# Chapter 4 Economic Freedom, Public Policy, and Entrepreneurship

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## Introduction

Although the idea that entrepreneurship promotes innovation and economic development is evident in the seminal writings of Adam Smith (1776) and Joseph Schumpeter (1934, 1942), it is not until relatively recently that policy makers and scholars around the world have started to recognize entrepreneurs as critical drivers of economic progress. Entrepreneurs contribute to social and economic progress by experimenting with new combinations of heterogeneous resources (Bjørnskov and Foss, 2012), introducing innovations, encouraging social change, generating competition, and enhancing rivalry in the economy (Carree and Thurik, 2003; Wennekers and Thurik, 1999). To governments eager to smooth the path to economic growth and job creation, public policy is increasingly viewed as a mechanism to encourage entrepreneurship and innovation (Acs, Åstebro, Audretsch, and Robinson, 2016; Brown, Mawson, and Mason, 2017; Cumming, Johan, and Zhang, 2018). Governments around the world have adopted a wide range of policy schemes to encourage entrepreneurial activity, many of which involve government interventions in the market process that often come at the expense of economic freedom.

Such interventions are often justified by assuming that market failures inhibit individuals from launching innovative start-ups, resulting in a suboptimal quantity of entrepreneurs and spillover-generating innovations (Acs et al., 2016; Colombo, Cumming, and Vismara, 2016). While there is considerable debate over policies aimed at fostering entrepreneurship, these discussions primarily focus on whether interventionist policies should aim to increase the quantity or quality of entrepreneurship. In other words, should taxpayers' resources be redistributed to induce a greater number of business start-ups or to encourage innovative, high-growth start-ups (Block, Fisch, and van Praag, 2018; Colombelli, Krafft, and Vivarelli, 2016; Shane, 2009)? Advocates for the latter often point out that most new businesses create very few jobs, but a small number of young, high-growth

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firms are responsible for a disproportionately large share of wealth and job creation (Åstebro and Tåg, 2017; Decker, Haltiwanger, Jarmin, and Miranda, 2014; Haltiwanger, Jarmin, and Miranda, 2013; Henrekson and Johansson, 2010; Neumark, Wall, and Zhang, 2011). Shane, for instance, suggests that policy makers should "[s]top subsidizing the formation of the typical start-up and focus on the subset of businesses with growth potential. Getting economic growth and jobs creation from entrepreneurs is not a numbers game. It is about encouraging high quality, high growth companies to be founded" (2009: 145).

Such calls for policy makers to redistribute taxpayers' resources towards the encouragement of high-growth start-ups assume that government officials have the ability to identify high-growth firms when they are nascent start-ups—long before they become high-growth ventures (Shane, 2009). They also assume that government officials have the correct incentives to allocate resources towards start-ups with the best potential to become high-growth firms, rather than those with the best political connections (Lerner, 2009; Stigler, 1971; Tullock, 1967). These are non-trivial assumptions that may not hold in practice because they implicitly assume a view of government as an omniscient, benevolent dictator, ignoring the possibility that those in government may not have the information or incentives to implement the desired policies (Holcombe, 2013).

Interventionist entrepreneurship policies also have the potential to result in the allocation of resources and entrepreneurial effort towards less economically productive activities (Baumol, 1990; Sobel, 2008), distorting the decentralized spontaneous functioning of the dynamic market-selection process that enables entrepreneurs to reallocate resources from less to more productive uses (Barnatchez and Lester, 2017; Bennett, 2019; Decker, Haltiwanger, Jarmin, and Miranda, 2014). This process requires market-supporting institutions and policies that are consistent with the principles of economic freedom, including personal choice, voluntary exchange, the protection of person and property, and the freedom to enter and compete in markets (Gwartney and Lawson, 2003).

Indeed a growing body of research provides empirical evidence that more economically free countries encourage more entrepreneurial activity (Bjørnskov and Foss, 2012; Boudreaux and Nikolaev, 2018; Nikolaev, Boudreaux, and Palich, 2018). Similarly, there is growing evidence that subnational economic freedom is associated with entrepreneurial activity across US states (Bennett, 2018; Campbell and Rogers, 2007; Gohmann, Hobbs, and McCrickard, 2008; Kreft and Sobel, 2005; Sobel, 2008; Tuszynski and Stansel, 2018) and US cities (Bennett, 2019; Bologna, 2014; Wagner and Bologna Pavlik, 2019). There is even research showing that entrepreneurial activity is higher in the more economically liberal subnational regions of the former centrally planned economies of China (Chang and Wu, 2014; Park, Li, and Tse, 2006) and Vietnam (Tran, 2018). Combined with a large number of studies showing that economic freedom is a robust determinant of economic growth (De Haan, Lundström, and Sturm, 2006; Gwartney, Holcombe, and Lawson, 2006; Murphy and O'Reilly, 2018) and development (Bennett, Faria, Gwartney, and Morales, 2017; Faria, Montesinos-Yufa, Morales, and Navarro, 2016), this suggests that pursuing policies consistent with the principles of economic freedom is a sustainable framework for encouraging entrepreneurship and economic growth that avoids the necessity for policy makers to intervene in, and potentially distort, the market process.

In the rest of this chapter, we first provide a more thorough discussion of interventionist entrepreneurship policy and its potential problems. We then review the existing country-level evidence on the relationship between economic freedom and entrepreneurship. In the penultimate section, we present some new cross-country evidence that economic freedom is associated with more innovative entrepreneurship. Finally, we offer concluding remarks.

## Government intervention as entrepreneurship policy—some problems

Eager to encourage entrepreneurship as a means to create jobs and foster economic growth, policy makers around the world have implemented a variety of public policies to assist in this endeavor (Acs, Åstebro, Audretsch, and Robinson, 2016). Public policies designed to encourage more people to start businesses are widely popular because of the early empirical finding that small and young businesses are the driving force of job creation in the US economy (Birch, 1979, 1981). Subsequent research has further examined the link between small business and job creation. Although some evidence supports this relationship (Acs and Audretsch, 1990; Birch, 1987; Kirchhoff and Phillips, 1988; Thurik, 2009), a growing body of evidence suggests that most new businesses create very few jobs, if any at all (Åstebro and Tåg, 2017; Fotopoulos and Storey, 2018; Shane, 2009; Van Stel and Storey, 2004). Rather, it is a very small number of rapidly growing firms, most of which are young—the so-called "gazelles"—that account for a disproportionately large share of job creation (Acs and Mueller, 2007; Coad, Daunfeldt, Holzl, Johansson, and Nightingale, 2014; Decker, Haltiwanger, Jarmin, and Miranda, 2014; Haltiwanger, Jarmin, and Miranda, 2013; Henrekson and Johansson, 2010; Neumark, Wall, and Zhang, 2011).

Evidence suggestive that new job creation is largely attributable to a small number of gazelles has led to calls for policy makers to abandon policies that encourage a greater number of entrepreneurs to start businesses in favor of policies that intend to promote high-growth entrepreneurship (Brown, Mawson, and Mason, 2017; Lerner, 2010; Mason and Brown, 2013). Shane, for instance, suggests that the taxpayers' resources be reallocated from "programs that support generic entrepreneurship efforts" to programs that "support high growth companies" (2009: 147). While it is beyond the scope of this chapter to describe all mechanisms and policy schemes adopted by governments to induce entrepreneurship, broadly speaking, such policies represent interventions in the market that, through various types of subsidies, intend to increase either the quantity or the quality of entrepreneurship.[1] Such interventionist policies are potentially problematic for a number of reasons.

First, interventionist policies to encourage entrepreneurship may distort the decentralized and spontaneous functioning of the market, undermining economic freedom by redistributing resources to particular firms and sectors through the political process rather than markets. This can result in the allocation of scarce resources, including entrepreneurial talent, towards less productive firms and sectors. For example, previous research suggests that Belgian firms backed by government venture capital (GVC) are significantly less productive than firms

1 Brown, Mawson, and Mason (2017) and Cumming, Johan, and Zhang (2018) discuss a variety of policies in practice around the world intended to encourage entrepreneurship .

backed by private venture capital (PVC), as well as those not backed by venture capital (VC) (Alperovych, Hübner, and Lobet, 2015). Additionally, a recent analysis of Swedish firms found that those receiving government R&D subsidies are less productive and less profitable (Gustafsson, Tingvall, and Halvarsson, 2017). The subsidization of inefficient firms not only fails to promote economic growth, but it also interferes with the ability of the market-selection mechanism to allocate resources to higher valued uses. This represents an inefficient use of societal resources and it may entice entrepreneurs to pursue unproductive actives such as currying special treatment and subsidies through the political process (Baumol, 1990; Lerner, 2009).

A related issue is the potential for government investments in entrepreneurial activities to crowd out other more productive activities. This issue is of particular concern when governments intervene in the entrepreneurial finance markets in an effort to bridge financing gaps, promote more rapid scale-up of entrepreneurial ventures, or encourage positive innovation externalities. As an example, governments around the world increasingly intervene in venture-capital markets (Colombo, Cumming, and Vismara, 2016; Cumming, Johan, and Zhang, 2018). They generally do so by either investing directly in firms or VC investment funds, or indirectly by partnering with private parties to develop VC funds (Block, Colombo, Cumming, and Vismara, 2018). While there is some evidence suggesting that GVC funding serves a certification role, increasing the likelihood that beneficiary firms receive follow-on private investments (Brander, Du, and Hellmann, 2015; Cumming, 2007; Guerini and Quas, 2016), there is also evidence that government VC funding crowds out private VC funding (Armour and Cumming, 2006; Brander, Egan, and Hellmann, 2008; Cumming and MacIntosh, 2006) and reduces the likelihood of a successful exit by IPO or acquisition (Cumming, Grilli, and Murtinu, 2017).[2]

Government programs that provide direct subsidies to entrepreneurial firms entail discretion on the part of government officials to determine which firms or investors should receive funding. The success of such programs in encouraging growth and innovation depends on government officials' being able to determine which entrepreneurs have winning venture ideas and will establish high-growth firms (HGF). This seems highly unlikely given that start-ups are inherently risky ventures attempting to commercialize novel products, services, or technologies for which no market currently exists. This being so, there is substantial uncertainty around the future success of most new ventures (Knight, 2012). If private-sector investors, who stand to benefit financially from investing in successful start-ups, face a low likelihood of picking winners, then there is no reason to believe that government officials, who lack similar financial incentives, will perform better. By the time a start-up establishes a track record of sales and profits suggesting that it is on its way to becoming an HGF, there is no need for government finance as such firms will be well-positioned to attract private capital to finance their scale-up (Coad, Frankish, Roberts, and Storey, 2016). Some have suggested that policy

2 That there is mixed evidence concerning whether public sector VC investments crowd-out or crowd-in private-sector investments is unsurprising given the debate concerning the effects of public-sector capital investments on private-sector capital investments (e.g., Aschauer, 1989; Gramlich, 1994; Voss, 2002).

makers can improve the probability of their picking winners by investing in high-tech companies, which are more likely to experience high-growth (Lerner, 2010; Shane, 2009), a view popular among politicians and often embedded in entrepreneurship policies. As Brown, Mawson, and Mason conclude, however, "[g]iven their extreme heterogeneity and lack of uniformity, it is very difficult for policymakers to identify HGFs *ex ante*" (2017: 430).

A related concern is that government officials given the discretion to allocate subsidies to specific firms or sectors, as well as legislators tasked with crafting entrepreneurship policies, may be tempted to direct funds or other special favors provided by government programs to low-productivity entrepreneurs who engage in socially unproductive rent-seeking activities (Baumol, 1990; Gustafsson, Tingvall, and Halvarsson, 2017). As an example, the US Small Business Innovation Research (SBIR) program, which provides R&D grants to small businesses, has been criticized for enabling the development of "SBIR mills", or underachieving firms that have managed to win a "large number of awards by cultivating relationships with federal officials" (Lerner, 2002: F81). Similarly, Gustaffson, Tingvall, and Halvarsson (2017) provide evidence that less productive Swedish firms with lower profits are more likely to receive R&D subsidies from the government, a result they attribute to successful rent-seeking by inefficient firms that would likely fail if their fates were to be decided by the market-selection process.

Entrepreneurship policies are often justified as a means to correct market failures and encourage job creation and economic growth. However, such policies often interfere with the market's ability to reward productive entrepreneurs and firms that provide highly valued goods and services with profits and growth and to penalize unproductive entrepreneurs and firms producing goods and services that are not highly valued with economic losses and eventual exit (Sobel, Clark, and Lee, 2007; Von Mises, 1990). Fritsch notes that "the highest priority of any policy towards entry is to secure a smooth and reliable selection of the fittest scenario ... policy should avoid anything that may distort this selection process ... [and] abstain from any interference with fair competition" (2008: 12). By intervening in the market process, most entrepreneurship "policies do not greatly reduce or solve any market failures. Instead, the evidence suggests that they waste taxpayers' money ... and mostly generate ... businesses with low-growth intentions" (Acs, Åstebro, Audretsch, and Robinson, 2016: 36).

But the government can play a meaningful role in encouraging entrepreneurship and innovation. Birch, for example, suggests that governments could indirectly encourage entrepreneurship by lowering taxes and reducing regulations, creating "an environment in which innovative, job-creating firms flourish" (1981: 10–11). Acs further adds that government policy could facilitate the creation of "new firms in all sectors of the economy by all segments of society" (1999) by removing barriers to entry and exit, reducing transaction costs, and minimizing the regulatory burden. In other words, rather than intervening in markets, policy makers can encourage entrepreneurship and innovation, as well as foster the unimpeded function of the market-selection mechanism, by developing institutions and policies consistent with the principles of economic freedom. Indeed, a growing body of empirical evidence suggests that economies characterized by higher levels of economic freedom exhibit more entrepreneurship. We review this evidence next.

## Economic freedom and entrepreneurship—a review of existing evidence

The 2012 edition of *Economic Freedom of the World* contains an excellent chapter by Bjørnskov and Foss (2012), who provide a thorough overview of the theoretical links between various elements of economic freedom and entrepreneurial activity. Here, we summarize their basic argument and refer interested readers to their chapter for a more detailed explanation of these mechanisms. The greater degree to which a nation's institutions and policies reflect the principles of economic freedom, the lower the transactions costs faced by entrepreneurs, including the costs of "searching for, combining, adapting, and fitting heterogeneous resources in the pursuit of profit under uncertainty ... The lower the transactions costs, the more such [entrepreneurial] activity will take place" (Bjørnskov and Foss, 2012: 248). Bennett adds that "entrepreneurs living in more economically free regions are less constrained in their ability to utilize their time, talents and resources to create a new venture to satisfy a perceived market need ... or recognize and capitalize on an unexploited entrepreneurial opportunity" (2019: 9). Indeed, a growing body of empirical evidence suggests that countries with more economic freedom experience more entrepreneurial activity.[3]

Before reviewing the evidence on the relationship between economic freedom and entrepreneurial activity, we discuss some issues related to the concept and definition of entrepreneurship as this will provide some perspective on the nuanced results obtained by various authors. Within the scholarly field that studies entrepreneurship, "entrepreneur" has been understood in a variety of ways, often reflecting "who the entrepreneur is and what he or she does" (Shane and Venkataraman, 2000: 218). Baumol (2010), for instance, distinguishes between innovative and replicative entrepreneurs. Innovative, or Schumpeterian, entrepreneurs develop creative new products, applications of technology, or cost-reducing production methods that lead to substantial improvements in productivity and living standards (Schumpeter, 1934, 1942). On the other hand, replicative entrepreneurs start new ventures that generally mimic other firms in the market, largely reflecting Kirzner's (1973, 1997) notion of equilibrating entrepreneurship that leads to enhanced competition, lower prices, and larger output levels of the same goods and services. A growing body of research focusing on high-growth start-ups reflects the innovative entrepreneurship definition, whereas the myriad studies focusing on self-employment and small business ownership better reflect the replicative entrepreneurship definition (Hurst and Pugsley, 2011).

Several studies on economic freedom and entrepreneurship have employed COMPENDIA's harmonized data on self-employment rates,[4] which is normalized by working-age population, as a measure of entrepreneurship. Nyström (2008), for example, examines the impact of the five areas of the EFW index on self-employment for a sample of 23 OECD countries over the period from 1972 to

3 We restrict our literature review to studies that specifically use an economic freedom index or the various components of one as the main variable of interest, excluding studies that use such variables as a control and those that use policy or institutional measures that reflect economic freedom but are not drawn from an established measure of economic freedom.

4 COMPENDIA is an acronym for COMParative ENtrepreneurship Data for International Analysis, a database constructed by EIM Business & Policy Research (EIM BV).

2002. Her results suggest that countries with smaller government sectors and those with better property-rights institutions and fewer regulations encourage more self-employment. She does not, however, estimate the impact of the overall EFW index on self-employment. For a sample of 25 OECD countries over the period from 1980s to 2005, Bjørnskov and Foss (2012) examine how the five EFW index areas influence self-employment, as well as how self-employment and the EFW index areas influence total factor productivity (TFP). They find that, although property rights are negatively associated with self-employment, a result contradictory to Nyström (2008), they exert a positive direct and overall effect on TFP. They also find that limited government and sound money influence TFP indirectly by positively influencing self-employment, which in turn exerts a positive impact on TFP. Additionally, they find that regulatory freedom exerts a negative direct effect on TFP.

Gohmann (2012) considers what effect the EFW index has on self-employment, but he uses survey data from the Entrepreneurship Flash Eurobarometer Surveys for a sample of 17 European countries and the United States over the period from 2001 to 2004. His results suggest that individuals living in more economically free countries are more likely to be self-employed, as well as more likely to prefer to be self-employed rather than earning wages. Interestingly, he finds that economic freedom's role in enhancing the preference for self-employment (that is, latent entrepreneurship) is higher among those who are actually self-employed than it is for those who are not self-employed.

An increasingly common distinction made in the literature is that between opportunity-motived entrepreneurship (OME) and necessity-motivated entrepreneurship (NME). Individuals who voluntarily start a business because they perceive it as a potentially valuable opportunity to fulfill an unmet market need are engaged in OME, whereas individuals who start a business because they lack other employment prospects are engaged in NME (Nikolaev, Boudreaux, and Palich, 2018). The Global Entrepreneurship Monitor (GEM) dataset provides measures of NME, OME, and total entrepreneurial activity (TEA, or the sum of NME and OME) for a growing number of countries.

Sobel, Clark, and Lee (2007) were the first to use the GEM dataset to study the effect of economic freedom on entrepreneurship. They find that the EFW index is positively associated with TEA in a cross-sectional study of 21 OECD countries for the year 2002. They also find that countries with higher average tariff rates and greater administrative burdens facing those starting a business have less entrepreneurial activity. Bjørnskov and Foss (2008) follow an approach similar to that of Nyström in considering the impact of the five areas of the 2005 EFW index on the 2001 OME, NME, and TEA measures for a cross-sectional sample of 29 countries. Their results suggest that countries with smaller government sectors and more sound monetary policies encourage more OME, NME, and TEA, but the other three areas of the index are not correlated with any of these measures. They also examine how the underlying components of Area 1 (Size of Government) correlate with the different measures of entrepreneurship. They find that: (1) government consumption as a share of GDP is negatively associated with OME, NME, and TEA; (2) transfer payments as a share of GDP are negatively associated with OME and TEA; and (3) limited taxation is positively associated with OME and TEA.

Angulo-Guerrero, Pérez-Moreno, and Abad-Guerrero (2017) use a dynamic panel-data model to estimate the effects of the EFW index on OME and NME for a sample of 33 OECD countries over the period from 2001 to 2012. Their results suggest that economic freedom is positively associated with OME, but negatively associated with NME. The positive effects of economic freedom on OME are driven by strong property rights and low levels of regulation. These two areas, along with greater trade freedom, drive the negative relationship between the EFW index and NME.

Several papers also find that economic freedom not only exerts a direct effect on entrepreneurship, but it also influences entrepreneurial action through other individual-level resources and characteristics. Boudreaux, Nikolaev, and Klein (2018), for example, examine how the EFW index moderates the effects of socio-cognitive traits on the probability that an individual participates in OME. Using a cross-sectional sample of more than 720,000 individuals from 45 countries, their results suggest that individuals with more self-efficacy and alertness to new business opportunities are more likely to participate in OME, but those with a stronger fear of failure are less likely. They also find that the EFW index not only has a positive direct effect on OME, but it also strengthens the positive effects of self-efficacy and alertness, and it weakens the deterrent effect of fear. Additionally, Boudreaux and Nikolaev (2018) examine how the EFW index moderates the effect of an entrepreneur's human, financial, and social capital on their propensity to become an OME for a sample of 45 countries over the period from 2002 to 2012. They find the three types of capital, as well as economic freedom, all increase the probability that an individual pursues OME. They also find that, as the level of the EFW index increases, human and physical capital become less important determinants of entrepreneurship, while social capital becomes a more important determinant.

Several studies have used the Heritage Foundation/Wall Street Journal *Index of Economic Freedom* (IEF) to examine how economic freedom affects opportunity and necessity entrepreneurship. In a cross-sectional study for a sample of 37 countries, McMullen, Bagby, and Palich (2008) examine how the ten factors included in the 2003 IEF correlate with 2002 measures of OME and NME. Their results suggest that: (1) labor market freedom is positively associated with both OME and NME; (2) property rights are positively associated with OME; (3) fiscal freedom and monetary freedom are positively associated with NME. Nikolaev, Boudreaux, and Palich (2018) explore 44 possible determinants of OME and NME for a cross-sectional sample of 73 countries using a robustness analysis method that accounts for model uncertainty.[5] Their results suggest that the IEF is the most robust determinant of both OME and NME for the sample of countries, exerting a positive effect on the former and a negative effect on the latter. Specifically, countries with less corruption and greater monetary and business freedom have higher levels of OME, but lower levels of NME.

While there are some inconsistent results with respect to the different areas of economic freedom and entrepreneurship,[6] the preponderance of evidence from

5 They use the long-run average of their variables, when available, over the period from 2001 to 2015.

6 This is not surprising given the heterogeneity of country samples, time periods, and empirical models estimated in the various studies (Bennett and Nikolaev, 2017).

this small but growing body of literature suggests that more economically free countries encourage greater rates of self-employment and OME, but discourage NME. Additionally, Saunoris and Sajny (2017) find, using Two-Stage Least Squares (2SLS) and quartile analyses for a cross-sectional sample of 60 countries, that the IEF is associated with more formal but less informal entrepreneurship.[7] Individuals residing in more economically free countries have access to better economic opportunities, alleviating the need to become self-employed or enter informal entrepreneurship because they lack other options to earn a living.

While the literature suggests economic freedom encourages self-employment, OME, and formal entrepreneurship, all are arguably measures of the quantity of entrepreneurship and not necessarily reflective of the type of innovative Schumpeterian entrepreneurship that propels rapid job creation and economic development (Henrekson and Sanandaji, 2014; Wong, Ho, and Autio, 2005).[8] Additionally, highly innovative countries such as Japan often score at the bottom of international rankings on self-employment while some less developed countries such as Uganda, where a large proportion of people are subsistence farmers, rank among the top (see, for example, GEM, 2017). Because innovative Schumpeterian entrepreneurship "remains an elusive concept, difficult to define exactly and harder yet to measure" (Henrekson and Sanandaji, 2014: 1,764), there is a paucity of evidence linking economic freedom to this type of disruptive, high-growth entrepreneurship. A few studies, however, provide some evidence that economic freedom is also associated with more innovative entrepreneurship. For instance, Bjørnskov and Foss (2012) find that some components of the EFW Index are positively associated with TFP, a proxy for economy-wide innovation. For a sample of 5,809 firms from 29 countries over the period from 1984 to 2006, Zhu and Zhu (2017) find that firms domiciled in countries with more economic freedom, as measured by the EFW Index, received more patents, a measure of corporate innovation. In a working paper, Bennett and Nikolaev (2019) provide evidence that the EFW index is linked to a composite measure of innovative outputs provided by the *Global Innovation Index* (GII). In the next section, we provide some additional evidence that the EFW index is associated with innovative entrepreneurship using measures of national creative output and knowledge and technology outputs.

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7 The distinction is whether a firm is a legally registered business that complies with the mandates of laws and regulations (Klapper, Amit, and Guillen, 2010; Webb, Tihanyi, Ireland, and Sirmon, 2009). With the possible exception of highly profitable criminal activities such as fraud and drug smuggling, most informal entrepreneurship is likely NME. Dau and Cuervo-Cazurra (2014) provide evidence for a sample of 51 countries over the period from 2002 to 2009 that IEF is positively associated with both formal and informal entrepreneurship.

8 Henrekson and Sanandaji (2014) show that for a sample of 50 countries rates of self-employment, small business ownership, and TEA are negatively correlated with several measures of innovative high-growth entrepreneurship (that is, number of billionaire entrepreneurs per capita; VC investment as share of GDP) and per-capita GDP. Wong, Ho, and Autio (2005) provide evidence that high-potential entrepreneurship is positively associated with economic growth for a sample of 37 countries, but OME, NME, and TEA are not associated with growth. Van Stel, Carree, and Thurik (2005), however, find that TEA is only beneficial for economic growth in countries with high levels of economic development.

## Economic freedom and innovative entrepreneurship

In this section, we provide some new empirical evidence that economic freedom, as measured by the 2016 EFW index (Gwartney, Lawson, Hall, and Murphy, 2018),[9] is associated with innovative entrepreneurship. We use data from the *Global Innovation Index 2018* (GII), which reflects a wide range of innovative activities in the economy by a large number of innovative actors, including not only scientists and manufacturing firms, but also entrepreneurial service-sector firms and public entities. The latest GII provides data for 126 economies, covering more than 90.8% of the global population and 96.3% of global economic output (Dutta, Lanvin, and Wunsch-Vincent, 2018).

The GII comprises two sub-indices: (1) innovative inputs and (2) innovative outputs. The former consists of factors that reflect a nation's capacity to develop innovations, including institutions, human capital, infrastructure, and market and business sophistication. The latter includes measures that reflect a nation's innovative outputs and is based on two main innovation pillars: (i) knowledge and technology outputs and (ii) creative outputs. Each of these two pillars consists of several sub-pillars based on measures that are widely believed to be a key output of the invention and innovation process. Because our focus is on examining the effect of economic freedom on innovative entrepreneurship, we use the two main pillars from the innovative outputs sub-index as proxies for entrepreneurial innovation. Table 4.1 describes the sub-pillars making up the knowledge and technology outputs and creative outputs pillars.

### *Preliminary analysis*

As a first step in our analysis, we sorted the countries in our dataset by level of economic freedom, from lowest to highest, and grouped them into four quartiles consisting of an equal number of countries. For each group, we then computed the mean creative outputs and knowledge and technology outputs scores. Figure 4.1 presents bar charts illustrating these results. Innovative outputs are clearly higher in more economically free countries. Creative outputs, for instance, in the most economically free countries are more than double those in the least economically free countries (figure 4.1A). There is also a nearly two-fold difference in the level of knowledge and technology outputs between the most and least economically free countries (figure 4.1B).

We next plot the EFW index against each of our innovative entrepreneurship measures (figure 4.2). There is a strong positive relationship between economic freedom and both creative outputs (correlation 0.67) and knowledge and technology outputs (correlation 0.52). Creativity plays a fundamental role in the innovation process, and the preliminary evidence here suggests that economic freedom is an essential input to an economy's creative process. More economically free countries are also more likely to engage in the creation of more effective knowledge that is also more easily diffused throughout the economy.

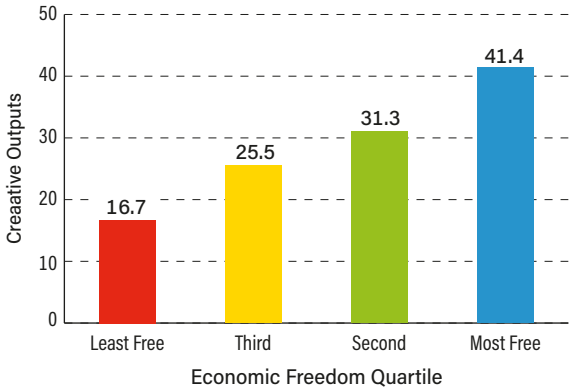
9 As a robustness check, we also performed the econometrics using the average EFW index score over the period 2000-2016 as a means to account for the long-run institutional environment in lieu of the contemporaneous one. Average EFW is highly correlated with the 2016 EFW for our sample (r=0.94) and the econometric estimates are nearly identical for both measures. We omit the results using the long-run average EFW score, but they are available upon request from the authors.

## Table 4.1: The Innovative Outputs Sub-Index from the *Global Innovation Index*

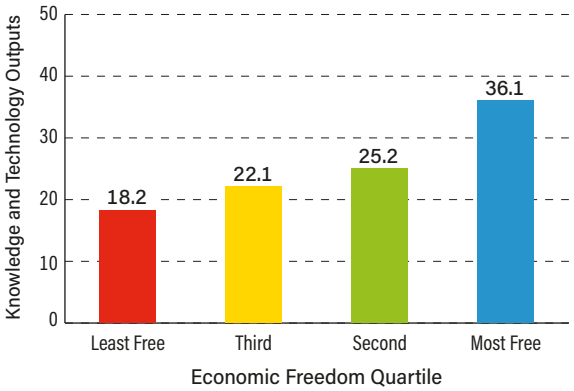
| Knowledge and Technology Outputs Pillar | Creative Outputs Pillar |
|---|---|
| 1. Knowledge Creation Sub-Pillar | 1. Intangible Assets Sub-Pillar |
| 1a. patents applications filed by residents both at the national patent office and the international level through the PCT;<br>1b. utility model applications filed by residents at the national office;<br>1c. scientific and technical published articles in peer-reviewed journals;<br>1d. number of articles (H) that have received at least H citations. | 1a. trademark applications by residents at the national office;<br>1b. industrial designs included in applications at a regional or national office;<br>1c. survey questions regarding the use of ICTs in business and organizational models; |
| 2. Knowledge Impact Sub-Pillar | 2. Creative Goods and Services Sub-Pillar |
| 2a. increases in labor productivity;<br>2b. entry density of new firms;<br>2c. spending on computer software;<br>2d. number of certificates of conformity with standard ISO 9001 on quality management systems issues;<br>2e. high and medium high-tech industrial output as share of total manufactures output. | 2a. cultural and creative service exports;<br>2b. national feature films produced;<br>2c. entertainment and media market;<br>2d. printing, publications, and other media market;<br>2e. creative goods exports. |
| 3. Knowledge Diffusion Sub-Pillar | 3. Online Creativity Sub-Pillar |
| 3a. intellectual property receipts as a percentage of total trade;<br>3b. high-tech net exports as a percentage of total exports;<br>3c. exports of ICT services as a share of total trade;<br>3d. net outflows of FDI as a percentage of GDP. | 3a. generic domains, scaled by 15–69 year old population;<br>3b. country-code top level domains, scaled by 15–69 year old population;<br>3c. average yearly edits to Wikipedia, scaled by 15–69 year old population;<br>3d. mobile app creation, scaled by GDP (bn PPP $). |

## Figure 4.1: Innovative entrepreneurship by EFW quartile

*4.1A: Average score for Creative Outputs, by EFW quartile*



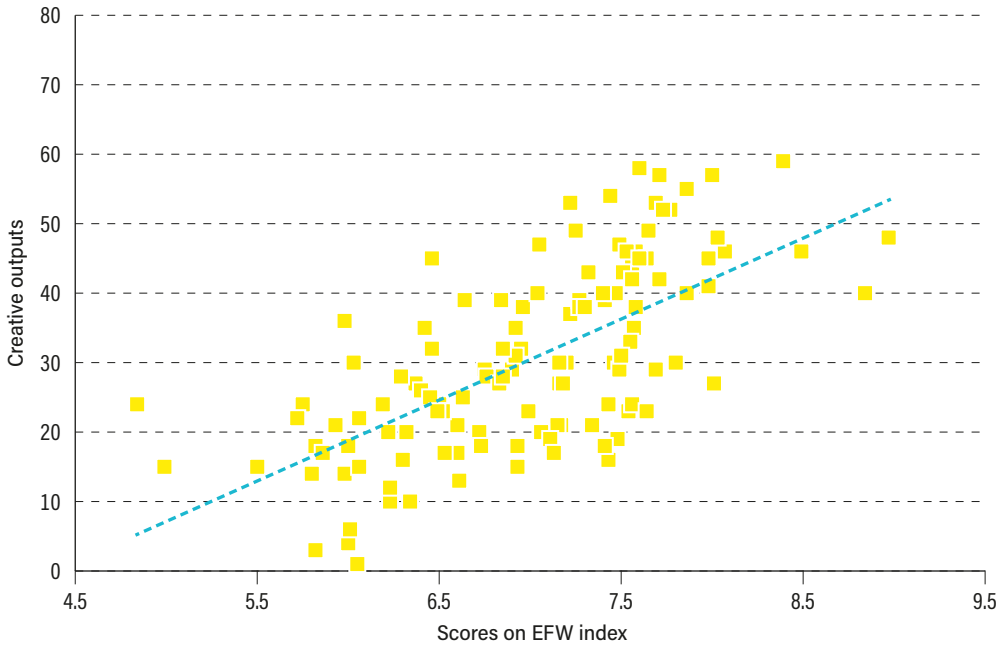

*4.1B: Average score for Knowledge and Technology Outputs, by EFW quartile*



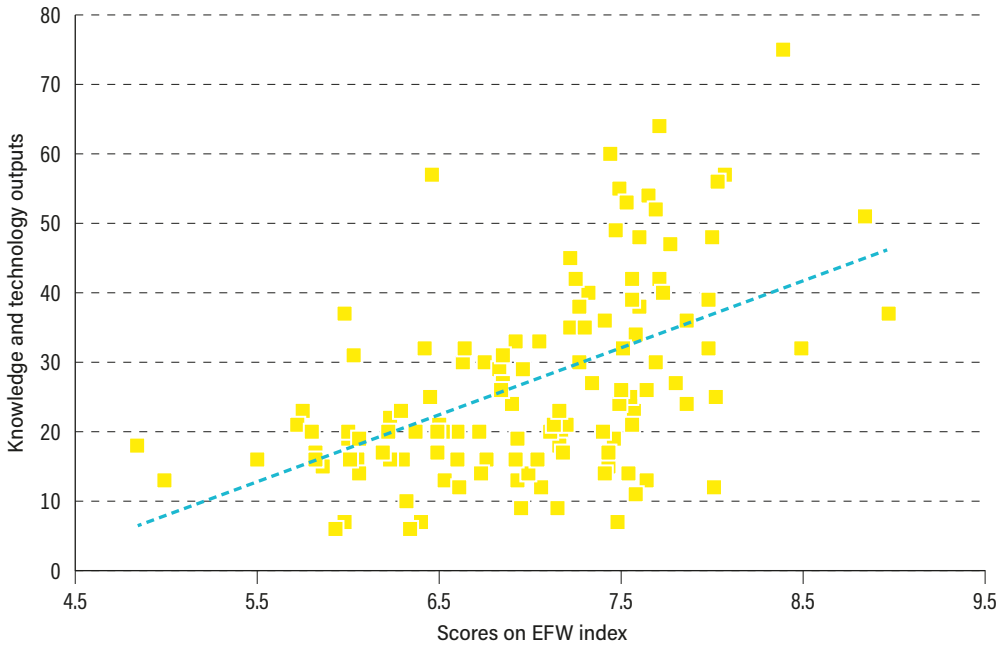

Source: Data on Creative Outputs and Knowledge and Technology Outputs were collected from the *Global Innovation Index 2018* (Dutta, Lanvin, and Wunsch-Vincent, 2018) and were measured on a scale from 0 (least innovative) to 100 (most innovative). Creative Outputs scores ranged from 0.56 (Burkina Faso) to 59.38 (Switzerland). Knowledge and Technology Outputs scores ranged from 5.56 (Yemen) to 74.88 (Switzerland).

Figure 4.2: Innovative entrepreneurship and economic freedom, 2016

*4.2A: Creative Outputs and EFW index*




*4.2B: Knowledge and Technology Outputs and EFW index*




*OLS results*

Our preliminary analysis is suggestive of a strong positive relationship between the EFW index and innovative entrepreneurship; however, other factors may confound this relationship. We therefore use Ordinary Least Squares (OLS) regression analysis to control for a number of factors that have been linked to economic development and innovation in the comparative economic development literature. This includes a set of legal-origins dummy variables that reflect the historical roots of a nation's legal system (La Porta, Lopez-de-Silanes, and Shleifer, 2008),

the shares of a nation's population belonging to the major world religions (Barro and McCleary, 2003), the historical prevalence of infectious diseases (Bennett and Nikolaev, 2019; Nikolaev and Salahodjaev, 2017), latitude to account for the effect of geography (Acemoglu, Johnson, and Robinson, 2001; Easterly and Levine, 2001), and ethnolinguistic fractionalization (Alesina, Devleeschauwer, Easterly, Kurlat, and Wacziarg, 2003).

Table 4.2 presents OLS results using our measures of innovative entrepreneurship as the dependent variable. In model 1, we estimate the simple relationship between the EFW index and creative outputs without any control variables. The EFW index enters positively and is highly significant statistically. The $R^2$ measure suggests that differences in the EFW index alone explain more than 44% of the variation in creative outputs. In model 2, we introduce the control variables described above to account for several alternative explanations for the deep origins of economic development and innovation Although the size of the EFW index's positive effect on creative outputs is reduced, it remains highly significant statistically. We repeat this empirical exercise in models 3 and 4 using the knowledge and technology outputs sub-index as the dependent variable. In model 3, we

## Table 4.2: Economic freedom and innovative entrepreneurship, OLS results

| Variables | (1) Creative Outputs | (2) Creative Outputs | (3) Knowledge and Tech Outputs | (4) Knowledge and Tech Outputs |
|---|---|---|---|---|
| EFW index | 11.65*** | 5.699*** | 9.540*** | 3.061* |
| | (1.228) | (1.263) | (1.436) | (1.566) |
| Disease Pathogens | | –6.199*** | | –5.759** |
| | | (2.136) | | (2.409) |
| Legal Origins | | | | |
| *Socialist* | | –7.676*** | | –18.95*** |
| | | (2.601) | | (6.363) |
| *French* | | –1.631 | | –10.51 |
| | | (2.379) | | (7.111) |
| *Great Britain* | | –3.523 | | –10.63 |
| | | (2.155) | | (6.615) |
| *Scandinavian* | | –9.452** | | –12.18 |
| | | (4.365) | | (9.824) |
| Latitude | | 0.124*** | | 0.192*** |
| | | (0.0362) | | (0.0434) |
| Muslim | | –0.0577* | | –0.119*** |
| | | (0.0297) | | (0.0361) |
| Catholic | | –0.0155 | | –0.0697* |
| | | (0.0278) | | (0.0400) |
| Protestant | | 0.0801 | | –0.0382 |
| | | (0.0606) | | (0.0896) |
| Fractionalization | | –9.471*** | | –7.714* |
| | | (3.391) | | (4.289) |
| Countries | 126 | 114 | 126 | 114 |
| R-squared | 0.441 | 0.710 | 0.266 | 0.617 |

Dependent variable indicated in column header. Robust standard errors in parentheses.
*** p < 0.01, ** p < 0.05, * p < 0.1

find that the EFW index alone explains over 26% of the variation in knowledge and technology outputs and is positive and highly significant statistically, even after accounting for the potential influence of legal origins, geography, religion, ethnolinguistic fractionalization, and the disease environment in model 4.

*2SLS results*

Our analysis thus far suggests that the EFW index is strongly and positively associated with innovative entrepreneurship. Because of limitations in the methodologies employed, we cannot definitely establish causality because it is plausible that innovative entrepreneurship, or its absence, may influence institutional and policy changes such that economic freedom is endogenous to innovative entrepreneurship. Although space does not allow a full treatment of this issue, we attempt to address it with a Two-Stage Least Squares (2SLS) model. Building on the work of Nikolaev and Salahodjaev (2017), who show that economic freedom has its origins in the historical prevalence of infectious diseases across countries (Murray and Schaller, 2010), we use historical disease pathogens as an instrumental variable for economic freedom.

Infectious diseases are historically a major source of morbidity, mortality, and natural selection, responsible for more evolutionary action across the human genome than any other environmental factor (Fumagalli, Sironi, Pozzoli, Ferrer-Admettla, Pattini, and Nielsen, 2011). The Parasite Stress Theory of Values and Sociality describes an evolutionary process linking the historical prevalence of infectious diseases to the development of cultural attitudes, beliefs, and values towards out-group and in-group members as an adaptive psychological immune-system response. Out-group members may carry novel parasites for which local immunity has not been developed and/or they may lack the knowledge of local parasite infection norms and customs related to, for example, hygiene and food preparation (Fincher and Thornhill, 2008). In an effort to safeguard against exposure to, and the contagion of, infectious diseases, groups of people living in regions with high levels of pathogenic stress developed various forms of prejudice against out-group members and in-group assortative sociality (for example, philopatry, xenophobia, and ethnocentrism), leading to more collectivistic cultural values. Meanwhile, groups of people living in regions with low levels of infectious disease stress were less concerned with contracting infectious diseases from out-group members and were therefore more open to economic and social interactions with outsiders, leading to more individualistic cultural values (Fincher, Thornhill, Murray, and Schaller, 2008). As Nikolaev and Salahodjaev explain,"the historical prevalence of infectious diseases ... shaped cultural values associated with collectivism ... which, in turn, led to the development of economic institutions that are inconsistent with the principles of economic freedom" (2017: 124). In other words, countries with high [low] levels of disease pathogens developed more collectivist [individualistic] cultural values, resulting in the development of less [more] economically free institutions.

We report the 2SLS results in table 4.3. Odd-numbered models report the first-stage results in which the EFW index is the dependent variable and is regressed on disease pathogens and a set of control variables. Even-numbered models report the second-stage results in which our measures of innovative entrepreneurship are the dependent variables and are regressed on the predicted values of the EFW index from the analogous first-stage estimates and the set of control variables.

## Table 4.3: Economic freedom and innovative entrepreneurship, 2SLS results

| | (1) EFW index | (2) Creative Outputs | (3) EFW index | (4) Creative Outputs | (5) EFW index | (6) Knowledge and Tech Outputs | (7) EFW index | (8) Knowledge and Tech Outputs |
|---|---|---|---|---|---|---|---|---|
| Disease Pathogens | −0.633*** | | −0.417*** | | −0.633*** | | −0.417*** | |
| | (0.092) | | (0.131) | | (0.093) | | (0.131) | |
| EFW Index | | 22.52*** | | 20.55*** | | 20.07*** | | 16.86*** |
| | | (2.852) | | (5.813) | | (3.137) | | (6.119) |
| LO: Socialist | | | −0.403 | −1.686 | | | −0.403 | −13.39** |
| | | | (0.313) | (6.049) | | | (0.313) | (6.367) |
| LO: French | | | −0.246 | 2.020 | | | −0.246 | −7.118 |
| | | | (0.330) | (6.438) | | | (0.330) | (6.778) |
| LO: Great Britain | | | 0.193 | −6.397 | | | 0.193 | −13.30** |
| | | | (0.316) | (5.941) | | | (0.316) | (6.254) |
| LO: Scandinavian | | | −0.513 | −1.833 | | | −0.513 | −5.100 |
| | | | (0.506) | (10.11) | | | (0.506) | (10.64) |
| Latitude | | | 0.005 | 0.053 | | | 0.005 | 0.126 |
| | | | (0.003) | (0.076) | | | (0.003) | (0.080) |
| Muslim | | | −0.006** | 0.031 | | | −0.006** | −0.037 |
| | | | (0.003) | (0.053) | | | (0.003) | (0.056) |
| Catholic | | | 0.001 | −0.022 | | | 0.001 | −0.076 |
| | | | (0.003) | (0.049) | | | (0.003) | (0.052) |
| Protestant | | | −0.000 | 0.080 | | | −0.000 | −0.038 |
| | | | (0.005) | (0.092) | | | (0.005) | (0.096) |
| Fractionalization | | | −0.581** | −0.843 | | | −0.581** | 0.301 |
| | | | (0.270) | (6.590) | | | (0.270) | (6.937) |
| Stage | 1st | 2nd | 1st | 2nd | 1st | 2nd | 1st | 2nd |
| Countries | 116 | 116 | 114 | 114 | 116 | 116 | 114 | 114 |
| R-squared | 0.290 | | 0.447 | | 0.290 | | 0.447 | |
| IV F-stat | | 46.61 | | 10.11 | | 46.61 | | 10.11 |

Dependent variable indicated in column header. Odd-numbered models are first-stage estimates. Even-numbered models are corresponding second-stage estimates. Robust standard errors in parentheses. IV F-stat is the first-stage F-statistic, which is used to test for weak instrumental variables. Because we have a single endogenous regressor, the Staiger-Stock rule of thumb is that instruments be deemed weak if IV F-stat < 10.
*** p<0.01, ** p<0.05, * p<0.1

Models 1–2 and 5–6 do not include any control variables, while models 3–4 and 7–8 control for the same set of variables included in the OLS model. Across all specification, we document that the historical prevalence of infectious diseases is negatively associated with less economic freedom, which in turn is strongly and positively associated with both measures of innovative outputs. Our results suggest that a one-point increase in the EFW index is associated with increases in creative outputs of 22 points and in knowledge and technology outputs of 20 points. These effects, if taken as causal, are large and economically meaningful. For example, if a country such as Zimbabwe, which is at the bottom quartile of the GII creative outputs rankings, were to enact liberalizing economic reforms that resulted in a one-point improvement in its EFW index score, it would advance to the forefront of the second quartile of most creative countries in the rankings.

Overall, the results are highly consistent with our main findings reported above and provide suggestive evidence that economic freedom is a causal determinant of innovative entrepreneurship. These results contribute to the growing body of evidence that institutions and policies consistent with the principles of economic freedom encourage productive entrepreneurship and innovation. This suggests that policy makers desiring to facilitate more innovative entrepreneurship should consider enacting institutional and policy reforms that enhance economic freedom, rather than intervening in markets with policy schemes that inefficiently redistribute resources through the political process and may create perverse incentives and generate unintended consequences.

## SEM results

Our results thus far suggest that economic freedom exerts a positive direct effect on innovative entrepreneurship, even after controlling for a number of potentially confounding factors. Economic freedom may also influence innovative entrepreneurship indirectly through a number of other channels such as economic development (Bennett, Faria, Gwartney, and Morales, 2017; Faria and Montesinos, 2009), human capital (Berggren and Jordahl, 2006; Faria, Montesinos-Yufa, Morales, and Navarro, 2016), infrastructure investments (Du, Lu, and Tao, 2008; Gwartney, Holcombe, and Lawson, 2006), income inequality (Bennett and Nikolaev, 2016, 2017; Bennett and Vedder, 2013), and market and business sophistication (Banalieva, Cuervo-Cazurra, and Sarathy, 2018; Cuervo-Cazurra and Dau, 2009; Hafer, 2013).[10]

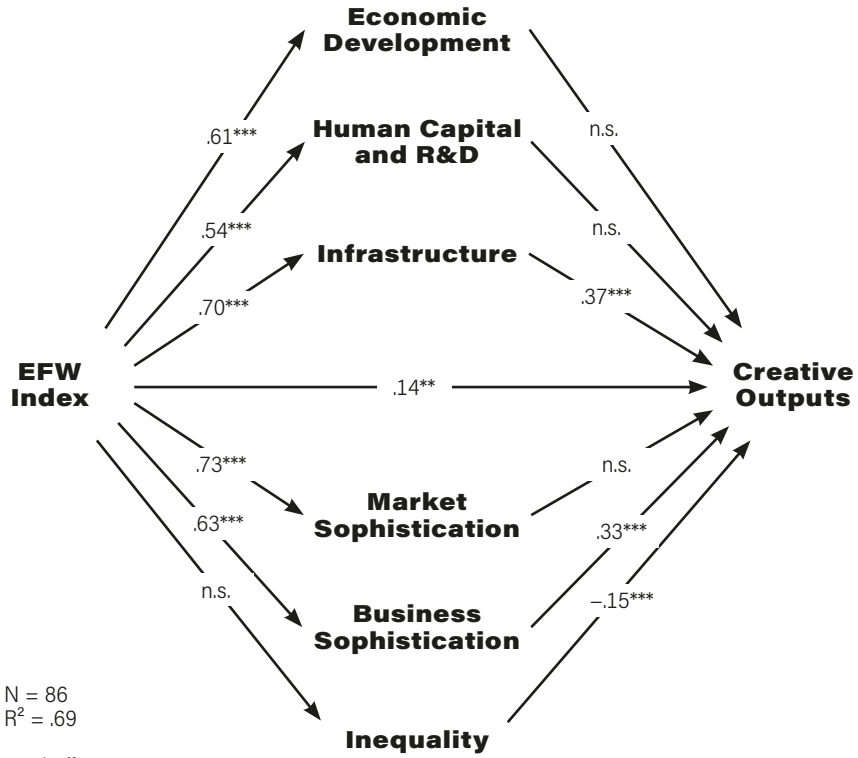
We therefore examine how economic freedom may affect creative innovation through these channels using a Structural Equation Model (SEM) analysis. We use data from the GII innovation input sub-index to measure human capital and research, infrastructure, and both business and market sophistication. Specifically, we use the pillar scores for each of these variables, which are composed of several underlying sub-pillar measures. We use the natural log of 2016 per-capita GPD figures from the World Bank's *World Development Indicators* dataset as our measure of economic development and the net income Gini coefficient from Solt (2016) as our measure of inequality.

Figure 4.3 depicts the results from our SEM in which the EFW index has both a direct and indirect effect on creative outputs via the channels previously described. For ease of interpretation, all reported coefficients are standardized. For example, an increase of one standard deviation in the EFW index is associated with an increase of 0.14 standard deviation in creative outputs. This represents the direct effect of economic freedom on creative entrepreneurship. As an example of the indirect effect of economic freedom, a standard-deviation increase in the EFW index is associated with an increase of 0.70 standard deviation in innovative infrastructure, which in turn increases creative outputs by 0.37 standard deviation. We also find that the EFW index exerts a positive and statistically significant effect on all of the other channels except inequality, but economic freedom only exerts an indirect effect on creative outputs through the channel of business sophistication.

10 These factors are plausibly caused by economic freedom, whereas the set of variables held constant in the OLS and 2SLS models are not. Because of the potential causal relationship between economic freedom and these development outcomes, controlling for them in the OLS and 2SLS models would introduce considerable multicollinearity that would reduce both the magnitude of the effect for economic freedom and its statistical significance.

Overall, our SEM explains nearly 70% of the variation in creative entrepreneurship. Interestingly, we find the indirect effect of economic freedom (unstandardized value = 10.1, $p < 0.001$) to be five times larger than the direct positive effect (unstandardized value = 2.3, $p < 0.001$). While we view these results as somewhat exploratory in nature and in need of additional theoretical motivation and robustness checks, they nonetheless suggest that economic freedom may exert indirect effects on innovation and entrepreneurship through multiple channels.

Figure 4.3: Economic freedom and creative entrepreneurship, SEM results




* Standardized coeffcients reported.

## Conclusion

Policy makers and scholars around the world increasingly recognize the importance of entrepreneurship for job creation and economic growth. For this reason, encouraging entrepreneurship is now generally considered a proper function of public policy. Acs and Szerb note that "any society interested in encouraging entrepreneurship must make it rewarding and easy to do" (2007: 111). Policies encouraging entrepreneurship in practice often seek to reduce the costs of entrepreneurship by intervening in the market process, offering various sorts of subsidies to certain firms or industries. While there is mixed evidence that interventionist entrepreneurship policies provide economic benefits, the market-distorting costs and unintended consequences of such policies are often ignored.

Meanwhile, there is a growing body of empirical evidence that institutions and policies consistent with the principles of economic freedom are positively associated with entrepreneurship. Most of this research has used self-employment or firm-entry rates as a measure of entrepreneurship. Such measures more closely reflect the Kirznerian or replicative notion of entrepreneurship, whereas our analysis employs novel measures of creative and knowledge and technology innovation. These measures better reflect the notion of Schumpeterian or innovative entrepreneurship. Our results indicate that more economically free countries have higher levels of innovative entrepreneurial activity.

Both Kirznerian and Schumpeterian entrepreneurship are important for economic advancement. Kirznerian entrepreneurs act as equilibrating agents who facilitate efficiency in the market process, leading to enhanced competition, lower prices, and larger quantities of goods and services being produced. Schumpeterian entrepreneurs, meanwhile, are disruptive agents who create completely new products and technological advancements that radically reshape our way of life and improve living standards. Our analysis, in combination with previous research, suggests that economic freedom is an important determinant of both types of entrepreneurship.

This suggests that countries seeking to encourage more entrepreneurship and innovation should consider increasing the degree to which economic resources are allocated through markets rather than the political process, reducing regulatory barriers to starting and running a business, limiting policy distortions of the product and labor markets, and improving the protection of private property and the even-handed enforcement of contracts. Economic freedom provides the institutional environment that encourages markets and rewards productive entrepreneurial activity (Baumol, 1990; Holcombe, 1998; Sobel, 2008), serving as the antecedent for entrepreneurship and innovation (Bjørnskov and Foss, 2016). As Acs and colleagues note, "economic institutions ... help to allocate resources to their most efficient uses; they determine who gets profits, revenues, and residual rights of control ... entrepreneurs, operating in productive institutional environments, provide the transmission mechanism from innovation to economic growth" (2018: 505).

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