concept (e.g., Minniti & Lévesque, 2008). Hence, it is definitely possible and worthwhile to study entrepreneurial activity from an economics perspective. Given the multidisciplinary nature of entrepreneurial activity, this dissertation not only draws from the economics field, but also the management, psychology and sociology fields of research.

Next to the investigation of a variety of formal and informal institutions, we incorporate multiple levels of analysis and apply different advanced methodological approaches. In chapter 2, we link four societal cultural practices to individuals' involvement in either entrepreneurship or intrapreneurship, conditional on being involved in innovative entrepreneurial activity. Whereas the extant literature often characterizes an entrepreneurial culture as performance oriented, little uncertainty avoidant and individualistic (e.g., Autio et al., 2013; Mueller & Thomas, 2001), we find that any culture can bring about entrepreneurial activity, although its appearance tends to differ between countries. For example, we show that societies characterized by uncertainty-avoidant cultural practices can in fact be highly entrepreneurial through higher levels of intrapreneurship. Even though individual entrepreneurial activities require some degree of risk-taking behavior, including those inside established firms (De Jong et al., 2015), societies at large may be uncertainty avoidant and develop institutions in such a way that entrepreneurial opportunities are most likely to be exploited within existing organizations. In chapter 3, we analyze how national-level legislation on employment protection affects the occupational choice of entrepreneurial individuals in society between employment and self-employment. From a worker's point of view, stringent legislation imposes significant opportunity costs on self-employment (Amit et al., 1995: Baumann & Brändle, 2012), but nonetheless, we find a positive relationship between higher severance payments and individuals'

likelihood to be involved in self-employment. Instead, a longer notice period is more likely to channel entrepreneurial talent towards wage employment, which calls for a more refined way of treating employment protection legislation (henceforth EPL) than has been the case in the past decades. In chapter 4, we provide empirical evidence that both entrepreneurial activity inside established firms and by newly established firms are associated with aggregate economic performance. However, depending on the design of the institutional framework, one type of entrepreneurial activity may be more important for growth than the other, similar to what has been suggested for different forms of entrepreneurship (e.g., Baumol & Strom, 2007; Bjørnskov & Foss, 2016; Bowen & De Clercq, 2008).

The remainder of this introductory chapter is organized as follows. In the next section (1.1), we start off by discussing how the entrepreneurship literature and some of its subfields have evolved up till state-of-the-art research (subsection 1.1.1). Subsections 1.1.2 and 1.1.3 deal with what we already know and what we still need to know about the institutional determinants and economic consequences of entrepreneurial activity, respectively. In section 1.2, we discuss some recent facts and figures about different types of entrepreneurial activity in society, intrapreneurship in particular, which essentially convinced us of the importance and relevance to investigate its key determinants and consequences in depth. Based on the literature and the identified gaps herein, we formulate research questions and introduce an overall conceptual framework in section 1.3. Section 1.4 discusses the scientific and societal relevance of this dissertation. Finally, the further use of terminology and the operationalization of the different concepts is clarified in section 1.5.

1.1 Literature review

1.1.1 Entrepreneurial activity in society

Although entrepreneurship is key to industrial dynamics and innovation, it has only relatively recently become a separate field of research. In essence, theories of entrepreneurship can be differentiated

into those that see entrepreneurship as an outcome or a phenomenon (e.g., self-employment), and those that perceive entrepreneurship as a way of thinking or acting (e.g., innovation). Joseph Schumpeter's early work on the economics of innovation clearly fits into the latter view (Schumpeter, 1911; 1934). According to him, the entrepreneur's function is to create new combinations from existing resources. By doing so, entrepreneurs are the prime cause of economic development. According to Schumpeter (1947), the discovery and the actual exploitation of opportunities are two entirely different things; "the inventor produces ideas, the entrepreneur "gets things done", …" Schumpeter (1947: 152). Hence, the Schumpeterian entrepreneur turns inventions into economically viable business activities.

Schumpeter is mostly known for his two models of innovation. Schumpeter Mark I (Schumpeter, 1911; 1934) stresses the role of independent entrepreneurs, who create new businesses in order to exploit opportunities for innovation. These new entrants herewith challenge the incumbent firms. The concept of *creative destruction* refers to the introduction of new inventions with which existing products, services and/or technologies become obsolete (also see Aghion & Howitt, 1992). In a Schumpeter Mark II regime (Schumpeter, 1942) innovations stem from research and development (R&D) activities by (groups of) employees of incumbent firms. This leads to a process of *creative accumulation* instead.

The distinction between Schumpeter Mark I and Mark II is closely related to that of (independent) entrepreneurship versus entrepreneurship inside (or rather, by) established organizations, respectively. Empirically, the former is usually measured by data on (new) business owners – if feasible with a further distinction into innovative and non-innovative entrepreneurs – and the latter by data on R&D input, such as R&D expenditures or the number of R&D workers (Stam, 2013). Although R&D workers are most likely the ones who create new knowledge inside incumbent organizations, the actual exploitation of opportunities that originate in this knowledge is not limited to them. In other words, it ignores the broader view on entrepreneurship inside established organizations that any

employee may take the lead in the actual implementation of ideas, including those that do not belong to the R&D department of firms. This calls for (empirical) research that also takes into account all other individual-level entrepreneurial activity that takes place inside established organizations.

According to the knowledge spillover theory of entrepreneurship, knowledge created in established organizations is an important source of opportunities (Acs et al., 2009; 2013; Audretsch & Keilbach, 2008; Braunerhjelm et al., 2010). Given that not all knowledge is perceived to be valuable by the incumbent, its commercialization accrues to entrepreneurs by means of newly established firms. The theory thus neglects entrepreneurial activity by employees of established organizations (Bjørnskov & Foss, 2016; Foss & Lyngsie, 2014), just like Schumpeter Mark I. Recent theorizing has led to the complementary knowledge spillover theory of intrapreneurship (Braunerhjelm et al., 2017). This theory highlights the importance of labor mobility of knowledge workers between established firms. More labor mobility is likely to lead to the faster diffusion of new knowledge and to the improved matching of heterogeneous knowledge. The mobility of knowledge workers is thus argued to promote intrapreneurship, which complements entrepreneurship in bringing forth innovations. Hence, both entrepreneurship and intrapreneurship may serve as a conduit of knowledge spillovers (Stam, 2013).

Gifford Pinchot (1985) was the first to coin the term *intrapreneurship*. According to him, intrapreneurs are the "dreamers who do" and "… those who take hands-on responsibility for creating innovation of any kind within an organization" (p. ix). His seminal piece of work carried the appropriate subtitle *Why you don't have to leave the corporation to become an entrepreneur*. Hence, intrapreneurs are considered similar to entrepreneurs insofar they both turn ideas into profitable realities. Intrapreneurs operate in an corporate context though, and do so for (or sometimes on behalf of) their employers. Antoncic & Hisrich (2001) simply define intrapreneurship as entrepreneurship within existing organizations, and identify four distinct dimensions. "Intrapreneurial organizations are those that engage in new business venturing, are innovative, continuously renew themselves, and are proactive" (Antoncic & Hisrich, 2001: 496). They also find support for the notion that intrapreneurship is

important for firms' absolute and relative growth (also see Alpkan et al., 2010; Antoncic & Antoncic, 2011; Augusto Felício et al., 2012). A refined definition of intrapreneurship refers to emergent behavioral intentions and behaviors related to departures of customary ways of doing business in existing organizations (Antoncic & Hisrich, 2003).

The concept of intrapreneurship is theoretically related yet not identical to many more concepts in the entrepreneurship literature. Sharma & Chrisman (1999) aimed to bring about a reconciliation of the definitional issues surrounding research on entrepreneurial activities within existing organizations, because "… similar to the study of entrepreneurship in general, there has been a striking lack of consistency in the manner in which these activities have been defined" (p. 11). Terms that are used most often in the literature regarding entrepreneurship inside established organizations include *corporate entrepreneurship* (e.g., Burgelman, 1983b; Covin & Miles, 1999; Zahra, 1991; 1993; Zahra & Covin, 1995), *corporate venturing* (e.g., Burgelman, 1983a; Garud, 1992; Miles & Covin, 2002), and *intrapreneurship* (e.g., Antoncic, 2003; 2007; Antoncic & Hisrich, 2001; 2003; Carrier, 1994; 1996; Rule & Irwin, 1988). Broadly speaking, corporate entrepreneurship and corporate venturing usually refer to firm-level entrepreneurial processes (top-down), whereas intrapreneurship is often seen as an employee-driven phenomenon at the individual-level (bottom-up). "Many corporate entrepreneurship studies deal with venturing activities that are initiated by the top management of an organization, not with venturing activities that emerge bottom-up by entrepreneurial employees" (Stam, 2013: 888). Some recent exceptions are Martiarena (2013) and Parker (2011). Sharma & Chrisman (1999) define entrepreneurship as "… acts of organizational creation, renewal, or innovation that occur within or outside an existing organization", and entrepreneurs as "… individuals or groups of individuals, acting independently or as part of a corporate system, who create new organizations, or instigate renewal or innovation within an existing organization" (p. 17). In this dissertation, we follow Sharma & Chrisman (1999) as to their view that entrepreneurial individuals in society can be involved in entrepreneurial activity that can take place both inside and outside established organizations.

Another related stream of research is the entrepreneurial orientation (EO) literature (e.g., Covin & Slevin, 1989; 1991). EO reflects firm's key entrepreneurial processes, practices and decision-making activities (Lumpkin & Dess, 1996). Five dimensions have proven useful to characterize a firm's EO, viz. innovativeness, proactiveness, risk-taking, autonomy and competitive aggressiveness (Lumpkin & Dess, 1996; Miller, 1983). Although EO is originally considered to be a firm-level phenomenon, some have called for investigation at other levels of analysis, including the individual level (Ireland et al., 2009; Miller, 2011). De Jong et al. (2015) followed up on this by applying three of EO's dimensions to individuals. Entrepreneurial behavior by employees in organizations is said to entail innovativeness, proactiveness and risk-taking (also see De Jong, 2016). According to this behavioral view, all employees are intrapreneurial to a greater or lesser extent. This contradicts most of the aforementioned perspectives in that they denote employees either as intrapreneurs or not (or, involved in intrapreneurship or not).

Another way of looking at entrepreneurship and intrapreneurship has been put forward by Foss et al. (2007). They characterize the internal organization of the firm as a nested hierarchy of judgment (Foss & Klein, 2012). Here, entrepreneurs are the source of *primary* or *original judgment* that may delegate entrepreneurial initiatives to their subordinates, referred to as *derived judgment*. Differences in firm performance are partly explained by the entrepreneurs' ability to exercise original judgment and to delegate derived judgment, next to interrelated activities like investment and hiring decisions. While the so-called *proxy entrepreneurs* are those who are involved in entrepreneurial activities based on delegated decision rights (Foss et al., 2007), intrapreneurs not necessarily require permission by their superiors to start developing an idea. The extent to which an employment relation leaves discretion to employees depends on the degree of completeness (or rather, incompleteness) of labor contracts, often operationalized by the amount of time employees are allowed to use corporate resources to engage in activities not directly prescribed by their employer (Foss et al., 2007: 1900). Job autonomy – that is, "the degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out"

(Hackman & Oldham, 1976: 258) – is found to be positively related to entrepreneurial behavior inside organizations (De Jong et al., 2015).

Despite obvious (contextual) differences between entrepreneurship and intrapreneurship – think of access to finance and other resources – entrepreneurial employees also have quite some (personal) similarities with independent entrepreneurs (e.g., Menzel et al., 2007; Parker, 2011). On average, entrepreneurial employees possess valuable personality traits like a proactive personality, a high need for achievement, and self-efficacy, they have a positive attitude towards entrepreneurial behavior, and the abilities to successfully engage in it (De Jong, 2016; De Jong et al., 2015). Moreover, (nascent) entrepreneurs and intrapreneurs are found to be largely similar in terms of their risk tolerance and perceptions of environmental uncertainty (Matthews et al., 2009).

Although existing research on *habitual entrepreneurship* thus far only concerns independent entrepreneurs (e.g., MacMillan, 1986; Ucbasaran et al., 2009; Wiklund & Shepherd, 2008), it may equally apply to entrepreneurial employees. For example, individuals may have more than one (part-time) job in which they act entrepreneurial, or combine involvement in entrepreneurial activity as an employee with owning-managing an independent business (i.e. *hybrid entrepreneurship*, see e.g. Folta et al., 2010). Entrepreneurial individuals might even be involved in entrepreneurial activity inside and outside the firm, either consecutively (i.e. *serial entrepreneurship*) or simultaneously (i.e. *portfolio entrepreneurship*) (Ucbasaran et al., 2006; Westhead & Wright, 1998). As compared to other employees, intrapreneurs are more likely to have previous experience with entrepreneurship, and to get involved in entrepreneurship (again), possibly based on knowledge gained at the current employer (Liebregts et al., 2015). In light of the above, we contend that entrepreneurial individuals in society allocate themselves across entrepreneurship and intrapreneurship, amongst others depending on the economic incentives provided by the institutional context (also see Bowen & De Clercq, 2008). In turn, these different types of entrepreneurial activity have a different impact on economic outcomes like growth. This will be discussed extensively in the upcoming two subsections.

1.1.2 Institutional determinants

Where much of the traditional entrepreneurship literature focused on the entrepreneur (for example, its personal characteristics) and the firm (for example, types of organizations, their structures and behaviors), researchers largely overlooked the role that the broader context plays (Welter, 2011). Only recently, entrepreneurship scholars have started to systematically explore the relationship between institutional theory and entrepreneurship (Boettke & Coyne, 2009; Bruton et al., 2010; Hwang & Powell, 2005; Welter & Smallbone, 2011). At the same time, the labor economics and economics of entrepreneurship literatures typically conceptualize entrepreneurship as an occupational choice between employment and self-employment (e.g., Kihlstrom & Laffont, 1979; Lucas, 1978). As long as the risky returns of entrepreneurship (i.e. profits) outweigh the non-risky returns of employment (i.e. fixed wages), individuals decide to become entrepreneurs. If not, they end up in (non-entrepreneurial) employment, thereby ignoring the wider perspective on entrepreneurship claiming that it may also appear inside established organizations (Bjørnskov & Foss, 2016; Foss & Lyngsie, 2014).

Recognizing a paid job as a credible occupational choice for entrepreneurial individuals in society raises the question what factors determine their allocation across employment and self-employment. According to Baumol (1990), the way entrepreneurship manifests itself – as productive, unproductive or even destructive entrepreneurship (also see Minniti, 2008) – depends on the incentive structure created by the institutional framework (Baumol & Strom, 2007). Likewise, institutions may channel entrepreneurial individuals either inside or outside the firm (Bjørnskov & Foss, 2008). Institutions determine the relative rewards of different occupations, in a pecuniary and non-pecuniary way, and thus play a key role in the allocation of entrepreneurial activity in society (Acemoglu, 1995; Murphy et al., 1991).

Institutions are increasingly recognized as influential determinants of entrepreneurship (e.g., Bjørnskov & Foss, 2013; 2016). North (1990: 3) defines institutions as “humanly devised constraints”

on action, as they shape the conditions of action through shared cognition, norms, and values (e.g., Denzau & North, 1994). The theory on institutional change by Douglass North (1990) distinguishes between formal institutions (rules, regulations, procedures, et cetera) and informal institutions (culture, norms, values, et cetera), whereby the latter may constrain the former, and *vice versa* (Gnyawali & Fogel, 1994; North, 1990; 2005). Formal institutions can be adjusted in a relatively short period of time, whereas changes in informal institutions usually take longer. Put differently, informal institutions are inertial in nature, and will not change immediately in reaction to the implementation of formal institutions. Formal institutions are more likely to reflect the informal institutional framework of countries instead. Moreover, informal institutions may substitute formal ones in reducing transaction costs (Arrow, 1972; Glaeser et al., 2002). Informal institutions usually have a pervasive influence on the long-run character of economies, and show a high degree of path dependence (North, 1991; Williamson, 1998; 2000).

There are quite some empirical studies that link a variety of institutions to entrepreneurship (e.g., Arin et al., 2015; Terjesen et al., 2016). The formal institutions that have gained most attention in the literature are the access to finance (e.g., Aparicio et al., 2016; Grilo & Irigoyen, 2006), the allocation and protection of intellectual property rights (e.g., Anton & Yao, 1994; 1995; 2004; Hellmann, 2007), and the regulatory complexity (e.g., Ardagna & Lusardi, 2009; Klapper et al., 2006). All three contribute to countries' economic freedom to a greater or lesser extent (e.g., Bjørnskov & Foss, 2008; McMullen et al., 2008; Nyström, 2008). Control of corruption (e.g., Aidis et al., 2008; Avnimelech et al., 2014), generalized or interpersonal trust (e.g., De Clercq et al., 2013; Welter, 2012; Welter & Smallbone, 2006), and national culture (e.g., Autio et al., 2013; Hayton et al., 2002) are among the most researched informal institutions. None of the aforementioned studies have incorporated entrepreneurial activities by employees in their empirical models.

With this dissertation, we aim to fill this gap in the literature by investigating how institutions drive the allocation of entrepreneurial individuals across entrepreneurship and intrapreneurship (also see

Bosma et al., 2013a). Current knowledge is limited to how certain institutions interact with independent types of entrepreneurial activity, while the exact same institutions may well have different effects on entrepreneurial activity by employees. If so, any observed negative effect on entrepreneurship may be not as detrimental as commonly assumed, because there might be a simultaneous positive effect on intrapreneurship, and *vice versa*. That is, similar to what Kacperczyk (2012) finds for the way opportunity structures in established firms affect entrepreneurship and intrapreneurship (also see Parker, 2011).

At first, we specifically focus on four societal cultural practices, viz. performance orientation, uncertainty avoidance, institutional collectivism and in-group collectivism (chapter 2), after which we investigate the effects of two main elements of national-level EPL, viz. severance pay and the notice period (chapter 3). National culture has been identified as an important factor in explaining economic development levels (e.g., Liñán & Fernandez-Serrano, 2014). Countries' formal institutions, such as the strictness of EPL, may echo their national culture, for example as to the way things are in society regarding uncertainty avoidance. We argue that legislation on employment protection can have unintended effects on individuals' occupational choice (e.g., Baumann & Brändle, 2012). In another chapter, our main interest goes out to the relationship between different types of entrepreneurial activity and national-level economic growth, but we also examine the preceding effects of five formal institutions that together indicate countries' economic freedom (chapter 4, also see subsection 1.1.3 below).

1.1.3 Economic consequences

The economic growth literature covers a large variety of economic and non-economic determinants (Aghion & Howitt, 2009; Barro & Sala-i-Martin, 2004; Sala-i-Martin, 1997). Factors proven to be associated with macroeconomic development include education, environmental quality, natural resources, political stability, and technology (e.g., Barro, 1991; 1997; 2013; Grossman & Krueger, 1994;

Gylfason, 2001; Nelson & Phelps, 1966). Entrepreneurship has long been neglected as one of possible factors affecting national-level economic growth, despite the fact that many economists would emphasize its importance (Bjørnskov & Foss, 2016). Hence, neoclassical growth theory is at best incomplete and at worst misleading (Parker, 2009).

Most importantly, entrepreneurs are thought to generate labor productivity gains, both through selection and increased competition (e.g., Geroski, 1989; Nickell, 1996; Nickell et al., 1997). Selection involves the replacement of incumbent firms by entrants, who are better at and/or more efficient in meeting consumers' demand. At the same time, these entrants intensify competition, and force any of the remaining incumbents to perform better. Entrepreneurship also brings about diffusion of knowledge, thereby creating knowledge spillovers (e.g., Acs et al., 2009; 2013; Braunerhjelm et al., 2010; Breschi & Lissoni, 2001). Especially in developed countries, firms increasingly rely on the development of knowledge-intensive goods in order to better exploit their competitive advantages (Acs et al., 2013). Resulting innovations might lead to the creation of jobs (e.g., Baptista et al., 2008; Birch, 1987; Van Stel & Storey, 2004), thereby enhancing economic growth, highly depending on how disruptive the innovations are for existing markets.

Despite the theoretical mechanisms above (also see Audretsch et al., 2006; Wennekers & Thurik, 1999), empirical evidence does not reveal a clear-cut positive effect of entrepreneurship on economic growth. By now, quite some empirical studies have covered different levels of analysis, in particular the firm level (e.g., Audretsch et al., 2004; Brock & Evans, 1986), the industry level (e.g., Caves, 1998, Haltiwanger, 2006), and the regional level (e.g., Audretsch & Keilbach, 2004a; 2004b; 2008; Carree & Thurik, 2003; Davidsson et al., 1994; Robbins et al., 2000). Research at the country level only emerged in the past few decades (e.g., Acs & Amorós, 2008; Audretsch et al., 2002; Carree & Thurik, 2008; Van Stel et al., 2005), mostly due to a lack of internationally comparative data on entrepreneurial activities. Spurred by labor-intensive yet valuable attempts to collect data on entrepreneurial activity across a high number of countries, scholars have started to also incorporate measures of entrepreneurship in

their models explaining national-level economic growth. Most country-level studies report a positive association – not to mention a positive effect, as its direction can often be questioned (Parker, 2009; Wennekers & Thurik, 1999) – between entrepreneurship and national economic performance (e.g., Koellinger & Thurik, 2012). An exception to this is the study by Blanchflower (2000), who finds a negative relationship. Others claim that there might be an optimal rate of entrepreneurship in society (e.g., Carree et al., 2002; Van Praag & Van Stel, 2013; Van Stel & Carree, 2004). According to Carree et al. (2007) there is only a growth penalty for having too few, not for having too many business owners.

Recent research distinguishes between different types of entrepreneurs – for example, growth-oriented, high-tech and/or opportunity entrepreneurship – operating in different kinds of contexts – for example, in a developing, transition or developed economy, in a peripheral or central region – revealing mixed evidence (e.g., Bosma et al., 2017; Minniti & Lévesque, 2010; Stam & Van Stel, 2011; Valliere & Peterson, 2009; Wong et al., 2005). Hence, one should be sensitive to the type of entrepreneurial activity, and under which conditions it takes place. Institutions give rise to different types of entrepreneurial activity in society, which, in turn, sum up to national-level economic consequences (Bjørnskov & Foss, 2016). The institutional environment both enables and constrains entrepreneurship – not only the number of entrepreneurial initiatives (e.g., Aidis et al., 2008), but also their subsequent success (or failure) – and hence, leads to different growth patterns (Bruton et al., 2010). Put differently, institutions may advance the level of entrepreneurial activities, and also channel them into more productive directions, thereby having a larger impact on economic growth (Bjørnskov & Foss, 2016; Bowen & De Clercq, 2008).

A recent review of comparative international entrepreneurship research by Terjesen et al. (2016) emphasizes the heterogeneous nature of entrepreneurial activity across countries, identifies country-level antecedents like culture and (other) institutions, and the importance of different types of entrepreneurial activity for country-level outcomes. Bjørnskov & Foss (2016) map the existing empirical literature on the institutions-entrepreneurship-growth nexus, and conclude that most

studies take entrepreneurship to be exclusively about start-ups and/or self-employment. The authors therefore call for future research that also includes entrepreneurship inside established firms mediating the relationship between institutions and aggregate performance. In this dissertation, we explicitly want to address this gap in the literature. Institutional theory considers institutions as a fundamental cause of growth (Acemoglu et al., 2005; Chang, 2011), or as North (1994) puts it: "Institutions form the incentive structure of a society, and the political and economic institutions, in consequence, are the underlying determinants of economic performance" (p. 359). Where traditional growth models indeed suggest a direct link between the institutional framework and economic development (e.g., Mulligan et al., 2004; Rodrik et al., 2004; Scully, 1988), we introduce different types of entrepreneurial activity as mechanisms bridging the two (also see Aparicio et al., 2016).

We argue that the theoretical mechanisms explaining the link between entrepreneurship and economic growth are also applicable to how intrapreneurship contributes to improved aggregate performance, possibly even to a greater extent. First and foremost, entrepreneurial employees have access to complementary assets spread across the employer's organization (e.g., Teece, 1986), which may facilitate the development of a new business activity. By recombining competences, resources and skills, entrepreneurial employees play a key role in firms' dynamic capabilities (Teece, 2007; Teece & Pisano, 1994; Teece et al., 1997). Moreover, intrapreneurship rates are found to be positively associated with educational attainment, both within society and within organizations (Bosma et al., 2010; 2012a; Stam et al., 2011), suggesting a sorting effect of highly educated individuals into established organizations rather than to newly established organizations. Intrapreneurship is indeed found to be related to favorable economic outcomes, such as innovation, expectations for growth and expected job creation (Bosma et al., 2011; Matthews et al., 2009; Stam, 2013), but has never been included in models explaining national-level economic growth. Recent data collection efforts have led to internationally comparative data on the prevalence of entrepreneurial activity by employees, which now provides the opportunity to do so.

Although we primarily focus on the macroeconomic consequences of entrepreneurial activities by both employees and entrepreneurs (including a subgroup of innovative entrepreneurs only), we also examine how and to what extent several formal institutions affect these different types of entrepreneurial activity in the first place. These are (1) the government size, (2) the legal structure and property rights, (3) the access to sound money, (4) the freedom to trade internationally, and (5) the regulation of credit, labor and business. Together, these five dimensions determine a country's general index that measures the degree to which policies and institutions of countries are supportive of economic freedom (Gwartney et al., 1999). The concept of economic freedom and its underlying dimensions have been regularly linked to a wide variety of economic and social consequences, including some studies on entrepreneurial outcomes (e.g., Bjørnskov & Foss, 2008; Freytag & Thurik, 2007; McMullen et al., 2008; Nyström, 2008). A comprehensive literature review by Hall & Lawson (2014) shows that a vast majority finds evidence for positive effects of economic freedom on outcomes such as growth and productivity.

1.2 Facts and figures

In this dissertation, we mostly rely on data from the Global Entrepreneurship Monitor (GEM). The GEM is a large-scale international survey on the prevalence of entrepreneurship since 1999. Each year, the answers of a minimum number of 2,000 individuals per country participating in their Adult Population Survey (APS) are aggregated to country-level measures of entrepreneurial activity. Rates of independent entrepreneurial activity have been determined since the GEM's inception. In 2011, the GEM for the first time included a set of questions in order to measure the relative prevalence of entrepreneurial activity by employees.[2] Until then, no data source offered the opportunity to compare

[2] Apart from the pilot study in 2008, in which eleven countries participated to measure their rate of entrepreneurial employee activity (EEA). In 2012 and 2013, the inclusion of this set of questions was optional, so relatively few participating countries actually did so. In 2014 and 2015, the GEM again measured the EEA rates of all participating countries. EEA rates turn out to be relatively stable over time.

this type of entrepreneurial activity across countries. We are now able to plot and analyze the incidence of entrepreneurial activity by individuals inside and outside existing organizations at the same time.

Figure 1.1 compares the rate of what the GEM coined Entrepreneurial Employee Activity (henceforth EEA) with its independent counterpart, i.e. Total (early-stage) Entrepreneurial Activity (henceforth TEA), across 52 countries at different stages of economic development. Two observations clearly stand out. First, ignoring EEA leads to the exclusion of an important share of entrepreneurial activity in society, especially in developed countries. In some countries, entrepreneurial employees even constitute a larger share of the adult population than independent entrepreneurs, let alone if we only consider innovative forms of entrepreneurship (henceforth TEAinnov).[3] Second, it seems like EEA and TEA are substitutes rather than positive correlates at the country level (also see Bosma et al., 2012a; 2013a). Countries with relatively low TEA rates seem to compensate this lack of independent entrepreneurial activity with higher levels of EEA, and *vice versa*. This provides some support for Baumol's (1990) hypothesis that entrepreneurial individuals in society allocate themselves across productive, unproductive and destructive forms of entrepreneurship (also see Minniti, 2008). Likewise, entrepreneurial talent may allocate itself across established and newly established organizations, or intrapreneurship and entrepreneurship, respectively (Bjørnskov & Foss, 2008). Both observations are at the heart of this dissertation.

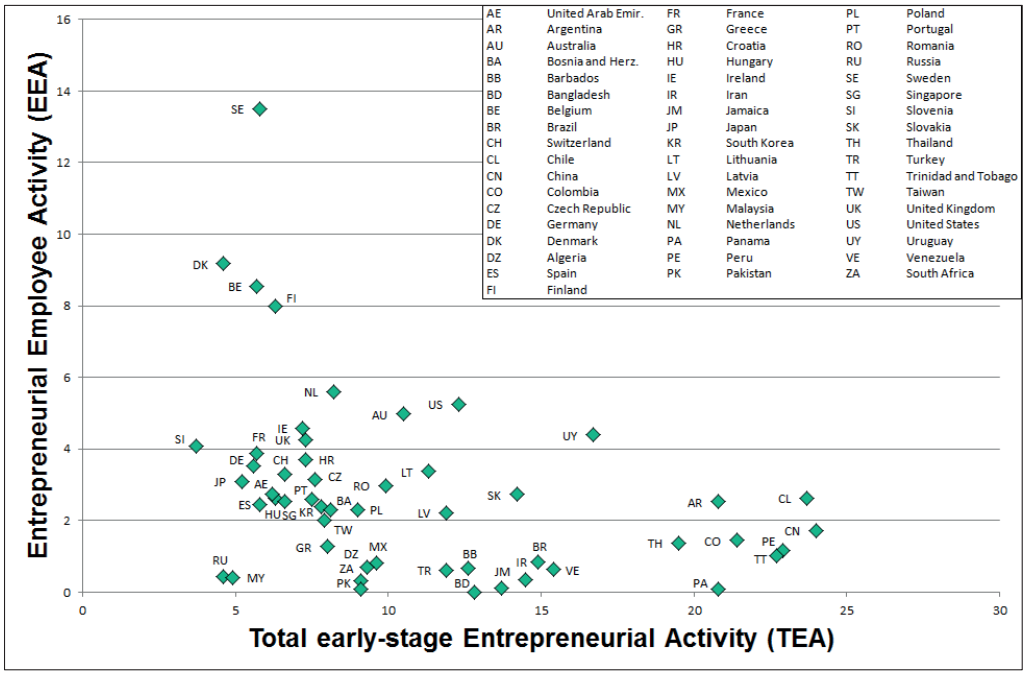
Figures 1.2 and 1.3 are world maps that once more display countries' 2011 TEA and EEA rates, respectively. We may conclude that, on average, the most advanced and competitive economies have the highest shares of EEA, and *vice versa*. In other words, entrepreneurial activity by employees is most prevalent in the developed countries, and limited or even negligible in less developed countries (also see Kelley et al., 2016). At the same time, the opposite is true for independent entrepreneurial activity;

[3] In almost all countries, only a minority of entrepreneurship is innovative. The share of entrepreneurs that offers products or services that are new to the market and/or different from most competitors' offerings, i.e. those that can be regarded as innovative, ranges from 6,8% (Bangladesh) to 57,4% (Chile).

highest TEA rates can be found among developing and transition economies. Hence, if one believes that economic prosperity can (at least partly) be attributed to entrepreneurial activity, then it seems to be mostly the result of that inside established organizations.

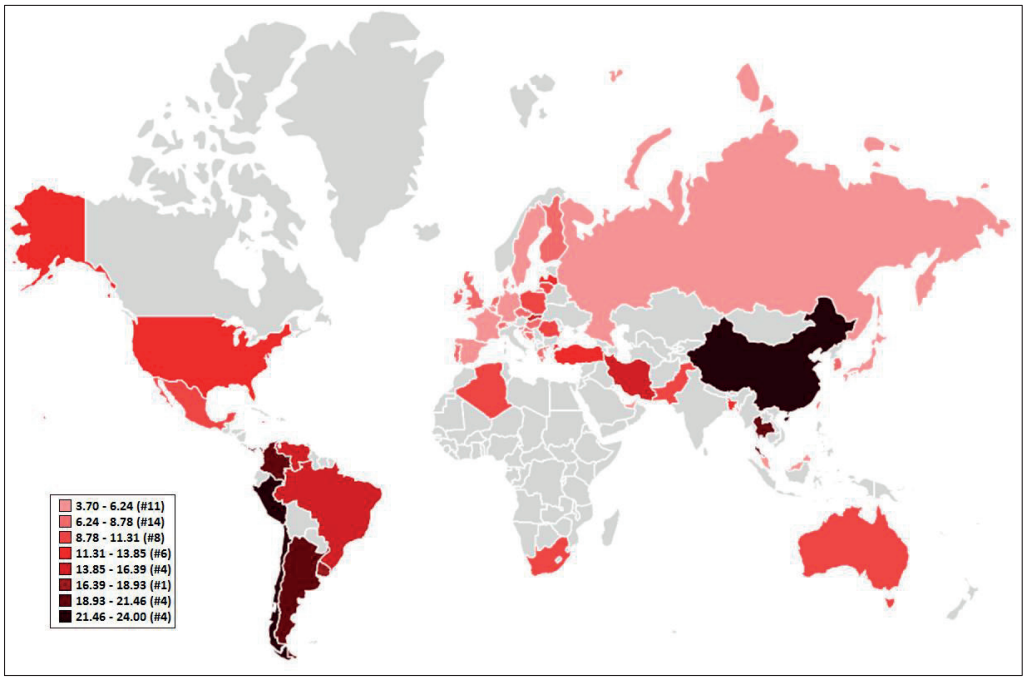
One should be careful though with interpreting the observed correlations as evidence of a (one-way) causal relationship running from entrepreneurial activity to economic growth. Furthermore, it should be emphasized that large heterogeneity can be found among the group of independent entrepreneurs. A more fine-grained analysis would, for example, make a further distinction between necessity and opportunity entrepreneurship. In developing countries, people usually face a lack of opportunities to get employed in the first place (Jütting & De Laiglesia, 2009), let alone to be involved in EEA. The relatively high shares of TEA in less developed countries might reflect the smaller presence of large firms (Ghoshal et al., 1999; Poschke, 2015). On the contrary, a higher presence of such firms might have an entry deterring effect on new firms (Choi & Phan, 2006).

Figure 1.1 – Entrepreneurial activity as a percentage of the adult population (2011)



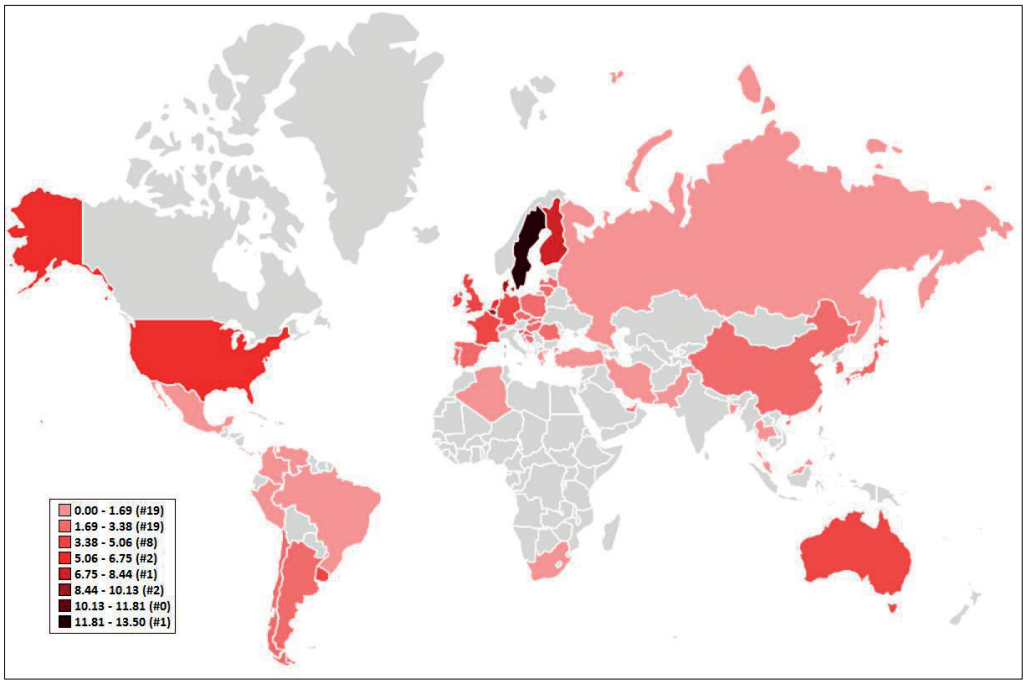
Source: GEM 2011 APS

Figure 1.2 – Total Entrepreneurial Activity (TEA) rates across the world (2011)



Source: GEM 2011 APS

Figure 1.3 – Entrepreneurial Employee Activity (EEA) rates across the world (2011)



Source: GEM 2011 APS

1.3 Research questions and conceptual framework

Both the extant literature and the recent empirical insights discussed above have inspired us to study the phenomenon of intrapreneurship in depth. We take intrapreneurship as part of the overall entrepreneurial activity in society, hereby complementing entrepreneurship, and aim to identify key formal and informal institutional determinants of these two different types of entrepreneurial activity, after which we move on to their economic consequences. Hence, the main research question of this dissertation is as follows:

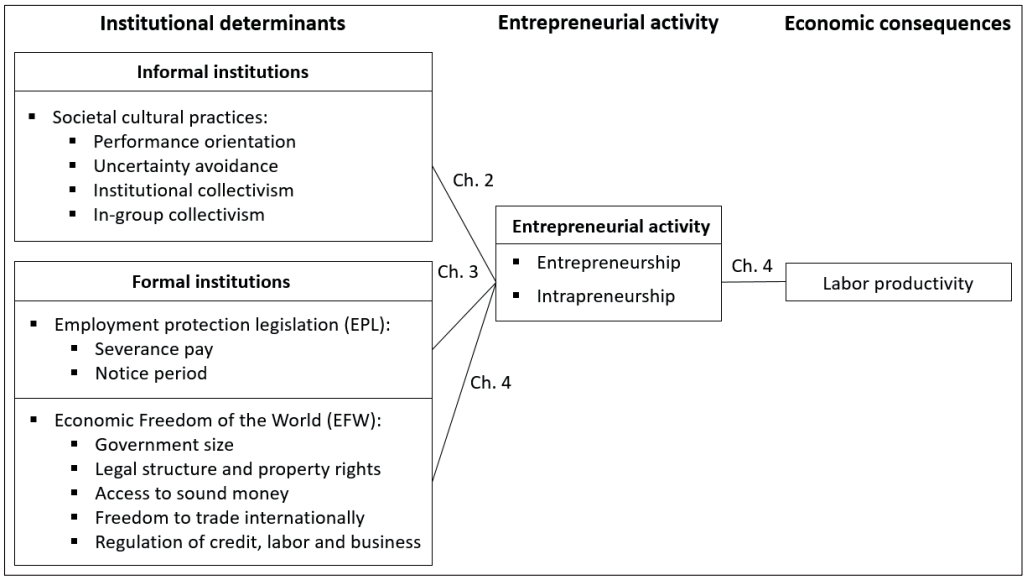
What are key institutional determinants and the economic consequences of two types of entrepreneurial activity in society, notably entrepreneurship and intrapreneurship?

We aim to answer our main research question by first answering the following three subquestions:

1. *How and to what extent do societal cultural practices affect the allocation of entrepreneurial activity in society across entrepreneurship and intrapreneurship?* [Chapter 2]
2. *How and to what extent does national-level employment protection legislation (EPL) affect the allocation of entrepreneurial activity in society across entrepreneurship and intrapreneurship?* [Chapter 3]
3. *How and to what extent do different types of entrepreneurial activity in society, notably entrepreneurship and intrapreneurship, affect national-level economic performance?* [Chapter 4]

The remainder of this dissertation is outlined as follows, and visualized by the conceptual framework in figure 1.4. Each subquestion is dealt with in a separate chapter. Taken together, chapters 2-4 form the core of the dissertation. Clearly, this dissertation only covers a selection of formal and informal institutions as supposed determinants of entrepreneurial activity in society. In answering the research questions, we incorporate multiple levels of analysis and apply different advanced methodological

Figure 1.4 – Conceptual framework



Notes: All institutions and labor productivity are measured at the country level. Entrepreneurial activity is measured at the individual level in case of chapters 2 and 3, and aggregated to country-level shares in the adult population in case of chapter 4.

approaches that fit the research questions and the available data. In chapter 5, we draw conclusions and extensively discuss what our key findings mean for entrepreneurship policy and future research.

In chapter 2, we investigate the effects of four dimensions of countries' national culture – that is, the degree of performance orientation, uncertainty avoidance, institutional collectivism, and in-group collectivism – on the allocation of entrepreneurial individuals across (innovative) entrepreneurship and intrapreneurship (subquestion 1). We use data on the way things *are* in society, labeled societal cultural practices, and estimate maximum-likelihood probit models with sample selection (Van de Ven & Van Praag, 1981) in order to correct for non-random self-selection into innovative entrepreneurial activity (Parker, 2011). Individuals are involved in innovative entrepreneurial activity if they are either an innovative entrepreneur or an intrapreneur. Intrapreneurs are involved in the development of business activities that relate to new products, services and/or markets, so they can be best compared

to the innovative part of the group of entrepreneurs. The four cultural practices are part of the informal institutional framework of countries.

In chapter 3, we unpack the effects of national-level EPL on the allocation of entrepreneurial activity in society across employment and self-employment (subquestion 2). By focusing on two of its main elements, i.e. severance pay and the notice period, we test two specific formal institutions as supposed determinants of the allocation of entrepreneurial activity in society. The regression models are multilevel in nature due to the inclusion of explanatory variables at different levels of analysis. We herewith answer Shepherd's (2011) call for more multilevel research on entrepreneurial decision-making (also see Bjørnskov & Foss, 2016). More specifically, we explain individual-level occupational status – either employed, whether or not entrepreneurially active, or self-employed – by national-level legislation on employment protection. Multilevel analysis techniques account for the fact that lower-level explanatory variables may have both within-group and between-group variation (e.g., Hox, 1995, 2010). In chapter 2, we conduct multilevel analysis as a robustness check. Together, chapters 2 and 3 cover most of the institutional determinants (or, left-hand) side of the conceptual framework.

In chapter 4, we move on to the economic consequences (or, right-hand) side of the conceptual framework, and investigate the role that our two focal types of entrepreneurial activity play in countries' economic performance (subquestion 3). We distinguish between the share of entrepreneurship – including a subgroup of innovative entrepreneurs – and intrapreneurship in the adult population, in a cross-national setting. We also explore these effects contingent on the impact of formal institutions on entrepreneurial activity. The institutions selected here capture different elements of economic freedom. We use a three-stage least squares (3SLS) method in order to find a causal link between institutions and different types of entrepreneurial activity, in turn explaining aggregate economic growth (e.g., Aparicio et al., 2016; Bosma et al., 2017).

Chapter 5 concludes this dissertation by answering the research questions and by discussing the contributions it brings to the extant literature. Furthermore, it extensively discusses the implications

that can be derived from the findings. This dissertation is not without limitations, so chapter 5 also provides some suggestions for future research.

1.4 Scientific and societal relevance

This dissertation is highly relevant for various fields of study, and because of multiple reasons. First and foremost, a mere focus on entrepreneurship in cross-country research is likely to ignore an important share of entrepreneurial activity in society (e.g, Bjørnskov & Foss, 2016; Foss & Lyngsie, 2014). Recent evidence shows that neither the prevalence of intrapreneurship nor its supposed contribution to favorable economic outcomes should be underestimated (e.g., Bosma et al., 2011; Stam, 2013). This is particularly true for the more advanced economies, where intrapreneurship is a relatively common type of entrepreneurial activity (Kelley et al., 2016). Thus far, entrepreneurial activity is mostly attributed to people who (intend to) set up or already own-manage a (new) business for own risk and reward (Reynolds et al., 2005), i.e. independent from any incumbent organization. In that respect, intrapreneurship is an underexposed or even hidden type of entrepreneurial activity (WEF, 2016), especially in empirical research. Now that intrapreneurship measures have become available for a large and diverse group of countries, this issue can be resolved.

The literature on cross-cultural research (e.g., Hayton et al., 2002) and institutional economics (e.g., Bruton et al., 2010) will benefit from the studies that not only link formal and informal institutions to independent types of entrepreneurial activity, but also to entrepreneurial activity by employees (chapters 2 and 3, respectively). Our current knowledge is limited to how institutions relate to independent types of entrepreneurial activity. However, these institutions may well have different effects on entrepreneurial activity by employees. In other words, any negative influence of institutions on entrepreneurship activities may be offset by a positive effect on the number of intrapreneurship activities, and *vice versa*. Potentially, this requires a revision of existing theories on institutions and entrepreneurship as to the interpretation of entrepreneurship. A more nuanced approach would then

also include entrepreneurial activity by employees. Likewise, recent evidence casts doubt on the well-established notion that large and mature organizations inhibit entrepreneurial activity; although employees in such organizations are found to be less likely to transition to entrepreneurship, they exhibit a higher propensity to engage in entrepreneurship inside the established firm instead (Kacperczyk, 2012). Hence, any observed detrimental effect on entrepreneurship may not be as harmful as generally assumed. This is particularly true if intrapreneurship is found to be positively related to beneficial economic outcomes. Parker (2011) provides empirical evidence for several individual-level and organizational-level characteristics affecting an individual's decision to exploit opportunities by means of entrepreneurship or intrapreneurship. In a similar fashion, country-level institutions are also expected to have an effect on the allocation of entrepreneurial activity in society across entrepreneurship and intrapreneurship (also see Bosma et al., 2013a).

Chapter 4 complements existing theories on entrepreneurship, innovation and their explanation of macro-level economic growth by including intrapreneurship as a hitherto neglected type of entrepreneurial activity. More specifically, we extend empirical research on the institutions-entrepreneurship-growth nexus by taking intrapreneurship as part of the overall entrepreneurial activity in society (Bjørnskov & Foss, 2016). Institutions are considered to be a fundamental cause of long-run growth (Acemoglu et al., 2005), as they form an incentive structure shaping the conditions of action (North, 1990; 1994). Quite a few studies have analyzed the direct relationship between political and economic institutions and development (e.g, Barro, 1997; Mulligan et al., 2004; Rodrik et al., 2004), and reveal mixed empirical evidence (Acemoglu & Robinson, 2008). Recently, some have introduced entrepreneurship as a mechanism impacting growth under certain institutional conditions (e.g., Aparicio et al., 2016). This dissertation contains a first attempt to also include intrapreneurship as a theoretically relevant way in which entrepreneurial activity mediates the relationship between national-level institutions and aggregate economic growth.

Since we conduct all of our studies in a cross-country setting, we contribute to the literature on comparative international entrepreneurship research. “An appreciation of similarities as well as fundamental differences [in entrepreneurial activity across countries] enables scholars to develop better theories to explain conditions that help or hinder entrepreneurial activity in different countries as well as the implications of entrepreneurship” (Terjesen et al., 2016: 301). Finally, we apply state-of-the-art methodologies with which we follow approaches and/or suggestions by recent studies. Parker (2011) highlights the importance of dealing with (non-random) self-selection into entrepreneurial activity when investigating factors that determine an individual’s involvement in either entrepreneurship or intrapreneurship, and so, we estimate maximum-likelihood probit models with sample selection to answer our research question in chapter 2 (Van de Ven & Van Praag, 1981). In chapter 3 (and in chapter 2 as a robustness check), we conduct multilevel analysis, because individual-level entrepreneurial activities are nested in higher-level factors, such as institutions and policies defined at the country level (Bjørnskov & Foss, 2016; Shepherd, 2011). In chapter 4, and as in Aparicio et al. (2016) and Bosma et al. (2017), we estimate three-stage least squares (3SLS) models to analyze how and to what extent different types of entrepreneurial activity mediate the relationship between institutions and economic growth.

Insights into the institutional determinants and economic consequences of different entrepreneurial activities in society, with a clear emphasis on those by employees, will also improve the effectiveness and efficiency of policy interventions to improve the competitiveness of firms, and eventually the economy at large. Because this dissertation takes into account both intrapreneurship and entrepreneurship levels, including a further subdivision in productive (innovative) and less productive (non-innovative, imitative or routine) forms of entrepreneurship, it provides novel insights into whether, and if so, how and to what extent different types of entrepreneurial activity affect aggregate economic performance (also see Bowen & De Clercq, 2008; Bruton et al., 2010). Policies should aim at redesigning institutions in ways that entrepreneurial talent is channeled into directions that are most beneficial for further economic development (also see Baumol & Strom, 2007). As this dissertation

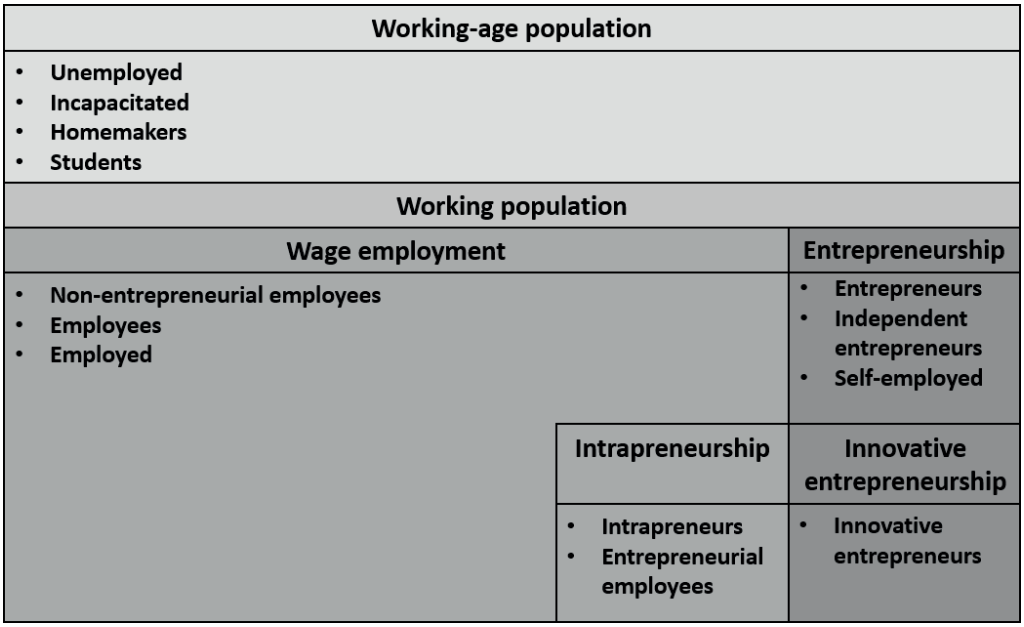
contains multiple cross-national studies, it also helps to determine which government policies and programs best support entrepreneurial efforts and their desired outcomes in different national contexts (Terjesen et al., 2016).

1.5 Terminology and operationalization

Hereafter, with *entrepreneurial activity* we refer to the overall entrepreneurial activity in society, consisting of both *entrepreneurship* (or *independent entrepreneurial activity*, used interchangeably) and *intrapreneurship* (or *entrepreneurial employee activity*, used interchangeably). People involved in the former type of entrepreneurial activity are referred to as *entrepreneurs* or *independent entrepreneurs* (or *self-employed* in chapter 3, see below), while those involved in the latter type of entrepreneurial activity are called *intrapreneurs* or *entrepreneurial employees*. Intrapreneurs are a subset of all individuals in wage employment. Those who do not engage in entrepreneurial activities for their employer are named *non-entrepreneurial employees*, or just *employees* or *employed*. *Innovative entrepreneurs* form a subset of all entrepreneurs. Together, innovative entrepreneurship and intrapreneurship sum up to all *innovative entrepreneurial activity* in society. The diagram in figure 1.5 illustrates the above.

Throughout all chapters, intrapreneurship is operationalized by adopting the GEM's narrow measure of EEA. Accordingly, employees act intrapreneurial if they are continuously involved in the development of new business activities for their main employer, and when they have a leading role in at least one of the two phases of the developmental process, i.e. the phase of idea development and the phase of preparation and implementation (Bosma et al., 2013b: 21). Here, *continuously* refers to both currently involved and (at least once) in the past three years. The GEM's broad definition of EEA only requires employees to be involved in the development of new business activities in the past three years. The GEM's approach to entrepreneurial activity by employees takes account of both top-down and bottom-up entrepreneurial activities, and is therefore closely related to the concepts of corporate

Figure 1.5 – Schematic overview to illustrate the use of terminology



Notes: The size of the areas are not meant to indicate absolute or relative numbers of the corresponding group of individuals.

entrepreneurship and intrapreneurship, respectively. The GEM deliberately coined the term entrepreneurial employee activity to circumvent labeling their measure by any of the two concepts. It herewith captures any entrepreneurial activity by employees of established organizations. Again, these are likely yet not exclusively R&D or knowledge workers. Examples of new business activities include setting up a new business unit, establishment or subsidiary, and the development of a new product, service and/or product-market combination (also see Bosma et al., 2013b).

In chapters 2 and 4, we make use of the GEM's measure of independent entrepreneurial activity (i.e. TEA) to operationalize entrepreneurship. In case of chapter 2 this concerns TEA at the individual level, and in case of chapter 4 we use TEA aggregated to country-level rates of entrepreneurship. Countries' TEA rate represents the share of the adult population being the owner-manager of a young business (less than 42 months old), or being involved in setting up an independent business, the so-called *young business owners* and *nascent entrepreneurs*, respectively (Reynolds et al., 2002; 2005). The adult

population consists of 18 up to 65 year-old people, and hence, could also be labeled the working-age population. In chapter 3, we operationalize entrepreneurship by taking those who report to be currently self-employed instead. This is based on a question in the GEM's 2011 APS that asked for respondents' occupational (or, employment) status. People with statuses other than employed or self-employed (for example, incapacitated or unemployed) are omitted from the analysis. We believe that this particular question better fits our opportunity costs argument with regard to entrepreneurial individuals' occupational choice between employment and self-employment.

In some of our model specifications, we also preselect specific subgroups of independent entrepreneurs. In chapter 2, we consider innovative forms of TEA only, because one could claim that entrepreneurial employees are also innovative by definition; they are involved in the development of business activities that relate to new products, services and/or markets. Individuals are involved in TEAinnov if they either sell products or services that are to some extent new to the market, or claim that not many competitors offer the same product. In chapter 4, we contrast country-level EEA rates to both regular TEA and innovative TEA rates. As such, we get a much more complete picture of how and to what extent different types of entrepreneurial activity in society contribute to national-level economic performance. Together, EEA and TEAinnov sum up to all innovative entrepreneurial activity in society.

Table 1.1 summarizes the way in which we operationalize our key variables throughout the dissertation. Note that we use data on entrepreneurial activity at different levels of analysis. All entrepreneurial activity variables are obtained from the GEM.

Table 1.1 – Operationalization of the key entrepreneurial activity variables

Variables	Description	Level of analysis
Chapter 2		
Innovative entrepreneurial activity (TEAinnov + EEA)	Takes the value one if an individual is involved in any of the two types of innovative entrepreneurial activity, either as an innovative entrepreneur or as an intrapreneur, and zero otherwise	Individual
Intrapreneurship (EEA)	Takes the value one if an individual is involved in intrapreneurship, and zero if an individual is involved in entrepreneurship, conditional on being involved in innovative entrepreneurial activity	Individual
Chapter 3		
Occupational status:		
0. Non-entrepreneurial employee	Employees (either part-time or full-time) that are not involved in the development of new business activities for their main employer [base outcome category]	Individual
1. Entrepreneurial employee (EEA)	Employees leading the development of new business activities for their main employer, currently and in the past three years	Individual
2. Self-employed	Self-employed individuals	Individual
Chapter 4		
Entrepreneurial employee activity (EEA)	The share of employees leading the development of new business activities for their main employer, currently and in the past three years, in the adult population	Country
Independent entrepreneurial activity (TEA)	The share of nascent entrepreneurs and owners/managers of young businesses (<42 months old) in the adult population	Country
Innovative independent entrepreneurial activity (TEAinnov)	The share of nascent entrepreneurs and owners/managers of young businesses (<42 months old) that develop new products, services, and/or product-market combinations in the adult population	Country

Notes: All variables are obtained from one or more editions of the Adult Population Survey (APS) by the Global Entrepreneurship Monitor (GEM).

2 Different cultures, different entrepreneurs: Cultural practices and the allocation of entrepreneurial talent across entrepreneurship and intrapreneurship[4,5]

Abstract

Entrepreneurial cultures are often said to be performance oriented, little uncertainty avoidant and individualistic. However, the view that only certain cultural conditions are conducive to entrepreneurial activity is directly contradicted by reality. We observe that any culture can bring about entrepreneurial activity, although its appearance tends to differ between countries. Whereas some cultural practices encourage people to set up a new firm, others might induce individuals to exploit new business opportunities inside an established firm. Hence, we conceive national culture as a determinant of the allocation of entrepreneurial talent in society across entrepreneurship and intrapreneurship. Our empirical findings reveal that uncertainty-avoidant and institutional collectivistic cultures seem to compensate their relatively limited levels of entrepreneurship by promoting intrapreneurship instead.

Keywords: national culture, cultural practices, innovative entrepreneurial activity, entrepreneurship, intrapreneurship

[4] This chapter is joint work with Coen Rigtering and Niels Bosma.

[5] The authors would like to thank the participants of the Ratio Colloquium for Young Social Scientists (Stockholm, August 2015), the DARE Research Seminar (Utrecht, November 2015), the Workshop on Institutions and Entrepreneurship (Reading, May 2016), the Annual Meeting of the Academy of Management (Anaheim, August 2016), and the ECSB Doctoral Workshop of the RENT XXX Conference (Antwerp, November 2016) for their helpful comments and constructive feedback on earlier versions of this chapter.

2.1 Introduction

How can we determine if a country possesses an entrepreneurial culture? Most studies looking into this question take entrepreneurship to be exclusively about setting up or owning independent firms (e.g., Autio et al., 2013; Bowen & De Clercq, 2008), thereby neglecting the broader view that entrepreneurial activity may also take place inside established firms (Bjørnskov & Foss, 2016; Foss & Lyngsie, 2014). The premise that employees can also exploit opportunities to create future goods and services (Shane & Venkataraman, 2000; Venkataraman, 1997), often referred to as intrapreneurship, is well-established in the entrepreneurship literature (e.g., Antoncic & Hisrich, 2001; 2003; Pinchot, 1985). A mere focus on independent forms of entrepreneurship proves insufficient to explain the different levels of entrepreneurial activity across countries (e.g., Bosma et al., 2013b; WEF, 2016), and hence, to establish the role of national cultures herein. To fill this gap, we theorize and model individuals' choices regarding the mode of exploitation of new business opportunities, and how such choices are affected by cultural practices. In our setting, business opportunities may either be exploited by starting a new firm or inside an established firm, i.e. by means of independent entrepreneurship or intrapreneurship, respectively (Parker, 2011).[6] Hence, we investigate under which cultural conditions individuals are more likely to opt for intrapreneurship rather than entrepreneurship, and *vice versa*.

Culture can be defined as "… both values and actual ways in which members of a culture go about dealing with their collective challenges" (Javidan et al., 2006: 899). It shapes individuals' cognitive processes, and therefore leads to different preferences and behavioral outcomes (Baum et al., 1993; Busenitz & Lau, 1996; Doney et al., 1998). We know from previous research that national culture also affects the extent to which entrepreneurial behavior is considered desirable by societal members (Hayton et al., 2002; Krueger et al., 2013), in turn leading to different levels of entrepreneurial activity,

[6] In the remainder, we refer to independent entrepreneurship as entrepreneurship. We denote the total sum of entrepreneurship and intrapreneurship in a country as entrepreneurial activity.

either directly or indirectly (Stephan & Pathak, 2016; Stephan & Uhlaner, 2010). Most often, empirical studies indicate that cultures characterized by high performance orientation, low uncertainty avoidance and strong individualism are most conducive to entrepreneurship (e.g., Autio et al., 2013; Hayton et al., 2002; Freytag & Thurik, 2010; Mueller & Thomas, 2001). However, based on recent mixed evidence (e.g., Pinillos & Reyes, 2011; Stephan & Uhlaner, 2010), a recent meta-analytical review casts doubt on the existence of one optimal entrepreneurial culture (Hayton & Cacciotti, 2013).

We indeed propose that no such thing as an entrepreneurial culture exists. In fact, we observe that any type of culture brings about entrepreneurial activity, even though its appearance tends to differ from one country to the other. Whereas some cultural practices encourage people to set up their own firm (i.e. entrepreneurship), others might induce them to exploit a new business opportunity inside a firm (i.e. intrapreneurship). Put differently, we conceive national culture as a determinant of the *allocation* of entrepreneurial talent in society across entrepreneurship and intrapreneurship. By and large, this is a derivative of Baumol's (1990) proposition that has so far been unaddressed in the literature on cross-cultural research (also see Bjørnskov & Foss, 2008). Baumol (1990) essentially argued that the way entrepreneurship manifests itself differs across different institutional frameworks.

The recent addition of a measure of entrepreneurial activity by employees to the annual survey of the Global Entrepreneurship Monitor (GEM) provides an opportunity to compare the share of intrapreneurs in the adult population across a large and heterogeneous set of countries. Intrapreneurship appears to be a relatively frequent mode of exploitation in developed economies (Kelley et al., 2016). We use data on societal cultural practices from the Global Leadership and Organizational Behavior Effectiveness (GLOBE) project to operationalize performance orientation, uncertainty avoidance, institutional and in-group collectivism (House et al., 2002; 2004). As compared to the indicators by Geert Hofstede and his colleagues (e.g., Hofstede, 1980; 2001; Hofstede et al., 2010), the GLOBE's country scores allow for a more nuanced and detailed understanding of how national cultures affect individuals' entrepreneurial decisions. We test our hypotheses for each of

these cultural practices on a sample of 128,477 individual across 24 developed countries, adopting maximum-likelihood probit models with sample selection in order to correct for non-random self-selection into innovative entrepreneurial activity.

We contribute to the literature on comparative international entrepreneurship research (e.g., Terjesen et al., 2016; Thomas & Mueller, 2000; Tiessen, 1997) by starting from the notion that culture is omnipresent, and that societal cultural practices affect distinct types of entrepreneurial activity. Our empirical findings provide support for our conceptual reasoning. For example, while a culture of uncertainty avoidance is often found to be unfavorable for innovative entrepreneurship to thrive (e.g., Mueller & Thomas, 2001), we find that it actually prompts entrepreneurial talent to take the intrapreneurial route. Similarly, an institutional collectivistic culture, rather than one of strong in-group collectivism, increases the probability that an individual is involved in intrapreneurship. Hence, cultures with relatively high levels of uncertainty avoidance and institutional collectivism practices, like those of Denmark and Sweden, seem to compensate their relatively limited levels of entrepreneurship by stimulating people to engage in intrapreneurship instead. Different types of entrepreneurial activity contribute to a greater or lesser extent to economic performance (e.g., Bowen & De Clercq, 2008), and so, the ubiquitous influence of culture urges entrepreneurship scholars and policymakers to take stock of different types of entrepreneurial activity in society when studying the effects of cultural practices.

The remainder of this chapter is organized as follows. The next section (2.2) shares the main insights from the extant literature on national culture in relation to entrepreneurial activity, and develops four hypotheses each involving a cultural dimension and its anticipated effect on the two different modes of entrepreneurial activity. We hereby draw from different theoretical perspectives. The third and fourth section (2.3 and 2.4) describe the methodology and data, respectively. Section 2.5 presents our key findings, and section 2.6 extensively discusses the conclusions and implications that can be derived from our study.

2.2 Theory and hypotheses

2.2.1 National culture and entrepreneurial activity

The cultural values of a society are reflected in national cultures, and are used by individuals to make sense of interactions and behaviors in organizations, the environment, and interpersonal relations (Geletkanycz, 1997). At the national level, cultures are understood as more homogeneous, while they typically vary from nation to nation (Minkov & Hofstede, 2012). This does not mean that norms and values are consistent across all groups and subgroups that constitute a population. Rather, it can be conceived as a shared property of "… a large number of people conditioned by similar background, education, and life experiences" (Doney et al., 1998: 607).

The impact of culture is most profound on the way individuals use information to make decisions (Triandis, 1972). Cultural values change the processes that individuals use by activating different cognitive preferences and heuristics (Busenitz & Lau, 1996), and therefore lead to different preferences and behavioral outcomes under similar conditions (Busenitz & Barney, 1997; Doney et al., 1998). As such, national cultures have also been recognized as an important determinant of both the quantity and quality of entrepreneurial activity across countries (e.g., Baumol, 1990; Terjesen et al., 2016). Quite some studies provide empirical evidence for the effects of national cultures on aggregate measures of entrepreneurship, such as business ownership or self-employment rates (e.g., Autio et al. 2013; Bowen & De Clercq, 2008; De Clercq et al., 2013; Noorderhaven et al. 2004). This also raises the question to what extent national cultures can lead to distinct ways in which individuals choose to exploit opportunities. That is, if national cultures can channel the preferences of individuals towards (or, against) entrepreneurial activity, then they may also affect the preferred mode of exploitation.

Hence, we address the important distinction of entrepreneurial activity into two modes of opportunity exploitation, viz. entrepreneurship and intrapreneurship. Research on entrepreneurship and intrapreneurship belongs to the broader domain of entrepreneurship research and the discovery, evaluation and subsequent exploitation of new business opportunities are crucial elements of both

concepts (Shane, 2003; Shane & Venkataraman, 2000). Unlike entrepreneurship, opportunities for intrapreneurship arise by (re)combining resources at a firm's disposal at a given time of development of the firm (Penrose, 1959). Pinchot (1985) therefore designated those employees that exploit new business opportunities within existing organizations and create change of any sort as intrapreneurs. Other scholars have used autonomous strategic behavior (Burgelman, 1983b), or simply entrepreneurial employee activity (Bosma et al., 2013b) to describe this type of entrepreneurial activity. The outcomes of intrapreneurship are associated with, but not limited to, innovation, new product or service development, strategic diversification, internal corporate venturing, and external corporate venturing (Antoncic & Hisrich, 2001; 2003; Burgelman, 1983b; Ireland & Webb, 2007; Kanter, 1988). As such, and similar to entrepreneurship, intrapreneurs initiate change and contribute to economic growth through new venture creation and firm growth (e.g., Antoncic & Antoncic, 2011; Augusto Felício et al., 2012).

Only a few studies explicitly address innovation or entrepreneurship inside (or rather, by) established organizations as an outcome measure (Morris et al., 1993; 1994; Shane, 1992). Others investigate cultural influences on different ways of new market entry by established firms (Kogut & Singh, 1988; Makino & Neupert, 2000; Shane, 1994). Lukes & Stephan (2017) find empirical evidence for managerial support mediating the relationship between perceived cultural support for innovation and employee innovative behavior. None have considered how national culture shapes individuals' choice between the two different modes of entrepreneurial activity. Hayton et al. (2002) call for more empirical research that examines the complex relationships among cultural dimensions and the various choice of entry mode. We satisfy this need by testing what kind of national culture is more likely to drive entrepreneurial talent into the entrepreneurial or intrapreneurial mode of exploitation.

2.2.2 Performance orientation

The degree to which a society encourages and rewards innovation, high standards, excellence, and performance improvement is referred to as the degree of performance orientation in society (House et al., 2004). Norms of individual accomplishments and willingness to achieve high future performance have been linked to entrepreneurship rates (Rauch et al., 2000), and a meta-analytical analysis confirms these findings (Rauch & Frese, 2007). Yet, international comparative research reports mixed findings. Stephan & Uhlaner (2010) and Suddle et al. (2010), for example, fail to identify any significant relationship between performance-oriented cultures and new business formation rates. Performance-oriented cultures, however, do build more "efficient formal institutions, which in turn enhance entrepreneurial opportunities" (Stephan & Uhlaner, 2010: 1357). The authors explain this apparent mismatch between the presence of entrepreneurial opportunities and the lack of exploitation through entrepreneurship by fierce competition with existing firms that may seek to exploit the same opportunities in performance-oriented cultural settings.

The concept of performance orientation is closely related to McClelland's (1961) work on individuals' need for achievement (House et al., 2004). Individuals with a high need for achievement tend to prefer concrete feedback on how well they are doing and the opportunity to take responsibility for the results of their own actions (McClelland, 1965). McClelland's (1961; 1965) understanding of need for achievement is not limited to the individual. Rather, culture shapes the need for achievement levels of individuals through social learning experiences (McClelland, 1965). Individuals are expected to hold a stronger need for achievement if standards of excellence, responsibilities for outcomes, and challenges that entail some level of uncertainty are widely promoted within a society (Maehr, 1974).[7] Performance-oriented cultures are thus expected to endow their societal members with a need for

[7] It is important to note that exact manifestations of individuals' need for achievement might vary, as a culture merely offers a context in which these social learning experiences take place (Maehr, 1974).

achievement orientation that induces them to seek feedback, and to take responsibility for their own actions.

Entrepreneurs and intrapreneurs both take on new challenges and take on (additional) responsibility for performance outcomes when exploiting new business opportunities. Nevertheless, we argue that the ego-enhancing motivations associated with a high need for achievement (e.g., Brunstein & Maier, 2005; Jenkins, 1987; McClelland, 1961) orient the preferences of individuals in a country with high levels of performance orientation towards entrepreneurship. Most importantly, the extent to which individuals can attribute success to their own actions and can get direct feedback on their performance is different for entrepreneurs and intrapreneurs. Intrapreneurs are part of an established organization, which allow them to build on existing internal competences and expertise. Especially in larger organizations – where communication, coordination and decision-making processes become increasingly complex – management has a major impact on the intrapreneurial process in terms of allocation of, for example, (human) resources and budgets, and high-level managers often use their power to shape intrapreneurial initiatives according to their own ideas (e.g., Belousova & Gailly, 2013). Under such conditions, assessing and providing direct feedback on individuals' performance is more difficult. Next to providing better opportunities to directly observe the outcomes of their own actions, and thus to get direct feedback on their performance, entrepreneurship therefore allows for better opportunities to satisfy ego-enhancing motivations related to gains in personal wealth or status in society.

There is a reasonable chance that entrepreneurial and intrapreneurial endeavors are not successful. Arguably, if so, the perceived loss in status is likely to be bigger for entrepreneurs than for intrapreneurs. However, this is where the feedback mechanism ties in with ego-enhancing motivations. Individuals are likely to assess their chances of success prior to starting their initiatives. Individuals with high need for achievement levels are likely to prefer entrepreneurship due to the ego-arousing clues (Brunstein & Maier, 2005) – high profits, gains in wealth, high societal status, and/or

strong social impact – that are generally associated with entrepreneurship rather than intrapreneurship. Such ego-arousing clues cause individuals to neglect the potential for negative feedback or a loss in status or personal wealth (Brunstein & Maier, 2005). Hence, we argue that individuals living in countries with performance-oriented cultures prefer to exploit business opportunities as entrepreneurs, because this provides better chances to satisfy the ego-enhancing needs associated with the prevailing performance-oriented cultural practices in society than taking the intrapreneurial route. This leads to our first hypothesis:

Hypothesis 1: The higher a country's level of performance orientation practices, the less (more) likely an individual's involvement in intrapreneurship (entrepreneurship).

2.2.3 Uncertainty avoidance

An uncertainty-avoidant culture is characterized by social norms, rules and procedures to mitigate the unpredictability that comes with future events (House et al., 2004). This conceptualization is different from Hofstede's understanding of uncertainty avoidance, which relates to the degree to which societal members feel uncomfortable with uncertainty and ambiguity (Hofstede, 1980, 1991; 2001; Hofstede et al., 2010). The extent to which individuals are willing to accept the risks associated with entrepreneurial activities is key to our understanding of entrepreneurship (McGrath et al., 1992; Schumpeter, 1911; 1934), and entrepreneurial activity within existing firms (e.g., Antoncic, 2003; 2007; Antoncic & Hisrich, 2001; 2003). However, the relationship between uncertainty avoidance and entrepreneurial activity is not clear-cut. Autio et al. (2013), for instance, find a negative association of countries' uncertainty avoidance practices with the entry of new firms, but not with the growth aspirations of firms post-entry. New entry and growth aspirations are key elements of entrepreneurial activity (Wiklund et al., 2009), and entrepreneurship and intrapreneurship have been described as alternative paths to new entry (Pinchot, 1985) and growth aspirations (Bosma et al., 2012b). Rather

than affecting entrepreneurial aspirations, we suggest that uncertainty avoidance affects individuals' preferences on how to achieve innovation and/or growth.

Kihlstrom & Laffont (1979) modeled that more risk-averse individuals are likely to become employees, whilst less risk-averse individuals become entrepreneurs. When employees decide to exploit new business opportunities on behalf of their employer, they run the risk of a worsened reputation or status, decreased career opportunities, or loss of the job (Bosma et al., 2011). These risks are, however, less impactful than those for entrepreneurs, as entrepreneurs often invest a large share of their personal financial assets in their businesses (e.g., Blanchflower & Oswald, 1998; Evans & Leighton, 1989). Martiarena (2013) compared intrapreneurs to entrepreneurs and, indeed, found that the former group is significantly more risk-averse, in that sense resembling employees rather than entrepreneurs.

Cognitive preferences inform an individual's risk assessment, allow individuals to make inferences about the future (Fiske & Linville, 1980), and are subject to cultural influences (Busenitz & Lau, 1996). Especially when confronted with complexity and uncertainty, something that the development of new business opportunities undeniably entails, decision-making needs to be simplified, and individuals rely more on cognitive preferences (Bruton et al., 2010; Busenitz & Barney, 1997). We posit that when individuals decide whether a new business opportunity can best be pursued as entrepreneur or intrapreneur, prevailing societal uncertainty avoidance practices orient their decisions towards intrapreneurship. In societies with high levels of uncertainty avoidance, additional structures and resources to alleviate uncertainty are established (House et al., 2004). Established organizations in uncertainty-avoidant countries reflect such practices, and can migrate much of the uncertainty associated with exploiting opportunities (e.g., Pfeffer & Salancik, 1978). When choosing a career as an entrepreneur, individuals first have to work without structures and resources (Calof, 1993). Entrepreneurial talent in countries with high levels of uncertainty avoidance are therefore more likely to seek a job within an established organization to pursue new business opportunities, or are less likely

to start an independent business if they discover a new business opportunity while being employed. This leads to our second hypothesis:

Hypothesis 2: The higher a country's level of uncertainty avoidance practices, the more (less) likely an individual's involvement in intrapreneurship (entrepreneurship).

2.2.4 Collectivism

Previous research suggests that individualistic and collectivistic cultural practices provide equally successful yet distinct approaches to entrepreneurship (Tiessen, 1997), and that entrepreneurship benefits from a balance between individualism and collectivism (Morris et al., 1993). In general, members of individualistic societies desire independence from group affiliation, and individuals leverage their resources through contract-based relationships (Triandis, 1993). Countries that score high on collectivism leverage their resources through clan type of controls (Ouchi, 1980), and by building relational ties (Tiessen, 1997).

House et al. (2004) distinguish between two different dimensions of collectivism, namely institutional collectivism and in-group collectivism (sometimes also referred to as familism, see Realo et al., 2008). Institutional collectivism refers to the practices that encourage and reward collective actions at a societal level, while in-group collectivism reflects the degree to which individuals express pride, loyalty, and cohesiveness in their organizations or families (Gelfand et al., 2004; House et al., 2004). Institutional and in-group collectivism are not two sides of the same coin, and we expect distinct effects on the decisions of individuals to favor entrepreneurship or intrapreneurship. In other words, different forms of collectivism are expected to result in different shares of entrepreneurship and intrapreneurship at the country level. We base this apparent contradiction on the way individuals interact in individualistic versus institutional collectivistic and in-group collectivistic societies, and the

different forms and levels of trust that these societies generate through repeated interactions (Doney et al., 1998; Realo et al., 2008).

Individualism is generally associated with higher levels of competition and autonomy (Triandis & Gelfand, 1998). However, higher levels of autonomy do not imply that trust between societal members decreases. Rather, autonomous agents must accept responsibility for their own actions and self, and project such assumptions about responsible behavior (trustworthiness) on others as well (Brewer & Chen, 2007; Realo et al., 2008). Similar levels of trust can also be generated through feelings of collectivism at the societal level (Hofstede, 1980), meaning that individualistic or collectivistic societies are not characterized by higher or lower levels of trust per se. Trust is essential to entrepreneurship as the uncertainty stemming from new business opportunities needs to be alleviated through contractual transactions (Welter, 2012; Welter & Smallbone, 2006). Within markets, trust smoothens transactions and reduces the complexity of contractual agreements (Nilashi et al., 2015). In organizations, employees need to rely on managers in higher positions to support the further development of innovative ideas, and that they are appropriately rewarded in case of success (Hayton, 2005; Rigtering & Weitzel, 2013). This implies that the enactment of both types of entrepreneurial activity depends upon trust.

The difference between institutional and in-group collectivistic practices is the radius to which individuals generalize trust to others (Realo et al., 2008). Institutional collectivism denotes a broad radius of trust towards societal members in general, and a belief that people should attain goals through collective action (House et al., 2004). In-group collectivism denotes a radius of trust that is geared towards smaller entities, such as (direct) family members, close friends and close colleagues (House et al., 2004). We posit that the radius of trust generated by institutional and in-group collectivism is important to the allocation of entrepreneurial talent in society, as the distribution of trust along social distances directs decision-making and behavior (e.g., Realo et al., 2008). In institutional collectivistic societies, were a broad radius of trust is present, individuals are more likely

to make favorable predictions about the trustworthiness of relevant actors (for example, middle or top managers) (Doney et al., 1998). Moreover, if societal practices encourage and reward collective action over competition, employees may also experience more approval from colleagues when they develop new business activities internally instead of starting an independent venture, due to society's focus on collective action. This leads to our third hypothesis:

Hypothesis 3: The higher a country's level of institutional collectivism practices, the more (less) likely an individual's involvement in intrapreneurship (entrepreneurship).

In-group collectivism is less likely to channel an individual's cognitive preferences towards intrapreneurship. The nature of trust in in-group collectivistic societies is limited to direct personal ties (House et al., 2004; Realo et al., 2008). Especially in larger organizations, where the majority of employees is unable to develop close and personal ties with those in decision-making positions, individuals are less likely to trust that they will receive management support, and that they will be rewarded in an appropriate way. In addition, colleagues are less likely to socially penalize the pursuit of new business opportunities through entrepreneurship, as there is less emphasis on collective action. This leads to our fourth hypothesis:

Hypothesis 4: The higher a country's level of in-group collectivism practices, the less (more) likely an individual's involvement in intrapreneurship (entrepreneurship).

2.3 Methodology

2.3.1 Probit models with sample selection

We estimate maximum-likelihood probit models with sample selection (e.g., Van de Ven & Van Praag, 1981). This is an example of a corrective methodology for sample selectivity, in accordance with Heckman's (1979) two-stage estimation procedure. We apply this method in order to correct for non-random self-selection of individuals into innovative entrepreneurial activity. We herewith account for sample-induced endogeneity (Certo et al., 2016). Our aim is to investigate the determinants of involvement in innovative entrepreneurial activity, and of individuals' choice between innovative entrepreneurship and intrapreneurship conditional on such involvement. Like Parker (2011), we are able to deal with sample selection, because our dataset also contains individuals who choose neither for innovative entrepreneurship nor for intrapreneurship.

In general, probit models with sample selection assume that there is a latent relationship,

$$y_{ij}^{*} = x_{ij}\beta + u_{1ij}$$

, such that we only observe the following binary outcome:

$$y_{ij}^{probit} = \left(y_{ij}^{*} > 0\right)$$

However, the dependent variable of this probit equation is only observed for individual i in country j if

$$y_{ij}^{selection} = \left(z_{ij}\gamma + u_{2ij} > 0\right)$$

Now, let S denote the sample selection variable – that is, the dependent variable in the first stage of our models – where $S_{ij} = 0$ if individual i in country j is not involved in any kind of innovative entrepreneurial activity, and $S_{ij} = 1$ if he or she is. Let I be the dependent variable in the second stage of the models reflecting an individual's choice on the mode of entrepreneurial activity. $I_{ij} = 0$ if

individual i in country j develops a new business activity as an innovative entrepreneur, whereas $I_{ij} = 1$ if this is done as an intrapreneur. Observations I_{ij} are only observed when $S_{ij} = 1$.

The selection equation, estimated in the first stage, then becomes:

$$S_{ij} = \gamma_0 + \left(Y_{ij} Z_{ij}\right) \begin{pmatrix} \gamma_1 \\ \gamma_2 \end{pmatrix} + u_{2ij}$$

, where Y_{ij} is a vector of independent variables affecting S_{ij} and potentially I_{ij}, and Z_{ij} is a vector of independent variables affecting S_{ij}, but not I_{ij} (i.e. the exclusion restrictions, see below).

Furthermore, the probit equation, estimated in the second stage, becomes:

$$I_{ij} = \beta_0 + \left(X_{ij} Y_{ij}\right) \begin{pmatrix} \beta_1 \\ \beta_2 \end{pmatrix} + u_{1ij}$$

, where X_{ij} is a vector containing our independent variables of interest (i.e. the four cultural dimensions). Even though they may also affect S_{ij}, we are especially interested in their role in the second stage of the model.

Both error terms are assumed to be jointly normally distributed with means zero and variances one, i.e.

$$u_{1ij} \sim N(0,1)$$

$$u_{2ij} \sim N(0,1)$$

, and their correlation coefficient is rho, i.e.

$$corr\left(u_{1ij}, u_{2ij}\right) = \rho$$

If $\rho \neq 0$, then sample selectivity exists, and standard probit techniques yield biased results. Instead, maximum-likelihood probit models with sample selection then provide consistent and asymptotically efficient estimates for all of its parameters. A Wald test of independent equations tests whether we can reject the null hypothesis that $\rho = 0$. Vector Y_{ij} contains all individual-level and country-level

control variables that we add to both the first-stage selection equation and the second-stage probit equation.

2.3.2 Identification of the exclusion restrictions

For probit models with sample selection to be well-identified, the selection equation should contain at least one independent variable that is not added to the probit equation (Sartori, 2003). Our full sample also consists of individuals who may choose, outside the two main entrepreneurial modes under study, for non-innovative entrepreneurship or paid employment (without acting entrepreneurial) instead. We are thus able to identify determinants of non-random self-selection into innovative entrepreneurial activity. Our identification strategy is to use *Household size* and *Household income* as exclusion restrictions in the first stage of the estimation procedure.

Household size is associated with an individual's responsibility for the well-being of his or her household (Aldrich & Cliff, 2003; Parker, 2011). On the one hand, the larger a household, the larger this responsibility, and the less likely individuals' engagement in risky and time-consuming entrepreneurial activities. Moreover, more family members have a say in whether or not to get involved in new business activities, which could make it more difficult to actually do so (Aldrich & Cliff, 2003). On the other hand, a larger household may mean greater access to some of the necessary resources to develop a new business activity, like financial and social capital (Krasniqi, 2009). Also, women who have (small) children are more likely to engage in home-based work, which, in turn, is most likely to be done by self-employed than paid employed (Edwards & Field-Hendrey, 2002).

Living in a household with another wage earner in a sense reduces the need to get involved in risky entrepreneurial activities (Krasniqi, 2009). However, household income or wealth, possibly through inheritance or savings, is also considered a good way to overcome financial constraints (Blanchflower & Oswald, 1998; Evans & Leighton, 1989; Grilo & Irigoyen, 2006). Wealthy households are generally more tolerant towards risk (Fairlie & Krashinsky, 2012; Hurst & Lusardi, 2004), and its members are

therefore more likely to get involved in any kind of entrepreneurial activity. Whereas Parker (2011) argues that offering higher salaries in order to retain intrapreneurs leads to individuals favoring intrapreneurship over entrepreneurship, we contend that having a higher household income is not obviously associated with an individual's choice between any of the two forms of entrepreneurial activity. After all, higher salaries also improve households' financial position, thereby lowering the threshold to start a new independent business.

All in all, the size and the income of a household have theoretically ambiguous effects on individuals' involvement in entrepreneurial activity, let alone innovative forms, which are often more risky, time-consuming and/or resource-demanding than routine business activities (e.g., Minniti & Lévesque, 2010). However, following Parker (2011), the key point here is that both household size and income are likely to affect the probability of being involved in any kind of innovative entrepreneurial activity, regardless of the direction of the effects. At the same time, they are not clearly related to the decision between innovative entrepreneurship and intrapreneurship, conditional on being involved in innovative entrepreneurial activity. Both innovative entrepreneurship and intrapreneurship require above-average time commitment and the willingness to take risks. Studies also show that intrapreneurs closely resemble entrepreneurs, for example as to their personality traits (e.g., Menzel et al., 2007).

2.4 Data

2.4.1 Dependent variable

Our primary data source is the Global Entrepreneurship Monitor (GEM), a large-scale international study of entrepreneurial behavior and attitudes of individuals as of 1999. The GEM's Adult Population Survey (APS) is a comprehensive questionnaire among at least 2,000 respondents per participating country (see Reynolds et al. (2005) for more information on the methodology). We use individual-level

data from both the 2011 and the 2014 APS, leaving us with an initial sample of more than 330,000 observations from 78 countries in different stages of economic development. The 2011 edition of the GEM's APS introduced a new set of questions on entrepreneurial employee activity, a concept theoretically related to intrapreneurship (Bosma et al., 2013b).[8] In 2014, the GEM reassessed to what extent individuals are involved in entrepreneurial activity as employees, across a large and heterogeneous set of countries.

The GEM thus distinguishes between two modes of entrepreneurial activity. Total (early-stage) Entrepreneurial Activity (henceforth TEA) refers to nascent entrepreneurs and the owner-managers of young businesses (less than 42 months old). Entrepreneurial Employee Activity (henceforth EEA) refers to the development of new business activities for their main employer. If respondents indicate to have pursued this in the past three years *and* that they pursue this at the moment of the survey, they are characterized as entrepreneurial employees (Bosma et al., 2013b). Examples of new business activities include setting up a new business unit, a new establishment or subsidiary, and the development or launch of a new product or service.

Because entrepreneurial employees are innovative by definition, in the sense that they are involved in activities that relate to new products, services and/or markets, we contrast EEA in our analysis with innovative forms of TEA, i.e. those early-stage entrepreneurs who are either selling products or services that are to some extent new to the market, or those who claim that not many competitors offer the same product. Hereafter, innovative forms of TEA are labeled innovative entrepreneurship, and EEA is referred to as intrapreneurship. Together, innovative entrepreneurs and intrapreneurs make up the part of the adult population that is involved in innovative entrepreneurial activity.

[8] Whereas intrapreneurship usually refers to bottom-up activities by lower-level employees, entrepreneurial employee activity includes both top-down and bottom-up entrepreneurial initiatives of individual employees.

2.4.2 Independent variables

To test for the hypothesized effects of four important dimensions of national cultures, we make use of the indicators of the Global Leadership and Organizational Behavior Effectiveness (GLOBE) project (House et al., 2002; 2004). GLOBE's overall purpose is to study how cultural differences are related to differences in approaches to leadership, and how different cultures view leadership behavior by others. GLOBE also investigates how cultural practices and values are related to the economic competitiveness of societies (House et al., 2004). Entrepreneurial activity can be seen as an important mechanism bridging the two (e.g., Acs & Amorós, 2008; Lee & Peterson, 2000). We adopt four of GLOBE's indicators of national culture, viz. performance orientation, uncertainty avoidance, institutional collectivism and in-group collectivism. For our purposes, the GLOBE indicators allow for a more nuanced and specific view on how they affect individuals' decision-making in terms of entrepreneurial behavior as compared to the measures provided by Hofstede and colleagues (Hofstede, 1980; 1991; 2001; Hofstede & Bond, 1988; Hofstede & Hofstede, 2005; Hofstede et al., 2010; Minkov, 2007). Hofstede's framework lacks an indicator of performance orientation, measures the *stress* component of the uncertainty avoidance construct rather than its *rule* component, and does not distinguish between the two different forms of collectivism (Venaik & Brewer, 2010).

GLOBE collected data from 17,300 middle managers in 951 organizations across 59 countries in between 1991 and 2004.[9] A majority of these countries also took part in at least one of the GEM's surveys. The first section of the beta questionnaire of the research survey of the GLOBE project is about "the way things *are* in your society", labeled societal cultural practices (or, as is) variables, and consists of a total number of 39 questions with scales running from one to seven.[10] The average of the ratings on a number of these questions is used to calculate country scores on each of the cultural dimensions.

[9] In principle, GLOBE collected data from 62 samples, but by taking the averages of the East-Germany and West-Germany sample in case of Germany, the black and white sample in case of South Africa, and the French-speaking and German-speaking sample in case of Switzerland, we end up with 59 country scores.

[10] The GLOBE project also generated country scores on "the way things generally *should be* in your society", labeled societal cultural values (or, should be) variables. In a similar fashion, they derived cultural practices (as

In short, the performance orientation questions measure the importance of continuously improved performance, and of rewarding innovation, performance and performance effectiveness. The uncertainty avoidance questions measure the importance of societal practices like orderliness and consistency, structured lives as well as the extent to which societal requirements and instructions, and rules and laws prevail in society. The questions with which the GLOBE team creates country scores on institutional collectivism are about group cohesion and loyalty, collective interests, and being accepted by other group members. The measures of in-group collectivism instead focus more on family cohesion; questions are on children taking pride in the individual accomplishments of their parents and *vice versa*, and about the ordinariness of living together, either as children until they get married or as aging parents.[11] Table 2.1 lists the exact definitions of the four cultural dimensions included in our study.

Table 2.1 – **Definition of four of GLOBE's societal cultural practices**

Cultural dimension	Definition
Performance orientation	"… the degree to which … society encourages and rewards group members for performance improvement and excellence." (p. 13)
Uncertainty avoidance	"… the extent to which members of … society strive to avoid uncertainty by relying on established social norms, rituals, and bureaucratic practices." (p. 11)
Institutional collectivism	"… the degree to which … societal institutional practices encourage and reward collective distribution of resources and collective action." (p. 12)
In-group collectivism	"… the degree to which individuals express pride, loyalty, and cohesiveness in their … families." (p. 12)

Source: House et al. (2004)

is) and values (should be) scales at the organizational level with the alpha questionnaire. We make use of GLOBE's country scores on country-level (or, societal) cultural practices (as is).

[11] GLOBE's collectivism scores correlate significantly with a frequently used measure of interpersonal trust from the World Values Survey (WVS) database; positively and negatively with institutional and in-group collectivism, respectively. The interpersonal trust variable aggregates individual responses to the statement that most people can be trusted (returning a one), or that one needs to be careful in dealing with people (returning a zero).

2.4.3 Control variables

Our individual-level control variables – that is, individuals' educational level, age, gender, household size, and household income – are derived from the GEM surveys. Previous research has shown the importance of individuals' educational level in their decision to become involved in entrepreneurial activity (e.g., Unger et al., 2011; Van der Sluis et al., 2005; 2008), and their subsequent success (Robinson & Sexton, 1994). Once engaged in any kind of entrepreneurial activity, general human capital is found to channel individuals towards entrepreneurship rather than intrapreneurship (Parker, 2011).

Regarding age, the existing literature typically finds evidence for young to middle-aged people being most likely to become involved in entrepreneurial activity (Delmar & Davidsson, 2000; Lévesque & Minniti, 2006). On the hand, would-be entrepreneurs need to have access to sufficient resources, for example in terms of financial, human and social capital (Davidsson & Honig, 2003). On the other hand, there must be a sufficiently prolonged stream of returns on their investments in starting a business. Those who lack the resources (the younger) or the financial incentives (the older) to develop such an independent business might be inclined to develop a new business activity as an intrapreneur (Parker, 2011).

Studies consistently find that men are more likely to engage in entrepreneurial activity – meaning independent forms of entrepreneurship – and to have higher entrepreneurial performance, for a variety of theoretical reasons (e.g., Fischer et al., 1993; Klyver et al., 2013). A possible explanation could be that women more often opt for the pursuit of new business opportunities inside established firms than men do. However, recent empirical evidence shows that women are also less likely to become intrapreneurs, possibly because of their disadvantageous position in the workplace (Adachi & Hisada, 2016). A gender gap in intrapreneurship is especially prevalent in high-income countries (Bosma et al., 2010; 2011).

The only country-level control variable in both stages of the model is the natural logarithm of a country's GDP per capita (*Log GDP per capita*). We herewith control for countries' level of economic development. Like Bosma et al. (2013a), and for reasons that we have shared before, we also expect the level of economic development to have an effect on the allocation of entrepreneurial talent across the two modes of entrepreneurial activity. Less developed countries offer less possibilities for people to get formally employed (Jütting & De Laiglesia, 2009), obviously a necessary condition to engage in intrapreneurship. The greater presence of large firms in developed countries (Ghoshal et al., 1999; Poschke, 2015) also has a deterring influence on new firm entry (Choi & Phan, 2006). Although our sample consists of developed countries only, there are still considerable differences between them with regard to their levels of GDP per capita.

Other individual-level controls, *Household size* and *Household income*, belong to the vector Z_{ij} and hence, are only included in the first stage of the models. With regard to the household size, we include two dummy variables indicating households consisting of two persons (*Two persons*, not necessarily a couple) and of more than two persons (*More than two persons*), respectively. Single-person households belong to the reference category. The household income of respondents has been categorized in tertiles, namely *Lowest tertile*, *Middle tertile*, and *Highest tertile*. Data on the household income is missing for a relatively large share of the observations, so that we use *Missing/cannot code* as the reference category. For the theoretical rationale behind the inclusion of *Household size* and *Household income*, see subsection 2.3.2.

The only country-level control variable, i.e. the natural logarithm of a country's GDP per capita in 2011, is taken from the World Economic Forum's (WEF) Global Competitiveness Report (GCR) 2012-2013 (WEF, 2012).

2.4.4 Descriptive statistics

Merging the data from our three different sources leaves us with a sample of 128,477 observations from 24 innovation-driven countries.[12] Table 2.2 denotes the number and percentage of people involved in innovative entrepreneurial activity ($S = 1$), and, in turn, whether this activity takes place inside ($I = 1$) or outside ($I = 0$) an established firm. Almost six percent of the entire sample is involved in the development of innovative business activities (N = 7,459). Conditional on being involved in innovative entrepreneurial activity, approximately two third is active as an intrapreneur (N = 5,021). Around one third is a nascent entrepreneur or an owner/manager of a young independent business (N = 2,438).

Table 2.2 – **Prevalence of the two types of innovative entrepreneurial activity**

Category	Subcategory	Frequency	Percent	Cum percent
No innovative entrepreneurial activity ($S = 0$)	N/A	121,018	94.2	94.2
Innovative entrepreneurial activity ($S = 1$)	*Entrepreneurship* ($I = 0$)	2,438	1.9	96.1
	Intrapreneurship ($I = 1$)	5,021	3.9	100.0
Total		128,477	100.0	

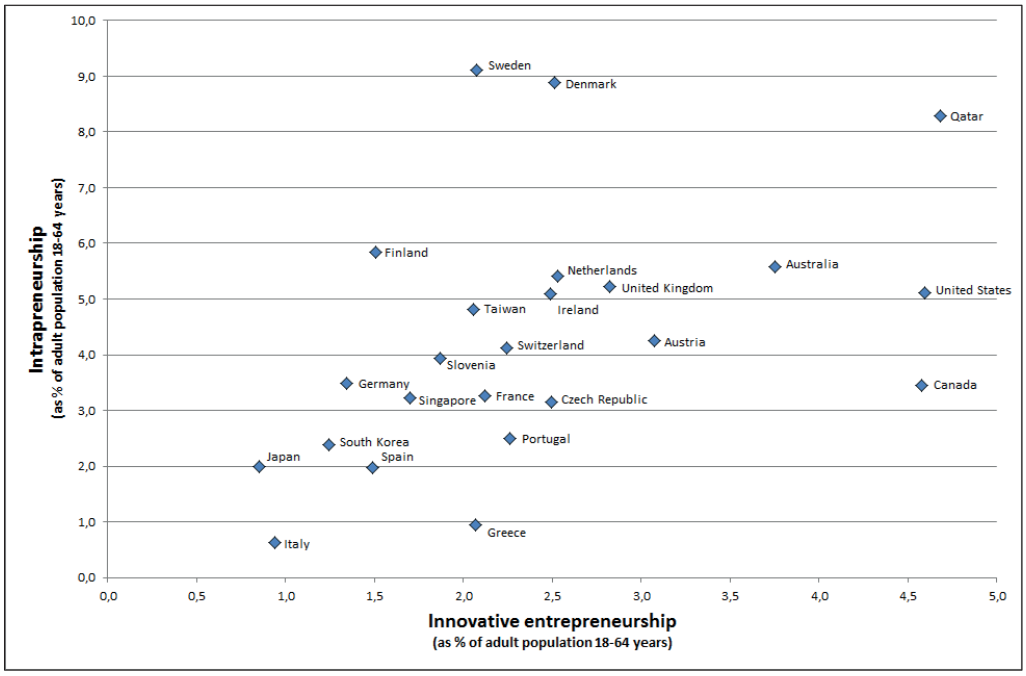
Notes: S is the sample selection variable, and takes the value one if an individual is involved in any of the two types of innovative entrepreneurial activity, either as an entrepreneur ($I = 0$) or as an intrapreneur ($I = 1$), and zero otherwise.

Figure 2.1 plots the percentage of the adult population involved in innovative entrepreneurship against the percentage involved in intrapreneurship and shows considerable variation between countries. Innovative forms of independent entrepreneurship are most prevalent in Canada (4.6 percent), the United States (4.6 percent), and Qatar (4.7 percent), whereas Qatar (8.3 percent), Denmark (8.9 percent), and Sweden (9.1 percent) have the highest shares of intrapreneurs. Japan has the lowest

[12] Based on a classification of stages of economic development by the World Economic Forum's (WEF) Global Competitiveness Report (GCR). The classification divides countries into three different stages, namely factor-driven, efficiency-driven, and innovation-driven economies. The latter category consists of countries where growth is based on firms developing and supplying new or improved products and services using the most sophisticated production processes. The classification can be conceived as similar to one into developing, transition, and developed countries, respectively.

share of innovation-oriented entrepreneurs (0.9 percent), and Italy's adult population includes the lowest share of intrapreneurs (0.6 percent). In general, there seems to be a fairly positive relationship between the share of innovative entrepreneurs and intrapreneurs in developed countries.[13] With the exception of Canada, Greece and Italy, the share of intrapreneurs in the adult population is consistently higher than the share of innovation-oriented entrepreneurs, especially in Denmark (6.4 percentage point) and Sweden (7.0 percentage point). This confirms that intrapreneurship is a viable and relatively popular mode of entrepreneurial activity in developed countries.

Figure 2.1 – **Prevalence rates of the two types of innovative entrepreneurial activity**



Source: GEM 2011 & 2014 APS

Table 2.3 summarizes descriptive statistics of all variables that will be included in the analyses. We hereby distinguish between groups of observations before and after selecting individuals that are

[13] Pearson's correlation coefficient is 0.45, and significant at a 5% significance level (two-tailed).

involved in any kind of innovative entrepreneurial activity. The left-hand side of the table compares individuals who are not involved in innovative entrepreneurial activity ($S = 0$) with those who are ($S = 1$), based on the full sample, i.e. before selection. The right-hand side of the table compares innovative entrepreneurs ($I = 0$) with intrapreneurs ($I = 1$), based on a restricted sample of individuals involved in innovative entrepreneurial activity only, i.e. after selection. These comparisons can only be indicative of possible differences in demographics and contexts of different groups of observations in our sample. Multivariate analyses are required to identify any robust relationships.[14]

Regarding the hypothesized cultural determinants of entrepreneurial activity, we do not observe a significant difference between innovative entrepreneurs and intrapreneurs for the degree of performance orientation in their countries. Intrapreneurs are more likely to live in countries with high uncertainty avoidance and strong institutional collectivism. Innovative entrepreneurs have a higher probability of living in countries with high levels of in-group collectivism. Furthermore, intrapreneurs appear to be more educated, older and more often male than innovative entrepreneurs.

Figures 2.2 to 2.5 show GLOBE's scores for each of the 24 innovation-driven economies in our sample on performance orientation, uncertainty avoidance, institutional collectivism, and in-group collectivism, respectively. We find the broadest range of scores for the latter cultural dimension, with the Czech Republic scoring 3.18 and Singapore scoring 5.64 on in-group collectivism. The two countries with the lowest shares of intrapreneurs in their adult population, Greece and Italy, appear to be among the least performance-oriented, uncertainty-avoidant, and institutional collectivistic countries. Singapore is among the most performance-oriented, uncertainty-avoidant, institutional collectivistic, and in-group collectivistic countries.

[14] For brevity, correlation matrices have been suppressed, but are available upon request from the author. No multicollinearity problems were detected among the control variables. Among our independent variables of interest, however, we found some quite strong correlations, for example between uncertainty avoidance and in-group collectivism (-0.69, significant at a 1% significance level, two-tailed), and hence, we follow a stepwise procedure to avoid any possible multicollinearity issue.

Table 2.3 – Descriptive statistics before and after selection

Variables	Before selection				After selection			
	Mean		N	p	Mean		N	p
	$S=0$	$S=1$			$I=0$	$I=1$		
Innovative entrepreneurial activity	0.942	0.058	128,477	*N/A*				
Intrapreneurship					0.327	0.673	7,459	*N/A*
Educational level:								
- None	0.039	0.007	128,477	0.000	0.014	0.004	7,459	0.000
- Some secondary	0.175	0.057	128,477	0.000	0.102	0.036	7,459	0.000
- Secondary degree	0.345	0.213	128,477	0.000	0.272	0.184	7,459	0.000
- Post-secondary	0.366	0.537	128,477	0.000	0.472	0.568	7,459	0.000
- Graduate experience	0.075	0.186	128,477	0.000	0.141	0.208	7,459	0.000
Age:								
- 18 – 24 years	0.123	0.063	128,477	0.000	0.118	0.036	7,459	0.000
- 25 – 34 years	0.205	0.234	128,477	0.000	0.265	0.218	7,459	0.000
- 35 – 44 years	0.234	0.316	128,477	0.000	0.279	0.334	7,459	0.000
- 45 – 54 years	0.234	0.256	128,477	0.000	0.215	0.275	7,459	0.000
- 55 – 64 years	0.203	0.132	128,477	0.000	0.124	0.136	7,459	0.147
Gender:								
- Male	0.488	0.623	128,477	0.000	0.600	0.634	7,459	0.004
Household size:								
- One person	0.111	0.123	128,477	0.001				
- Two persons	0.241	0.237	128,477	0.384				
- More than two persons	0.648	0.640	128,477	0.188				
Household income:								
- Missing/cannot code	0.226	0.128	128,477	0.000				
- Lowest tertile	0.199	0.109	128,477	0.000				
- Middle tertile	0.255	0.201	128,477	0.000				
- Highest tertile	0.320	0.562	128,477	0.000				
Log GDP per capita	10.573	10.698	128,477	0.000	10.670	10.713	7,459	0.000
Performance orientation					4.113	4.117	7,459	0.720
Uncertainty avoidance					4.367	4.561	7,459	0.000
Institutional collectivism					4.193	4.324	7,459	0.000
In-group collectivism					4.681	4.513	7,459	0.000

Notes: S is the sample selection variable, and takes the value one if an individual is involved in any of the two types of innovative entrepreneurial activity, either as an entrepreneur ($I=0$) or as an intrapreneur ($I=1$), and zero otherwise. N stands for the number of observations. p stands for p-value, computed for χ^2 tests on the equality of proportions in case of pairs of binary variables, and for two independent samples t-tests on the equality of means in case of pairs of continuous variables.

Figure 2.2 – GLOBE scores on performance orientation by country (N=24)

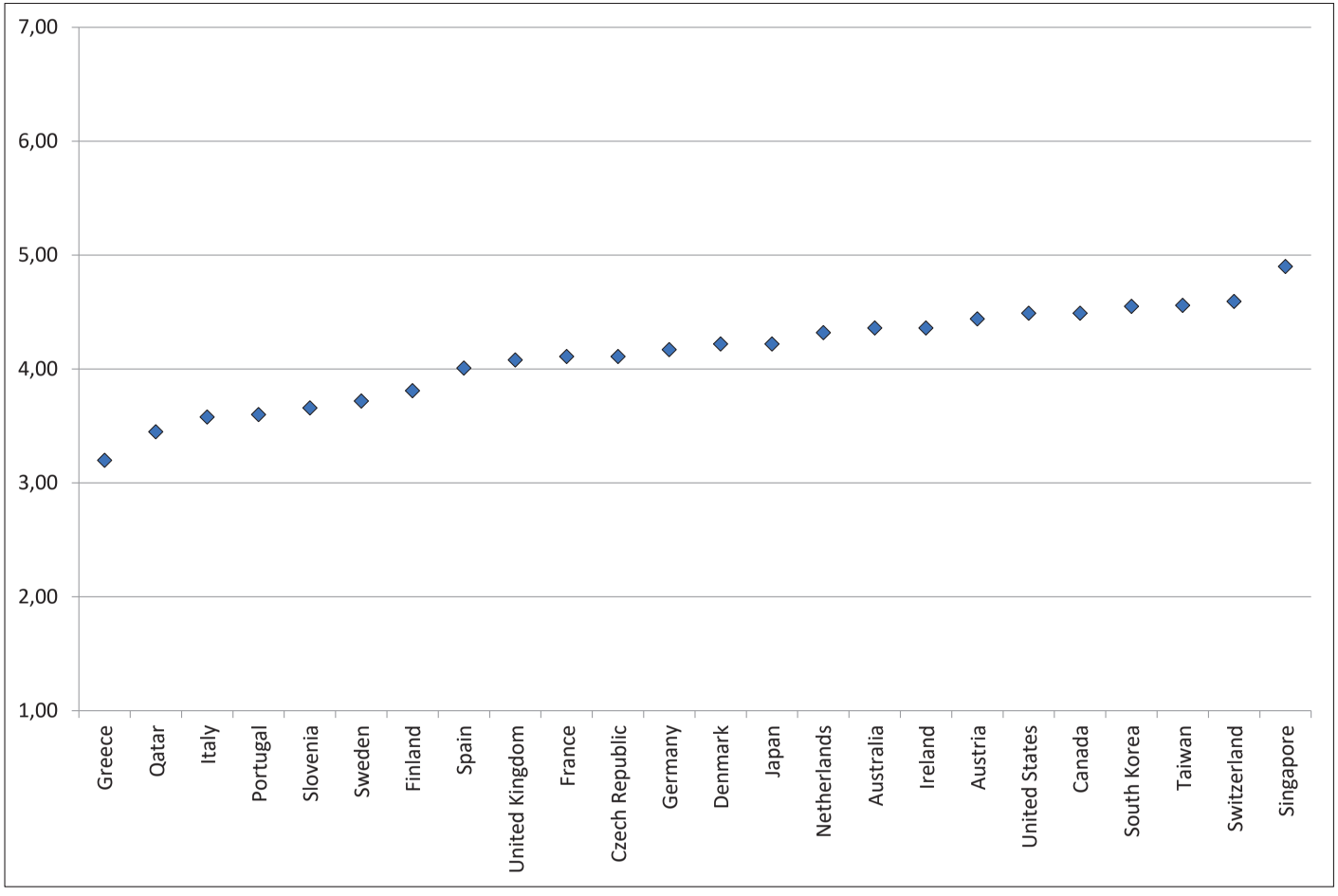


Figure 2.3 – GLOBE scores on uncertainty avoidance by country (N=24)

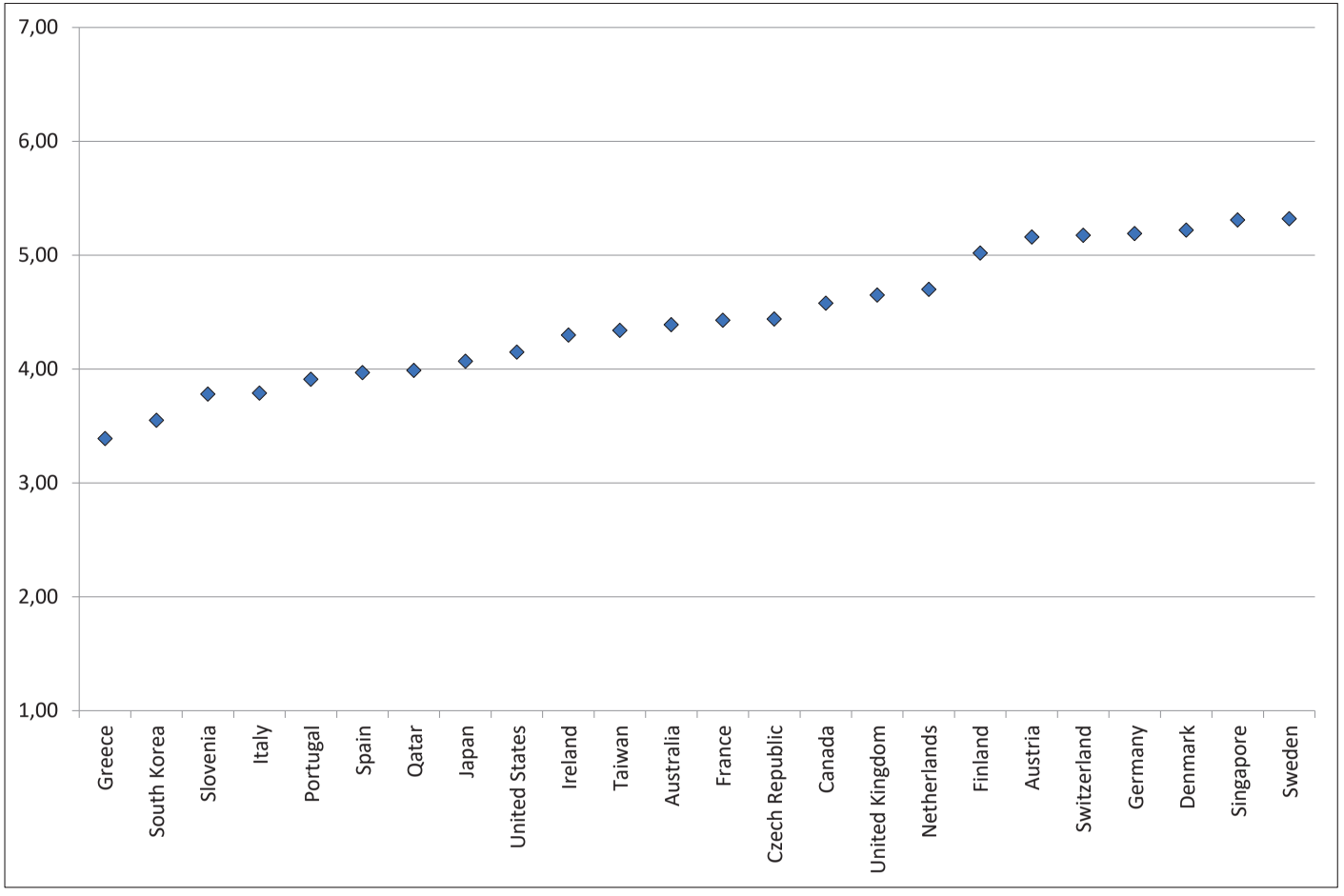


Figure 2.4 – GLOBE scores on institutional collectivism by country (N=24)

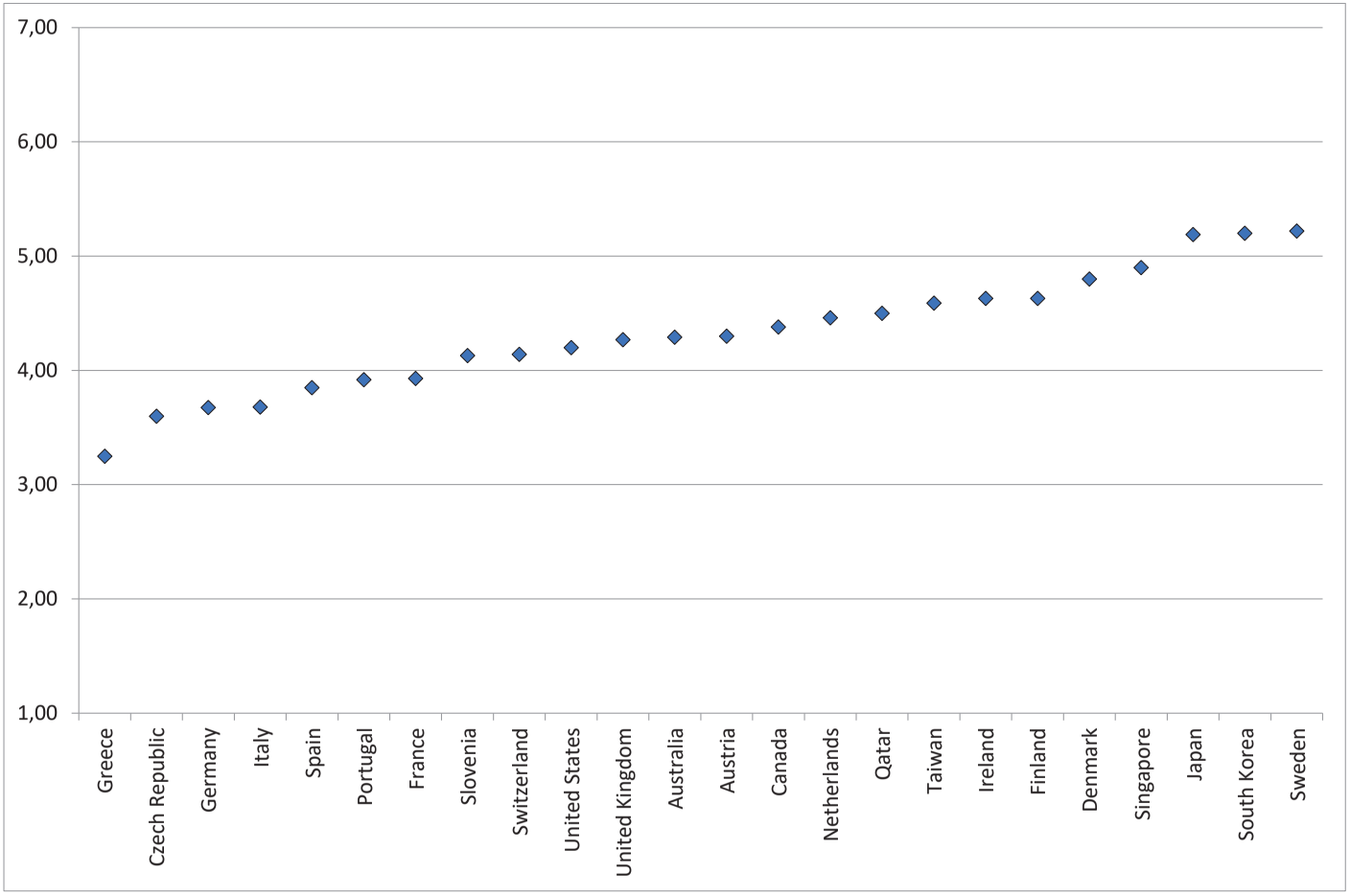
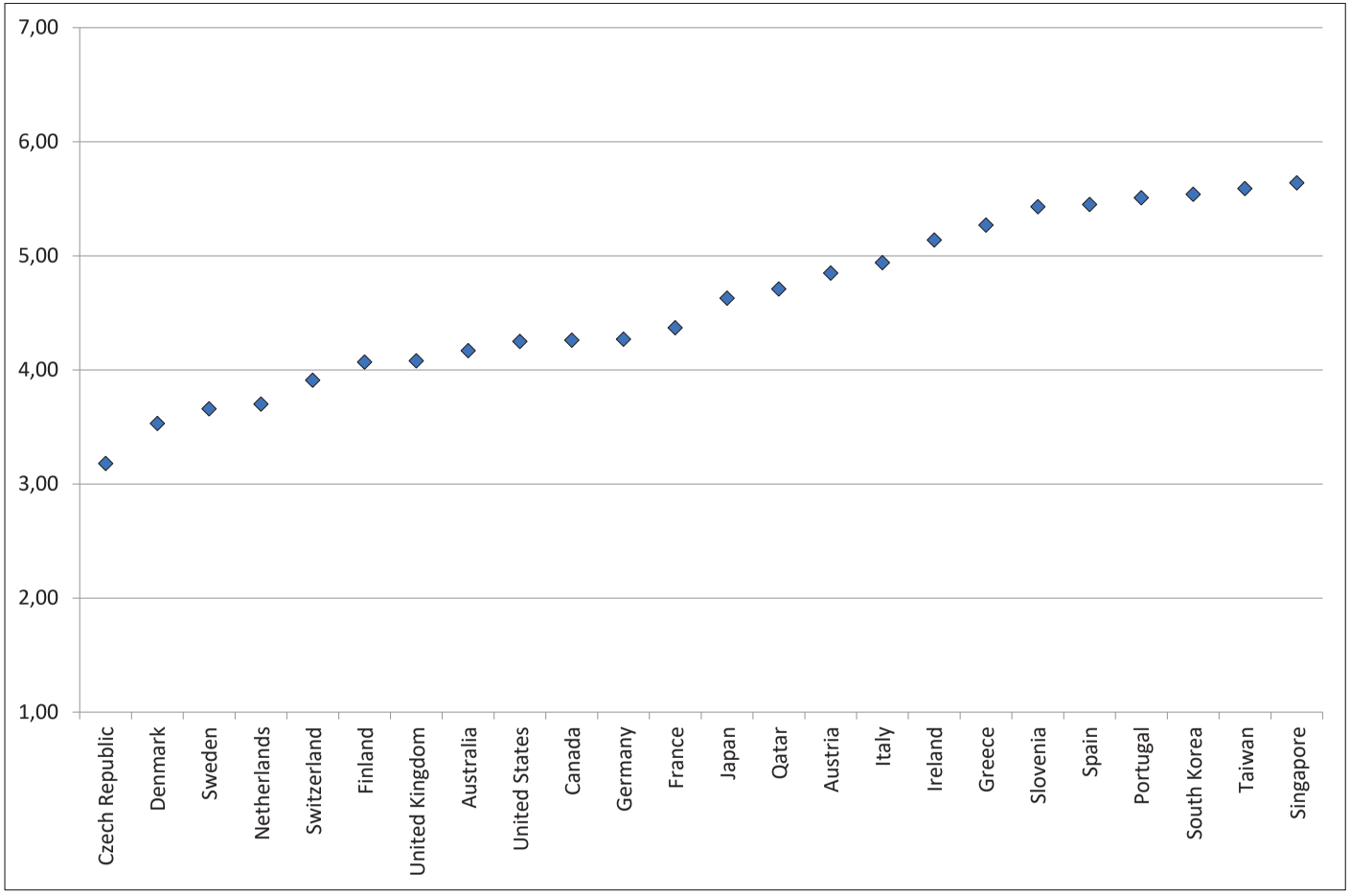


Figure 2.5 – GLOBE scores on in-group collectivism by country (N=24)



2.5 Results

2.5.1 Identifying the predictors of sample selection

We applied the following procedure to identify our predictors of sample selection, and to assess their appropriateness as exclusion restrictions. We first only used the two dummy variables indicating the household size to identify the model. Then, the three dummy variables for the households' income were also included in the first stage of the model. A likelihood ratio test compares the log likelihoods of the two models, and shows whether their difference is statistically significant. If so, then the latter model fits our data significantly better. Likewise, we started with including the three dummy variables for the household income in the selection equation, followed by a model that also included the two dummy variables for the household size. In both cases, the likelihood ratio test rejected the null hypothesis that the coefficients of the added variables are simultaneously equal to zero ($\chi^2(3) = 879.12$ and $\chi^2(2) = 44.71$, respectively). Hence, it turns out that the dummy variables indicating both household size and household income jointly induce a statistically significant improvement of the model fit. Three out of five dummy variables are also individually significant predictors of selection into innovative entrepreneurial activity (also see table 2.4).

Next, we also tested whether an individual's decision to engage in innovative entrepreneurial activity is independent from our outcome of interest, i.e. an individual's choice on the mode of entrepreneurial activity. If we can reject the null hypothesis of $\rho = 0$, i.e. that the correlation across the error terms of the selection and probit (outcome) equation is zero, then we are dealing with sample selectivity, and a single-equation probit model (without sample selection) would yield biased results. The $\chi^2(1)$ likelihood ratio statistic appears to be 190.46, is statistically significant, and hence, we are justified in using probit models with sample selection instead.

2.5.2 Results of the benchmark probit models

Table 2.4 contains the estimates of both stages of a probit model with sample selection (model 1), and of a probit model without sample selection (model 2), yet using the same (number of) observations as in the second stage of model 1, i.e. 7,459 individuals involved in any kind of innovative entrepreneurial activity. Model 1 only includes control variables and a year dummy in both the selection equation and the second-stage probit equation. As to enable comparability, the probit equation of model 2 is similar to model 1's second stage, so excluding the exclusion restrictions *Household size* and *Household income*. Marginal effects corresponding to the estimates in table 2.4 can be found in table 2.5.

In line with previous research (see before, e.g., Unger et al., 2011), we find that individuals' general human capital is significantly related to engagement in innovative entrepreneurial activity. Marginal effects range from 0.009 to 0.095 in the first stage (all significant at a 0.1% significance level), where the higher educated, the larger the effects. Regarding age, middle-aged people (i.e. from 35 to 44 years) are most likely to end up in any kind of innovative entrepreneurial activity (marginal effect: 0.030***). Conditional on being involved in innovative entrepreneurial activity, older people are more likely to do so as intrapreneurs. Men have a higher probability than women to become involved in innovative entrepreneurial activity (marginal effect: 0.025***). Once involved, men are more likely to opt for innovative entrepreneurship as compared to intrapreneurship. In contrast to what we expected beforehand, individuals are less likely to engage in intrapreneurship when living in a better developed country, conditional on involvement in innovative entrepreneurial activity. However, we do confirm our *a priori* expectation that the better developed someone's home country, the greater the probability that he or she develops new business activities at all (marginal effect: 0.040***).

We furthermore find that both the size and the income of a household influence individuals' involvement in innovative entrepreneurial activity. Both dummies for household size have a highly significant negative effect (marginal effects are modest in size though; -0.007** and -0.012***, respectively), and the dummy variable indicating that the household income belongs to the highest

tertile of a country has a strongly positive and significant effect (marginal effect 0.037***). This confirms the legitimate use of *Household size* and *Household income* as exclusion restrictions. Apparently, being responsible for a larger household withholds individuals from engaging in risky and time-consuming new business activities, which is in contrast to what Parker (2011) finds. Contrarily, a high household income does not deter people from involvement in any kind of innovative entrepreneurial activity. This might be because it helps to overcome financial capital constraints, and because rich households are usually less risk-averse.

The sample selection parameter is negative (-0.893), and a Wald test rejects the null hypothesis of $\rho = 0$, once more confirming the independence of the selection and probit equations. Accordingly, individuals developing new business activities rather than performing routine activities, either as employee or as independent entrepreneur, possess certain unobserved attributes that also predispose them to take the entrepreneurial route. Given the presence of sample selectivity, the estimates of model 2 are biased. This would have led to incorrect conclusions, for example with regard to individuals' educational level. Where model 2 suggests that having had higher education most likely drives someone into intrapreneurship, we know from model 1 that individuals' educational level increases the likelihood of getting involved in innovative entrepreneurial activity of any kind. Once we have taken into account the selection issue, we see that education actually has a negative effect on being involved in intrapreneurship. A similar misinterpretation arises when looking at the effects of someone's gender and a country's GDP per capita in the second model. As a consequence, we continue estimating and interpreting the results of probit models with sample selection, also when adding our independent variables of interest (i.e. the four dimensions of countries' national culture) to the second-stage probit equations.

Table 2.4 – Benchmark probit models with and without sample selection

Variables	Model 1 (w/ sample selection)						Model 2 (w/o sample selection)		
	Dependent variable: S (1st stage)			Dependent variable: I (2nd stage)			Dependent variable: I		
	Coeff	Std error	Signif	Coeff	Std error	Signif	Coeff	Std error	Signif
Constant	-6.465	1.458	***	3.999	0.901	***	-3.038	1.512	*
Educational level:									
- Some secondary	0.189	0.041	***	-0.050	0.117		0.201	0.242	
- Secondary degree	0.370	0.059	***	0.002	0.137		0.619	0.225	**
- Post-secondary	0.709	0.057	***	-0.105	0.141		0.911	0.213	***
- Graduate experience	0.944	0.060	***	-0.223	0.140		1.025	0.195	***
Age:									
- 25 – 34 years	0.212	0.040	***	0.092	0.067		0.522	0.098	***
- 35 – 44 years	0.291	0.045	***	0.134	0.081	+	0.733	0.107	***
- 45 – 54 years	0.222	0.043	***	0.211	0.085	*	0.777	0.123	***
- 55 – 64 years	0.004	0.058		0.307	0.077	***	0.662	0.126	***
Gender:									
- Male	0.239	0.032	***	-0.124	0.032	***	0.127	0.061	*
Household size:									
- Two persons	-0.064	0.024	**						
- More than two persons	-0.111	0.026	***						
Household income:									
- Lowest tertile	-0.068	0.056							
- Middle tertile	0.054	0.042							
- Highest tertile	0.332	0.028	***						
Log GDP per capita	0.376	0.135	**	-0.193	0.074	**	0.192	0.149	
Year dummy included?	Yes			Yes			Yes		
Model summary									
Number of countries	24						24		
Number of observations	128,477						7,459		
Censored observations	121,018						0		
Uncensored observations	7,459						7,459		
Log pseudolikelihood	-30,344.960						-4,467.372		
ρ	-0.893 (0.033)								
Wald test of independent equations	76.37***								

Notes: S is the sample selection variable, and takes the value one if an individual is involved in any of the two types of innovative entrepreneurial activity, either as an entrepreneur ($I = 0$) or as an intrapreneur ($I = 1$), and zero otherwise. Robust standard errors for clustered data. Reference category of *Educational level*: *None*. Reference category of *Age*: *18 – 24 years*. Reference category of *Household size*: *One person*. Reference category of *Household income*: *Missing/cannot code*. *Year dummy*: 2011 = 0, and 2014 = 1. Significance levels: + 0.05<p≤0.10; * 0.01<p≤0.05; ** 0.001<p≤0.01; *** p≤0.001.

Table 2.5 – Marginal effects corresponding to the regression results in table 2.4

Variables	Model 1 (w/ sample selection)						Model 2 (w/o sample selection)		
	Dependent variable: S (1st stage)			Dependent variable: I (2nd stage)			Dependent variable: I		
	Coeff	Std error	Signif	Coeff	Std error	Signif	Coeff	Std error	Signif
Educational level:									
- Some secondary	0.009	0.003	***	-0.003	0.006		0.076	0.090	
- Secondary degree	0.022	0.003	***	0.000	0.007		0.237	0.083	**
- Post-secondary	0.058	0.006	***	-0.006	0.007		0.341	0.077	***
- Graduate experience	0.095	0.007	***	-0.014	0.007	*	0.378	0.071	***
Age:									
- 25 – 34 years	0.020	0.004	***	0.007	0.007		0.199	0.038	***
- 35 – 44 years	0.030	0.005	***	0.009	0.007		0.273	0.040	***
- 45 – 54 years	0.022	0.004	***	0.014	0.007	+	0.287	0.045	***
- 55 – 64 years	0.000	0.005		0.018	0.007	*	0.249	0.05	***
Gender:									
- Male	0.025	0.005	***	-0.007	0.002	***	0.043	0.022	*
Household size:									
- Two persons	-0.007	0.003	**						
- More than two persons	-0.012	0.003	***						
Household income:									
- Lowest tertile	-0.006	0.005							
- Middle tertile	0.005	0.004							
- Highest tertile	0.037	0.005	***						
Log GDP per capita	0.040	0.012	***	-0.011	0.004	**	0.065	0.050	

Notes: S is the sample selection variable, and takes the value one if an individual is involved in any of the two types of innovative entrepreneurial activity, either as an entrepreneur ($I = 0$) or as an intrapreneur ($I = 1$), and zero otherwise. Marginal effects of model 1 are the predicted probabilities of being involved in innovative entrepreneurial activity (first stage) and intrapreneurship (second stage), with respect to all explanatory variables, and calculated based on all observations. Significance levels: + 0.05<p≤0.10; * 0.01<p≤0.05; ** 0.001<p≤0.01; *** p≤0.001.

2.5.3 Results of the probit models including cultural practices

The most important results of our empirical analyses can be found in table 2.6. The table contains the results of four maximum-likelihood probit models with sample selection, similar to model 1 in table 2.4, but now including the four cultural dimensions to the second-stage probit equation following a stepwise procedure. The estimates of the first-stage selection equations are almost equal to those of the benchmark model, and so, they are omitted for the reader's convenience. All four models are based on an initial sample of 128,477 individuals coming from 24 innovation-driven economies.[15,16] Sample selection reduces the number of individuals to the 7,459 individuals as before. The sample selection parameter ρ remains negative and highly significant throughout all models, still demonstrating the presence of sample selectivity.

The effect of a performance-oriented culture on intrapreneurship is insignificant (see model 1). Hence, we do not find empirical support for our first hypothesis. A culture of performance orientation appears to have no significant effect on an individual's choice for the mode of exploitation of an innovative idea, conditional on being involved in innovative entrepreneurial activity. We do find support for hypotheses 2 to 4, as the remaining three societal cultural dimensions all show a highly significant effect on intrapreneurship (see models 2 to 4). Countries with a culture of high uncertainty avoidance are more likely to bring forth intrapreneurs rather than innovative entrepreneurs (marginal effect: 0.016***).

[15] We have also estimated similar probit models with sample selection where we omitted the Scandinavian countries from the analysis, here taken as Denmark, Finland and Sweden (Iceland and Norway already dropped from our sample before). The direction of the effects of the four societal cultural practices remain the same. However, the magnitude decreases, and the effects of the collectivism practices become insignificant.

[16] Qatar is a special economy in the sense that it mainly relies on its mining industry – mostly two natural resources, namely oil and natural gas – so we have also estimated similar probit models with sample selection while excluding Qatar. The direction and significance of the effects hardly change, but their magnitude in most cases does. The marginal effects of our independent variables of interest, i.e. the four cultural dimensions, remain the same, however.

Table 2.6 – Probit models with sample selection

Variables	Model 1			Model 2			Model 3			Model 4		
	Dep variable: I (2nd stage)			Dep variable: I (2nd stage)			Dep variable: I (2nd stage)			Dep variable: I (2nd stage)		
	Coeff	Std err	Signif	Coeff	Std err	Signif	Coeff	Std err	Signif	Coeff	Std err	Signif
Constant	4.048	1.019	***	4.187	1.243	***	4.291	1.008	***	5.642	1.415	***
Educational level:												
- Some secondary	-0.050	0.118		-0.064	0.119		-0.035	0.111		-0.045	0.116	
- Secondary degree	0.003	0.140		-0.035	0.137		-0.013	0.134		-0.005	0.138	
- Post-secondary	-0.103	0.142		-0.108	0.142		-0.128	0.134		-0.092	0.143	
- Graduate experience	-0.220	0.140		-0.211	0.138		-0.248	0.134	+	-0.200	0.142	
Age:												
- 25 – 34 years	0.092	0.067		0.115	0.075		0.079	0.066		0.120	0.073	
- 35 – 44 years	0.134	0.081	+	0.150	0.085	+	0.115	0.078		0.165	0.086	+
- 45 – 54 years	0.211	0.084	*	0.217	0.085	*	0.198	0.081	*	0.233	0.088	**
- 55 – 64 years	0.307	0.077	***	0.295	0.076	***	0.286	0.077	***	0.315	0.077	***
Gender:												
- Male	-0.124	0.032	***	-0.107	0.037	**	-0.125	0.032	***	-0.114	0.034	***
Log GDP per capita	-0.193	0.074	**	-0.316	0.105	**	-0.306	0.096	***	-0.304	0.108	**
Performance orientation	-0.013	0.108										
Uncertainty avoidance				0.244	0.050	***						
Institutional collectivism							0.225	0.104	*			
In-group collectivism										-0.114	0.045	*
Year dummy included?	Yes			Yes			Yes			Yes		
Model summary												
Number of countries	24			24			24			24		
Number of observations	128,477			128,477			128,477			128,477		
Censored observations	121,018			121,018			121,018			121,018		
Uncensored observations	7,459			7,459			7,459			7,459		
Log pseudolikelihood	-30,344.846			-30,267.211			-30,294.853			-30.321.215		
ρ	-0.893 (0.032)			-0.877 (0.033)			-0.902 (0.030)			-0.882 (0.039)		
Wald test of indep equations	81.23***			91.40***			84.78***			62.57***		

Notes: I stands for *Intrapreneurship*, and takes the value one if an individual is involved in intrapreneurship, and zero if an individual is involved in entrepreneurship, conditional on being involved in innovative entrepreneurial activity. Coefficients and standard errors of the explanatory variables in the selection equations of each of the four models are largely the same as those of the benchmark probit model with sample selection (i.e. model 1 in table 2.4), and hence, not reported here. Robust standard errors for clustered data. Reference category of *Educational level*: *None*. Reference category of *Age*: *18 – 24 years*. *Year dummy*: 2011 = 0, and 2014 = 1. Significance levels: + 0.05<p≤0.10; * 0.01<p≤0.05; ** 0.001<p≤0.01; *** p≤0.001.

Individuals in institutional collectivistic societies also have a higher probability to opt for intrapreneurship, given their involvement in innovative entrepreneurial activity (marginal effect: 0.013^{+}). Contrarily, national cultures that are characterized by high in-group collectivism increase the likelihood of people choosing for innovative entrepreneurship as the mode of exploitation (marginal effect: -0.007*). At first sight, the marginal effects seem relatively modest in size. However, recall that we are dealing with cross-level marginal effects, which should be interpreted with care. For example, a one-unit increase in societal uncertainty avoidance practices leads to an increase in the probability of being an intrapreneur by 1.6 percentage points on average. This is likely to convert into a higher relative prevalence of intrapreneurs at the country level.

2.5.4 Robustness checks

We perform three relevant robustness checks. First, we estimate multilevel probit models without sample selection using the same (number of) observations as in the second stage of our probit models with sample selection. Since we have both individual-level and country-level explanatory variables, multilevel analysis techniques may be more appropriate than estimating *regular* maximum-likelihood probit models (Bjørnskov & Foss, 2016; Shepherd, 2011), as is the case with model 2 of table 2.4, since they account for the fact that lower-level explanatory variables may have both within-group and between-group variation (e.g., Hox, 1995; 2010). Second, we estimate similar probit models with sample selection as in table 2.6, while using a less restrictive sample selection variable in the first stage of the models. More specifically, we now also select nascent entrepreneurs and owner/managers of young businesses that perform routine activities. In the second stage, individuals now choose between intrapreneurship (as before) and entrepreneurship, which is not necessarily innovative in nature. We hereby increase the number of uncensored observations to 13,620. Third, we make use of the dataset's full potential by also including all less developed countries for which we have no missing values on any

of the included variables. This almost doubles the number of countries from 24 to 46.[17] Here, we again use the original sample selection variable, hence selecting people engaged in innovative entrepreneurial activity only. Table 2.7 reports the estimates of the independent variables of interest for each of the three robustness checks (panel A to C).[18]

The results largely confirm our key findings from table 2.6. First of all, the effect of performance orientation remains insignificant throughout all three robustness checks, meaning that such cultural practices do not influence individual's choice between entrepreneurship and intrapreneurship, not even in case of a much broader sample that also includes less developed countries (see model 9). Second, uncertainty avoidance still proves to be a stable and important predictor of people favoring intrapreneurship over entrepreneurship, conditional on involvement in (innovative) entrepreneurial activity. The more uncertainty avoidant a society is, the more likely its members want to exploit their innovative idea as an employee of an established firm. This is confirmed by sample selection probit models that select those who are involved in any kind of entrepreneurial activity, which is not necessarily innovative in nature, in the first stage (see model 6). Hence, even though individuals here choose between intrapreneurship and entrepreneurship, so including less risky replicative and/or routine activities, an uncertainty-avoidant culture still prevents one from becoming an independent entrepreneur.

The direction of the effects of both collectivism variables stay as hypothesized, but lack significance in some of the models. Institutional collectivism loses its significance when using a less restrictive sample selection variable (see model 7), and when also including less developed countries (see model 11).

[17] Our sample now also includes the following factor-driven and efficiency-driven countries (in alphabetical order): Argentina, Bolivia, Brazil, China, Colombia, Ecuador, Georgia, Guatemala, Hungary, India, Indonesia, Iran, Kazakhstan, Malaysia, Mexico, Philippines, Poland, Russia, South Africa, Thailand, Turkey, and Venezuela.
[18] The full estimation results of the three robustness checks are available upon request from the author.

Table 2.7 – Robustness checks

Variables	Dependent variable: *I*			Dependent variable: *I*			Dependent variable: *I*			Dependent variable: *I*		
	Coeff	Std err	Signif	Coeff	Std err	Signif	Coeff	Std err	Signif	Coeff	Std err	Signif
Panel A – Multilevel probit models without sample selection												
	Model 1			**Model 2**			**Model 3**			**Model 4**		
Performance orientation	0.034	0.056										
Uncertainty avoidance				0.219	0.059	***						
Institutional collectivism							0.172	0.057	**			
In-group collectivism										-0.120	0.069	+
Number of countries		24			24			24			24	
Number of observations		7,459			7,459			7,459			7,459	
Panel B – Probit models with sample selection using a less restrictive sample selection variable												
	Model 5			**Model 6**			**Model 7**			**Model 8**		
Performance orientation	-0.007	0.090										
Uncertainty avoidance				0.220	0.053	***						
Institutional collectivism							0.143	0.091				
In-group collectivism										-0.131	0.046	**
Number of countries		24			24			24			24	
Number of observations		128,477			128,477			128,477			128,477	
Censored observations		114,857			114,857			114,857			114,857	
Uncensored observations		13,620			13,620			13,620			13,620	
Panel C – Probit models with sample selection including less developed countries												
	Model 9			**Model 10**			**Model 11**			**Model 12**		
Performance orientation	0.032	0.124										
Uncertainty avoidance				0.168	0.064	**						
Institutional collectivism							0.122	0.084				
In-group collectivism										-0.083	0.059	
Number of countries		46			46			46			46	
Number of observations		229,657			229,657			229,657			229,657	
Censored observations		217,789			217,789			217,789			217,789	
Uncensored observations		11,868			11,868			11,868			11,868	

Notes: *I* stands for *Intrapreneurship*, and takes the value one if an individual is involved in intrapreneurship, and zero if an individual is involved in entrepreneurship (in case of panel B and C conditional on being involved in entrepreneurial activity and innovative entrepreneurial activity, respectively). Robust standard errors for clustered data. Year dummies included in all twelve models (2011 = 0, and 2014 = 1). Significance levels: $^{+}$ 0.05<p≤0.10; * 0.01<p≤0.05; ** 0.001<p≤0.01; *** p≤0.001.

In-group collectivism only has an insignificant effect on intrapreneurship in case of the higher number of countries (see model 12). In general, we find less empirical support for our hypotheses when using a sample with countries in different stages of economic development, thereby confirming that the theoretical mechanisms only seem to hold in case of innovation-driven countries, as argued before.

2.6 Conclusions and discussion

In this chapter we aim to explain how and to what extent different societal cultural practices affect the mode of opportunity exploitation by entrepreneurial talent in society, hereby distinguishing between innovative entrepreneurs and intrapreneurs. By doing so, we contribute to the comparative international entrepreneurship literature (Terjesen et al., 2016; Thomas & Mueller, 2000; Tiessen, 1997). The most common types of entrepreneurial activity that have been researched so far in this stream of literature are all independent forms of entrepreneurship, such as new venture creation and self-employment (e.g., George & Zahra, 2002). It herewith overlooks all entrepreneurial activity that takes place within established firms (e.g., Antoncic & Hisrich, 2001; 2003). The ubiquitous influence of culture on individuals' preferences and behavior (e.g., Baum et al., 2003; Doney et al., 1998), also with regard to opportunity exploitation, calls for a broader perspective on entrepreneurial activity in society (Bjørnskov & Foss, 2016; Parker, 2011).

We find that people living in uncertainty-avoidant countries are more likely to be involved in intrapreneurship rather than entrepreneurship, conditional on being involved in any of the two types of innovative entrepreneurial activity. This supports our hypothesis that higher levels of uncertainty avoidance are more likely to generate intrapreneurship in society. The use of heuristics as a guide to decision-making under conditions of complexity and uncertainty (Bruton et al., 2010; Busenitz & Barney, 1997; Kahneman & Tversky, 1987) might induce entrepreneurially talented people to favor an established organization over establishing a new organization, as they offer resources and structures that alleviate uncertainty associated with entrepreneurial activity. High uncertainty avoidance cultures

are often found to be detrimental for the number of innovative entrepreneurs in society (e.g., Mueller & Thomas, 2001). Our empirical results show, however, that entrepreneurial talent may then find its way into established firms in order to pursue new business opportunities. For example, while being uncertainty-avoidant societies, Denmark and Sweden have relatively high shares of entrepreneurial employees in the adult population. From a macro perspective, this may even be the preferred outcome, as intrapreneurs usually have access to more complementary assets dispersed in their employer's organization (Teece, 1986). Some studies indeed point at intrapreneurship rates being positively associated with favorable economic outcomes, such as innovation, expectations for growth and expected job creation (Bosma et al., 2011; Matthews et al., 2009; Stam, 2013).

Another major finding, yet somewhat less confirmed by our robustness checks, is that national cultures of high institutional and in-group collectivism are more likely to bring about intrapreneurship and entrepreneurship, respectively. A consistent finding in the literature is that a culture of individualism – the counterpart of collectivism, and mostly measured by Hofstede's indicator (Hofstede, 1980; 1991; 2001) – fosters both start-up activity (e.g., Baughn & Neupert, 2003; Pinillos & Reyes, 2011) and corporate entrepreneurship (e.g., Morris et al., 1994). We provide a more fine-grained analysis by distinguishing between two forms of collectivism (Gelfand et al., 2004), and argue that the difference between institutional and in-group collectivism is the radius to which individuals generalize trust to others (Realo et al., 2008). The World Values Survey (WVS) measure of interpersonal trust indeed shows strong correlations with country scores of institutional collectivism (positive) and in-group collectivism (negative). A broad radius of interpersonal trust in institutional collectivistic societies drives individuals towards intrapreneurship, since established organizations offer a trustworthy and less competitive environment for innovative entrepreneurial activity to take place. In in-group collectivistic societies, interpersonal trust is limited to strong personal ties – or, bonding social capital, also see Putnam (2001) – so that innovative opportunity exploitation is less likely to come about within established organizations, especially in the larger ones. Moreover, societal practices in institutional collectivistic countries encourage and reward collective action (House et al., 2004), and hence,

intrapreneurship is to be preferred over the rather individual act of independent entrepreneurship. All in all, we may conclude that there is no one way in which collectivism (or, individualism) affects entrepreneurial activity in society, but rather necessitates a more refined way of looking at it. That is, there are two different forms of collectivism, each relating to more or less trust in distant societal members, and thus having an opposite effect on the two different modes of innovative entrepreneurial activity.

We do not find empirical support for one of our four hypotheses; performance orientation appears to have no significant effect on either one of the two modes of innovative entrepreneurial activity. Performance orientation is closely related to the concept of individuals' need for achievement (McClelland, 1961). Individuals with a high need for achievement prefer work situations that are challenging, that offer concrete feedback on their performance as well as the opportunity to take responsibility for the consequences of actions (McClelland, 1965). Although we believe that independent entrepreneurship allows for better opportunities to satisfy ego-enhancing motivations than intrapreneurship (Brunstein & Maier, 2005), intrapreneurs also desire challenging work situations, more than other employees do. In fact, intrapreneurs closely resemble entrepreneurs with regard to some of the personality traits clearly associated with entrepreneurial orientation, including a proactive personality (e.g., De Jong et al., 2015; Hisrich, 1990; Luchsinger & Bagby, 1987). Hence, a performance-oriented culture might affect the level and quality of innovative entrepreneurial activity in general, but is less obviously related to entrepreneurship or intrapreneurship.

A national culture is part of a country's informal institutional framework (North, 1990; 2005). Changes in informal institutions, if any, take long and show a high degree of path dependence (e.g., Barkema & Vermeulen, 1997; Williamson, 1998; 2000). Formal institutions – that is, laws, rules, regulations, procedures, et cetera – tend to reflect societal cultural values (Veciana & Urbano, 2008), and typically endure less long. Therefore, the prevalence and nature of entrepreneurial activity is said to be most responsive to informal institutional factors (Aparicio et al., 2016; Urbano & Alvarez, 2014), but, at the

same time, these are most difficult to intervene on. Nonetheless, our findings give rise to some important implications for policymakers. First and foremost, neither the number of intrapreneurs nor their contribution to economic performance should be underestimated, particularly in developed countries. While these countries have relatively low shares of independent entrepreneurial activity from a global perspective, they have above-average shares of intrapreneurship. Thus far, intrapreneurs have been largely ignored, both by entrepreneurship scholars and policymakers; the emphasis usually lies at new business creation. Yet, it might be worthwhile to also develop policy aimed at fostering and facilitating intrapreneurship. Second, and related to that, countries with cultural practices of high uncertainty avoidance and/or institutional collectivism are more likely to bring about intrapreneurship, so governments of such countries displaying relatively low levels of intrapreneurship might start wondering why. The same holds for highly in-group collectivistic countries and a lack of innovative entrepreneurship. Being aware of the prevailing national culture helps governments in designing the correct policy aimed at productive forms of entrepreneurial activity (Baumol, 1990), whether inside or outside the boundaries of established firms.

Our study is not without limitations. First, we make use of secondary data sources, and so, we do not capture real decision dynamics that underlie the hypothesized relationships between culture and entrepreneurial activity. That is, we do not measure individuals' cognitive processes while deciding on how to exploit an innovative idea, and whether the prevailing societal cultural practices really play a role in them (Lim et al., 2010). The outcome variables in both stages of the sample selection models are static and represent the current occupational status of individuals rather than a real occupational choice. Future (qualitative) studies are encouraged to make use of in-depth interviews with entrepreneurially talented people as to assess their true considerations and individual-level cognitive processes when deciding on the mode of exploitation of their innovative idea (see e.g., Baron, 1998; Mitchell et al., 2000).

Second, the national-level cultural practices and individual-level characteristics that we include in our models form a non-exhaustive list of factors that may influence people's decision for a certain mode of entrepreneurial activity. For example, the models lack good measures of people's access to different types of resources (e.g., De Clercq et al., 2013). The size and income of a household can be regarded as proxies of an individual's social and financial capital, respectively, but are only used as the exclusion restrictions in the first stage of our sample selection models (although for good reasons that we have shared before). Moreover, entrepreneurs' social and financial capital typically go beyond the family. Social networks also consist of weaker ties that may contribute to the development of new business activities (De Carolis et al., 2009; Klyver & Hindle, 2007). And even though entrepreneurs' own financial assets can play a critical role (e.g., Arenius & Minniti, 2005), many (also) resort to external sources to meet their financial needs (e.g., Winborg & Landström, 2000). The ease with which people can access bank credit (Aparicio et al., 2016), for example, is believed to be a valuable addition to future research. Similarly, the effect of the quality of countries' educational system, whether or not specifically targeted at entrepreneurial activities, might also be investigated (Bowen & De Clercq, 2008; De Clercq et al., 2013). We do include educational level as a measure of individual-level human capital, but models explaining entrepreneurial activity are also expected to benefit from the inclusion of measures of general and/or entrepreneurship-specific human capital (Millán et al., 2014).

Third, we implicitly assume that national cultures remain relatively stable over time (Hofstede, 1980; 1991). Although various researchers have challenged this assumption by arguing that cultural values are converging (e.g., Nordström, 1991), others have found additional evidence for its validity (e.g., Barkema & Vermeulen, 1997). GLOBE's country scores regarding the four cultural practices have been collected in the nineties and the early zeroes, and are related to much more recent GEM data on different types of entrepreneurial activity (2011-2014). Hence, our relationships are also cross-sectional in nature. Notwithstanding our belief that only large exogenous shocks may have a significant (long-term) influence on national cultures, we invite future research to apply panel data analysis using data that spans a longer period of time. This would be a better approach to unravel the complex and

dynamic relationships among cultural dimensions and entrepreneurial activity. In addition, we encourage scholars to include a wider set of societal cultural practices, like future orientation and power distance (Makino & Neupert, 2000; Shane, 1994). Finally, the simultaneous addition of formal institutions to such models could make clear how they interact with informal ones, and which one of these types is most influential in explaining individuals' mode of exploitation of their innovative idea.

3 Unpacking the effects of employment protection legislation on the allocation of entrepreneurial activity in society[19,20]

Abstract

Labor market institutions enable and constrain individuals' behavior on the labor market and beyond. We investigate two main elements of countries' employment protection legislation and their unintended effects on individuals' occupational status. More specifically, we use multilevel analyses to examine the separate effects of severance pay and the notice period on the allocation of entrepreneurial activity across employment and self-employment. Unlike some of our prior expectations, country-level legislation on severance pay and the notice period are found to be negatively and positively related to entrepreneurial employee activity, respectively.

Keywords: employment protection legislation, severance pay, notice period, entrepreneurial employee activity, self-employment

[19] This chapter is joint work with Erik Stam.

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3.1 Introduction

Institutions, the man-made rules of the game in society (North, 1990), have wide-ranging intended and unintended effects on economic action, and ultimately economic performance (Acemoglu & Robinson, 2012; Chang, 2011; Nickell & Layard, 1999). Institutions define the relative rewards for different occupations, and hence, play a key role in the allocation of talent in society (Acemoglu, 1995; Baumol, 1990; Murphy et al., 1991). The impact of labor market institutions on labor market outcomes has been the topic of recurrent policy discussions and much research (e.g., Acemoglu & Angrist, 2001; Belot et al., 2007; Blanchard & Tirole, 2008; Holmlund, 2014). Labor market institutions are usually thought of as policy interventions or collective provisions that interfere with employment and wage determination (Bertola, 1990; Bertola & Rogerson, 1997), and perhaps unintendedly with occupational choices (Baumann & Brändle, 2012). One particular and often discussed type of labor market institutions is employment protection legislation (henceforth EPL). EPL consists of rules and procedures that define the limits of employers to hire and fire workers in employment relationships (e.g., OECD, 2013; Skedinger, 2010).

During the second half of the twentieth century, many countries – mostly European – enacted laws on employment protection (Holmlund, 2014). The standard argument in favor of such laws is the protection of employees against fair or unfair dismissal by their employers (Bertola et al., 2000). Opponents argue that employment levels decrease, because employers are less likely to hire new employees (Kahn, 2007; 2010). Given the difficulty and hence costs of firing employees, attracting new workers is risky, and so, employers are reluctant to hire more of them. Under the assumption of optimal EPL and properly designed labor contracts, EPL does not affect employment levels (Lazear, 1990; Pissarides, 2001). EPL thus has theoretically ambiguous effects on employment and unemployment levels in societies (Kahn, 2010).

From a worker's point of view, EPL imposes significant opportunity costs on self-employment (Amit et al., 1995; Baumann & Brändle, 2012). Employees considering becoming self-employed have to give up

their legal rights as an employee, and will think twice before they actually do so. Shane & Venkataraman (2000) define entrepreneurship as the discovery, evaluation and exploitation of opportunities to create future goods and services by individuals, and so, do not limit entrepreneurship to those setting up an independent business, or owning-managing a new business for own risk and reward (Jensen & Meckling, 1976; Knight, 1921). In fact, workers with entrepreneurial abilities might also opt for the engagement in entrepreneurship within established organizations (e.g., Antoncic & Hisrich, 2001; 2003; Foss & Lyngsie, 2014; Subramanian, 2005; Parker, 2011). Labor mobility across employment and self-employment, especially by workers with entrepreneurial abilities, is likely to be affected by EPL. Put differently, EPL is expected to affect the allocation of entrepreneurial activity across new and established organizations in a country.

This study examines whether the strictness of a country's EPL has an effect on individuals' occupational status, which may be either employed or self-employed. In turn, the category of employed individuals consists of both employees undertaking entrepreneurial activities for their employer, also referred to as entrepreneurial employee activity, and those who do not. We use multilevel analyses to disentangle the mechanisms of two main elements of EPL, i.e. severance pay and the notice period, and their effect on the allocation of entrepreneurial activity across employment and self-employment. We herewith answer Shepherd's (2011) call for more multilevel research on entrepreneurial decision-making.

The objective of this chapter is to provide a better understanding of how labor market regulations, in particular two of EPL's components, affect the allocation of entrepreneurial talent in society. We hereby make a threefold contribution to the extant literature. First and foremost, entrepreneurial employees are only recently acknowledged and internationally measured as a separate category of entrepreneurially active individuals (Bosma et al., 2013b; Stam, 2013). As such, we are able to take a closer look at the allocation of entrepreneurial activity across employed and self-employed individuals. Second, we investigate the effects of country-level EPL on individual-level occupational status, whereas most studies so far focused on macro effects, such as changes in unemployment, employment, and/or

self-employment levels (e.g., Kahn, 2010; Lazear, 1990). Third, we estimate the separate effects of the two main elements of EPL. Many studies have used a composite index instead to measure countries' entire system of provisions regarding employment protection (e.g., Robson, 2003; Torrini, 2005). Given the complex multi-dimensional nature of EPL, we provide a more fine-grained analysis by separating two of its underlying mechanisms (Lazear, 1990; Pissarides, 2001).

Our regression models are multilevel in nature due to the inclusion of explanatory variables at different levels of analysis (Shepherd, 2011). For our dependent variable we make use of the 2011 Adult Population Survey (APS) of the Global Entrepreneurship Monitor (GEM). According to the GEM, employees are involved in entrepreneurial activity if they take the lead in the developmental process of new business activities for their employer (Bosma et al., 2013b). We use data from both the World Bank (WB) and the Organisation for Economic Co-operation and Development (OECD) on countries' legislation regarding severance payments and advance notice of contract termination by employers (Nicoletti et al., 1999).

The remainder of this chapter is organized as follows. Section 3.2 discusses the extant literature regarding employment protection legislation and its effects on different labor market outcomes. Section 3.3 describes our data, and section 3.4 explains the methodological approach. In section 3.5 we present our main results. Finally, section 3.6 concludes and discusses the policy implications of our findings.

3.2 Theory and hypotheses

In his influential paper about productive, unproductive or even destructive entrepreneurship, Baumol (1990) already speculated that there might be a 'true' rate of entrepreneurship. This rate is said to be more or less equal across countries, but its appearance depends on the incentive structure created by the institutional framework. Institutions define the relative pay-offs to different occupations, and thereby determine the allocation of talent in society (Acemoglu, 1995; Baumol, 1990; Murphy et al.,

1991). EPL is a specific type of labor market institution, and in that sense part of a country's formal institutional framework. Pissarides (2001: 136) defines employment protection as follows: "Any set of regulations, either legislated or written in labor contracts, that limit the employer's ability to dismiss the worker without delay or cost."

Most research so far only focused on the macro effects of employment protection. Theoretically, employment protection has ambiguous effects, because there are (at least) two mechanisms at play. On the one hand, EPL increases the costs of firing, making it more complicated to fire workers, and so, better protection is expected to have a positive effect on employment levels (Bertola, 1992; Bertola et al., 2000). Simultaneously, and for similar reasons, stricter EPL is expected to have a negative effect on unemployment levels. On the other hand, EPL increases the (future) costs of firing, making it less attractive to hire new workers, and so, it will result in lower employment and higher unemployment levels (Kahn, 2007; 2010).

Using a mathematical model, Lazear (1990) derives that severance pay requirements do not have to influence employment levels in a perfect market. If labor contracts are properly designed, meaning that each government-ordered monetary transfer from employer to employee will be undone by a contractual transfer of the same size from employee to employer, then severance pay has no effect on the level of employment. This is confirmed by a model of Pissarides (2001); optimally chosen severance pay and notice period have no influence on employment levels. His simulations also show that optimally chosen EPL does not reduce job creation.

Empirical findings are inconclusive regarding the effects of composite EPL indices on unemployment, employment, and/or self-employment rates. Addison & Teixeira (2003) mapped part of the modern empirical literature on the labor market consequences of employment protection, and come to three main conclusions: stricter EPL (1) increases structural unemployment, (2) reduces employment on average, and (3) is positively associated with self-employment. Cahuc & Postel-Vinay (2002) note that firing restrictions may or may not cut unemployment, with the impact being very limited in either

direction. Micco & Pagés (2006) find more stringent EPL to be the cause of a decrease in employment, driven by a decline in the net entry of firms. Román et al. (2011) conclude that strict EPL promotes dependent self-employment, because employers are encouraged to contract-out work to self-employed, which used to be done by employees. Others, however, find no robust or even a negative relationship between EPL and self-employment (Robson, 2003; Torrini, 2005). Millán et al. (2013) show that the strictness of EPL is negatively related to labor mobility among small firms.

The aforementioned studies all faced difficulties in formulating a satisfactory one-dimensional measure of EPL, which calls for a more fine-grained analysis of the effects of its most important elements. But, most notably, they did not take into account entrepreneurial activity by employees within established firms, often referred to as intrapreneurship (e.g., Antoncic & Hisrich, 2001; 2003; Subramanian, 2005; Parker, 2011). Instead, self-employment is seen as the only route that entrepreneurial individuals can take. Bosma et al. (2013a) find that the prevalence of intrapreneurship and independent entrepreneurship are negatively correlated at the macro level; more intrapreneurship means less independent entrepreneurship in society, and *vice versa*. This suggests that these two modes of entrepreneurial activity are substitutes rather than complements at the national level, in a sense confirming the allocation of entrepreneurship perspective by Baumol (1990). Bosma et al. (2013a) also conclude that both formal and informal institutions influence the allocation of talent across the two modes of entrepreneurial activity. More specifically, they expect social security favoring employment over self-employment to positively affect the share of entrepreneurial employees in a country.

Likewise, we investigate two main elements of the formal institutions that together constitute legislation on employment protection, i.e. severance pay and the notice period, which both favor employment over self-employment, and the more so if set stricter. Within the category of employed individuals we further distinguish between entrepreneurial employees and those who do not qualify as such. Someone is identified as an entrepreneurial employee if he is continuously involved in the

developmental processes of new business activities for his main employer, and when he has (had) a leading role in the phase of idea development and/or the phase of preparation and implementation (Bosma et al., 2013b). Examples of new business activities include setting up a new business unit, establishment, or subsidiary, but also the development of a new product, service, or product-market combination.

From a worker's perspective, the opportunity costs of self-employment increase with stricter requirements regarding the dismissal of workers (Amit et al., 1995). Put differently, EPL raises the expected income of dependent employment (Baumann & Brändle, 2012). Employed individuals will think twice before they decide to make a step towards self-employment, since they have to give up their legal protection rights as an employee. So, employees rather stay employed, and there is a higher chance that they are able to do so. At the same time, employers are less likely to hire new employees given the difficulty and hence costs of firing them, lowering unemployed individuals' chance to become employed, let alone to become entrepreneurially active as an employee.

The increased opportunity costs of self-employment due to stricter EPL negatively influence the likelihood that people will be self-employed (Amit et al., 1995; Baumann & Brändle, 2012). Focusing solely on entrepreneurial individuals, we expect a higher chance of being entrepreneurially active as an employee instead. Most empirical studies on EPL have taken a composite index as the explanatory variable (e.g., Robson, 2003; Torrini, 2005), while most theoretical studies have focused on the effects of severance pay only (e.g, Gavin, 1986; Lazear, 1987). In this study, we neither take the composite indicator of EPL nor the height of severance payments only. Instead, we analyze the effects of the two most important elements of a country's legal system concerning employment protection, namely both severance pay and the notice period, hereby following Lazear's (1990) seminal empirical work and the revised estimates by Addison & Grosso (1996). We hypothesize that both elements of EPL are positively related to individuals being entrepreneurially active as employee, and negatively related to individuals being self-employed. This leads to the following two hypotheses:

Hypothesis 1: The stricter country-level legislation on severance pay for employers, the more (less) likely an individual's involvement in entrepreneurial activity as employee (self-employed).

Hypothesis 2: The stricter country-level legislation on the notice period for employers, the more (less) likely an individual's involvement in entrepreneurial activity as employee (self-employed).

Both hypotheses have to be interpreted relative to a base outcome category, which consists of employees that do not qualify as entrepreneurial employees. Individuals have this third kind of occupational status when they are not involved in developing new business activities for their employer.

3.3 Data

The data comes from a variety of sources with the Global Entrepreneurship Monitor (GEM) being the most important one. The GEM is an annual large-scale international study on the prevalence of entrepreneurship as of 1999. The 2011 edition of the GEM Adult Population Survey (APS) was the first one to include entrepreneurial employee activity as a special topic.[21] More than 156k individuals coming from 52 countries completed the survey. The 52 participating countries include (1) six factor-driven economies (i.e. Algeria, Bangladesh, Iran, Jamaica, Pakistan and Venezuela), (2) 24 efficiency-driven economies (i.e. Argentina, Barbados, Bosnia and Herzegovina, Brazil, Chile, China, Colombia, Malaysia, Mexico, Panama, Peru, South Africa, Thailand, Trinidad and Tobago, Uruguay and most of Eastern Europe), and (3) 22 innovation-driven economies (i.e. Australia, Japan, South Korea, Singapore,

[21] Apart from the pilot study in 2008, in which eleven countries participated to measure their rate of entrepreneurial employee activity.

Taiwan, the United Arab Emirates, the United States and most of Western Europe). This follows a classification of countries into three stages of economic development by the World Economic Forum (WEF), and corresponds to a distinction between developing, transition and developed countries, respectively. As such, the data set covers a wide range of countries at different stages of economic development.

3.3.1 Dependent variable

Amongst others, the GEM 2011 APS asked for the respondents' occupational status, referring to whether someone is currently employed (either part-time or full-time), self-employed, unemployed, not working (i.e. retired or disabled), a student, or a full-time homemaker. A specific set of questions is then targeted at all adult employees in the sample in order to determine who can be regarded as entrepreneurially active. This is the case when individuals have been involved in the development of new business activities for their main employer in the past three years, and have had a leading role in at least one of the two phases of this developmental process, being the phase of idea development and the phase of preparation and implementation (Bosma et al., 2013b). When someone is also currently involved in such a development, he or she satisfies a more narrow definition of entrepreneurial employee activity. Hence, these individuals are continuously active and leading as entrepreneurial employees. On average, only 2.8% of the adult population satisfies the latter definition. Typically, innovation-driven economies demonstrate higher prevalence rates of entrepreneurial employee activity than less well-developed economies (Bosma et al., 2013b; Kelley et al., 2016). Other stylized facts show that to a certain extent entrepreneurial employee activity is a substitute of independent entrepreneurial activity, since in general, the share of entrepreneurial employee activity in overall entrepreneurial activity in society declines with the level of independent entrepreneurial activity (Bosma et al., 2013a).

The dependent variable is an unordered categorical variable, which indicates an individual's occupational status. Individuals that are employed by others, either in part-time or full-time work, are treated as the base outcome category. The second category consists of individuals involved in entrepreneurial employee activity according to the GEM's narrow definition. Finally, self-employed people belong to the third and last category.

Table 3.1 presents the descriptive statistics of the dependent variable. Due to the focus on the working part of the adult population, all other kinds of occupational statuses are omitted, and we end up with a data set covering more than 91k individuals. It appears that a vast majority of the full sample, i.e. 67.1%, is employed and not entrepreneurially active, whilst only 3.7% is employed and involved in entrepreneurial activity. This comes down to 5.3% of the employees being entrepreneurially active. Approximately 30% of the sample is self-employed.

Table 3.1 – Descriptive statistics of the dependent variable (*Occupational status)*

Category	Frequency	Percent	Cumulative percent
0. Non-entrepreneurial employee	61,501	67.1	67.1
1. Entrepreneurial employee	3,430	3.7	70.8
2. Self-employed	26,798	29.2	100,0
Total	91,729	100.0	

3.3.2 Independent variables

The World Bank and the OECD both gather EPL data, and thus serve as a source for information on countries' legal height of severance payments and length of the notice period. The World Bank's Doing Business ranking incorporates a variety of measures of labor market policy, of which the Employing Workers indicators refer to EPL. These indicators cover (1) the difficulty of hiring, (2) the difficulty of firing, (3) firing costs, and (4) hours rigidity. Our focus is on the two main items of the firing costs for employers, namely severance pay and the notice period for redundancy dismissal, both measured in terms of salary weeks. Workers with more years of tenure are typically better protected against

dismissal, and so, it might be useful to distinguish between workers with one, five and ten years of tenure, but the main conclusions are drawn based upon the averages of severance pay and the notice period for workers at different years of tenure.

The OECD distinguishes between five categories of employment protection, namely (1) severance payment, (2) advance notice of termination, (3) administrative procedures, (4) difficulty of dismissal, and (5) additional measures for collective dismissals (Nicoletti et al., 1999). Our main interest is in the first and second category. Both can be viewed as some sort of transfer from the employer to the employee – a direct money transfer in case of severance payment, and an information transfer in case of advance notice of termination of a labor contract – whereas the other three categories seem to be procedural ways to impede employers to dismiss a worker. Nonetheless, they might induce employers to delay a (collective) dismissal, or to buy off employees in order to avoid lengthy negotiations, and in that sense they may act like a severance payment or notice period. The OECD thus measures EPL by looking at the procedures and costs involved in dismissing individuals or groups of workers, and the procedures involved in hiring workers on fixed-term or temporary work agency contracts. This is reflected in three main indicators, namely (1) individual dismissal of workers with regular contracts, (2) additional costs for collective dismissals, and (3) regulation of temporary contracts. Items indicating the height of severance pay and the length of the notice period are part of the first indicator (both measured in months). Both items distinguish between workers at nine months, four years and twenty years tenure, but again, we mainly focus on the averages for workers at different years of tenure.

Both the World Bank and the OECD data set contain time series – in case of some of the OECD indicators even ranging from 1985 to 2013 – but we only use 2011 data due to the restricted availability of the GEM data. However, it must be noted that institutional regimes are often hard to change, and indeed, it appears that EPL remains fairly stable over time in most of the countries. The World Bank has EPL data on 214 countries, including 50 out of the 52 GEM countries, whereas the OECD data set only covers 43 countries, of which 29 are also covered by the GEM.

It should be emphasized that none of the used elements of EPL, or a combination of those elements, fully covers a country's EPL. Each item addresses part of a country's full set of provisions regarding employment protection. Also think of collective agreements, agreed upon at the regional or sectoral level, and containing all kinds of provisions not covered by legislation imposed at the national level. We argue, however, that severance pay and the notice period are among a country's most important provisions relating to employment protection. Moreover, in most countries, severance payments and notice periods in collective agreements are usually similar to those set out in national-level legislation (Venn, 2009).

3.3.3 Control variables

The regression models take into account a number of controls at different levels. All of them stem from the GEM 2011 APS, except for the 2011 unemployment rate, which is collected by the World Bank. It is likely that the level of unemployment in a country affects the allocation of individuals over employment and self-employment. The GDP per capita is also considered to be an important country-level control variable when predicting an individual's occupational choice. As mentioned before, economic development typically leads to higher prevalence rates of entrepreneurial employee activity (Bosma et al., 2013b; Kelley et al., 2016). Demographic characteristics like age and gender, characteristics capturing cognitive ability like educational level, and the household income are included as control variables at the individual level.

3.3.4 Descriptive statistics of the independent variables

Table 3.2 shows the descriptive statistics of the independent variables, including the controls. Note that the World Bank indicators of EPL are given in weeks, whereas the OECD indicators are measured in months. Still, the mean values of the indicators differ quite substantially. For example, the average

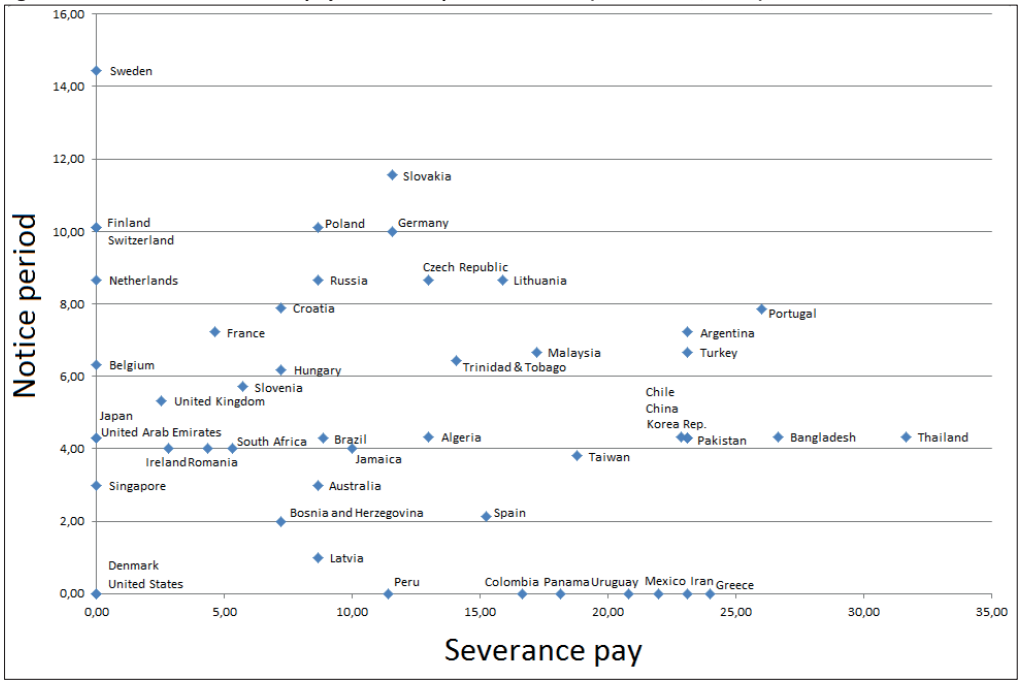
notice period according to the World Bank is slightly more than a month, while it is almost two months according to the OECD. This is likely to be the result of a different sample of countries; the World Bank also has information on less well-developed countries as compared to the OECD. Both job security provisions become more generous towards workers with more years of tenure, as expected (not shown here). The largest part of the sample is middle-aged (35 to 44 years, 27.4%), and the majority are men (56.0%). The 2011 unemployment rate ranges from 0.7% (in Thailand) up to 27.6% (in Bosnia and Herzegovina).

Figure 3.1 and figure 3.2 represent scatter plots that have countries' severance pay on the horizontal axis, and the notice period on the vertical axis – according to World Bank and OECD data, respectively – and reveal substantial dispersion. Hence, there is no clear relationship between the strictness of severance pay and the notice period within countries. At best, we can observe a weak negative relationship within the sample of OECD countries only. Figures 3.3 to 3.6 again show the large variety in the way countries set out their severance pay and the notice period in national-level legislation. At first, countries are split up into their respective categories – either a factor-, efficiency- or innovation-driven economy – after which they are ranked based on the strictness of the provision. Legislation on severance payments and the notice period appears to differ quite substantially within yet not so much between the three development categories. This holds true for both World Bank and OECD data.

Table 3.2 – Descriptive statistics of the independent variables

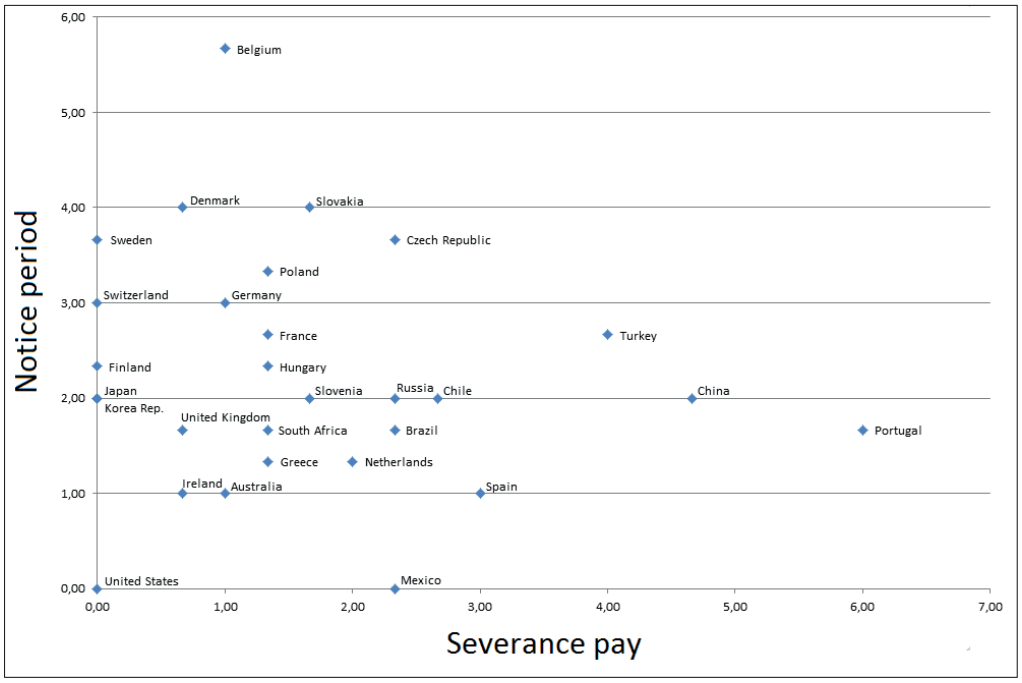
Variable	Observations	Mean	Std. Deviation	Minimum	Maximum
Severance pay (WB)	90,007	12.401	8.429	0	31.667
Notice period (WB)	90,007	4.589	3.662	0	14.444
Severance pay (OECD)	60,054	1.936	1.412	0	6.000
Notice period (OECD)	60,054	1.970	1.174	0	5.667
Age:					
- 18 – 24 years	91,729	0.108	0.310	0	1
- 25 – 34 years	91,729	0.259	0.438	0	1
- 35 – 44 years	91,729	0.274	0.446	0	1
- 45 – 54 years	91,729	0.233	0.423	0	1
- 55 – 64 years	91,729	0.125	0.331	0	1
Gender:					
- Male	91,711	0.560	0.496	0	1
Educational level:					
- None	90,767	0.068	0.252	0	1
- Some secondary	90,767	0.134	0.341	0	1
- Secondary degree	90,767	0.329	0.470	0	1
- Post-secondary	90,767	0.374	0.484	0	1
- Graduate experience	90,767	0.095	0.294	0	1
Household income:					
- Missing/Cannot code	91,729	0.173	0.378	0	1
- Lowest tertile	91,729	0.124	0.329	0	1
- Middle tertile	91,729	0.280	0.449	0	1
- Highest tertile	91,729	0.424	0.494	0	1
Log GDP per capita	88,126	9.558	0.730	6.854	10.578
Unemployment rate	90,447	9.903	5.797	0.7	27.6

Figure 3.1 – Countries' severance pay and notice period in weeks (World Bank; N=50)



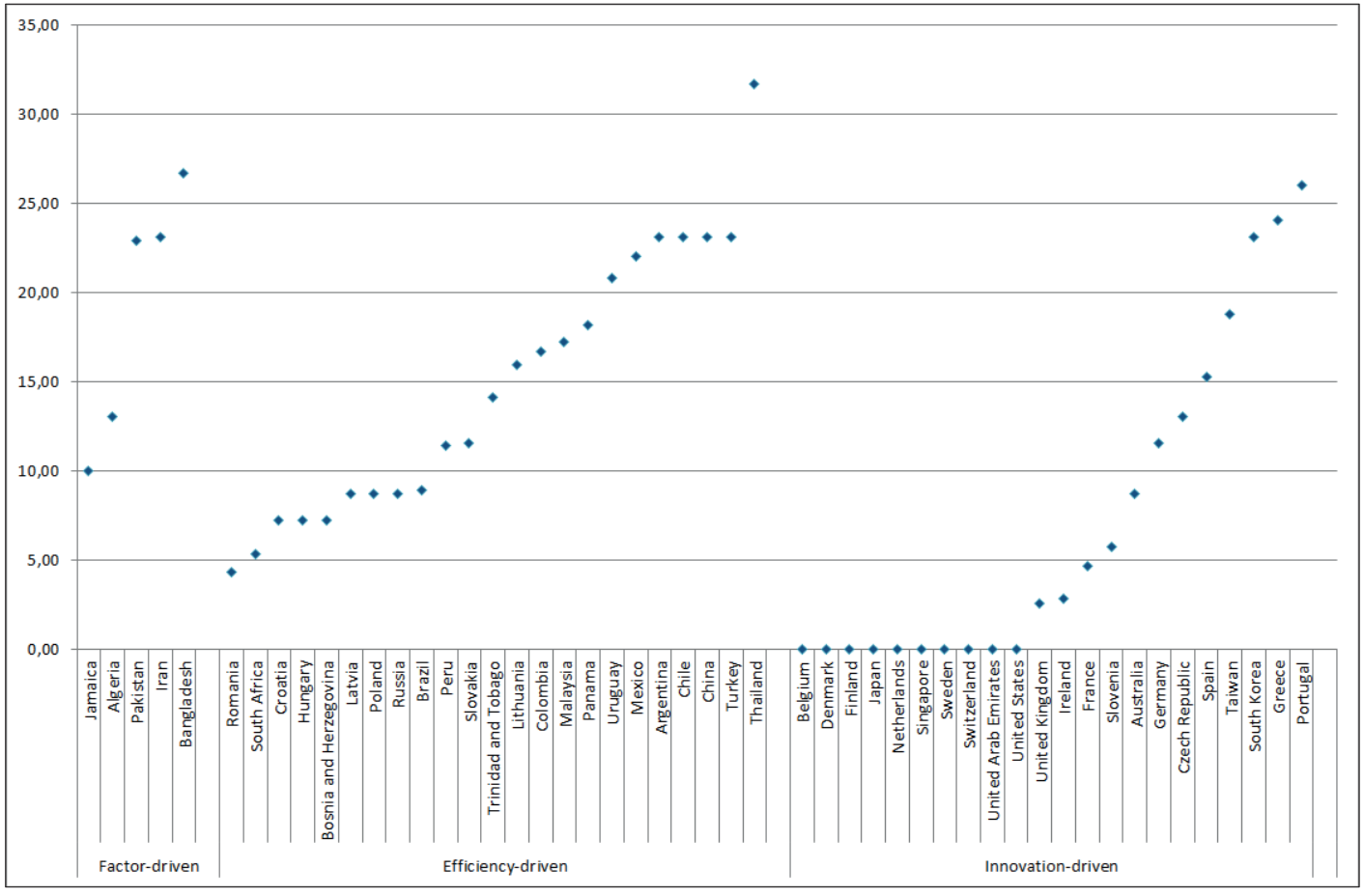
Notes: Data on national-level legislation. Severance pay and the notice period may be different in collectively and/or privately negotiated agreements.

Figure 3.2 – Countries' severance pay and notice period in months (OECD; N=29)



Notes: Data on national-level legislation. Severance pay and the notice period may be different in collectively and/or privately negotiated agreements.

Figure 3.3 – Severance pay in weeks (World Bank; N=50)



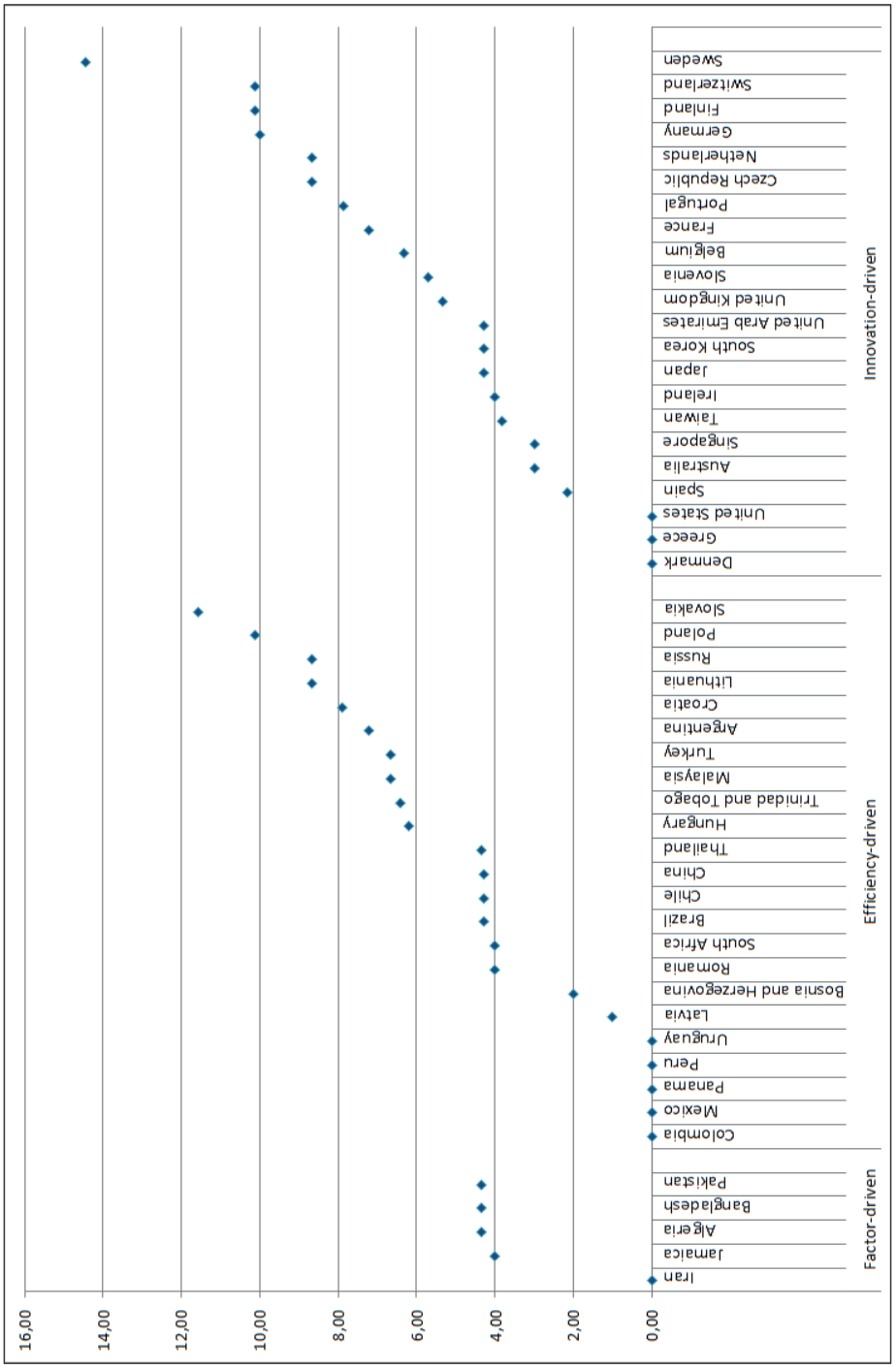


Figure 3.4 – Notice period in weeks (World Bank; N=50)

Figure 3.5 – Severance pay in months (OECD; N=29)

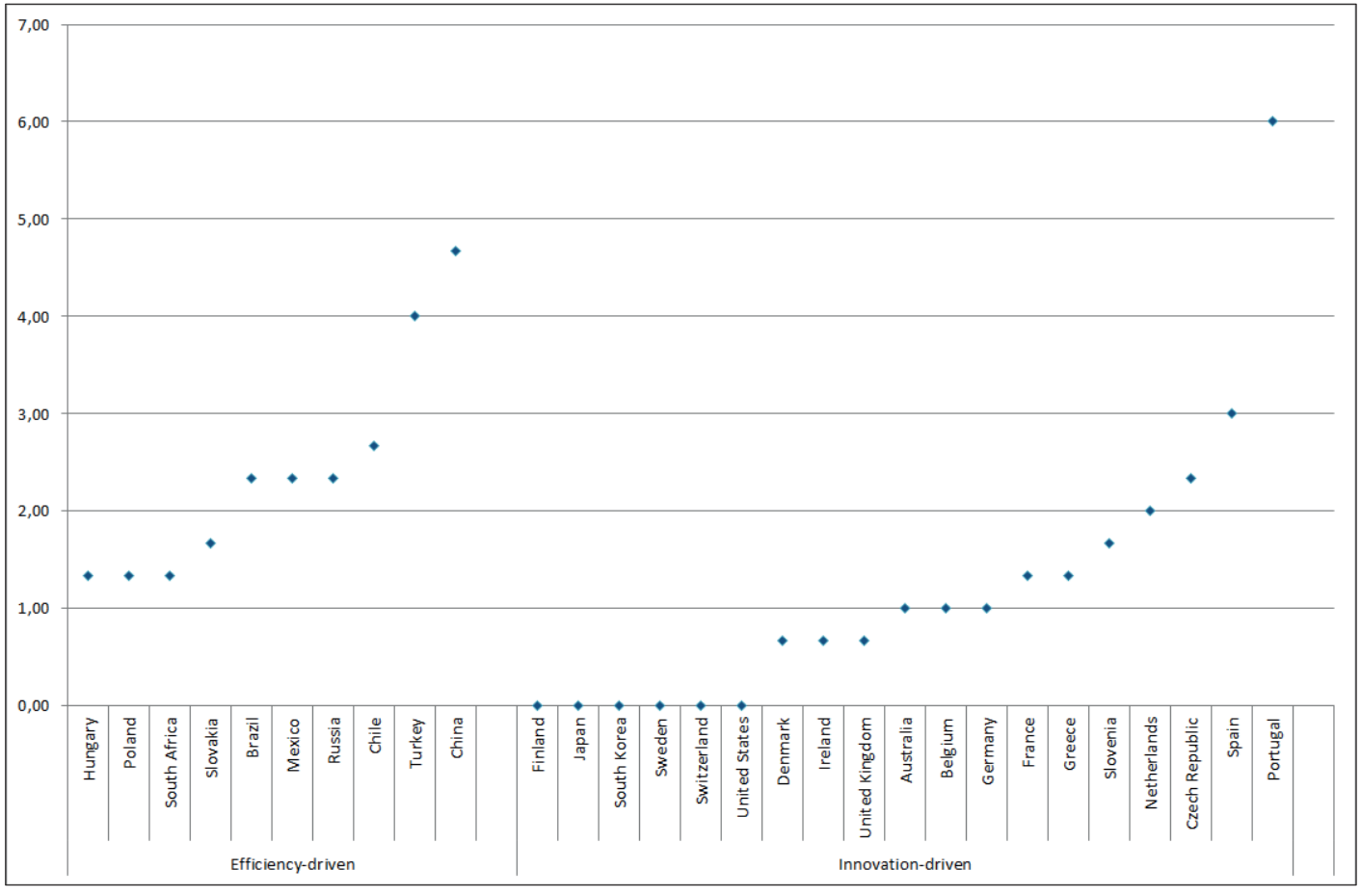
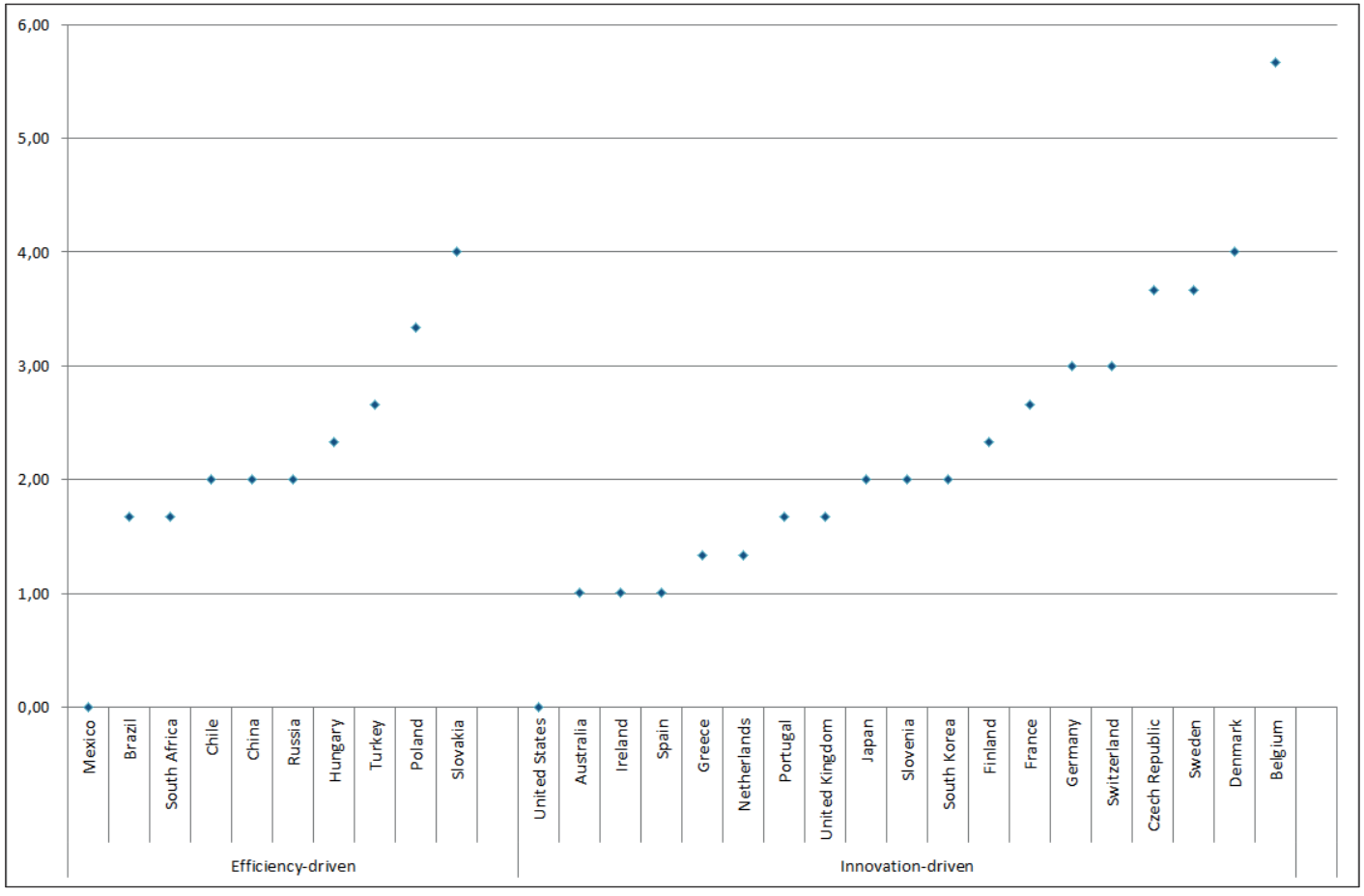


Figure 3.6 – Notice period in months (OECD; N=29)



3.4 Methodology

Both entrepreneurial employee activity and self-employment are not only affected by the national context, but also by individual characteristics. This implies that disentangling the determinants of the allocation of entrepreneurial activity necessitates a multilevel analysis (Bjørnskov & Foss, 2016; Shepherd, 2011). In this way, we are able to unravel the direct effects of determinants at different levels as well as possible cross-level interactions. More specifically, we are both able to investigate the effects of a country's severance pay and notice period on an individual's occupational status and, for example, whether or not these effects depend on his or her age.

The composed data set has a hierarchical data structure; it includes variables on the individual level as well as on the national level. Traditional approaches to deal with hierarchical data are either disaggregating all variables to the lowest level, or aggregating all variables to the highest level, followed by standard analyses like multiple regression analyses. However, with hierarchical data, observations are not independent, errors are not independent, and different observations may have errors with different variances (i.e. heteroscedastic errors), whilst multiple regression analysis assumes exactly the opposite. Observations of individuals within the same group (or, country in this case) tend to be more similar as compared to observations between different groups. This may be due to selection issues or a shared history of the individuals within a group. Multilevel techniques account for the fact that most variables have both within-group and between-group variation, and that the effect of an individual-level explanatory variable may well be different across different groups.

In general, the lowest level of a basic multilevel regression model is represented by the following equation:

$$y_{ij} = \beta_{0j} + \beta_{1j} x_{ij} + \varepsilon_{ij} \tag{1}$$

At the second level, we have

$$\beta_{0j} = \gamma_{00} + \gamma_{01} z_j + u_{0j} \tag{2}$$

and

$$\beta_{1j} = \gamma_{10} + \gamma_{11} z_j + u_{1j} \tag{3}$$

Substitution of equations (2) and (3) into equation (1) and rearrangement of terms leads to the following single-equation version of a two-level regression model, with only one explanatory variable per level:

$$y_{ij} = \gamma_{00} + \gamma_{10} x_{ij} + \gamma_{01} z_j + \gamma_{11} z_j x_{ij} + u_{1j} x_{ij} + u_{0j} + \varepsilon_{ij} \tag{4}$$

Here, y_{ij} is the dependent variable, where the subscript i refers to individuals ($i = 1, \dots, n_j$), and the subscript j refers to groups ($j = 1, \dots, J$). The right-hand side of the equation is split up into a fixed (or, deterministic) and a random (or, stochastic) part, respectively. The term x_{ij} is an individual-level independent variable, whereas z_j is a group-level independent variable. Note that the model indeed contains a cross-level interaction term $z_j x_{ij}$.

Usually, as is the case in this study, one deals with more than one explanatory variable at both levels. Assume that there are P explanatory variables x at the lowest (individual) level, indicated by the subscript p ($p = 1, \dots, P$), and Q explanatory variables z at the highest (group) level, indicated by the subscript q, ($q = 1, \dots, Q$). The more general equation is then given by:

$$y_{ij} = \gamma_{00} + \gamma_{p0} x_{pij} + \gamma_{0q} z_{qj} + \gamma_{pq} z_{qj} x_{pij} + u_{pj} x_{pij} + u_{0j} + \varepsilon_{ij} \tag{5}$$

Our basic model consists of twelve individual-level explanatory variables representing an individual's age, gender, educational level and household income, and two country-level explanatory variables, namely a country's log GDP per capita and unemployment rate. The full multilevel regression models also include the severance pay and notice period variables for workers with different years of tenure, and hence, $p = 1, \dots, 12$ and $q = 1, \dots, 4$. Due to the specific form of the dependent variable (i.e. unordered categorical), we estimate so-called multilevel mixed-effects logistic regression models.

3.5 Results

3.5.1 Correlation coefficients

The correlation coefficients between the dependent variable, the independent variables of interest, and the control variables, based on the full sample, are given in table 3.3. They already provide us with some insights into their mutual relationships.

Since our dependent variable is unordered categorical, we cannot draw any firm conclusions (yet) as to its correlation with any of the severance pay and notice period indicators. In case of both World Bank and OECD data, severance pay and the notice period are significantly and negatively correlated, so, on average, the higher the severance payments, the shorter the notice period, and *vice versa*. This is remarkable, because in the worst case employers can treat the notice period as if it is a severance payment by allowing employees not to be present during the notice period and paying them anyway. The highest correlations can be found among the severance pay and notice period variables coming from different sources. For example, the correlation between the World Bank and OECD indicator of severance pay is 0.743, and highly significant. We may conclude that both data sources seem to assess the strictness of EPL in a fairly similar way.

Other correlation coefficients worth mentioning are those between the log GDP per capita and the severance pay variable, in case of both World Bank and OECD data. The highly significantly negative relationships (-0.575 and -0.594, respectively) point at more developed countries having less strict EPL in terms of severance pay requirements. The coefficients are inconclusive regarding its relationship with countries' legislated notice period.

Table 3.3 – Correlation coefficients

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. *Occupational status*	1.000										
2. *Severance pay (WB)*	0.185 ***	1.000									
3. *Notice period (WB)*	-0.168 ***	-0.281 ***	1.000								
4. *Severance pay (OECD)*	0.055 ***	0.743 ***	-0.142 ***	1.000							
5. *Notice period (OECD)*	-0.045 ***	-0.195 ***	0.636 ***	-0.180 ***	1.000						
6. *Age*[1]	0.092 ***	-0.076 ***	0.064 ***	-0.102 ***	0.011 **	1.000					
7. *Male*	0.067 ***	0.037 ***	-0.041 ***	0.008 *	-0.009 *	-0.022 ***	1.000				
8. *Educational level*[2]	-0.134 ***	-0.192 ***	0.039 ***	-0.157 ***	-0.036 ***	-0.058 ***	-0.066 ***	1.000			
9. *Household income*[2]	0.013 ***	0.031 ***	-0.022 ***	0.014 **	-0.034 ***	0.011 **	0.077 ***	0.278 ***	1.000		
10. *Log GDP per capita*	-0.194 ***	-0.575 ***	0.199 ***	-0.594 ***	-0.089 ***	0.143 ***	-0.061 ***	0.194 ***	0.027 ***	1.000	
11. *Unemployment rate*	-0.002	0.095 ***	-0.287 ***	0.314 ***	-0.352 ***	0.064 ***	-0.018 ***	0.027 ***	0.083 ***	0.214 ***	1.000

Notes: Significance levels: $^{+}$ 0.05<p≤0.10; * 0.01<p≤0.05; ** 0.001<p≤0.01; *** p≤0.001; [1] Continuous variable; [2] Ordered categorical variable.

3.5.2 Regression results

Table 3.4 shows the results of the main multilevel mixed-effects logistic regression models. Model 1 and 2 alternately include the World Bank and OECD variables regarding the average severance pay and notice period. Since World Bank data is available for a larger number of countries, their sample sizes differ. The results of models 1 and 2 are based on data for 46 and 28 countries, respectively.[22] Both models contain all aforementioned control variables. We have also run models in which we test the effects of the severance pay and notice period variables separately, and their results do not deviate from what is discussed next as to the direction and significance of the effects.[23]

The base outcome category of the two models is *Non-entrepreneurial employee*, such that all coefficients should be interpreted relative to this occupational status. A non-entrepreneurial employee is someone who is employed, either part-time or full-time, but does not qualify as an entrepreneurial employee, because he or she is not involved in developing new business activities for the employer. Coefficients are shown of the effects on the remaining two occupational statuses, i.e. *entrepreneurial employee* and *self-employed*, two ways in which an individual can be entrepreneurially active.

Contrarily to what we hypothesized in hypothesis 1, severance pay is found to be negatively associated with the probability of an individual's involvement in entrepreneurial employee activity, although the effect is only weakly significant in case of World Bank data, and insignificant in case of OECD data. At the same time, severance pay seems to be positively related to being self-employed; the coefficient of the World Bank indicator is significantly positive. However, OECD data cannot confirm this finding. We do find support for hypothesis 2, since the notice period has a significantly positive effect on individuals being entrepreneurially active as an employee. This effect is even relatively strong and highly

[22] Hence, this is somewhat less than the 50 and 29 countries for which EPL data is available, because of missing data on some of the included controls with the GEM 2011 APS as a data source.
[23] The regression results of these and various other specifications of the model (e.g., without control variables) are available upon request from the author.

significant in case of the sample with OECD countries only. Moreover, a longer notice period is negatively associated with being self-employed, as also hypothesized by our second hypothesis.

In any case, both provisions have an opposite effect on the different outcome categories. One can say that these findings are in line with the empirical results of the analyses by Addison & Grosso (1996), who revised Lazear's (1990) estimates, and concluded that severance pay has a negative effect on the employment level, whilst a longer notice period increases employment. If the latter is true, then it is more likely that, in the end, more people will be involved in entrepreneurial employee activity. The opposite is true regarding severance pay; if higher government-ordered severance payments decrease employment, entrepreneurial individuals tend to become self-employed earlier, since the opportunity of being entrepreneurially active within established organizations decreases.

Almost all control variables are highly significant; only countries' unemployment rate remains insignificant throughout both models. Their coefficients mostly have the expected sign. Age is positively related with being involved in entrepreneurial activity in general, so either as an employee or as self-employed. The largest effect on being an entrepreneurial employee can be found for individuals between 35 and 44 years of age. People above 55 years of age are most likely to be self-employed. Moreover, men have a higher probability of being entrepreneurially active than women, relative to being employed and not involved in entrepreneurial activity. A higher educational level as well as a higher household income are especially positive for being an entrepreneurial employee. Both controls are negatively related to self-employment, yet insignificant for individuals with a household income that belongs to the highest tertile of the population. The higher a country's GDP per capita, the greater the probability that an individual is entrepreneurially active as an employee. The reverse holds for people being self-employed.

Table 3.4 – Results of the multilevel mixed-effects logistic regression models

Variables	Model 1 (World Bank indicators)						Model 2 (OECD indicators)					
	1. Entrepreneurial employee			2. Self-employed			1. Entrepreneurial employee			2. Self-employed		
	Coeff	Std err	Signif	Coeff	Std err	Signif	Coeff	Std err	Signif	Coeff	Std err	Signif
Severance pay (WB)	-0.160	0.089	+	0.176	0.085	*						
Notice period (WB)	0.149	0.059	*	-0.258	0.057	***						
Severance pay (OECD)							-0.052	0.142		-0.175	0.138	
Notice period (OECD)							0.256	0.096	**	-0.163	0.095	+
Age:												
- 25 – 34 years	0.255	0.041	***	0.077	0.013	***	0.286	0.050	***	0.123	0.018	***
- 35 – 44 years	0.369	0.041	***	0.205	0.013	***	0.431	0.050	***	0.269	0.018	***
- 45 – 54 years	0.327	0.040	***	0.259	0.013	***	0.403	0.048	***	0.323	0.018	***
- 55 – 64 years	0.237	0.034	***	0.312	0.011	***	0.277	0.040	***	0.352	0.015	***
Gender:												
- Male	0.204	0.019	***	0.135	0.008	***	0.214	0.021	***	0.207	0.010	***
Educational level:												
- Some secondary	0.220	0.074	**	-0.050	0.012	***	0.250	0.098	**	-0.028	0.017	
- Secondary degree	0.467	0.095	***	-0.152	0.016	***	0.544	0.129	***	-0.119	0.022	***
- Post-secondary	0.889	0.097	***	-0.281	0.017	***	0.950	0.132	***	-0.190	0.023	***
- Graduate experience	0.630	0.059	***	-0.146	0.013	***	0.674	0.080	***	-0.094	0.016	***
Household income:												
- Middle tertile	0.162	0.044	***	-0.082	0.013	***	0.163	0.049	***	-0.104	0.016	***
- Highest tertile	0.556	0.045	***	-0.015	0.014		0.584	0.050	***	-0.004	0.016	
Log GDP per capita	0.239	0.088	**	-0.261	0.084	**	0.529	0.159	***	-0.568	0.152	***
Unemployment rate	0.039	0.086		-0.046	0.083		-0.021	0.103		0.123	0.100	
Constant	-3.392	0.076	***	-0.921	0.071	***	-3.540	0.076	***	-0.886	0.064	***
Model summary												
Number of individuals	85,470						59,412					
Number of countries	46						28					
Log likelihood	-57,231.773						-39,378.003					
Deviance	114,463.546						78,756.006					
σ^2_{u0}	0.264 (0.053)						0.312 (0.030)					

Notes: Base outcome category: 0. Non-entrepreneurial employee; In case of *Household income* missing values included, but not reported here; Standardized variables; Robust standard errors for clustered data; Significance levels: $^{+}$ 0.05<p≤0.10; * 0.01<p≤0.05; ** 0.001<p≤0.01; *** p≤0.001.

3.5.3 Robustness checks

Our robustness checks include the estimation of similar models, but (1) now using the World Bank and OECD indicators of severance pay and the notice period for workers at different years of tenure, and (2) preselecting 29 OECD countries.[24] The question regarding the latter robustness check is whether the conclusions previously drawn also hold for a more homogeneous set of countries. The subsample that results from this prior selection excludes all factor-driven economies, and most countries that qualify as efficiency-driven economies.[25] By focusing on better developed countries only, our results are less influenced by necessity-based and/or informal forms of entrepreneurship, which are more prevalent in developing countries (e.g., Acs, 2006).

Usually, employment protection is less strict for workers with less years of tenure, and so, any changes in the strictness of regulations affects them more than workers with more years of tenure. In that sense, one would expect severance pay and the notice period for workers with less years of tenure to be stronger determinants of the allocation over different occupations. Recall that the World Bank data allows for differentiation between workers with one year, five years, and ten years of tenure. The OECD in turn distinguishes between employment protection for employees working nine months, four years, and twenty years for their current employer. On average, the length of the notice period decreases with years of tenure going up in case of OECD data. Also, on average, severance pay is set highest for workers with four years tenure. For the sample of countries for which we have World Bank data we see that both severance pay and notice period are set stricter for people who work longer for their current employer.

[24] In the latter case, we end up with one country less than the preselected number of countries, because of missing data on some of the included controls with the GEM 2011 APS as a data source.

[25] A prior selection of the 22 innovation-driven economies largely coincides with the preselected sample of OECD countries only, but additionally leaves out seven efficiency-driven OECD countries. The results of similar regression models using this even more restrictive sample show that, based on OECD data, severance pay is significantly negatively related to being self-employed. This actually is in line with hypothesis 1, but contradicts our benchmark results in table 3.4.

The findings in table 3.5 reveal that the direction of the effects does not depend on differences in legislation for workers with different tenure lengths. Only small differences appear in the magnitude and significance of the various effects. For example, only severance payments for workers with a relatively short tenure length (one year or nine months) have a significantly negative effect on them being an entrepreneurial employee. Contrarily, the notice period for workers with more years of tenure has stronger significant effects on the probability that an individual is an entrepreneurial employee.

A prior selection of the 29 OECD countries fully confirms the previous findings as to the direction of the effects (see table 3.6). Obviously, our interest goes out to the first model, in which we use the World Bank indicators. Model 2 exactly replicates the second model in table 3.4. The effect of countries' average severance pay on being an entrepreneurial employee loses its (weak) significance. The three other coefficients of interest remain significant. Especially the notice period has a clear positive effect on someone being an entrepreneurial employee, and a clear negative effect on being self-employed. This is both in line with what we hypothesized.

All in all, we may conclude that our main results are fairly robust for using slightly different specifications of the model, and for preselecting a different group of countries. We find that two of EPL's main elements, i.e. severance pay and the notice period, have opposite effects on two types of entrepreneurial activity. A higher severance pay decreases the probability that an individual is active as an entrepreneurial employee, but increases his chances of being self-employed, and the reverse is true for a longer notice period. This holds for both a heterogeneous set of countries and a more homogeneous sample regarding their level of economic development.

Table 3.5 – Results of robustness check 1: Workers with different years of tenure

Variables	Model 1 (World Bank indicators)						Model 2 (OECD indicators)					
	1. Entrepreneurial employee			2. Self-employed			1. Entrepreneurial employee			2. Self-employed		
	Coeff	Std err	Signif	Coeff	Std err	Signif	Coeff	Std err	Signif	Coeff	Std err	Signif
Severance pay 1y (WB)	-0.177	0.058	**	0.112	0.051	*						
Notice period 1y (WB)	0.021	0.082		-0.267	0.079	***						
Severance pay 9m (OECD)							-0.115	0.065	+	-0,219	0.059	***
Notice period 9m (OECD)							0.196	0.058	***	-0.137	0.056	*
	Model 3 (World Bank indicators)						**Model 4 (OECD indicators)**					
Severance pay 5y (WB)	-0.139	0.088		0.186	0.085	*						
Notice period 5y (WB)	0.145	0.074	*	-0.239	0.072	***						
Severance pay 4y (OECD)							-0.086	0.092		-0.088	0.086	
Notice period 4y (OECD)							0.241	0.074	***	-0.126	0.073	+
	Model 5 (World Bank indicators)						**Model 6 (OECD indicators)**					
Severance pay 10y (WB)	-0.111	0.095		0.178	0.092	+						
Notice period 10y (WB)	0.189	0.084	*	-0.234	0.083	**						
Severance pay 20y (OECD)							0.113	0.097		-0.079	0.093	
Notice period 20y (OECD)							0.260	0.095	**	-0.141	0.094	
Control variables												
Included?	Yes						Yes					
Models summary												
Number of individuals	85,470						59,412					
Number of countries	46						28					

Notes: Base outcome category: 0. Non-entrepreneurial employee; Standardized variables; Robust standard errors for clustered data; Significance levels: $^{+}$ 0.05<p≤0.10; * 0.01<p≤0.05; ** 0.001<p≤0.01; *** p≤0.001.

Table 3.6 – Results of robustness check 2: OECD countries only

Variables	Model 1 (World Bank indicators)						Model 2 (OECD indicators)					
	1. Entrepreneurial employee			2. Self-employed			1. Entrepreneurial employee			2. Self-employed		
	Coeff	Std err	Signif	Coeff	Std err	Signif	Coeff	Std err	Signif	Coeff	Std err	Signif
Severance pay (WB)	-0.029	0.084		0.197	0.078	*						
Notice period (WB)	0.218	0.058	***	-0.202	0.056	***						
Severance pay (OECD)							-0.052	0.142		-0.175	0.138	
Notice period (OECD)							0.256	0.096	**	-0.163	0.095	+
Control variables												
Included?	Yes						Yes					
Model summary												
Number of individuals	59,412						59,412					
Number of countries	28						28					
Log likelihood	-39,353.772						-39,378.003					
Deviance	78,707.544						78,756.006					
σ^2_{u0}	0.309 (0.036)						0.312 (0.030)					

Notes: Base outcome category: 0. Non-entrepreneurial employee; Standardized variables; Robust standard errors for clustered data; Significance levels: $^{+}$ 0.05<p≤0.10; * 0.01<p≤0.05; ** 0.001<p≤0.01; *** p≤0.001.

3.6 Conclusions and discussion

The way the effects of EPL have been studied to date is largely unsatisfactory. Most research so far only focused on effects at the national level, such as changes in employment and/or unemployment levels. Moreover, and despite EPL's complex nature, previous studies frequently used a composite index to determine its strictness. This study, however, focuses on two of its main elements separately, i.e. severance pay and the notice period, and finds opposing effects on the allocation of entrepreneurial individuals across established and newly established organizations. The higher the state-mandated severance payments from employer to employee after dismissal, the lower the probability that an individual will be an entrepreneurial employee, but the higher individual's chances to be self-employed. These results are, however, weakly significant regarding the effect on entrepreneurial employee activity, and not confirmed when using OECD data. The estimation results involving countries' average notice period do show highly significant coefficients, in the hypothesized directions, and for both World Bank and OECD data. That is, a longer notice period is positively related to individuals being entrepreneurially active as an employee, and negatively related to self-employed individuals. The results are highly robust according to two checks.

The findings are remarkable in the sense that different elements of countries' EPL have opposite effects on the allocation of entrepreneurial activity. The results can therefore be seen as evidence against the use of composite indices for EPL, which has been the standard in empirical research over the past decades. Different kinds of employment protection regulation might have contradictory effects, as is shown here. We are not the first to provide empirical evidence for opposite effects of severance payments and the notice period. Revised estimates of those of Lazear (1990) by Addison & Grosso (1996) only confirmed Lazear's findings as to the positive directional influence of severance pay on the employment level, but not to that of the notice period. This result and our own findings are puzzling, because at worst employers might treat the notice period as if it were severance pay by allowing employees not to be present during the entire notice period, while still paying their usual

wage. So, one would expect the coefficients to at least have the same sign, and ideally with a less strong effect of the notice period. A somewhat speculative explanation for the opposite effects is that a notice period may encourage active job search (Addison & Blackburn, 1995), whereas severance payments might lead to workers delaying their job search. If so, then an extended notice period induces higher (re-)employment levels, ultimately leading to a higher number of entrepreneurial employees. As long as one receives severance payments, there is less or even no need to have a paid job again, thereby lowering the probability of being an entrepreneurially employee. A high severance payment may also be used as seed money to start up a new independent business, lowering liquidity constraints to become self-employed, explaining its positive relationship with self-employment (Evans & Jovanovic, 1989; Holtz-Eakin et al., 1994).

Policy recommendations regarding EPL should be formulated with care, because of its complex multi-dimensional nature. Labor market regulations are often hard to change, partly because of the path dependency involved in the way countries' legislation evolves over time, and the interdependencies with other types of regulations, for example with regard to capital and product markets (Amable et al., 2011; Fallick et al., 2006). Even though our analyses are cross-country, they provide a starting point for implementing changes in EPL within a country (Boeri & Jimeno, 2005). Policymakers might experiment with changing labor market regulations, or, more in particular, consider adjusting employers' obligations regarding severance payments and advance notice of contract termination in accordance with the results. That is, if policymakers aim to increase the number of individuals with entrepreneurial abilities to reveal these within established organizations, then the notice period for employers should be set longer, while severance payments should be set less generous.

This study is not without limitations. First, it might be the case that strict EPL is embedded in a culture of uncertainty avoidance, as formal institutions are often interdependent on informal institutions (North, 1990; Williamson, 1998; 2000). In that sense, one may expect more people willing to become an employee, and some of them ultimately engaging in entrepreneurial employee activity, instead of

becoming self-employed. In other words, there might be some endogeneity present in this study. Future studies are encouraged to also include informal institutions, and to test their interactions with formal institutions like the ones constituting countries' legislation on employment protection. Second, we use a cross-sectional data set, which implies that it is hard to exclude reverse causality. Ideally, we would have had a longitudinal data set covering more than the year 2011 only. Nonetheless, it is unlikely that causality runs from an individual's choice about where to be entrepreneurially active to country-level EPL, leaving our main conclusions unaltered. Third, severance pay and the notice period only capture part of a country's EPL. Even though these two provisions are among the most important elements of EPL, future research might consider the inclusion of various other regulations that are part of a country's legislation on employment protection. One can think of the maximum length of fixed-term contracts, whether or not redundancy dismissal is allowed by law, and whether or not third-party notification and/or approval are needed. Finally, there is a focus on employment protection legislated at the country level, because of the difficulty involved in obtaining information on privately or collectively negotiated contracts. This might be misleading though, for example in case of the Netherlands, where most employment protection regulations are laid down in collective agreements, on top of the prevailing national laws. Even though such regulations usually follow those set out in national-level legislation (Venn, 2009), future studies should take into account subnational heterogeneity in labor market regulations, such as sectoral- and regional-specific provisions (Autor et al., 2007).

4 On the macroeconomic benefits of entrepreneurial talent inside the firm[26]

Abstract

This chapter addresses an important gap in the entrepreneurship literature trying to explain national-level economic growth. Common measures of aggregate entrepreneurship only cover independent types of entrepreneurial activity, such as industry shares of small firms, the number of (new) businesses, and self-employment or business ownership rates. The literature herewith overlooks an important alternative way of new value creation. In a first attempt to also include entrepreneurship inside established firms, we find that the role of entrepreneurial employees in society is at least as important as that of independent entrepreneurs. Moreover, the empirical analyses especially demonstrate the importance of easy access to sound money and limited international trade for entrepreneurial activities by employees to contribute to countries' economic performance.

Keywords: institutions, entrepreneurial employee activity, independent entrepreneurial activity, economic growth, knowledge spillover theory of entrepreneurship

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4.1 Introduction

A common denominator in studies linking entrepreneurship to country-level outcomes is their focus on independent types of entrepreneurial activity (Terjesen et al., 2016). Measures of aggregate entrepreneurship mostly concern industry shares of small firms, the number of (new) businesses, and self-employment or business ownership rates (Foss & Klein, 2012; Parker, 2009). The literature herewith overlooks an important alternative way of new value creation, namely entrepreneurship inside established firms (e.g., Bjørnskov & Foss, 2016; Foss & Lyngsie, 2014). Until recently, no data source offered the opportunity to compare this type of entrepreneurial activity across countries. A measure of entrepreneurial employee activity in recent editions of the Adult Population Survey (APS) of the Global Entrepreneurship Monitor (GEM) has changed this.

We argue that a larger share of entrepreneurial employees in one's adult population has a positive effect on national-level economic growth. There are multiple reasons for this, many of which are similar to how independent entrepreneurs enhance growth. Most importantly, we draw from the knowledge spillover theory of entrepreneurship claiming that (independent) entrepreneurship is one of the main channels through which new knowledge can be exploited (Acs et al., 2009; 2013; Audretsch & Keilbach, 2007; Audretsch et al., 2006; Braunerhjelm et al., 2010). Whereas most studies take entrepreneurship as new venture creation through which the new knowledge is being exploited, in-house exploitation of opportunities that, for example, arise from R&D activities is largely ignored (Braunerhjelm et al., 2017). However, as long as established firms sufficiently value the ideas of their employees, they will appropriate the economic returns from their endowment of new knowledge by developing the ideas inside the firm (Arrow, 1962a; Audretsch & Thurik, 2001a). Recent evidence shows that although employees in large and mature organizations are less likely to transition to entrepreneurship, they exhibit a higher propensity to engage in entrepreneurship inside the established firm instead (Kacperczyk, 2012).

Entrepreneurial activity becomes increasingly important in developed countries, as globalization, digitalization and other technological change induces them to better exploit their competitive advantages in developing knowledge-intensive goods (Acs et al., 2013). Entrepreneurial activity by employees may be an essential way of doing so, next to entrepreneurial activity by independent entrepreneurs. In line with Schumpeter's renowned models of innovation (1911; 1934; 1942) we argue that both entrepreneurial activities inside established organizations and those by newly established organizations contribute to countries' economic growth (also see Aghion & Howitt, 1992). However, depending on the characteristics and quality of the institutional framework one type of entrepreneurial activity may be more important for economic growth than the other, similar to what has been proposed for different forms of (independent) entrepreneurship (e.g., Baumol & Strom, 2007; Bjørnskov & Foss, 2016; Bowen & De Clercq, 2008).

In this chapter, we empirically investigate the effect of entrepreneurial employee activity (henceforth EEA) on countries' economic performance, and compare and contrast this to the effect of independent entrepreneurial activity. We not only use the GEM's rate of total (early-stage) entrepreneurial activity (henceforth TEA) – that is, the share of nascent entrepreneurs and owners/managers of young businesses in the adult population (Reynolds et al., 2002; 2005) – but also select a subgroup of innovative independent entrepreneurs (henceforth TEAinnov). By using these different measures, we offer a more complete picture of how and to what extent different types of entrepreneurial activity in society contribute to aggregate economic performance. Our model specification follows previous research in taking a simple Cobb-Douglas production function as a starting point (Cobb & Douglas, 1928), extended with our measures of knowledge capital and entrepreneurship capital (see e.g. Audretsch & Keilbach, 2004a; 2004b; Audretsch et al., 2008; Urbano & Aparicio, 2016; Van Praag & Van Stel, 2013). We furthermore follow Aparicio et al. (2016) in their approach to also explore some key institutional factors, and how they affect the prevalence of different types of entrepreneurial activity in society (also see Bosma et al., 2017).

The remainder of this chapter is organized as follows. The next section discusses the theoretical foundations of how entrepreneurial activity mediates the relationship between the institutional framework and economic growth. Section 4.3 explains our empirical approach, primarily the three-stage least squares (3SLS) method that we use to find a causal link between institutions and different types of entrepreneurial activity, in turn explaining aggregate economic growth. In section 4.4 we describe our data and sample, and section 4.5 presents our main results. Finally, section 4.6 concludes and extensively discusses the implications of our findings.

4.2 Theory

4.2.1 Knowledge, entrepreneurial activity and economic growth

Broadly speaking, there are three macro-theoretical perspectives on the relationship between entrepreneurship and economic growth. For this study, we adopt the knowledge-based perspective.[27] Early endogenous growth models already emphasized the importance of knowledge and human capital for growth, but without explaining *how* they actually lead to economic success (e.g., Aghion & Howitt, 1992; 1998; Lucas, 1988; Romer, 1986; 1990). Breschi & Lissoni (2001) emphasize the fact that knowledge creation induces further knowledge creation through spillovers, thereby facilitating other individuals' innovation efforts, either intentionally or unintentionally. Knowledge by itself does not contribute to economic development, but is only a necessary condition (Braunerhjelm et al., 2010). Rather, it is about converting knowledge into economically relevant knowledge (Arrow, 1962b). This requires a number of favorable but rare conditions, or as Braunerhjelm et al., 2010: 107) put it: "The

[27] Next to the knowledge-based view on entrepreneurship and growth, scholars have also developed technology-based (e.g., Garicano & Rossi-Hansberg, 2006; Lazear; 2005) and wealth-based theories of entrepreneurship (e.g., Acemoglu et al., 2006; Aghion & Bolton, 1997; Banerjee & Newman, 1993; Lloyd-Ellis & Bernhardt, 2000). The former perspective essentially argues that entrepreneurs respond to incentives created by technological change, whilst the latter view principally states that wealth promotes entrepreneurship, in turn enhancing wealth. Both theoretical perspectives are less applicable as it comes to how entrepreneurial activities by employees contribute to growth.

ability to transform new knowledge into economic opportunities involves a set of skills, aptitudes, insights, and circumstances that is neither uniformly nor widely distributed in the population".

The knowledge spillover theory of entrepreneurship has identified (independent) entrepreneurship as the missing link between knowledge and economic growth (Acs et al., 2009; Audretsch & Keilbach, 2007; Audretsch et al., 2006; Braunerhjelm et al., 2010; Carlsson et al., 2009). Knowledge developed in large established organizations, for example through R&D activities, may be commercialized by setting up new independent businesses. A divergence in the assessment and evaluation of the (expected) value of new ideas between incumbent organizations and their employees might lead to employees creating new independent businesses in order to appropriate the (expected) value of their knowledge (Braunerhjelm et al., 2010). Independent entrepreneurship in that sense serves as a conduit of knowledge spillovers (Stam, 2013).

However, independent entrepreneurship is only one conceivable mechanism that links new knowledge to economic growth (Braunerhjelm et al., 2010). If new ideas are deemed valuable by incumbents, then they will try to exploit the resulting entrepreneurial opportunities themselves (Arrow, 1962a; Audretsch & Thurik, 2001a). This is where the role of entrepreneurial talent inside the firm comes into play. Entrepreneurial employees, sometimes also referred to as corporate entrepreneurs or intrapreneurs (e.g., Antoncic & Hisrich, 2001; 2003; Pinchot, 1985), are those who lead the development of new business activities for their main employer (Bosma et al., 2013b). These are likely yet not exclusively people working for R&D departments.[28] R&D workers mostly explore new opportunities. Entrepreneurial employees differ from them and other employees by taking the lead in the identification and/or exploitation of opportunities that (also) advance their employers' organization (De Jong, 2016). The prevalence rate of entrepreneurial activity by employees is

[28] In fact, in some organizations all employees are expected to act entrepreneurial (i.e. *contextual ambidexterity*, compare with *structural ambidexterity*, see e.g. Gibson & Birkinshaw (2004)). Essentially anyone could then be identified as an entrepreneurial employee. Prime examples of such organizations are 3M and Google, who allow their employees to spend some of their time on innovative projects unrelated to their core activities.

increasing along the stages of economic development; it is most prevalent in developed countries, yet almost negligible in developing and transition economies (Kelley et al., 2016).

The above-mentioned modes of commercialization of new ideas show strong similarities with the two models of innovation described in Joseph Schumpeter's seminal work on the economics of innovation (Schumpeter, 1911; 1934; 1942). Schumpeter Mark I (Schumpeter, 1911; 1934) introduced the concept of *creative destruction*, which refers to the introduction of new inventions so that existing products, services, and/or technologies become obsolete (also see Aghion & Howitt, 1992). There is a major role for innovative (independent) entrepreneurs; they create new firms in order to exploit opportunities originating in new knowledge overlooked or neglected by incumbent firms (also see Sørensen & Fassiotto, 2011). Contrarily, in Schumpeter Mark II (Schumpeter, 1942) innovations stem from R&D activities by employees of incumbent firms that they develop themselves. This leads to a process of *creative accumulation*. Schumpeter (1947: 152) emphasizes that "the inventor produces ideas, the entrepreneur "gets things done", …". Hence, the Schumpeterian entrepreneur is the one turning inventions into business activities. Or, put differently, the one turning knowledge into economically relevant knowledge, possibly through knowledge spillovers (Arrow, 1962b; Braunerhjelm et al., 2010).

New business activities may thus be developed by new and established organizations, primarily depending on the (expected) valuation of the new idea by the involved parties. Irrespective of the mode of entrepreneurial activity, i.e. inside or outside the firm, the ones leading the development of a new business activity can be regarded as an entrepreneur in a Schumpeterian sense. In fact, entrepreneurial employees closely resemble independent entrepreneurs, for example as to their personality traits (e.g., Hisrich, 1990; Luchsinger & Bagby, 1987; Parker, 2011).[29] According to Menzel et al. (2007: 734-735), "intrapreneurs come up with new ideas, take full advantage of opportunities and turn them into profitable new realities, push for change and develop creative responses in the

[29] An exception to this is a study by Martiarena (2013), who compared the decision-making of intrapreneurs to that of independent entrepreneurs in Spain, and found that the former group is significantly more risk-averse, in that sense resembling (other) employees rather than independent entrepreneurs.

organization". Entrepreneurial employees combine valuable personality traits like a proactive personality, a high need for achievement, and self-efficacy with a positive attitude towards entrepreneurial behavior, and have the ability to successfully engage in it, just like independent entrepreneurs (De Jong, 2016; De Jong et al., 2015).

Although many studies acknowledge the importance of entrepreneurship by large established organizations and the role of employees herein (e.g., Antoncic & Hisrich, 2001; 2003; Hellmann, 2007; Monsen et al., 2010; Pinchot, 1985)[30], none of them has empirically tested the relationship between entrepreneurial activity by employees and national-level economic growth (Bjørnskov & Foss, 2016). The empirical literature on the intrapreneurship-growth relationship remains limited to studies linking (support for) entrepreneurship inside established organizations to firm performance (e.g., Ağca et al., 2012; Alpkan et al., 2010; Antoncic & Antoncic, 2011; Augusto Felício et al., 2012; Pearce & Carland, 1996). At the country level, the entrepreneurship literature thus far only focused on independent forms of entrepreneurship, as measured by, for example, industry shares of small firms, the number of (new) businesses, and self-employment or business ownership rates (e.g., Audretsch et al., 2006; Terjesen et al., 2016; Van Stel, 2006; Van Stel et al., 2005; Wennekers & Thurik, 1999; Wong et al., 2005). This is largely due to a prolonged lack of internationally comparative data on entrepreneurship inside established firms. The addition of a measure of entrepreneurial activity by employees to recent editions of the Adult Population Survey (APS) of the Global Entrepreneurship Monitor (GEM) has changed this.

In general, any entrepreneurial activity that successfully exploits new knowledge leads to improved economic performance, but depending on the type, and hence, the context in which the activities take

[30] We hereby have to distinguish between the corporate entrepreneurship literature (also see Burgelman, 1983b; Covin & Miles, 1999; Sharma & Chrisman, 1999; Zahra, 1991; Zahra & Covin, 1995) and the intrapreneurship literature (also see Adachi & Hisada, 2016; Antoncic, 2003; 2007; Carrier, 1994; 1996; Rule & Irwin, 1988). Corporate entrepreneurship usually refers to firm-level entrepreneurial processes (top-down), whereas intrapreneurship is often seen as an employee-driven phenomenon at the individual level (bottom-up). Also compare with the entrepreneurial orientation (EO) literature (e.g., Covin & Slevin, 1989; 1991; Lumpkin & Dess, 1996; 2001; Miller, 1983).

place, its contribution may be smaller or larger. The extant literature puts forward several reasons why countries with greater shares of (independent) entrepreneurial activity would enjoy higher growth rates. First and foremost, entrepreneurial talent plays an important role in promoting knowledge diffusion and exploiting knowledge spillovers (e.g., Acs et al., 2009; Braunerhjelm et al., 2010; Breschi & Lissoni, 2001), that is, our main argument why both independent entrepreneurs and entrepreneurial employees would contribute to aggregate growth. Other reasons put forward in the extant literature are that entrepreneurs foster labor productivity, both through selection and increased competition (e.g., Geroski, 1989; Nickell, 1996; Nickell et al., 1997), and that a certain share of the entrepreneurs is innovative, thereby disrupting existing markets and/or creating entirely new markets (e.g., Acs & Audretsch, 1990; 2003; Minniti & Lévesque, 2010). The individual contribution of these mechanisms, if any, is unknown, but we argue that they are also applicable to entrepreneurial activity by employees, possibly even to a greater extent, for a number of reasons outlined below.

Entrepreneurial employees potentially have a large pool of financial resources at their disposal. While Banerjee & Newman (1993) only consider rich individuals wealthy enough to overcome borrowing constraints as to become an (independent) entrepreneur, any employee might get access to sufficient financial resources in order to develop a new business activity. The resources are owned by the principal entrepreneur, but after being convinced of the new idea and its (expected) value for the firm (Arrow, 1962a; Audretsch & Thurik, 2001a), employees are granted access to them as to create a new internal venture or an otherwise growth-enhancing business activity.[31] A sizeable scale and scope can be attained fairly quickly (Kuratko et al., 2011), because valuable complementary assets like colleagues' competences and skills are dispersed in the employer's organization (Burgelman, 1983b; Teece, 1986). Having access to more and better non-financial resources also facilitates and accelerates

[31] Employees that perform well typically climb the corporate ladder, and consequently earn a higher wage. Given that every individual bequeaths a certain share of the generated wealth to their offspring, as in Banerjee & Newman's (1993) model, this enables subsequent generations to (also) get involved in entrepreneurial activity. Hence, not only independent entrepreneurs are capable of enhancing wealth and economic growth, but also employees – once granted access to the firm's resources – can contribute to a more prosperous and entrepreneurial economy, both directly and indirectly.

the developmental process of the internal venture. Because of their leading role in reconfiguring the internal and external competences, resources and skills, entrepreneurial employees are key to firms' dynamic capabilities (Teece, 2007; Teece & Pisano, 1994; Teece et al., 1997). Entrepreneurial failure is a widespread phenomenon (e.g., Dimov & De Clercq, 2006; McGrath, 1999), but large established organizations are usually good at coping with (potential) failures (Kuratko et al., 2011).

Entrepreneurial employees face particular thresholds before they are allowed to make use of the firm's resources; they first have to convince their manager(s) of the viability and profitability of the new business activity. In order to receive approval, the internal venture needs to have much more potential impact than the average independent new business (Stam, 2013). Such strict selection criteria are likely to increase the (future) value and size of new internal ventures. The little evidence available confirms that, on average, entrepreneurial employees expect to create more jobs in five years from the start of a new business activity than nascent entrepreneurs and owners/managers of young businesses do (Bosma et al., 2011). Yet, new ideas developed by incumbent firms tend to be relatively close to their core business, and hence, be less radical in nature (e.g., Hill & Rothaermel, 2003). The number of radically new independent businesses, however, is also very limited (Stam, 2013). Independent entrepreneurship is frequently imitative or routine in nature, and often does not commercialize new knowledge at all (Koellinger, 2008; Santarelli & Vivarelli, 2007). Although Schmitz (1989) argues that imitative activities of entrepreneurs also foster economic growth, innovative activities are most beneficial for economic growth (e.g., Baumol, 2010; Stam & Van Stel, 2011). Regarding a group of developed countries, Stam (2013) concludes that several widely used innovation indicators are positively associated with the relative prevalence of entrepreneurial employee activity, but are not or even negatively associated with the relative prevalence of independent entrepreneurial activity. Entrepreneurial activity by employees is also found to be positively related to educational attainment, both within society and within organizations (Bosma et al., 2010; 2012a; Stam et al., 2011). This suggests a sorting effect of highly educated entrepreneurial talent into established organizations rather than newly established organizations.

4.2.2 Institutions and entrepreneurial activity

Countries' institutional framework enables and constrains entrepreneurship – not only the prevalence of entrepreneurial activities (e.g., Aidis et al., 2008), but also their subsequent performance – and hence, gives rise to different economic growth patterns (Bruton et al., 2010). In other words, institutions lead to different types of entrepreneurial activities, in turn affecting economic growth in different ways (e.g., Aparicio et al., 2016). Therefore, inclusive growth models also explore institutional factors that affect the quantity and quality of different types of entrepreneurial activity in society (also see Bosma et al., 2017). Bjørnskov & Foss (2016) map the extant literature on the institutions-entrepreneurship-growth nexus, and conclude, that most studies take entrepreneurship to be exclusively about start-ups and/or self-employment (also see Foss & Lyngsie, 2014). They thus call for empirical studies that also include measures of entrepreneurship inside established organizations mediating the relationship between institutions and national-level economic performance. We fill this gap in the literature by investigating how several important formal institutions affect the prevalence of different types of entrepreneurial activities, which are expected to yield different patterns of economic growth.

The interest in institutions, entrepreneurship and economic growth as well as in some of the intersections between these areas of research has grown in the past decades. However, relatively few studies have been devoted to how institutions affect the supply and allocation of entrepreneurial activity in society (Bjørnskov & Foss, 2008; Bowen & De Clercq, 2008). Most likely, this is caused by some notorious difficulties in measuring different types of entrepreneurial activity across a large number of countries, let alone their (institutional) determinants and/or (economic) consequences (e.g., Baumol, 1986). Recent data collection efforts now provide initial opportunities to not only include the supply of independent entrepreneurial activity, but also that of entrepreneurial activity inside established firms. Hence, we are now able to distinguish between the supply and the allocation of

entrepreneurial activity (Baumol, 1990; Minniti, 2008), particularly between entrepreneurship inside established firms and by newly established firms (also see Bosma et al., 2013a).

In general, institutions may be understood as the rules of the game in society and (thus) as systems of incentives (North, 1990). While a large number of institutions can be (and have been) regarded as possible determinants of entrepreneurship (e.g., Freytag & Thurik, 2007; Valdez & Richardson, 2013), we specifically focus on how economic freedom impacts different types of entrepreneurial activity in society. The concept of economic freedom and its underlying dimensions are among the most researched formal institutions in the empirical literature as it comes to their effect on entrepreneurship (e.g., Bjørnskov & Foss, 2008; McMullen et al., 2008: Nyström, 2008). The five areas of economic freedom are (1) the size of government in its broadest sense, (2) the legal structure, specifically the extent to which property rights are secure, (3) the access to sound money, (4) the degree of openness to international trade and investment, and (5) public regulation of the credit and labor market and doing business. Almost all studies using their overarching concept – that is, a general index of Economic Freedom of the World (EFW), see Gwartney et al. (1999) – find evidence for positive relationships with desirable economic outcomes like growth and productivity (Hall & Lawson, 2014).

There are multiple reasons why any of these five areas would influence entrepreneurial activity. First, a large government, both in terms of direct and indirect control, is likely to reduce entrepreneurial activity, because not much room for entrepreneurship is left in industries where economic activities are nationalized or require prior permission (e.g., Henrekson, 2005). Second, the importance of well-defined and enforced property rights has been emphasized quite often in the literature (e.g., Anton & Yao, 1994; 1995; 2004; Hellmann, 2007). Property rights reduce transaction costs and thereby the risks of engaging in entrepreneurial activities, which may foster the incidence of entrepreneurship (e.g., Glaeser et al., 2004). Also, they decrease the likelihood of unintended knowledge spillovers, so that incumbent firms are more likely to invest in R&D. Third, the concept of sound money is often associated with countries' level of financial development, indicating the ease with which

entrepreneurial talent can attract capital. Access to capital has been extensively discussed as a critical condition for entrepreneurship (e.g., Chandler & Hanks, 1998; Dunn & Holtz-Eakin, 2000; Samila & Sorenson, 2011). Fourth, increased openness to international trade flows and foreign investment further extends the number of opportunities for potential entrepreneurs beyond the borders of one's own country, thereby having a positive impact on entrepreneurship. Fifth, regulation has theoretically ambiguous effects on entrepreneurship, since rules and procedures both facilitate and impede entrepreneurial action (e.g., De Clercq et al., 2010). On the one hand, entrepreneurs benefit from clear rules and predictable enforcement of those rules. On the other hand, excessive regulation is burdensome, therefore detrimental for the prevalence of entrepreneurship (e.g., Ardagna & Lusardi, 2009). It may also drive people into destructive forms of entrepreneurship, such as rent-seeking activities (Baumol, 1990). Once more it should be stressed that institutions, the aforementioned ones in particular, may have different effects on different types of entrepreneurial activity. In turn, the entrepreneurial activities that emerge within a certain institutional framework may have different effects on economic growth (Bowen & De Clercq, 2008).

4.3 Methodology

First of all, we specify and estimate several cross-sectional growth models as a solid basis for our subsequent panel approach (also see Bosma et al., 2017). We hereby follow the estimation procedure by Mankiw et al. (1992) and the initial cross-section regressions by Islam (1995), although relying on more common model specifications in the entrepreneurship literature aiming to explain economic growth (e.g., Audretsch & Keilbach, 2004a; 2004b; Mueller, 2007; Van Praag & Van Stel, 2013).[32] That is, we take a simple Cobb-Douglas production function – one that explains economic output (as measured by countries' GDP) by the inputs physical capital and labor (Cobb & Douglas, 1928) – and

[32] Instead, Mankiw et al. (1992) and Islam (1995) estimate Solow's (1956) (augmented) neoclassical growth model with diminishing returns.

extend it with our measures of knowledge capital and entrepreneurship capital in society (also see below). In a first set of models, we do not (yet) include countries' initial GDP. Later on, however, we do control for initial GDP levels, hereby testing for convergence in standards of living, that is, for whether less advanced economies tend to grow faster than developed countries (e.g., Abramovitz, 1986; Colino et al., 2014).

Given that we have a (short) panel, we also estimate pooled regression (OLS) models that include a lagged dependent variable, in line with Islam (1995). The pooled regressions, in turn, serve as a prelude to the estimation of several systems of equations using a three-stage least squares (3SLS) method (Aparicio et al., 2016; Bosma et al., 2017). Our 3SLS models simultaneously estimate an equation explaining one of the types of entrepreneurial activity and an equation explaining economic performance. In each of the models, the latter equation is similar to our most complete pooled regression models. By using 3SLS, we are able to test the effects of several important formal institutions on different types of entrepreneurial activity in society, which in turn may impact economic growth. It also allows us to limit the potential problems of endogeneity and that of reverse causality between entrepreneurial activity and growth (e.g., Audretsch & Acs, 1994), since we add a measure of economic growth as a control variable when first explaining entrepreneurial activity. 3SLS is argued to be consistent and asymptotically efficient, because it takes into account the correlation between the standard errors of the set of equations that it estimates simultaneously (Wooldridge, 2010; Zellner & Theil, 1962).

The first part of the set of equations is as follows:

$$EEA_{it} = f(I_{it}, x_{it}) \quad (1a)$$

$$TEA_{it} = f(I_{it}, x_{it}) \quad (1b)$$

Here, EEA_{it} represents the share of entrepreneurial employees in the adult population (18-64 years old), and TEA_{it} is the share of independent entrepreneurs in the adult population, both for country i at time t. In both equations, I_{it} is a vector representing a selection of institutions, and x_{it} is a vector

of control variables for country i at time t. In alternative model specifications, we substitute our measure of independent entrepreneurial activity (i.e. TEA_{it}) by a subset indicating innovative independent entrepreneurs only (i.e. $TEAinnov_{it}$).

We simultaneously estimate a Cobb-Douglas production function of the following form:

$$Y_{it} = \alpha K_{it}^{\beta_1} L_{it}^{1-\beta_1} R_{it}^{\beta_2} EEA_{it}^{\beta_3} TEA_{it}^{\beta_4} \quad (2)$$

As usual, Y_{it} represents economic output measured by the GDP of country i at time t, K_{it} is the endowment of physical capital, L_{it} is labor, and R_{it} is knowledge capital (often operationalized as R&D input, see e.g. Van Praag & Van Stel, 2013). EEA_{it} and TEA_{it} are to be interpreted as before. Together, EEA_{it} and TEA_{it} can be regarded as countries' entrepreneurship capital (usually denoted with E_{it}, see e.g. Audretsch & Keilbach, 2004a). Again, TEA_{it} will be substituted by $TEAinnov_{it}$ in some alternative specifications of the model.

While existing empirical studies measure countries' entrepreneurship capital by data on independent types of entrepreneurial activity only (e.g., Audretsch & Keilbach, 2004a; Urbano & Aparicio, 2016; Van Praag & Van Stel, 2013), we also consider entrepreneurial activity by employees to be part of it. It is possible that our measure of knowledge capital to a small extent overlaps with the concept of EEA, even though such activity is not only carried out by knowledge or R&D workers.

By dividing both sides of equation (2) by labor we obtain:

$$(Y/L)_{it} = \alpha (K/L)_{it}^{\beta_1} R_{it}^{\beta_2} EEA_{it}^{\beta_3} TEA_{it}^{\beta_4} \quad (3)$$

Here, $(Y/L)_{it}$ represents the GDP per person employed (or, labor productivity) of country i at time t, and $(K/L)_{it}$ is the physical capital stock per person employed (or, capital intensity) of country i at time t. The remaining variables are to be interpreted as before.

Most likely, current levels of countries' GDP per person employed heavily depend on their past levels. In order to control for the level of GDP per person employed in the previous year, we add a lagged dependent variable to our models. Hence, equation (3) now becomes:

$$(Y/L)_{it} = \alpha(Y/L)_{it-1}^{\beta_1}(K/L)_{it}^{\beta_2}R_{it}^{\beta_3}EEA_{it}^{\beta_4}TEA_{it}^{\beta_5} \quad (4)$$

In natural log-linear form equation (4) becomes:

$$\ln(Y/L)_{it} = \ln\alpha + \beta_1\ln(Y/L)_{it-1} + \beta_2\ln(K/L)_{it} + \beta_3\ln R_{it} + \beta_4\ln EEA_{it} + \beta_5\ln TEA_{it} \quad (5)$$

Estimation of equation (5) allows for a direct interpretation of the estimated coefficients; they represent the percent change in labor productivity resulting from a one percent increase of the corresponding independent variable.

4.4 Data and sample

We use a variety of data sources, of which the Global Entrepreneurship Monitor (GEM) is most restrictive for our sample. The GEM is a large-scale international survey on the prevalence of entrepreneurship since 1999. Each year, the answers of a minimum number of 2,000 individuals per country participating in the Adult Population Survey (APS) are aggregated to country-level measures of entrepreneurial activity, thereby doing justice to the individual-level choices of respondents, for example regarding the mode of entrepreneurial activity. The GEM's measure of independent entrepreneurial activity has been determined for all participating countries since the first APS, but that of entrepreneurial activity by employees since 2011 only. In total, 53 out of 55 countries that participated in the GEM's 2011 APS determined their rate of entrepreneurial employee activity (EEA). In 2014 and 2015, the GEM measured the EEA rate of all participating countries (70 and 60, respectively). In between, so in 2012 and 2013, it was optional to include the set of questions needed to measure a country's EEA rate, so relatively few participants did so (only 35 and 26 countries, respectively). In total, 91 countries determined the relative prevalence of entrepreneurial employees

in their adult population at least once during the five-year period from 2011 to 2015. Data from every other source is available for a vast majority of them, yet in different compositions. Eventually, we end up with a sample of 57 countries for our cross-sectional regressions, and a slightly unbalanced panel containing data on 46 countries for the 2011-2015 period for our panel regressions. This includes 5 factor-driven, 17 efficiency-driven and 24 innovation-driven economies, i.e. similar to a classification into developing, transition, and developed countries, respectively.[33] The total number of observations drops to 114, amongst others because of the inclusion of a lagged dependent variable.

Below, we explain in detail what data we use to estimate our models. This is summarized in table 4.1, which lists all variables that we include in our analyses, including a brief variable description and the corresponding data source. Table 4.2 contains summary statistics and the correlation coefficients between all variables included in our analyses. Most noticeable are the opposite correlations of EEA on the one hand and TEA and TEAinnov on the other hand with GDP growth, labor productivity, capital intensity and knowledge capital as well as most of the institutions. While countries' EEA rate is significantly and positively correlated with almost all of the aforementioned variables, except government size and GDP growth, the opposite is true for the TEA rate of countries. In most cases, this also holds for TEAinnov, although the size of the correlation coefficients is consistently lower than those of TEA. Knowledge capital R and EEA indeed appear to correlate positively (0.426***), yet not to levels for concern. Tests show that multicollinearity is no issue in case of our panel regression analyses, as the highest variance inflation factor (VIF) is 3.59 and the lowest tolerance is 0.28, both in case of the capital intensity variable.

Economic output (Y)

[33] The World Economic Forum's (WEF) Global Competitiveness Report (GCR) divides countries into three different stages of economic development. Factor-driven economies primarily compete based on their factor endowments (i.e. low-skilled labor and natural resources), efficiency-driven economies further develop because of more efficient production processes and increased product quality, and innovation-driven economies compete by means of (incrementally) new products and services using the most sophisticated processes.

We use one of the most frequently adopted measures of economic output, i.e. gross domestic product (GDP), taken from the Total Economy Database (TED) maintained by The Conference Board (TCB). GDP is measured in millions of 2015 U.S. dollars, and converted to the 2015 price level by using updated 2011 purchasing power parities (PPPs) in order to make the monetary units comparable across countries. For a vast majority of the countries, performance figures are available from the early fifties of the previous century up till today, and hence, includes the 2011-2015 period for which the GEM's data on EEA is available.

Physical capital (K)

Our measure of physical capital is obtained from the World Development Indicators (WDI) database of the World Bank. The original data sources are national accounts data files from the World Bank and OECD. Gross capital formation, formerly known as gross domestic investment, consists of expenditures on additions to the fixed assets of an economy as well as net changes in the level of firms' inventories. Amongst others, countries' fixed assets include land, machinery, equipment, infrastructure, schools, offices, and hospitals. Inventories are stocks of goods held by firms to be able to meet temporary or unexpected fluctuations in production or sales. Data are in millions of constant 2010 U.S. dollars, and (at least) span the 2011-2015 period in case of almost all countries in our sample.

Labor (L)

Our measure of labor is also adopted from the TED by TCB, and reflects the total number of persons employed (in thousands of persons). Dividing output Y and capital K by labor L we get labor productivity Y/L and capital intensity K/L, respectively. We may also refer to GDP per person employed (in 2015 U.S. dollars) and gross capital formation or physical capital stock per person employed (in constant 2010 U.S. dollars) instead.

Table 4.1 – Variable description

Equations (1a) and (1b)		
Dependent variables	**Description**	**Source**
Entrepreneurial employee activity (*EEA*)	The share of employees leading the development of new business activities for their main employer, currently and in the past three years, in the adult population	GEM
Independent entrepreneurial activity (*TEA*)	The share of nascent entrepreneurs and owners/managers of young businesses (<42 months old) in the adult population	GEM
Innovative independent entrepreneurial activity (*TEAinnov*)	The share of nascent entrepreneurs and owners/managers of young businesses (<42 months old) that develop new products, services, and/or product-market combinations in the adult population	GEM
Independent variables	**Description**	**Source**
Institutions (I):		
- Government size (*GovSize*)	Size of government: Expenditures, taxes, and enterprises	Fraser Institute
- Legal system (*LegalSystem*)	Legal structure and security of property rights	Fraser Institute
- Sound money (*SoundMoney*)	Access to sound money	Fraser Institute
- International trade (*IntTrade*)	Freedom to trade internationally	Fraser Institute
- Regulation (*Regulation*)	Regulation of credit, labor, and business	Fraser Institute
Control variables (x):		
- GDP growth ($\hat{Y}$)	Growth of GDP, percent change	TCB
Equation (4)		
Dependent variables	**Description**	**Source**
Labor productivity (*Y/L*)	GDP per person employed (in 2015 US$, converted to 2015 price level with updated 2011 PPPs)	TCB
Independent variables	**Description**	**Source**
Capital intensity (*K/L*)	Gross capital formation per person employed (in constant 2010 US$)	World Bank/TCB
Knowledge capital (*R*)	Researchers in R&D (per million people)	World Bank
Entrepreneurship capital (*E*)	Similar to the dependent variables of equations (1a) and (1b)	GEM

Notes: The lagged dependent variable as independent variable in equation (4) is omitted from the table.

Table 4.2 – Summary statistics and correlation coefficients

	Variables	Mean	Std dev	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1.	*EEA*	0.894	0.870	1.000											
2.	*TEA*	2.151	0.452	-0.011	1.000										
3.	*TEAinnov*	0.822	0.603	0.243 **	0.828 ***	1.000									
4.	*GovSize*	1.720	0.217	-0.328 ***	0.481 ***	0.251 **	1.000								
5.	*LegalSystem*	1.860	0.200	0.565 ***	-0.393 ***	-0.115	-0.377 ***	1.000							
6.	*SoundMoney*	2.191	0.125	0.530 ***	-0.390 ***	-0.146	-0.319 ***	0.588 ***	1.000						
7.	*IntTrade*	2.012	0.181	0.425 ***	-0.166 +	0.134	-0.139	0.589 ***	0.676 ***	1.000					
8.	*Regulation*	1.965	0.107	0.481 ***	-0.076	0.123	-0.103	0.637 ***	0.372 ***	0.681 ***	1.000				
9.	*Ŷ*	1.678	2.561	-0.199 *	0.418 ***	0.347 ***	0.415 ***	-0.125	-0.231 *	0.157 +	0.193 *	1.000			
10.	*Y/L*	11.055	0.444	0.624 ***	-0.543 ***	-0.299 **	-0.417 ***	0.759 ***	0.628 ***	0.367 ***	0.428 ***	-0.421 ***	1.000		
11.	*K/L*	9.131	0.804	0.632 ***	-0.482 ***	-0.183 +	-0.500 ***	0.855 ***	0.627 ***	0.421 ***	0.503 ***	-0.273 **	0.896 ***	1.000	
12.	*R*	7.666	1.016	0.426 ***	-0.597 ***	-0.389 ***	-0.454 ***	0.718 ***	0.518 ***	0.311 ***	0.347 ***	-0.282 **	0.759 ***	0.780 ***	1.000

Notes: Based on the 114 observations available for the 46 countries in our final sample. All variables are in natural logarithm, except for GDP growth (Ŷ). Significance levels: + $0.05<p\leq0.10$; * $0.01<p\leq0.05$; ** $0.001<p\leq0.01$; *** $p\leq0.001$.

Knowledge capital (R)

To measure a country's knowledge capital we consider the number of researchers in Research & Development (R&D) per million people, taken from the WDI database of the World Bank. According to its original data source, i.e. the UNESCO Institute for Statistics (UIS), R&D workers are professionals engaged in the conception or creation of new knowledge, products, processes, methods or systems, and in the management of the projects concerned. It is a narrower measure than that of EEA (see below), as it is limited to those who are explicitly hired to do R&D on behalf of their employer, whilst any employee can be engaged in EEA. Interpolation techniques have been used to fill the very few missing values in between two moments of measurement.[34]

Entrepreneurship capital (E)

Employees are involved in EEA if they contribute to the development of new business activities for their employer, at least once in the past three years and currently, and when having (had) a leading role in at least one of the two phases of the developmental process, i.e. the phase of idea development, and the phase of preparation and implementation (Bosma et al., 2013b). The definition takes account of both top-down and bottom-up entrepreneurial activities, and is therefore theoretically related yet not identical to the concepts of corporate entrepreneurship and intrapreneurship, respectively. Examples of new business activities include setting up a new business unit, establishment or subsidiary, and the development of a new product, service or product-market combination. Not only knowledge or R&D workers are involved in such activities; EEA extends to employees across the entire organization. For countries having one or more missing values in between two moments of

[34] Only in case of the panel regression models, and only for some of the included variables missing values have been replaced by using interpolation techniques. In case of our measure of knowledge capital, this only concerns 4 out of the total number of 114 observations (for 3 out of 46 countries).

measurement, we made use of interpolation techniques.[35] A few exceptions aside, countries' EEA rates seem to be relatively stable over time (in the short term).

For (independent) entrepreneurship, we use the GEM's 'traditional' rate of total (early-stage) entrepreneurial activity (TEA, see Reynolds et al., 2002; 2005), and a measure that can be regarded as a more genuine counterpart of EEA. To obtain the latter measure, we limit TEA to those who develop new products, services, and/or product-market combinations (i.e. innovative independent entrepreneurs, denoted by TEAinnov). TEA and TEAinnov rates are available for each participating country in the GEM's surveys. Again, interpolation techniques have been applied in case of countries showing missing values in between two moments of measurement.[36]

Institutions (I)

As institutions we include the five areas that together determine countries' ranking with regard to economic freedom, as measured by the Fraser Institute, i.e. (1) government size, (2) the legal structure and security of property rights, (3) access to sound money, (4) the freedom to trade internationally, and (5) regulation of the credit market, the labor market and business. The summary index of Economic Freedom of the World (EFW) is based on 42 data points, and measures the degree to which policies and institutions of countries are supportive of economic freedom (Gwartney et al., 2016). The five areas each cover part of the institutional framework that may foster such economic freedom. For example, the access to sound money includes components like money growth and the freedom to own foreign currency bank accounts. We have argued that each of the five areas are likely to affect the prevalence of the two different types of entrepreneurial activity, in different ways, in turn affecting countries' economic growth patterns (also see Gwartney et al., 1999).

[35] In case of our measure of entrepreneurial employee activity (EEA), 40 out of the total number of 114 observations have been obtained by means of interpolation (for 25 out of 46 countries).
[36] In case of our two measures of independent entrepreneurial activity (TEA and TEAinnov), 6 out of the total number of 114 observations have been obtained by means of interpolation (for 5 out of 46 countries).

Control variables (x)

We only control for countries' GDP growth, adopted from the TED as collected by TCB. GDP growth is measured as the annual percent change in GDP (in millions of 2015 U.S. dollars), i.e. our measure of economic output. By adding GDP growth to the right-hand side of equations (1a) and (1b), we aim to limit the potential problem of reverse causality between entrepreneurial activity and growth (also see Aparicio et al., 2016).

4.5 Results

4.5.1 Cross-sectional regression results

The cross-sectional regression results are based on a sample of 57 countries, and shown in table 4.3 and table 4.4. All seven models in table 4.3 have GDP per person employed in 2015 as a dependent variable, take the averages for the 2011-2015 period of the independent variables, and do not include the initial GDP per person employed (i.e. in 2011). Hence, we do not (yet) test for convergence in countries' income levels. In table 4.4, however, we do control for countries' GDP per person employed in 2011, and now regress on the difference in GDP per person employed between 2011 and 2015. In model 1, only the log of countries' 2011 GDP per person employed is included on the right-hand side to test for unconditional convergence. In the remaining six models, we add our measures of capital intensity, knowledge capital and entrepreneurship capital, and thus test for conditional convergence.

We first discuss the cross-sectional regression results without testing for convergence (in table 4.3). Not unexpectedly, the variance in countries' labor productivity in 2015 is mostly explained by the average capital intensity during the five-year period before. This is also witnessed by the high adjusted R-squared (0.857) of model 1, which barely increases in case of the other models, if at all. The average degree of knowledge capital appears to have no significant effect on economic output in any of the

models. The stepwise inclusion of our entrepreneurship capital measures reveals mixed evidence. The average share of EEA in the adult population from 2011 to 2015 has a positive association with countries' labor productivity in 2015, but is only significant in case we also include our measures of independent entrepreneurial activity, i.e. in model 6 (TEA) and model 7 (TEAinnov). Apparently, both of our measures of entrepreneurship capital should be included at once for EEA to have a positive significant effect on labor productivity. The average share of nascent entrepreneurs and young business owners (i.e. TEA) in the adult population throughout the 2011-2015 period is negatively related to the outcome variable, even if preselecting innovative entrepreneurs only (i.e. TEAinnov), although insignificant in any of the model specifications.

In brief, the convergence hypothesis states that, in the absence of exogenous shocks, countries with different initial levels of per capita income would tend to converge, because countries with lower levels of per capita income would experience higher per capita growth rates, and *vice versa* (Barro, 1991). Table 4.4 reports the results of regressions of the difference in the log of GDP per person employed over the period 2011 to 2015 on the log of GDP per person employed in 2011, with and without controlling for capital intensity, knowledge capital and different types of entrepreneurial activity in society. Model 1 in table 4.4 confirms that unconditional convergence takes place within our sample, as the coefficient of the initial labor productivity is significantly negative, and the adjusted R-squared is 0.249. All other models in table 4.4 also provide strong evidence for (conditional) convergence, that is, that low-income countries tend to grow faster than high-income countries in our sample of 57 countries. The coefficients of labor productivity in 2011 are significantly negative, and even much lower than in model 1. Moreover, the inclusion of the other independent variables substantially improves the models' fit, as witnessed by the adjusted R-squared.

Controlling for countries' initial labor productivity levels comes at the expense of the significance of capital intensity. Its effect remains positive throughout all models, but only significant in case of model 2 (without any entrepreneurship capital variables). Interestingly, the effect of EEA on the log difference

Table 4.3 – Cross-sectional regression results excl. tests for convergence (2011-2015)

Variables	Dependent variable: Log GDP per person employed in 2015, i.e. *ln(Y/L)15*						
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Constant	6.260***	6.313***	6.730***	6.465***	6.320***	7.314***	7.029***
	(0.261)	(0.270)	(0.385)	(0.343)	(0.272)	(0.526)	(0.425)
ln(K/L)	0.525***	0.498***	0.448***	0.507***	0.506***	0.441***	0.444***
	(0.029)	(0.044)	(0.055)	(0.046)	(0.047)	(0.054)	(0.054)
ln(R)		0.025	0.025	0.009	0.017	-0.013	-0.006
		(0.032)	(0.031)	(0.039)	(0.036)	(0.039)	(0.037)
ln(EEA)			0.062			0.095*	0.103*
			(0.041)			(0.046)	(0.048)
ln(TEA)				-0.051		-0.121	
				(0.070)		(0.076)	
ln(TEAinnov)					-0.022		-0.080
					(0.045)		(0.051)
Countries	57	57	57	57	57	57	57
Adjusted R^2	0.857	0.856	0.859	0.855	0.854	0.863	0.863

Notes: Standard errors in parentheses. Independent variables are averages for the period 2011-2015. No prior interpolation in case of the knowledge capital and entrepreneurship capital variables. Significance levels: $^{+}$ $0.05<p\leq0.10$; * $0.01<p\leq0.05$; ** $0.001<p\leq0.01$; *** $p\leq0.001$.

Table 4.4 – Cross-sectional regression results incl. tests for convergence (2011-2015)

Variables	Dependent variable: Log difference GDP per person employed 2011-2015, i.e. *ln(Y/L)11-15*						
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Constant	0.702***	1.134***	1.372***	0.995***	1.082***	1.296***	1.323***
	(0.150)	(0.211)	(0.224)	(0.227)	(0.210)	(0.271)	(0.247)
ln(Y/L)11	-0.061***	-0.142***	-0.151***	-0.133***	-0.134***	-0.147***	-0.147***
	(0.014)	(0.033)	(0.032)	(0.033)	(0.033)	(0.033)	(0.033)
ln(K/L)		0.043*	0.026	0.034	0.032	0.025	0.025
		(0.021)	(0.021)	(0.022)	(0.022)	(0.022)	(0.022)
ln(R)		0.009	0.009	0.018^{+}	0.017^{+}	0.012	0.012
		(0.009)	(0.008)	(0.010)	(0.010)	(0.011)	(0.010)
ln(EEA)			0.027*			0.024^{+}	0.023^{+}
			(0.011)			(0.012)	(0.013)
ln(TEA)				0.030		0.011	
				(0.019)		(0.021)	
ln(TEAinnov)					0.021^{+}		0.007
					(0.012)		(0.014)
Countries	57	57	57	57	57	57	57
Adjusted R^2	0.249	0.322	0.382	0.340	0.347	0.373	0.372

Notes: Standard errors in parentheses. Independent variables are averages for the period 2011-2015, except for the log GDP per person employed in 2011, i.e. ln(Y/L)11. No prior interpolation in case of the knowledge capital and entrepreneurship capital variables. Significance levels: $^{+}$ 0.05<p≤0.10; * 0.01<p≤0.05; ** 0.001<p≤0.01; *** p≤0.001.

in labor productivity between 2011 and 2015 remains positive and significant, although only at the ten percent level in models that also include measures of independent entrepreneurial activity, i.e. in models 6 (TEA) and 7 (TEAinnov). We now also find a positive effect for TEA, yet only weakly significant when considering innovative entrepreneurs only (see model 5). This provides some empirical support for the notion that independent entrepreneurial activity enhances economic growth, but only if it brings forth product or service innovations.

4.5.2 Panel regression results

Table 4.5 contains the results of our pooled regression models including a lagged dependent variable. The dependent variable again is the log GDP per person employed, as in table 4.3, but now for country i at time t. Because we only have one observation without missing values on any of the included variables in case of 11 countries, our sample now consists of 46 countries only (5 factor-driven, 17 efficiency-driven and 24 innovation-driven economies). The total number of observations decreases to 114, mostly due to the inclusion of the lagged dependent variable. This comes down to approximately 2.5 observations per country on average.

The addition of a lagged dependent variable to the right-hand side leads to almost unrealistically high model fits; the R-squared is found to be 0.999. That is, controlling for countries' labor productivity in the previous year almost fully explains this year's labor productivity. Still, countries' capital intensity is shown to have a positive and significant effect on labor productivity. However, almost none of the coefficients of our knowledge and entrepreneurship capital measures are now significant. Only our main measure of independent entrepreneurial activity (TEA), so without further specification of the degree of innovativeness, appears to have a significantly positive effect on labor productivity (in model 4).

Table 4.5 – Pooled regression results incl. a lagged dependent variable (2011-2015)

Variables	Dependent variable: Log GDP per person employed, i.e. $ln((Y/L)_{it})$						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant	0.427***	0.434***	0.476***	0.380***	0.398***	0.430***	0.436***
	(0.067)	(0.067)	(0.086)	(0.074)	(0.072)	(0.122)	(0.094)
$ln((Y/L)_{it-1})$	0.946***	0.945***	0.942***	0.948***	0.949***	0.945***	0.946***
	(0.010)	(0.010)	(0.011)	(0.010)	(0.010)	(0.013)	(0.012)
$ln((K/L)_{it})$	0.020***	0.019***	0.017**	0.018***	0.016**	0.017**	0.015*
	(0.005)	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)
$ln(R_{it})$		0.001	0.002	0.003	0.003	0.003	0.003
		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
$ln(EEA_{it})$			0.004			0.003	0.003
			(0.003)			(0.004)	(0.003)
$ln(TEA_{it})$				0.008*		0.005	
				(0.004)		(0.006)	
$ln(TEAinnov_{it})$					0.006		0.004
					(0.004)		(0.004)
Country dummies included?	No	No	No	No	No	No	No
Observations	114	114	114	114	114	114	114
Countries	46	46	46	46	46	46	46
R^2	0.999	0.999	0.999	0.999	0.999	0.999	0.999

Notes: Standard errors allowing for intragroup correlation in parentheses. Significance levels: $^{+}$ $0.05<p\leq0.10$; * $0.01<p\leq0.05$; ** $0.001<p\leq0.01$; *** $p\leq0.001$.

The results of our three-stage least squares (3SLS) regressions are shown in table 4.6. We simultaneously estimate equations (1) and (4) as to estimate the impact of various institutions on different types of entrepreneurial activity, and, in turn, the influence of entrepreneurial activity on national-level economic performance, which is measured by the log GDP per person employed for country i at time t.[37] We denote equation (1) as the entrepreneurial activity equation, and equation (4) as the growth equation. The former equation tries to explain entrepreneurial activity by the five formal institutions that together indicate countries' economic freedom, next to GDP growth. The latter equation each time coincides with the most complete pooled regression models in table 4.5. The growth equations of the a-models do not include country dummies, whereas the growth equations of the b-models do include country dummies. Hausman specification tests consistently reject the null hypothesis in favor of the alternative hypothesis that fixed effects are appropriate, so that most of our attention goes out to the 3SLS models that add country dummies to the growth equations (i.e. the b-models). After all, running pooled OLS with country dummy variables is equivalent to (one-way) fixed effects. All regressions are run on our final sample of 46 countries, together encompassing 114 observations.

The regression results of the growth equations of the a-models are remarkably similar to those of the pooled regressions in table 4.5 if it concerns the effects of capital intensity and knowledge capital. The capital intensity of countries has a positive and significant effect on labor productivity in models 2a and 3a. Knowledge capital, as measured by the number of knowledge workers per million people, does not seem to drive economic performance, as its effect remains insignificant throughout all three a-models.

[37] To be precise, we first simultaneously estimate equations (1a) and (4) in log-linear form, i.e. equation (1a) in log-linear form and equation (5). The estimation results are shown as models 1a and 1b in table 4.6. Second, we simultaneously estimate equations (1b) and (4) in log-linear form, of which the results are shown as models 2a and 2b. Third, we replace TEA in equation (1b) by TEAinnov, and simultaneously estimate this equation and equation (4) in log-linear form. The results are shown as models 3a and 3b.

Table 4.6 – Three-stage least squares regression results (2011-2015)

Variables	Equation (4) - Dependent variable: Log GDP per person employed, i.e. $ln((Y/L)_{it})$					
	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b
Constant	0.438***	2.393*	0.200*	2.418*	0.271***	2.641**
	(0.098)	(0.959)	(0.093)	(1.018)	(0.076)	(1.028)
$ln((Y/L)_{it-1})$	0.952***	0.700***	0.957***	0.724***	0.960***	0.708***
	(0.013)	(0.069)	(0.009)	(0.084)	(0.009)	(0.083)
$ln((K/L)_{it})$	0.006	0.087*	0.017***	0.056	0.013**	0.058
	(0.008)	(0.041)	(0.005)	(0.040)	(0.005)	(0.044)
$ln(R_{it})$	0.002	0.024*	0.003	0.019	0.003	0.018
	(0.003)	(0.011)	(0.003)	(0.020)	(0.002)	(0.023)
$ln(EEA_{it})$	0.022*	0.059*	0.004	0.007	0.003	0.007
	(0.011)	(0.028)	(0.003)	(0.005)	(0.002)	(0.005)
$ln(TEA_{it})$	0.006	-0.012	0.047**	0.038*		
	(0.005)	(0.008)	(0.017)	(0.018)		
$ln(TEAinnov_{it})$					0.046**	0.030
					(0.017)	(0.021)
Country dummies included?	No	Yes	No	Yes	No	Yes

Variables	Equations (1a) and (1b) - Dependent variables:					
	$ln(EEA_{it})$	$ln(EEA_{it})$	$ln(TEA_{it})$	$ln(TEA_{it})$	$ln(TEAinnov_{it})$	$ln(TEAinnov_{it})$
Constant	-8.348*	-7.144*	2.111*	2.265^{+}	0.003	-0.004
	(3.927)	(3.372)	(1.026)	(1.298)	(1.232)	(1.841)
$ln(GovSize_{it})$	-0.318	-0.402	0.272	0.487^{+}	0.106	0.259
	(0.325)	(0.398)	(0.215)	(0.271)	(0.186)	(0.464)
$ln(LegalSystem_{it})$	0.841^{+}	1.722***	-0.639**	-0.357	-0.444	-0.101
	(0.462)	(0.528)	(0.211)	(0.467)	(0.274)	(0.876)
$ln(SoundMoney_{it})$	2.648**	2.556*	0.010	-0.233	0.213	-0.371
	(1.033)	(1.132)	(0.443)	(0.741)	(0.428)	(1.076)
$ln(IntTrade_{it})$	-0.342	-1.254^{+}	0.348	-0.407	0.549	0.176
	(0.878)	(0.709)	(0.300)	(0.459)	(0.435)	(0.841)
$ln(Regulation_{it})$	1.533	1.222	-0.038	0.479	-0.119	0.459
	(1.289)	(1.338)	(0.375)	(0.595)	(0.438)	(1.029)
$\hat{Y}_{it}$	0.060	0.031	0.065***	0.059***	0.075***	0.073***
	(0.046)	(0.022)	(0.015)	(0.012)	(0.021)	(0.020)
Country dummies included?	No	No	No	No	No	No
Observations	114	114	114	114	114	114
Countries	46	46	46	46	46	46
Log pseudolikelihood	206.824	286.674	284.845	352.168	244.711	303.565

Notes: Standard errors allowing for intragroup correlation in parentheses. Significance levels: $^{+}$ 0.05<p≤0.10; * 0.01<p≤0.05; ** 0.001<p≤0.01; *** p≤0.001.

However, our measure of employees exploring as well as exploiting new knowledge, i.e. EEA, now shows a significantly positive effect on growth (in model 1a). Moreover, the estimated size of the impact of EEA on growth (0.022*) has increased by almost a factor eight as compared to the pooled regression results. Once we also include country dummies to the growth equation (in model 1b), the effect size of EEA increases even further (0.059*). This coincides with a 5.9 percent increase in labor productivity if the share of EEA in the adult population would increase by one hundred percent (i.e. when countries' EEA rate would double), all else equal. Moreover, the effects of capital intensity and knowledge capital are now significant. Model 1b especially demonstrates the importance of a proper legal structure including adequate security of property rights (1.722***), the access to sound money (2.556*) and limited international trade (-1.254^{+}) for entrepreneurial activities by employees. Tests for the significance of their effects on growth through EEA show that only the latter two are significant (at the ten and five percent level, respectively). Improving each of the two institutional factors by ten percent leads to an increase in labor productivity through EEA of 1.5 percent (*SoundMoney*) and a decrease in labor productivity through EEA by 0.7 percent (*IntTrade*), respectively.

Our main measure of independent entrepreneurial activity (i.e. TEA) also has a positive and significant effect on the labor productivity of countries (in model 2a). Once we include country dummies to the growth equation (in model 2b), the size of the effect somewhat decreases (from 0.047* to 0.038*), but has still increased with a factor seven to eight as compared to the estimated effect in model 6 of table 4.5. An estimated coefficient of 0.038 corresponds to a 3.8 percent increase in labor productivity resulting from a doubled TEA rate. Only one out of five institutional factors has a (weakly) significant effect on TEA, viz. the one indicating the government size (0.487^{+}). Controlling for GDP growth in the entrepreneurial activity equations shows that it has a positive and significant influence on both types of independent entrepreneurial activity. Hence, the larger countries' growth of GDP, the higher the share of nascent entrepreneurs and young business owners (TEA) as well as the share of innovative ones only (TEAinnov). However, only TEA mediates the effect of GDP growth on economic performance; a ten percent increase in GDP growth leads to 0.02 percent increase in the GDP per

person employed through TEA (significant at the ten percent level). TEAinnov does have a positive and significant effect on growth in model 3a, but this effect becomes insignificant as soon as we control for country fixed effects (in model 3b).

4.6 Conclusions and discussion

The empirical quest for factors explaining national-level economic growth has a long tradition, mostly dating back to the nineties of the previous century (e.g., Barro, 1991; 1997; Islam, 1995; Mankiw et al., 1992; Sala-i-Martin, 1997). Starting with all kinds of economic and non-economic determinants (e.g., Aghion & Howitt, 2009), entrepreneurship had long been ignored as one of the possible factors, despite the fact that entrepreneurship is often seen as conducive to innovation and job creation (e.g., Audretsch et al., 2006; Baumol, 1986; Wennekers & Thurik, 1999). Most studies indeed report a positive effect on economic growth, although highly depending on the type of entrepreneurial activity and the institutional context it is subject to (Boettke & Coyne, 2009; Terjesen et al., 2016). The knowledge spillover theory of entrepreneurship designates entrepreneurs as the ones who exploit new knowledge, thereby enhancing growth (e.g., Acs et al., 2009; 2013; Braunerhjelm et al., 2010). Our contribution builds upon the notion that new knowledge may also be converted to economically relevant knowledge inside established firms, as long as the value added of new ideas is deemed sufficiently high (Audretsch & Thurik, 2001a).

Hence, new business activities may be developed by entrepreneurial talent inside or outside the established firm, primarily depending on the (expected) valuation of the new idea by the involved parties. In the former case, we are dealing with entrepreneurial activities by employees, also often labeled intrapreneurship (e.g., Pinchot, 1985). Although it has been proven to foster firm-level growth (e.g., Antoncic & Hisrich, 2001), the extant literature lacks empirical evidence for a link with macroeconomic benefits. Recent data collection efforts by the GEM provide the opportunity to compare prevalence rates of entrepreneurial employee activity across a large number of countries at

different stages of economic development. For our panel regressions, we end up with a slightly unbalanced panel containing data on 46 countries for the 2011-2015 period. This study is a first attempt to also include entrepreneurship inside established firms in models explaining national-level economic growth.

Institutional theory stresses the importance of institutions as determinants of economic development (Acemoglu et al., 2005; Chang, 2011; North, 1990; 1994). Some traditional growth models analyze a direct link between the institutional framework and economic development (e.g., Rodrik et al., 2004). Others have considered the relationship between institutions and entrepreneurship, both empirically and theoretically (e.g., Aldrich & Fiol, 1994; Bruton et al. 2009; 2010; Manolova et al., 2008). Hence, interdependencies between institutions, entrepreneurial activity and economic growth have raised the interest of many scholars, yet surprisingly few studies have brought them together in a unified framework (Bjørnskov & Foss, 2016). A recent empirical study by Aparicio et al. (2016) is one of the scarce exceptions. We follow this study in simultaneously estimating a set of equations using a three-stage least squares (3SLS) method. In doing so, we first analyze the effects of various important formal institutions on different types of entrepreneurial activity in society, which, in turn, impact aggregate economic performance in different ways (also see Bowen & De Clercq, 2008). In particular, we test whether entrepreneurial activities by both employees and entrepreneurs – including a subgroup of innovative entrepreneurs only – mediate the relationship between the institutional framework and aggregate economic performance.

Our 3SLS regressions reveal that entrepreneurial activity by employees is at least as important for aggregate economic performance as independent entrepreneurial activity. We find positive and significant effects of both EEA and TEA on countries' labor productivity, but EEA's effect size is somewhat bigger. If the shares of entrepreneurial employees and independent entrepreneurs in countries' adult population would double, then, *ceteris paribus*, their labor productivity would increase with 5.9 and 3.8 percent, respectively. However, these effects clearly depend on the characteristics of

the economic institutional context, as our pooled regression results disclose much smaller and mostly insignificant effects. EEA appears to mediate the effects of access to sound money (positive) as well as the freedom to trade internationally (negative) on labor productivity. Intuitively, one would say that more freedom to trade with individuals and firms from abroad increases the number of entrepreneurial opportunities. However, it also leads to fiercer competition from foreign entrepreneurs (Bjørnskov & Foss, 2008). Since larger firms are more likely to engage in international trade (e.g., Bernard et al., 2007; Calof, 1993), they are also more easily affected by policies that remove barriers to trade across borders. This may explain the significantly negative mediation effect of EEA on labor productivity in case of the international trade variable.

All in all, we have shown that entrepreneurial activity by employees should not be underestimated, neither its prevalence nor its contribution to national-level economic growth. Hence, the transition from the managed to the entrepreneurial economy (Audretsch & Thurik, 2000; 2001b; Thurik et al., 2013) also requires a policy standpoint on how to stimulate and facilitate entrepreneurship inside established firms. Entrepreneurship policy should aim at increasing the quantity and quality of entrepreneurial activities by all members of the working population, i.e. both employees and entrepreneurs. Moreover, good policy redesigns institutions so as to channel entrepreneurial talent into directions where they are most beneficial for macroeconomic performance (also see Baumol & Strom, 2007). This may well be inside the established firm. One could even claim that business activities developed inside the firm are more likely to grow faster and to succeed, as incumbent organizations generally provide access to more resources. Our findings confirm that easy access to sound money positively affects growth, yet solely through an increase in the share of entrepreneurial employee activity. Also think of employees' access to non-financial (complementary) assets like colleagues' skills and competences (Teece, 1986). In general, we may conclude that both entrepreneurial activities by employees and those by entrepreneurs play a role in countries' economic performance. However, depending on the degree to which their policies and institutions are supportive of economic freedom (Gwartney et al., 2016), one type of entrepreneurial activity is more important than the other.

A frequent drawback of existing studies on the entrepreneurship-growth relationship is the potential impact of reverse causality (Bjørnskov & Foss, 2016). Although some studies tried to address this issue (Audretsch & Acs, 1994; Wennekers et al., 2005), none really succeeded in their attempts (Parker, 2009). We believe that our key findings can be interpreted in a causal way, as we estimate dynamic panel data models and 3SLS models that limit reverse causality problems. Nevertheless, a clear limitation of this study is the relatively limited time span, which is due to a lack of early internationally comparative data on entrepreneurial activities by employees (i.e. before 2011). Although we feel that we exploited the currently available data in the best possible ways, entrepreneurship scholars are encouraged to follow up on this study by using a panel with a longer time span. New business activities have both direct (or, immediate) and indirect (or, delayed) effects on economic growth, where indirect effects may take more than six years to work through (e.g., Baptista et al., 2008). By having a longer panel, future studies could, for example, estimate models with greater time lags to account for this.

Finally, future research should pay attention to how the prevalence of different types of entrepreneurial activity interacts with the availability of knowledge capital. After all, their impact on economic growth may be different for different levels of knowledge in society. This would further investigate our argument that both entrepreneurial employees and independent entrepreneurs convert new knowledge into profitable business opportunities (Braunerhjelm et al., 2010: Menzel et al., 2007).

5 Conclusions and discussion

With this dissertation we aim to contribute to the fast-growing field of entrepreneurship research. With entrepreneurship one usually refers to activities by individuals running a business for own risk and reward (Jensen & Meckling, 1976; Knight, 1921). This, however, neglects the discovery, evaluation and exploitation of opportunities by individuals employed at established firms (Shane & Venkataraman, 2000). Instead, we follow Sharma & Chrisman (1999) as to their view on entrepreneurship – that is, "acts … that occur within or outside an existing organization" (p. 17) – and consider both intrapreneurship and entrepreneurship as part of the overall entrepreneurial activity in society. Intrapreneurship is a form of bottom-up, employee-driven renewal or innovation, which is typically underemphasized in corporate entrepreneurship and strategic management research. An exception is the process study by Burgelman (1983b) that attributes diversity in firms' strategic activities primarily to autonomous strategic initiatives from the operational level.

The notion that employees can also act entrepreneurial by creating new combinations from existing resources has already been put forward in seminal work by Joseph Schumpeter (Schumpeter, 1911; 1934; 1942), and many others since then (e.g., Hellmann, 2007; Pinchot, 1985). Although many studies highlight the importance of entrepreneurship inside established organizations (e.g., Antoncic & Hisrich, 2001; Carrier, 1994), the extant literature lacks multilevel analyses of its determinants or consequences (Shepherd, 2011), let alone in a unified framework (Bjørnskov & Foss, 2016). Thus far, research mainly focused on the (macro-level) determinants and consequences of independent types of entrepreneurship (e.g., Arin et al., 2015; Valdez & Richardson, 2013). This is mainly due to a prolonged lack of internationally comparative data on intrapreneurship, a problem that has recently been solved by the Global Entrepreneurship Monitor (GEM). Some of their latest adult population surveys contain a measure of what they coined Entrepreneurial Employee Activity (EEA), next to their commonly used measure of nascent entrepreneurship and young business ownership, i.e. Total (early-

stage) Entrepreneurial Activity (TEA), and of a subgroup of innovative entrepreneurs (TEAinnov). By having combined these GEM data with already available data on countries' institutions and economic performance, we are now able to answer the main research question that we formulated in the introductory chapter:

What are key institutional determinants and the economic consequences of two types of entrepreneurial activity in society, notably entrepreneurship and intrapreneurship?

Hence, we sought to find an answer to how the institutional context channels people into different types of entrepreneurial activity, which, in turn, leads to different economic growth patterns (e.g., Baumol & Strom, 2007; Bowen & De Clercq, 2008). This is a derivative of William Baumol's notion stating that entrepreneurial individuals allocate themselves across different types of entrepreneurial activity in society. Whereas Baumol (1990) distinguishes between productive, unproductive and destructive forms of entrepreneurship, we focused on entrepreneurship and intrapreneurship as two different modes of opportunity exploitation. We argued that both types of entrepreneurial activity play an important role in commercializing new knowledge. Still, one of these types of entrepreneurial activity may prove more productive for society than the other, primarily depending on the institutional framework that these activities are subject to (Bjørnskov & Foss, 2013; 2016; Boettke & Coyne, 2009).

In order to tackle the main research question, we first investigated the impact of various informal and formal institutions on the allocation of entrepreneurial activity in society (in chapters 2 and 3, respectively). Chapter 4 also took into account the effects of a number of formal economic institutions, but mainly focused on different types of entrepreneurial activity and their contribution to national-level economic growth. We herewith aimed to answer the following three subquestions:

1. *How and to what extent do societal cultural practices affect the allocation of entrepreneurial activity in society across entrepreneurship and intrapreneurship?* [Chapter 2]

2. *How and to what extent does national-level employment protection legislation (EPL) affect the allocation of entrepreneurial activity in society across entrepreneurship and intrapreneurship?* [Chapter 3]
3. *How and to what extent do different types of entrepreneurial activity in society, notably entrepreneurship and intrapreneurship, affect national-level economic performance?* [Chapter 4]

In a recent review of comparative international entrepreneurship research, Terjesen et al. (2016) emphasize the heterogeneous nature of entrepreneurial activity across countries. Moreover, they identify country-level antecedents like culture and (other) institutions, and stress the importance of different types of entrepreneurial activity for country-level outcomes. Yet, intrapreneurship has not been mentioned explicitly as one of them. Given that all three studies have been conducted in a cross-national setting, this dissertation specifically contributes to this area of entrepreneurship research by incorporating intrapreneurship as an additional way to engage in entrepreneurial activity. We incorporated multiple levels of analysis, and applied different advanced methodological approaches.

The remainder of this concluding chapter is organized as follows. The next section once more summarizes and briefly discusses the key findings of this dissertation. In particular, we intend to provide an answer to the three subquestions above, ultimately leading to an answer to our main research question. Section 5.2 discusses the implications for policy that arise from these findings. Our studies are not without limitations, and so, section 5.3 provides some promising avenues for future research. Clearly, future research suggestions also stem from our findings and, for example, concern opportunities that fall outside the scope of this dissertation.

5.1 Main findings

In chapter 2, we extensively discussed four important dimensions of national cultures, and the way they affect individuals' involvement in either innovative entrepreneurship or intrapreneurship. We estimated maximum-likelihood probit models with sample selection (Van de Ven & Van Praag, 1981) in order to correct for non-random self-selection into innovative entrepreneurial activity (as in Parker, 2011). Both household size and household income have been proposed and successfully tested as exclusion restrictions. That is, they are found to influence people's decision to engage in any kind of innovative entrepreneurial activity, but they are not obviously related to their decision between innovative entrepreneurship and intrapreneurship in the second stage of the models.

We made use of culture data collected by the GLOBE project (House et al., 2002; 2004). More specifically, we tested the effects of four societal cultural practices, or the way things *are* in society, instead of the way things *should be* (labeled *cultural values* instead). Our attention went out to the following four cultural dimensions: Performance orientation, uncertainty avoidance, institutional collectivism and in-group collectivism. Despite similar definitions to some of the cultural dimensions put forward by Hofstede and colleagues (Hofstede, 1980; 2001; Hofstede et al., 2010), there are major differences in the way they have been operationalized. For example, there appears to be a strong negative correlation between the GLOBE and Hofstede indicators of uncertainty avoidance. Venaik & Brewer (2010) attribute this to the fact that both models measure different components of the uncertainty avoidance construct, namely *rule orientation* (GLOBE) and *stress orientation* (Hofstede). GLOBE's survey items amongst others measure the preferences of societal members for orderliness, consistency and structure's in one's lives, while Hofstede's items mainly capture individuals' nervousness, tension and state of health. We argue that the rule component of uncertainty avoidance better reflects our theoretical argumentation regarding why an uncertainty-avoidant culture is more likely to bring about intrapreneurs in society. Moreover, Hofstede's measure of individualism versus collectivism does not distinguish between two fundamentally different forms of collectivism like

GLOBE does (Venaik & Brewer, 2010), although theory suggests opposite effects on individual's involvement in any of the two types of entrepreneurial activity (Realo et al., 2008). Performance orientation has been included as an additional dimension of culture in GLOBE, but is not part of Hofstede's framework. As compared to Hofstede's indicators, GLOBE's country scores thus allow for a more nuanced and detailed understanding of how national cultures affect individual's decision-making with regard to entrepreneurial behavior.

In advance, we hypothesized that an individual's involvement in intrapreneurship is more likely in cultures characterized by lower levels of performance orientation, higher levels of uncertainty avoidance, higher levels of institutional collectivism, and lower levels of in-group collectivism, respectively. The empirical analyses provide support for positive effects of uncertainty-avoidant and institutional collectivistic practices, and for a negative effect of in-group collectivistic practices on intrapreneurship. The effect of uncertainty-avoidant cultural practices is most robust according to a few additional checks. We do not find significant effects of performance-oriented cultures. These findings suggest that cultures with relatively high levels of uncertainty avoidance and institutional collectivism seem to compensate their relatively limited levels of innovative entrepreneurship by fostering intrapreneurship instead. For example, countries like Denmark and Sweden have been shown to possess uncertainty-avoidant and institutional collectivistic cultures (also see figures 2.3 and 2.4), but nonetheless bring forth relatively high shares of intrapreneurship in the adult population. This directly contradicts the widespread idea that performance-oriented, little uncertainty-avoidant and individualistic cultures are most likely to bring about entrepreneurial activity (e.g., Autio et al., 2013; Freytag & Thurik, 2010; Hayton et al., 2002; Mueller & Thomas, 2001). Instead, any culture can give rise to certain levels of entrepreneurial activity in society. Only its appearance tends to differ between countries. Whilst some cultural practices encourage people to engage in innovative entrepreneurship, others induce individuals to get involved in intrapreneurship. Hence, our results further decrease confidence in the existence of a single entrepreneurial culture (Hayton & Cacciotti, 2013).

In chapter 3, we analyzed how national-level employment protection legislation (EPL) affects individuals' occupational choice. Where the traditional labor economics literature typically takes entrepreneurship as an occupational choice between employment and self-employment (e.g., Kihlstrom & Laffont, 1979; Lucas, 1978), we contended that entrepreneurial individuals can also end up in wage employment. Effects of two of EPL's main elements, i.e. severance pay and the notice period for employers, on the two outcome categories have to be interpreted relative to the base category consisting of non-entrepreneurial employees. We applied multilevel analysis to account for the fact that the individual-level independent variables may have both within-country and between-country variation (e.g., Hox, 1995, 2010). We herewith answer Dean Shepherd's call for more multilevel research on decision-making in the entrepreneurship domain (Shepherd, 2011). Also see the review of the empirical literature on the interdependence of institutions, entrepreneurship and economic growth by Bjørnskov & Foss (2016), in which they appeal to entrepreneurship scholars to use multilevel designs when studying the antecedents and consequences of entrepreneurship. We employ a composite dataset in which individual-level characteristics and entrepreneurial actions are nested in national-level rules and regulations regarding employment protection, which clearly differ between countries. EPL data is obtained from both the World Bank and the OECD.

EPL is said to have theoretically ambiguous effects on employment and unemployment levels (e.g., Kahn, 2010), because employers are less likely to fire current workers, but, at the same time, to hire new ones. From a worker's point of view, and under the assumption that individuals are well able to choose between employment and self-employment, stricter EPL imposes additional opportunity costs on self-employment (Amit et al., 1995; Baumann & Brändle, 2012), so that they are more likely to opt for employment instead. Already employed people have to give up their legal rights as an employee, and will think twice before they will actually do so (also see Bosma et al., 2013a). Notwithstanding our theoretical argumentation summarized above, and our resulting hypotheses that stricter country-level legislation on both severance pay and the notice period for employers increases the likelihood that an individual is involved entrepreneurial activity as an employee, we find a positive relationship between

higher levels of severance payments and being self-employed. An explanation could be that such payments are used to overcome liquidity constraints in becoming self-employed (e.g., Evans & Jovanovic, 1989; Holtz-Eakin et al., 1994). Contrarily, a longer notice period for employers increases individuals' probability to be involved in entrepreneurial activity as employee (as hypothesized). Such a notice period may be used for active job search, on average leading to higher (re-)employment levels (Addison & Blackburn, 1995). If it concerns entrepreneurial talent, they may become entrepreneurially active as an employee (again). In estimating the separate effects of two of the most important elements of countries' EPL, we followed seminal and well-cited work by Lazear (1990) and Pissarides (2001). Although more recent research often used a composite index to indicate countries' strictness of EPL (e.g., Robson, 2003; Torrini, 2005), our estimates justify the more refined way of treating EPL (also see Addison & Grosso, 1996).

Chapter 4 is a first attempt to measure the effect of entrepreneurial employee activity (EEA) on countries' economic performance (measured by labor productivity). In our empirical models, we contrast this effect to the effects of new independent entrepreneurial activity in society (TEA) and of a subgroup consisting of innovative entrepreneurs only (TEAinnov). EEA and TEA (or, TEAinnov) together form the entrepreneurship capital of one's country. The rate of EEA in the adult population was expected to positively influence national-level economic performance for similar reasons why TEA (or, TEAinnov) would contribute to growth. Most importantly, entrepreneurs are said to spur knowledge diffusion and to exploit knowledge spillovers (e.g., Acs et al., 2009; 2013; Braunerhjelm et al., 2010). However, new knowledge may also be commercialized by employees inside established firms, as long as the expected value added for the firm is deemed sufficiently high (Audretsch & Thurik, 2001a).

Following previous entrepreneurship research in explaining economic growth (e.g., Van Praag & Van Stel, 2013), we took a simple Cobb-Douglas production function as a starting point, i.e. economic output explained by the inputs physical capital and labor (Cobb & Douglas, 1928), and extended it with

our measures of knowledge capital and entrepreneurship capital (also see Audretsch & Keilbach, 2004a). Inspired by some of the early growth models of Mankiw et al. (1992) and Islam (1995), we estimated both cross-sectional and panel regression models. Furthermore, we followed Aparicio et al. (2016) in their approach to also explore some of the institutional factors that precede different types of entrepreneurial activity (also see Bosma et al., 2017). Each of our three-stage least squares (3SLS) models simultaneously estimated an equation explaining one of the types of entrepreneurial activity (i.e. the entrepreneurial activity equation), and an equation explaining aggregate economic performance (i.e. the growth equation).

The results of our 3SLS models indeed provide empirical evidence for positive effects on countries' labor productivity of entrepreneurial activity inside and outside the established firm (EEA and TEA, respectively). Put differently, both entrepreneurship and intrapreneurship are beneficial for macroeconomic performance. However, depending on the degree to which their institutions are supportive of economic freedom (Gwartney et al., 2016), their exact contribution differs. This is in line with previous research stating that a country's institutional framework influences the extent to which entrepreneurial activities are channeled into directions that are most beneficial for economic growth (e.g., Baumol & Strom, 2007; Bjørnskov & Foss, 2016; Bowen & De Clercq, 2008). We particularly find that EEA positively mediates the effect of access to sound money, and negatively mediates the effect of the freedom to trade internationally. The detrimental effect of international trade through EEA may be explained by the fact that established organizations are most likely to trade across borders (e.g., Bernard et al., 2007; Calof, 1993), and hence, hit hardest by fierce competition that increased international trade entails (Bjørnskov & Foss, 2008). We do not find a significant effect for TEAinnov in the 3SLS regression model that also includes country dummies in the growth equation.

In sum, we identified multiple formal and informal institutions that play a key role in the allocation of entrepreneurial activity in society across entrepreneurship and intrapreneurship. We have shown that cultural dimensions like uncertainty avoidance, and institutional and in-group collectivism determine

the type of (innovative) entrepreneurial activity in which individuals are more likely to be involved in. Similarly, elements of countries' legislation on employment protection are found to determine entrepreneurial individuals' occupational choice between employment and self-employment. Any negative effect of any of these formal and informal institutions on entrepreneurship may be undone by a positive effect on intrapreneurship instead, and *vice versa*. Hence, the influence of these institutions may not be as detrimental for the entrepreneurial activity in society as so far commonly assumed. Cross-cultural research and the institutional economics literature would benefit from a more nuanced approach as it comes to entrepreneurship, one that also acknowledges all entrepreneurial activity taking place inside established organizations. Intrapreneurship has been shown to complement entrepreneurship by (also) contributing to macro-level economic performance, especially under certain institutional conditions of economic freedom.

5.2 Policy implications

In a sense, intrapreneurship can be considered a hidden type of entrepreneurial activity (WEF, 2016). Europe is often perceived to lag the rest of the world in terms of new independent entrepreneurship, and so, most entrepreneurship policies aim at stimulating and/or facilitating new independent businesses. However, if one would also take into account all entrepreneurship that takes place within established organizations, then the overall picture changes drastically. As the introductory chapter already made clear (for example, see figure 1.1), relatively low shares of independent entrepreneurial activity seem to be compensated by relatively high shares of entrepreneurial activity by employees, for example in case of Denmark and Sweden. In general, the higher a country's level of development, the higher the prevalence of entrepreneurial employees in the adult population (Kelley et al., 2016). Thus, ignoring intrapreneurship as an alternative way to engage in entrepreneurial activity would be a too narrow-minded view when designing entrepreneurship policies, particularly in developed countries.

Moreover, policies are typically generic in the sense that no distinction is made between entrepreneurial activities of different quality. However, if the quantity of entrepreneurs goes up, the contribution to aggregate economic performance does not necessarily increase. After all, a majority of independent entrepreneurial activities is imitative or routine in nature (Koellinger, 2008; Santarelli & Vivarelli, 2007), and, in line with William Baumol's legacy, entrepreneurial activities can even prove to be unproductive (for example, rent seeking) or destructive (for example, organized crime) as to their contribution to economic growth (Baumol, 1990). Today, policy measures increasingly aim at specific groups of entrepreneurs, as witnessed by, for example, an increased focus on the most competitive industries. Nonetheless, entrepreneurial activities by employees remain underexposed, while they may be of greater importance for growth than those by independent entrepreneurs (also see chapter 4). It should be noted, however, that intrapreneurial activities may also prove to be unproductive or even destructive. If anything becomes clear from this dissertation, it is that effective and efficient entrepreneurship policies should not be generic, neither across nor within countries, but targeted at specific actors while taking into account the prevailing institutional context.

It has been argued that developed countries have passed through a shift from a managed to an entrepreneurial economy (Audretsch & Thurik, 2000; Thurik et al., 2013). A managed economy is typically dominated by large established firms with a long lifespan operating in relatively stable product markets. Such firms tried to achieve economies of scale and scope by mainly employing routinized labor. Instead, an entrepreneurial economy is characterized by knowledge and entrepreneurial activity as production factors. Globalization and technological change have been put forward as the most important factors responsible for this shift. At the same time, these factors have caused a transition in the organization of labor. Today, fewer people perform routine tasks under lifetime contracts, mainly because of the displacement of jobs to less developed countries and the replacement of jobs by technological innovations (e.g., Autor et al., 2003). Employees are increasingly responsible for non-routine tasks and the development of new business activities that increase the competitiveness of the employer's organization.

Also, the emergence and growth of more flexible forms of organization with shorter lifespans have become more important. Firms are subject to increased competition and greater uncertainty about the development and availability of technologies, and hence, the demand for their goods and services. Stronger market dynamics cause firms to retain a thicker layer of flexible labor. More and more people have multiple jobs, usually part-time and/or under temporary contracts, or combine employment with solo self-employment (i.e. a form of *hybrid entrepreneurship*, see e.g. Folta et al., 2010). Such ways of gaining an income would fit in the broader trend towards a so-called *gig economy*, one in which temporary labor contracts are commonplace and established firms tend to hire solo self-employed instead of full-time employees (e.g., De Stefano, 2016; Friedman, 2014). Part of the solo self-employed perform the same tasks as they could have done as an employee.

All in all, we may conclude that the traditional dichotomy between employment and self-employment does not fit future-oriented labor market policies (also see Liebregts, 2016). Employees are increasingly required to engage in entrepreneurial activities for their employer, and, at the same time, quite some (solo) self-employed do not act entrepreneurial at all as it comes to the innovativeness of their activities. Hence, in order to become an entrepreneurial society (Audretsch, 2007), it is more appropriate to develop a perspective on entrepreneurial activities by all members of the working population. The attention of policymakers should go out to the activities that are most beneficial for societies' welfare (Baumol & Strom, 2007), regardless of whether they take place inside or outside the established firm. Two implications for policy clearly emerge from the conclusions above.

First, policy should aim for developing and improving individuals' modern (or, twenty-first century) skills like creativity, rather than educating people for specific lifelong jobs. One should be creative to be able to create significant new value, no matter the occupation, so a high-quality educational system is designed in such a way that it teaches individuals' creative and innovative behavior. Once employed, their employers should allow for bottom-up initiatives from the operational level by providing time and resources (or, *organizational slack*, see e.g. Tan & Peng, 2003). To unlock employees' full potential,

any possible barriers to entrepreneurial behavior such as bureaucracy and organizational politics should be removed (e.g., Sørensen & Sharkey, 2014). However, close consideration of the actual implementation of new ideas is still warranted, since some of them may be unproductive or destructive for the firm's performance. Workers should also be aware that they themselves are increasingly responsible for human capital investments during their own career.

Second, policies should ease labor mobility between different occupations. Any difference in judicial and tax treatment between employed and solo self-employed may hamper the flow of entrepreneurial talent towards most productive directions. Employees may be entitled to all kinds of welfare state arrangements that solo self-employed individuals have to arrange themselves. Think of health insurance and other kinds of social benefits. Losing access to (financial means for) education and training, mortgages, pension schemes, social security *et cetera* should not prevent individuals from moving freely across the labor market. Hence, a country's welfare system should be equally accessible for all workers. Increased labor mobility may lead to the faster diffusion of knowledge and to improved matching of heterogeneous knowledge (Braunerhjelm et al., 2017), at least as long as the use of non-compete agreements is limited (e.g., Marx et al., 2009).

There is no clear-cut way in which EPL affects entrepreneurial activity. In chapter 3, we have shown that different elements of EPL have different effects on different types of entrepreneurial activity in society. Next to its complex and multidimensional nature, EPL also interacts with other formal institutions, such as capital and product market regulations (Amable et al., 2011; Fallick et al., 2006), and redesign of formal institutions may prove counterproductive if inconsistent with the prevailing informal institutions (e.g., Dixit, 2009). Policy recommendations with regard to EPL should thus be formulated with care. Less stringent EPL is often said to decrease *job* security, but, at the same time, to increase *employment* security, i.e. someone's chances of getting a paid job (again). Combined with a generous welfare system that also provides ample opportunities for (re)training, these chances are generally thought to increase even further. Denmark is the most prominent example of a country that

successfully employs such a welfare system, usually referred to with the term *flexicurity*, a contraction of *flexibility* and *security* (Wilthagen & Tros, 2004). Proponents argue that labor markets benefit from increased flexibility and labor mobility. Although other countries might want to follow Denmark's example, one should be aware that reducing the stringency of different dimensions of EPL can have opposite effects on the allocation of entrepreneurial activity in society. If policymakers aim to increase the number of entrepreneurial activities inside established organizations, then the notice period for employers should be set longer, while severance payments should be reduced.

Likewise, the results in chapter 2 showed that different cultural practices induce different types of entrepreneurial activity in society. That led us to conclude that no single entrepreneurial culture exists (Hayton & Cacciotti, 2013). Instead, any national culture may bring about entrepreneurial activity, but its most prevalent appearance differs between countries. For example, intrapreneurship is most likely to emerge in uncertainty-avoidant cultures, like the one of Denmark. At first sight, this seems inconsistent with its flexicurity system characterized by relatively low levels of job security for people with permanent contracts, because one would expect a country's formal institutions to reflect its informal institutional framework. However, as argued before, a reduction in the stringency of EPL is offset by relatively generous welfare state arrangements, such that the employment security of individuals remains at high levels.

Institutions should not be considered in isolation. In a way, informal institutions can function as substitutes of formal institutions in that they reduce transaction costs (Arrow, 1971; Glaeser et al., 2002). Denmark's culture is also characterized by high institutional collectivism, which appears to correlate positively with a measure of interpersonal trust by the World Values Survey (WVS). Trust has been put forward as a sanctioning mechanism that complements the formal institutional framework (e.g., Welter & Smallbone, 2006). Under high-trust conditions, productive forms of entrepreneurial activity are more likely to emerge. In institutional collectivistic societies, individuals generalize trust to other societal members in general (Realo et al., 2008), which led us to believe that an individual's

involvement in intrapreneurship is more likely (confirmed by our empirical analyses). Berggren & Jordahl (2006) claim to provide causal evidence that trust between people can emerge from an improvement in a country's legal structure and security of property rights. Yet, it is unlikely that government policy is able to improve interpersonal trust or other informal institutional conditions that are deemed relevant for entrepreneurial activity in the short run (Elert et al., 2017). Changes in informal institutions, if any, take long and are often characterized by path dependencies (North, 1991; Williamson, 1998; 2000). Although the prevalence and nature of entrepreneurial activity is most responsive to informal institutions (e.g., Gnyawali & Fogel, 1994), these are typically most difficult to intervene on.

5.3 Limitations and future research

We acknowledge that our studies are not without limitations, and so, we invite scholars to follow up on this dissertation by taking into account some of the suggestions for future research below. Most of the limitations are empirical in nature, and come down to a lack of certain types of data. Other future research suggestions stem from the limited scope of this dissertation.

Most pressing is the problem of cross-sectional instead of longitudinal data on some of our key variables. For example, GLOBE's country scores on cultural practices have only been collected once, and date back to the nineties and the early zeroes. Even though national cultures are said to be relatively stable over time, by now they may be different from what they used to be at the time the data have been collected. It might well be that current cultural practices shape the conditions of entrepreneurial action in a (slightly) different manner than our empirical results have suggested. Formal institutions like laws on employment protection are more likely to change in the short term. EPL data is available for multiple and more recent years and from different sources, but has not been merged with data on different types of entrepreneurial activity over time. The GEM has only started to collect data on entrepreneurial activity by employees in 2011. EEA rates have been collected ever

since, but in a non-compulsory manner, so relatively few countries have determined their EEA rate each and every year thereafter. Missing values in between two moments of measurement either reduce the number of countries in our sample or the reliability of the empirical analyses. At best, we were able to construct a short and slightly unbalanced panel by using interpolation techniques in chapter 4. Additionally, we applied a 3SLS approach to further limit the potential problems of endogeneity and reverse causality. In case of chapters 2 and 3, it is unlikely that causality runs from an individual's involvement in any of the types of entrepreneurial activity to country-level informal and formal institutions, respectively. Multilevel analyses – as robustness checks in chapter 2, and as the main methodology in chapter 3 – have strengthened our belief that our findings can be interpreted in a causal way. Still, we encourage entrepreneurship researchers to work on longer and more balanced panel data models as to gain better insights into the longer term mono-causal mechanisms between the institutional determinants and economic consequences of different types of entrepreneurial activity (Bjørnskov & Foss, 2016). Ideally, one is able to apply multilevel techniques to panel data, which are available for a longer period of time for all countries in the sample (Shepherd, 2011).

Although we conducted both multilevel analyses and analyses at multiple levels, these only concerned the individual and country level. It is equally important to address levels in between, such as the industry and regional level, because the institutional context differs across industries and regions just as well. For example, national-level EPL is often complemented or even replaced by collective agreements that only apply to employees in specific industries. Thus, a more detailed understanding of how EPL affects the allocation of entrepreneurial activity also requires the inclusion of industry- and region-specific regulations (e.g., Autor et al., 2007). Given that certain industries and/or regions are more susceptible to the one type of entrepreneurial activity than the other, their growth patterns most likely deviate as well. Most importantly, however, we lack analyses that include measures at the organizational level, which is something peculiar for research on entrepreneurial activity inside established organizations. In contrast to entrepreneurship, intrapreneurship is not only affected by the national context, but also by the organizational context, which itself is partly a product of the national

context. Adding firm-level characteristics undoubtedly contributes to a better understanding of which organizational factors are most likely to bring forth intrapreneurship, and how these interact with factors at other levels of analysis. Thus far, the availability and use of large-scale firm-level datasets in entrepreneurship research remains limited (Bjørnskov & Foss, 2016). Ideally, one has access to data on all individuals employed at many different organizations for each of a large number of countries (and over time), but collecting such multilevel (panel) data is a highly complex undertaking that requires heavy investments.

In our empirical analyses in chapters 2 and 4, we have (also) been contrasting EEA to innovative TEA only. The reasoning behind this is that entrepreneurial employees are deemed innovative by definition. According to the GEM, individuals are involved in EEA if they lead the development of new business activities for their main employer, both at the moment of measurement and somewhere in the three years before. Examples of such new business activities are the development of a new business unit, product, service and/or product-market combination. Similarly, nascent entrepreneurs and young business owners (TEA) are said to be innovative (TEAinnov) if they develop a new product, service and/or product-market combination. Hence, we do distinguish between more and less innovative forms of entrepreneurship, but we implicitly discard the possibility of having less innovative forms of intrapreneurship. Or, in William Baumol's terms, we do not subdivide intrapreneurship into forms that are productive, unproductive and destructive for society (Baumol, 1990). This is primarily an empirical issue, as the GEM does not allow to make such a distinction. It is a relevant one though, since new business activities may turn out to be detrimental for the firm's performance, in turn having a negative impact on aggregate economic performance. Even entrepreneurial activities beneficial to the firm may be detrimental for a country's performance. This calls for comparative international data collection efforts that go beyond the identification of entrepreneurial employees only. A promising avenue for future research would then be the investigation of contextual factors at the national and organizational level, and how they channel people into intrapreneurial activities that differ in terms of their productive contribution to society.

Future research should also pay attention to how institutions impact the overall level of entrepreneurial activity in society, i.e. by taking all entrepreneurship and intrapreneurship activities together. The studies in this dissertation only investigated a number of institutions and their effect on the *allocation* of individuals across the two different types of entrepreneurial activity. It would be equally interesting to examine the impact of institutional conditions on the overall *supply* of entrepreneurial activity in society (Bjørnskov & Foss, 2008), preferably with a further distinction into the degree of innovativeness of those activities. The optimal rate of entrepreneurial activity in society not only depends on entrepreneurship, but on intrapreneurship just as well. Current knowledge remains limited as to what can be considered the optimal rate of independent entrepreneurial activity in society (e.g., Van Praag & Van Stel, 2013). However, the optimal rate may be different if one also takes stock of entrepreneurial activities by employees. The attention of researchers should thus go out to how institutions channel individuals to most productive entrepreneurial activities, including both entrepreneurship and intrapreneurship activities.

Throughout the dissertation, GEM data on different types of entrepreneurial activity have been merged with institutional data coming from various secondary sources. This implies that, unlike Lim et al. (2010), we do not grasp individuals' cognitive processes while deciding on the mode of entrepreneurial activity. The dependent variables in chapters 2 and 3 are static, and merely represent individuals' current state of being rather than a real decision between entrepreneurship and intrapreneurship based on the prevalent informal and formal institutional conditions. In order to capture the decision dynamics underlying our hypothesized relationships, one should conduct additional qualitative research. In-depth interviews with entrepreneurial talent might reveal their true considerations and cognitive processes when deciding between employment or self-employment, and how these depend on the institutional conditions (see e.g. Baron, 1998; Mitchell et al., 2000).

Finally, we have tested the effects of various kinds of formal and informal institutions, but did not consider their interactions in explaining the allocation of entrepreneurial activity across

entrepreneurship and intrapreneurship. Future studies are encouraged to actually do so, because "through its influence on [entrepreneurial] beliefs, motives and behaviors, culture can magnify or mitigate the impact of institutional and economic conditions upon entrepreneurial activity" (Hayton & Cacciotti, 2013: 708). Moreover, cultures are argued to affect economic development directly, but also indirectly through better functioning (formal) institutions (see e.g. Tabellini, 2008; 2010). In their review, Hayton et al. (2002) already identified a lack of integration of cultural and (other) institutional factors in single studies explaining entrepreneurial outcomes (also see Busenitz et al., 2000). Since then, relatively few studies have emerged that simultaneously test culture and, for example, political and/or economic institutions, and how they relate to cross-country differences in entrepreneurship (e.g., Nguyen et al., 2009; Wennekers et al., 2007). More recent exceptions are studies by Aparicio et al. (2016) and Turró et al. (2014). In this dissertation, we examined the effects of cultural practices and elements of EPL in two separate studies, while stringent EPL might reflect the preferences of people being part of an uncertainty-avoidant culture. Future studies are thus encouraged to simultaneously include formal and informal institutions in models explaining entrepreneurial outcomes (Terjesen et al., 2016). Exploring their interactions would also shed light on how they complement each other in generating different types of entrepreneurial activity in society.

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Nederlandse samenvatting

Introductie

Met dit proefschrift beogen we bij te dragen aan de wetenschappelijke literatuur op het gebied van ondernemerschap. Bij ondernemerschap denkt men vaak aan personen die voor eigen rekening en risico een bedrijf bezitten en beheren (Jensen & Meckling, 1976; Knight, 1921). Hiermee wordt echter voorbij gegaan aan alle personen die in loondienst van bestaande bedrijven kansen ontdekken, evalueren en/of benutten (Shane & Venkataraman, 2000). Daarom gaan we in dit proefschrift uit van de definitie van ondernemerschap zoals Sharma & Chrisman (1999) deze ooit verwoordden. Volgens hen omvat ondernemerschap "handelingen van organisatorische creatie, vernieuwing of innovatie, die binnen of buiten een bestaande organisatie plaatsvinden" (p. 17). Met andere woorden, wij beschouwen zowel al het zelfstandige ondernemerschap als al het ondernemerschap binnen bestaande organisaties – vaak *intrapreneurship* genoemd (bv. Antoncic & Hisrich, 2001; 2003; Pinchot, 1985) – als onderdeel van de ondernemende activiteit in de samenleving. Intrapreneurship is een vorm van organisatorische nieuwe waardecreatie, waarbij werknemers het initiatief nemen. Dit type ondernemende activiteit wordt doorgaans niet belicht in onderzoek naar strategisch management en ondernemerschap door bestaande bedrijven (ook wel *corporate entrepreneurship* genoemd). Burgelman (1983b) vormt een uitzondering met zijn studie, waarin hij spreekt over "autonome strategische initiatieven op operationeel niveau" (p. 1361) als belangrijkste bron van diversiteit in de strategische activiteiten van bedrijven.

Het idee dat ook werknemers ondernemend gedrag kunnen vertonen door nieuwe combinaties te maken met bestaande middelen werd al eens beschreven in het invloedrijke werk van Joseph Schumpeter (Schumpeter, 1911; 1934; 1942) en later ook door vele anderen (bv. Hellmann, 2007; Pinchot, 1985). Hoewel een groot aantal studies het belang van ondernemerschap binnen bestaande

organisaties benadrukt (bv. Antoncic & Hisrich, 2001; Carrier, 1994), bevat de literatuur niet of nauwelijks *multilevel* analyses van de determinanten en consequenties van intrapreneurship (Shepherd, 2011), laat staan in een verenigd raamwerk (Bjørnskov & Foss, 2016). Tot dusver richtte bestaand onderzoek zich vooral op de determinanten en consequenties (op macroniveau) van zelfstandige vormen van ondernemerschap (bv. Arin et al., 2015; Terjesen et al., 2016; Valdez & Richardson, 2013). Dit komt met name door een langdurig gebrek aan data over ondernemende activiteit door werknemers die een goede vergelijking tussen landen mogelijk maken.

In dit proefschrift benutten we data die de Global Entrepreneurship Monitor (GEM) pas sinds enkele jaren verzameld. De jaarlijkse enquête onder minimaal 2.000 leden van de volwassen bevolking van de deelnemende landen bevat sinds 2011 een maat van ondernemende activiteit door werknemers (EEA). Volgens de nauwe definitie van de GEM is er sprake van ondernemende werknemers als zij betrokken zijn bij de ontwikkeling van een nieuwe bedrijfsactiviteit voor hun werkgever, zowel op het moment van meten alsook minimaal één keer in de drie jaren daaraan voorafgaand. Daarbij dienen zij de leiding te hebben (gehad) in minimaal één van de twee fasen van het proces, te weten de fase van idee-ontwikkeling en de fase van voorbereiding en implementatie (zie ook Bosma et al., 2013b: 21). Voorbeelden zijn het opzetten van een nieuw bedrijfsonderdeel en het ontwikkelen van een nieuw product, een nieuwe dienst of een nieuwe product-markt combinatie. Al sinds de start verzamelt de GEM data over het aandeel (zelfstandige) ondernemers in wording en eigenaren van jonge bedrijven (niet ouder dan 42 maanden) in de volwassen bevolking van een groot aantal landen (TEA). Deze maat van nieuw zelfstandig ondernemerschap omvat een zeer heterogene groep ondernemers. In een aantal van de analyses zetten we EEA niet alleen af tegen TEA, maar ook tegen een subgroep van hen, namelijk zij die producten of diensten verkopen die in zekere mate nieuw zijn voor de markt en/of zij die beweren dat niet veel concurrenten hetzelfde product of dezelfde dienst aanbieden (TEAinnov). Alle individuen betrokken bij EEA en TEAinnov vormen samen de innovatieve ondernemende activiteit in de samenleving.

Door de hierboven beschreven GEM data te combineren met al beschikbare secundaire data over diverse instituties en de economische prestaties van landen, kan de belangrijkste onderzoeksvraag uit dit proefschrift worden beantwoord. Deze luidt als volgt:

Wat zijn belangrijke institutionele determinanten en de economische consequenties van twee soorten ondernemende activiteit in de samenleving, ondernemerschap en intrapreneurship in het bijzonder?

Oftewel, dit proefschrift analyseert hoe en in welke mate de institutionele context bepaalt bij welke soort ondernemende activiteit individuen betrokken zijn en wat dit voor gevolgen heeft voor de economische groeipatronen van landen (bv. Baumol & Strom, 2007; Bowen & De Clercq, 2008). Dit is een afgeleide van William Baumol's opvatting dat individuen zich over verschillende soorten ondernemende activiteit in de samenleving alloceren. Daar waar Baumol (1990) onderscheid maakt tussen productieve, onproductieve en destructieve vormen van ondernemerschap, richten wij ons op ondernemerschap en intrapreneurship als twee verschillende manieren waarop ondernemend talent kansen kan benutten. We betogen dat beide vormen van ondernemende activiteit van belang zijn voor het commercialiseren van nieuwe kennis, maar afhankelijk van het institutionele kader kan het ene type productiever blijken voor de maatschappij dan het andere (Bjørnskov & Foss, 2013; 2016; Boettke & Coyne, 2009).

Om bovenstaande onderzoeksvraag te beantwoorden, onderzoeken we eerst welke invloed diverse informele en formele instituties hebben op de allocatie van ondernemende activiteit in de samenleving (resp. in hoofdstuk 2 en 3). Hoofdstuk 4 kijkt ook naar de effecten van een aantal formele instituties, maar richt zich voornamelijk op de verschillende soorten ondernemende activiteit en hun bijdrage aan de economische groei van landen. Hiermee trachten we de volgende drie deelvragen te beantwoorden:

1. *Hoe en in welke mate hebben maatschappelijke culturele praktijken invloed op de allocatie van ondernemende activiteit in de samenleving over ondernemerschap en intrapreneurship?* [Hoofdstuk 2]

2. *Hoe en in welke mate heeft nationale wetgeving inzake ontslagbescherming invloed op de allocatie van ondernemende activiteit in de samenleving over ondernemerschap en intrapreneurship?* [Hoofdstuk 3]
3. *Hoe en in welke mate hebben verschillende soorten ondernemende activiteit in de samenleving, ondernemerschap en intrapreneurship in het bijzonder, invloed op de economische prestaties van landen?* [Hoofdstuk 4]

In een recent overzicht van internationaal vergelijkend ondernemerschapsonderzoek benadrukken Terjesen et al. (2016) de hoge mate van heterogeniteit in ondernemende activiteit tussen landen. Daarnaast bediscussiëren ze diverse antecedenten op landniveau, zoals nationale cultuur en (andere) instituties, en het belang van verschillende soorten ondernemende activiteit voor uitkomsten op landniveau. Echter, intrapreneurship wordt niet expliciet benoemd als één van de mogelijke vormen van ondernemende activiteit. Doordat alle drie de studies in dit proefschrift zijn uitgevoerd met grensoverschrijdende data, dragen we bij aan dit specifieke onderzoeksgebied. Hierbij beschouwen we intrapreneurship als een additionele wijze waarop men betrokken kan zijn bij ondernemende activiteiten. We betrekken meerdere niveaus in onze analyses en maken gebruik van diverse geavanceerde methodologieën.

Hoofdstuk 2

In hoofdstuk 2 gaat de aandacht uit naar vier belangrijke dimensies van nationale culturen en hun effect op de betrokkenheid van individuen bij óf innovatief ondernemerschap óf intrapreneurship, op voorwaarde dat men betrokken is bij één van deze twee vormen van innovatieve ondernemende activiteit. We schatten zogenaamde *maximum-likelihood* probit modellen met steekproefselectie (Heckman, 1979; Van de Ven & Van Praag, 1981) om te corrigeren voor de niet-willekeurige zelfselectie in innovatieve ondernemende activiteit (zoals in Parker, 2011). Zowel de grootte als het inkomen van het huishouden zijn met succes gebruikt als uitsluitingsbeperkingen (de zogenaamde *exclusion*

restrictions) in het eerste stadium van het model. Dit betekent dat ze iemands keuze beïnvloeden om betrokken te zijn bij innovatieve ondernemende activiteit, maar dat ze niet duidelijk gerelateerd zijn aan de keuze tussen innovatief ondernemerschap en intrapreneurship in het tweede stadium van het model. Er worden diverse *multilevel* modellen geschat als robuustheidscontroles.

We maken gebruik van data over cultuur verzameld door het GLOBE project (House et al., 2002; 2004). De operationalisatie van indicatoren wijkt af van die door Geert Hofstede en zijn collegae (bv. Hofstede, 1980; 1991; Hofstede et al., 2010), ondanks de vaak sterk gelijkende definities van hun culturele dimensies. De indicatoren van GLOBE bieden ruimte voor een genuanceerder en gedetailleerder begrip van hoe nationale culturen invloed uitoefenen op de besluitvorming van individuen aangaande hun ondernemend gedrag (bv. Venaik & Brewer, 2010). Daarnaast sluit de wijze van operationalisatie beter aan bij onze theoretische argumentatie. We maken in het bijzonder gebruik van vier maatschappelijke *culturele praktijken*, ofwel de manier waarop dingen *zijn* in de samenleving (in plaats van de manier waarop dingen *zouden moeten zijn* volgens de respondenten, genaamd *culturele waarden*).

Op voorhand veronderstelden we dat iemands betrokkenheid bij intrapreneurship waarschijnlijker is in een cultuur die wordt gekenmerkt door een lage prestatiegerichtheid, een hoge onzekerheidsvermijding, een hoge mate van institutioneel collectivisme en een lage mate van *in-group* collectivisme. Dit is gebaseerd op diverse theoretische mechanismen. In geval van de laatste twee culturele dimensies beroepen we ons bijvoorbeeld op het idee dat de straal van vertrouwen tussen personen in een institutioneel collectivistische samenleving verder reikt dan in een *in-group* collectivistische samenleving (Realo et al., 2008). De analyses bieden empirisch bewijs voor positieve effecten van onzekerheidsvermijdende en institutioneel collectivistische praktijken en voor een negatief effect van *in-group* collectivistische praktijken op intrapreneurship. Het positieve effect van onzekerheidsvermijdende culturele praktijken blijkt het meest robuust volgens een aantal controles. We vinden geen significant effect van prestatiegerichte culturele praktijken.

Culturen met een relatief hoge onzekerheidsvermijding en een relatief hoog institutioneel collectivisme lijken hun relatieve gebrek aan innovatief ondernemerschap dus te compenseren door een hogere mate van intrapreneurship voort te brengen. Dit gaat in tegen het heersende idee dat culturen gekenmerkt door prestatiegerichtheid, weinig onzekerheidsvermijding en individualisme het vaakst ondernemende activiteit teweegbrengen (bv. Autio et al., 2013; Freytag & Thurik, 2010; Hayton et al., 2002; Mueller & Thomas, 2001). Blijkbaar kan iedere cultuur tot een zekere mate van (innovatieve) ondernemende activiteit in de samenleving leiden. Het is slechts de meest voorkomende vorm van ondernemende activiteit die grote verschillen kent tussen landen. Terwijl sommige culturele praktijken ertoe leiden dat individuen eerder betrokken zijn bij innovatief ondernemerschap, sporen andere culturele praktijken ondernemende individuen aan om betrokken te zijn bij intrapreneurship. Oftewel, onze resultaten bevestigen de twijfel van Hayton & Cacciotti (2013) aan het bestaan van één ondernemende cultuur.

Hoofdstuk 3

In hoofdstuk 3 analyseren we hoe nationale wetgeving op het gebied van ontslagbescherming de arbeidsmarktkeuze van individuen beïnvloedt. De traditionele arbeidseconomie literatuur beschouwt ondernemerschap gewoonlijk als een keuze tussen een baan in loondienst en een bestaan als een zelfstandig ondernemer (bv. Kihlstrom & Laffont, 1979; Lucas, 1978). Indien de (verwachte) winst uit ondernemerschap hoger is dan het inkomen uit loondienst, zal men er voor kiezen om ondernemer te worden. Zo niet, dan wordt men een (niet-ondernemende) werknemer. Wij betogen echter dat individuen ook ondernemend actief kunnen zijn als werknemer. In dat geval is er sprake van intrapreneurship. We kijken specifiek naar twee belangrijke elementen van ontslagbescherming, te weten de ontslagvergoeding en de opzegtermijn voor werkgevers. De effecten op zelfstandig ondernemerschap en intrapreneurship moeten worden geïnterpreteerd ten opzichte van de basiscategorie bestaande uit niet-ondernemende werknemers.

We maken gebruik van een samengestelde dataset waarin individuele kenmerken en ondernemerschapsvoorkeuren worden gecombineerd met landelijke regels en voorschriften op het gebied van ontslagbescherming. De data over ontslagvergoedingen en opzegtermijnen zijn afkomstig van zowel de Wereldbank als de Organisatie voor Economische Samenwerking en Ontwikkeling (OESO). We voeren *multilevel* analyses uit en beantwoorden daarmee de oproep van Dean Shepherd om meer *multilevel* onderzoek te doen naar besluitvorming omtrent ondernemerschap (Shepherd, 2011). Zie ook het overzicht van de empirische literatuur over de samenhang van instituties, ondernemerschap en economische groei door Bjørnskov & Foss (2016), waarin ook zij een beroep doen op ondernemerschaps-onderzoekers om meer *multilevel* modellen te gebruiken.

Wetgeving inzake ontslagbescherming heeft zowel bedoelde als onbedoelde effecten op het arbeidsmarktgedrag van individuen. Theoretisch gezien heeft dergelijke wetgeving een tweeledig effect op werkgelegenheids- en werkloosheidsniveaus (bv. Kahn, 2010). In geval van strikte ontslagbescherming zijn werkgevers minder snel bereid om werknemers te ontslaan, maar tegelijkertijd zullen ze ook minder snel nieuwe werknemers aantrekken. Vanuit het oogpunt van werkenden, en aannemende dat individuen een reële keuze hebben tussen zelfstandig ondernemerschap en een baan in loondienst, leidt strengere ontslagbescherming tot een stijging van de opportuniteitskosten van zelfstandig ondernemerschap (Amit et al., 1995; Baumann & Brändle, 2012). Mensen met een baan in loondienst zouden hun wettelijke rechten als werknemer op moeten geven en denken dus wel twee keer na voordat ze de stap naar het zelfstandige ondernemersbestaan zetten (zie ook Bosma et al., 2013a). De hypotheses gaan dus uit van een grotere kans op betrokkenheid bij ondernemende activiteit als werknemer in geval de bescherming tegen ontslag van werknemers toeneemt.

Ondanks bovenstaande theoretische argumentatie en de resulterende hypotheses, vinden we een positieve relatie tussen een hogere ontslagvergoeding en zelfstandig ondernemerschap. Een speculatieve verklaring wijst op de mogelijkheid om de vergoeding in te zetten als startkapitaal voor

een zelfstandige onderneming en daarmee financiële beperkingen te omzeilen (bv. Evans & Jovanovic, 1989; Holtz-Eakin et al., 1994). Omgekeerd hangt een langere opzegtermijn voor werkgevers positief samen met intrapreneurship (zoals op voorhand verwacht). Gedurende de opzegtermijn kan men actief op zoek naar een andere baan, hetgeen gemiddeld genomen leidt tot hogere werkgelegenheidsniveaus (Addison & Backburn, 1995). Wanneer het ondernemend talent betreft, dan zouden zij (opnieuw) betrokken kunnen raken bij ondernemende activiteit als werknemers. Het schatten van de afzonderlijke effecten van de ontslagvergoeding en opzegtermijn als twee van de belangrijkste elementen van ontslagbescherming is gebaseerd op veelgeciteerd werk van Lazear (1990) en Pissarides (2001). Hoewel recenter onderzoek vaak een samengestelde indicator gebruikt om haar striktheid aan te duiden (bv. Robson, 2003; Torrini, 2005), rechtvaardigen onze bevindingen de meer verfijnde benadering van wetgeving op het gebied van ontslagbescherming (zie ook Addison & Grosso, 1996).

Hoofdstuk 4

Hoofstuk 4 is een eerste poging om het effect te schatten van ondernemende activiteit door werknemers (EEA) op de economische prestaties van landen, gemeten in termen van arbeidsproductiviteit. In de empirische modellen zetten we het effect van EEA af tegen dat van nieuw zelfstandig ondernemerschap (TEA) en de subgroep bestaande uit innovatieve ondernemers (TEAinnov). EEA en TEA (of TEAinnov) tezamen vormt het ondernemerschap kapitaal van een land. De verwachting is dat het aandeel EEA in de volwassen bevolking de economische groei van landen positief beïnvloed, om vergelijkbare redenen waarom TEA (of TEAinnov) zou bijdragen aan groei. Als belangrijkste reden voeren we aan dat ondernemers kennisverspreiding aanjagen en kennis spillovers benutten (bv. Acs et al, 2009; 2013; Braunerhjelm et al., 2010). Echter, nieuwe kennis kan ook worden gecommercialiseerd door werknemers binnen bestaande ondernemingen, maar alleen zodra de

verwachte toegevoegde waarde voor de onderneming als hoog genoeg wordt gezien (Audretsch & Thurik, 2001a).

We volgen bestaand onderzoek dat economische groei (onder meer) probeert te verklaren met één of meerdere maten van ondernemerschap (bv. Van Praag & Van Stel, 2013). Ergo, we nemen een eenvoudige Cobb-Douglas productiefunctie als uitgangspunt – i.e. economische output verklaard door de productiefactoren (fysiek) kapitaal en arbeid (Cobb & Douglas, 1928) – en breiden het model uit met onze maten van kennis kapitaal en ondernemerschap kapitaal (zie ook Audretsch & Keilbach, 2004a). Geïnspireerd door enkele van de economische groeimodellen in Mankiw et al. (1992) en Islam (1995) schatten we zowel cross-sectionele als longitudinale regressiemodellen. Daarnaast volgen we de benadering van Aparicio et al. (2016) door ook de voorafgaande effecten van een aantal economische institutionele factoren op ondernemende activiteit te onderzoeken (zie ook Bosma et al., 2017). Ieder zogenaamd *three-stage least squares* (3SLS) model schat gelijktijdig een vergelijking met één van de drie vormen van ondernemende activiteit als afhankelijke variabele (i.e. de ondernemende activiteit vergelijking) en een vergelijking met arbeidsproductiviteit als afhankelijke variabele (i.e. de groeivergelijking).

De resultaten van de 3SLS modellen laten inderdaad positieve effecten zien op de arbeidsproductiviteit van zowel het aandeel EEA als het aandeel TEA in de volwassen bevolking. Met andere woorden, ondernemende activiteiten binnen en buiten bestaande organisaties dragen bij aan de macro-economische prestaties van landen. De exacte bijdrage blijkt echter afhankelijk van de mate waarin hun instituties economische vrijheid ondersteunen (Gwartney et al., 2016). Dit is overeenkomstig bestaand onderzoek dat beweert dat het institutionele kader invloed uitoefent op de mate waarin ondernemende activiteiten naar de meest productieve richtingen voor de samenleving worden geleid (bv. Baumol & Strom, 2007; Bjørnskov & Foss, 2016; Bowen & De Clercq, 2008). We vinden met name dat EEA het effect van toegang tot financieel kapitaal positief medieert en het effect van internationale handelsvrijheid negatief medieert. Het nadelige effect van internationale handelsvrijheid via EEA kan

worden verklaard doordat vooral gevestigde organisaties handel drijven over de grens (bv. Bernard et al., 2007; Calof, 1993). Zij worden dus het meeste blootgesteld aan de hevige concurrentie die een toename in internationale handel met zich meebrengt (Bjørnskov & Foss, 2008). We vinden geen significant effect van TEAinnov in het 3SLS regressiemodel dat ook landendummies toevoegt aan de groeivergelijking.

Conclusies en discussie

In dit proefschrift identificeren we diverse formele en informele instituties die een belangrijke rol spelen in de allocatie van ondernemende activiteit in de samenleving, bestaande uit zowel (zelfstandig) ondernemerschap als intrapreneurship. We laten zien dat maatschappelijke culturele praktijken zoals onzekerheidsvermijding en institutioneel en *in-group* collectivisme het meest waarschijnlijke type innovatieve ondernemende activiteit bepalen, waarbij individuen betrokken zijn. Op vergelijkbare wijze tonen we aan dat twee elementen van nationale wetgeving op het gebied van ontslagbescherming, te weten de ontslagvergoeding en de opzegtermijn voor werkgevers, bepalend zijn voor de keuze van ondernemende individuen tussen ondernemerschap en intrapreneurship. Een negatief effect van elk van deze formele en informele instituties op ondernemerschap kan ongedaan worden gemaakt door een positief effect op intrapreneurship en *vice versa*. Oftewel, de invloed van deze instituties is wellicht niet zo nadelig voor de ondernemende activiteit in de samenleving als doorgaans wordt aangenomen. Cross-cultureel onderzoek en de literatuur op het gebied van institutionele economie zou er dus goed aan doen om een genuanceerdere benadering van ondernemerschap te hanteren, namelijk één waarin alle ondernemende activiteit binnen bestaande ondernemingen ook wordt erkend. Intrapreneurship blijkt zelfstandig ondernemerschap aan te vullen door (ook) bij te dragen aan de macro-economische prestaties van landen, vooral onder bepaalde institutionele condities van economische vrijheid.

Intrapreneurship kan in zekere zin worden beschouwd als een verborgen type ondernemende activiteit (WEF, 2016). Over Europese landen wordt vaak gezegd dat ze achterblijven bij de rest van de wereld in termen van nieuw zelfstandig ondernemerschap. Europees ondernemerschapsbeleid richt zich dan ook op het stimuleren en/of faciliteren van nieuwe zelfstandige bedrijven. Echter, zodra men ook alle ondernemende activiteit binnen bestaande ondernemingen in ogenschouw neemt, wijzigt het geschetste beeld drastisch. Relatief lage aandelen zelfstandig ondernemerschap lijken te worden gecompenseerd door relatief hoge aandelen van ondernemende activiteit door werknemers, bijvoorbeeld in geval van Denemarken en Zweden. In het algemeen geldt dat hoe beter ontwikkeld een land is, hoe hoger het aandeel ondernemende werknemers in de volwassen bevolking (Kelley et al., 2016). Met andere woorden, het miskennen van intrapreneurship als alternatieve wijze waarop men betrokken kan zijn bij ondernemende activiteit leidt tot een te nauwe blik bij het vormgeven van ondernemerschapsbeleid, vooral in ontwikkelde landen.

Ook is beleid vaak generiek in de zin dat er geen onderscheid wordt gemaakt tussen ondernemende activiteiten van verschillende kwaliteit. Echter, als het aantal ondernemers stijgt, dan neemt hun totale bijdrage aan de economie niet noodzakelijkerwijs toe. Immers, een meerderheid van de zelfstandige ondernemende activiteit is imitatief of routineus van aard (Koellinger, 2008; Santarelli & Vivarelli, 2007) en, in lijn met het werk van William Baumol, ondernemerschap kan onproductief of destructief blijken te zijn (Baumol, 1990). Vandaag de dag richten beleidsmaatregelen zich al in toenemende mate op specifieke groepen ondernemers. Zie bijvoorbeeld de grotere aandacht voor de meest competitieve sectoren. Niettemin blijven ondernemende activiteiten door werknemers onderbelicht, terwijl deze juist van groter belang kunnen zijn voor economische groei dan die door zelfstandige ondernemers (zie ook hoofdstuk 4). Er dient wel te worden opgemerkt dat ondernemende activiteiten door werknemers ook onproductief of destructief kunnen zijn. Als er iets duidelijk wordt uit dit proefschrift, dan is het dat effectief en efficiënt ondernemerschapsbeleid niet generiek dient te zijn – noch over verschillende landen, noch binnen landen – maar gericht op specifieke actoren, terwijl men rekening houdt met de prevalerende institutionele context.

Van werknemers wordt in toenemende mate verlangd om deel te nemen aan ondernemende activiteiten voor hun werkgevers. Tegelijkertijd is een groot deel van de zelfstandige ondernemers helemaal niet zo ondernemend gelet op de mate van innovativiteit van hun activiteiten. We kunnen dus stellen dat de traditionele tweedeling tussen werknemers en ondernemers niet meer past bij toekomstgericht arbeidsmarktbeleid (zie ook Liebregts, 2016). Om een ondernemende samenleving te worden (Audretsch, 2007) zou men een perspectief moeten ontwikkelen op de ondernemende activiteiten door alle leden van de werkzame bevolking. De aandacht van beleidsmakers zou daarbij met name uit moeten gaan naar de activiteiten die het meeste bijdragen aan de welvaart van landen (Baumol & Strom, 2007), ongeacht of deze binnen of buiten een bestaande onderneming plaatsvinden. Omdat men in beide gevallen creatief dient te zijn voor significante nieuwe waardecreatie, schenkt een kwalitatief onderwijssysteem aandacht aan de ontwikkeling van moderne vaardigheden zoals creatief en innovatief werkgedrag. Daarnaast zou er sprake moeten zijn van gelijke toegang tot het welvaartssysteem voor alle werkenden. Ieder verschil in arbeidsrechtelijke en fiscale behandeling tussen werknemers en ondernemers kan een belemmering zijn voor ondernemend talent om zich in de meest productieve richting te begeven. Een toename in arbeidsmobiliteit kan leiden tot snellere verspreiding van kennis en tot betere *matching* van heterogene kennis (Braunerhjelm et al., 2017).

We hebben laten zien dat verschillende elementen van nationale wetgeving op het gebied van ontslagbescherming verschillende effecten hebben op verschillende soorten ondernemende activiteit. Beleidsaanbevelingen moeten dus zorgvuldig worden geformuleerd. Als beleidsmakers zich tot doel stellen om ondernemende activiteit binnen bestaande ondernemingen te laten toenemen, dan zou de gemiddelde opzegtermijn voor werkgevers langer moeten zijn, terwijl ontslagvergoedingen verlaagd dienen te worden. Naast haar toch al complexe en multidimensionale aard interacteert wetgeving inzake ontslagbescherming met andere formele instituties, zoals regels voor kapitaal- en productmarkten (Amable et al., 2011; Fallick et al., 2006). Daarnaast kan (her)ontwerp van formele instituties contraproductief blijken als hierbij geen rekening wordt gehouden met de geldende informele instituties (bv. Dixit, 2009). Een lage mate van ontslagbescherming is overigens niet per

definitie inconsistent met een onzekerheidsvermijdende cultuur. Minder bescherming leidt tot een lagere baanzekerheid, maar tegelijkertijd tot een hogere werkzekerheid, zeker wanneer gecombineerd met voldoende mogelijkheden tot bij- en omscholing. Denemarken is het meest prominente voorbeeld van een land met een dergelijk welvaartssysteem, meestentijds aangeduid met de term *flexicurity*, een samentrekking van *flexibility* (flexibiliteit) en *security* (zekerheid) (Wilthagen & Tros, 2004).

Instituties staan niet op zichzelf. Informele instituties kunnen de werking van formele instituties (deels) vervangen door transactiekosten te verlagen (Arrow, 1971; Glaeser et al., 2002). Institutioneel collectivisme blijkt positief te correleren met een maatstaf van interpersoonlijk vertrouwen door de World Values Survey (WVS). Zulk vertrouwen kan functioneren als een sanctioneringsmechanisme, waarmee het formele instituties aanvult (bv. Welter & Smallbone, 2006). Er is een grotere kans op productieve vormen van ondernemende activiteit in samenlevingen met een hoge mate van onderling vertrouwen. In institutioneel collectivistische samenlevingen hebben individuen vertrouwen in andere leden van de samenleving in het algemeen (Realo et al., 2008), waardoor we veronderstelden dat de kans op iemands betrokkenheid bij intrapreneurship groter is (hetgeen werd bevestigd door de empirische analyses). Berggren & Jordahl (2006) beweren bewijs te hebben gevonden voor een causaal verband tussen een verbetering in de wettelijke structuur van een land en de bescherming van eigendomsrechten aan de ene kant en toegenomen vertrouwen tussen mensen aan de andere kant. Het is niettemin onwaarschijnlijk dat overheidsbeleid interpersoonlijk vertrouwen – of andere informele instituties die relevant worden geacht voor ondernemende activiteit in de samenleving – op korte termijn kan wijzigen (Elert et al., 2017). Veranderingen in informele instituties duren vaak lang en worden gekenmerkt door padafhankelijkheid (North, 1991; Williamson, 1998; 2000). Hoewel de prevalentie en aard van ondernemende activiteiten het meeste worden beïnvloed door informele instituties (bv. Gnyawali & Fogel, 1994), is het meestal het moeilijkst om hierop te interveniëren.

Het onderzoek in dit proefschrift kent enkele beperkingen. De meeste van deze beperkingen zijn het gevolg van een gebrek aan bepaalde data. Andere suggesties voor toekomstig onderzoek komen voort

uit de beperkte reikwijdte van dit proefschrift. Ten eerste beschikken we slechts over cross-sectionele in plaats van longitudinale data in geval van enkele belangrijke variabelen. Ondanks het gebruik van diverse geavanceerde methodologieën om endogeniteitsproblemen en de kans op omgekeerde causaliteit te beperken, moedigen we ondernemerschapsonderzoekers aan om te werken aan langere en meer gebalanceerde panel data modellen. Zo kan men betere inzichten verkrijgen in de langere termijn monocausale mechanismen tussen de institutionele determinanten en economische consequenties van verschillende soorten ondernemende activiteit (Bjørnskov & Foss, 2016). Idealiter is men in staat om *multilevel* technieken toe te passen op panel data, die beschikbaar zijn over een langere tijdsperiode in geval van alle landen in de steekproef (Shepherd, 2011). Ten tweede missen we enkele relevante analyseniveaus in onze studies. Zo bevat geen van de geschatte modellen variabelen op sector- of regionaal niveau. Belangrijker nog is het gebrek aan data op bedrijfsniveau. In tegenstelling tot ondernemerschap wordt intrapreneurship niet alleen beïnvloed door de nationale context, maar ook door de organisatorische context, die deels tot stand is gekomen onder invloed van de nationale context. De toevoeging van variabelen op bedrijfsniveau draagt bij aan een beter begrip van welke organisatorische factoren intrapreneurship stimuleren en hoe deze interacteren met factoren op andere analyseniveaus. Ten derde maken we geen onderscheid tussen vormen van intrapreneurship met een verschillende mate van innovativiteit. Het is echter interessant om te onderzoeken hoe diverse contextuele factoren op lands- en bedrijfsniveau werknemers richting ondernemende activiteiten leiden die verschillen in hun productieve bijdrage aan de samenleving. Dit vraagt om meer dan alleen de identificatie van ondernemende werknemers bij het verzamelen van data voor internationaal vergelijkend onderzoek. Ten vierde zou toekomstig onderzoek zich kunnen richten op het optimale niveau van ondernemende activiteit in de samenleving, hierbij rekening houdend met ondernemende werknemers. Onze huidige kennis blijft beperkt tot wat het optimale niveau van zelfstandig ondernemerschap zou zijn (bv. Van Praag & Van Stel, 2013). Daar waar de studies in dit proefschrift kijken naar de effecten van instituties op de *allocatie* over twee soorten ondernemende activiteit, is het minstens zo interessant om hun invloed op het totale *aanbod* van

ondernemende activiteit te onderzoeken (Bjørnskov & Foss, 2008). Ten vijfde weerspiegelt een aantal belangrijke variabelen slechts het soort ondernemende activiteit waarbij men op het moment van meten betrokken is in plaats van een echte keuze tussen ondernemerschap en intrapreneurship op basis van de prevalerende institutionele omstandigheden. Aanvullend kwalitatief onderzoek kan de ware overwegingen en cognitieve processen van individuen onthullen (Baron, 1998; Mitchell et al., 2000). Tot slot zouden toekomstige studies interacties tussen allerlei formele en informele instituties kunnen onderzoeken, iets waar het aan ontbreekt in dit proefschrift. Dit zou een ander licht kunnen werpen op hoe verschillende soorten instituties elkaar aanvullen in het voortbrengen van verschillende soorten ondernemende activiteit in de samenleving. Zo kan cultuur de invloed van (formele) instituties op ondernemende activiteit vergroten of verkleinen (bv. Hayton & Cacciotti, 2013).

Curriculum Vitae

Werner Liebregts (1988) was born in Oirschot, the Netherlands. He holds a BSc in *Economics*, and a MSc in both *Economics* and *Econometrics & Mathematical Economics*, all from the Tilburg School of Economics and Management (TiSEM, Tilburg University, the Netherlands). During and directly after his studies, he held several positions as a quantitative researcher at (applied) scientific research institutes in the Netherlands, viz. EIM Business and Policy Research and TNO. In September 2013, he became a doctoral candidate at the Utrecht University School of Economics (U.S.E., Utrecht University, the Netherlands), where he completed this dissertation. His research focuses on entrepreneurship and innovation in general, and on entrepreneurship inside established organizations (or, *intrapreneurship*) in particular. Amongst others, Werner has published in the *International Small Business Journal* and in two Dutch journals, and has contributed to a book published by the Netherlands Scientific Council for Government Policy (WRR). He has presented his work at numerous national and international conferences, seminars and workshops, including the DRUID Academy Conference (2015), the Babson College Entrepreneurship Research Conference (2016), the Annual Meeting of the Academy of Management (2016), and the DRUID Society Conference (2017). Werner has obtained his university teaching qualification (BKO) in August 2017. He will continue doing research as an assistant professor in entrepreneurship (tenure track) at the Jheronimus Academy of Data Science (JADS, 's-Hertogenbosch, the Netherlands), a joint initiative of Tilburg University (TiU) and the Eindhoven University of Technology (TU/e).

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