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Institutions and New Business Startups in the Former Socialist States

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INSTITUTIONS AND NEW BUSINESS START-UPS
IN THE FORMER SOCIALIST STATES

A Thesis
Presented to
the Graduate School of
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ABSTRACT

This paper examines the impact of institutional quality on the level of new business formation in 26 of the former socialist states from 2006-2018. Using cross-sectional and panel data, I find that the quality of a nation's institutions, as measured by the rule of law and control of corruption, has a statistically and economically significant effect on the number of newly registered LLCs. Economies willing to improve their institutional quality can expect more businesses start-ups to register in the formal economy. Specifically, improving the control of corruption by one standard deviation is associated with between 1.5 and 2.4 new businesses registered per 1,000 working age people. Furthermore, I propose that institutional quality also influences an individual's decision whether to operate a new business start-up in the informal or formal sector.

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I. INTRODUCTION

The purpose of this paper is to investigate the strength and significance of the relationship between institutional quality and new business registration in former socialist states. I build on the work of North (1990) in highlighting the impact of institutional structures on economic activity. In this paper, I focus on two consequential economic choices – the choice to start a new business or not, and subsequently, the choice to operate in the formal or informal sector – and ask: How do a country's political institutions influence each of these decisions?

New business start-ups are crucial for the continued development of a modern market economy. J.S. Metcalfe argues that the "dynamic of modern capitalism lies in the combinatorial growth of knowledge and investment opportunities" (2004, 158). New business start-ups foster this growth and innovation by disseminating best practice procedures and knowledge into the market (Lafuente, Szerb and Zoltan 2016). Start-ups also fill gaps in the market and exert competitive pressure on incumbent firms (Bresnahan and Reiss 1991).

The political and economic institutions within a given country will influence the allocation of effort between and among activities in the formal and informal sector. Because people have limited resources to allocate, I assume that individuals make their occupational choices based on their calculations of the net costs and benefits associated with forming and operating a new business start-up. When the perceived costs and benefits of a formal venture outweigh the informal option, it can be expected that there will be a larger amount of formal enterprises, and vice versa.

Political institutions set the balance of costs and benefits associated with different economic activities by placing credible constraints on government behavior. In nations with high-quality institutions, those who abuse power are quickly punished so the threat of

expropriation and other abuses of privilege are mitigated. This helps to protect property rights and ensure inclusive access to opportunity. When individuals feel secure under the prevailing institutions, they will be more likely to secure the benefits of formal registration including the ability to enter and enforce formal contracts and legally own and trade property (de Soto 2000).

In countries with poor-quality institutions, individuals often lack political freedoms and any property rights granted are poorly protected. Thus, citizens will have little confidence in the enforceability and predictability of economic transactions. This uncertainty may disincentivize individuals from forming a new start-up and those that do may choose to "fly under the radar" and open their business in the informal sector. As Acemoglu and Johnson (2005) note, "when there are no checks on the state, on politicians, and on elites, private citizens do not have the security of property rights necessary for investment" (953). Therefore, I hypothesize that the quality of institutions, specifically the rule of law and control of corruption, will be positively associated with the entry rate of new business start-ups in the formal economy.

Those who operate in the informal sector evade legislation and regulation, so many informal economic activities are not declared. Therefore, the majority of this paper will focus on new business start-ups for which there is data, those registered in the formal economy.

My analysis will focus on countries within Eastern Europe and Central Asia, specifically the former Soviet and Yugoslav republics.[1] During the socialist period, Yugoslavia and the Soviet Union, and its satellite states, shared a similar national-federal structure which created a unique institutional arrangement of 'two-tiered socialism'. Although the socialist period ended in the early 90s with the dissolution of the Soviet Union in 1991 and Yugoslavia in 1992, many of

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[1] Data is collected on former Yugoslav republics: Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, Serbia, and Slovenia, former Soviet Republics: Russia, Belarus, Ukraine, Armenia, Azerbaijan, Georgia, Turkmenistan, Uzbekistan, Tajikstan, Kazakhstan, Kyrgyzstan, Estonia, Latvia, Moldova, Albania, Bulgaria, Czech Republic and Slovakia, and former Satellite states: Hungary, Poland, and Romania.

these states are still transitioning from a centrally planned economy to a free market. Thus individuals must base their economic decisions on an institutional framework that is itself in flux. This makes Eastern Europe and Central Asia a good empirical setting to test the interaction between institutions and their impact on the formation of new business start-ups.

I begin by discussing the definition and importance of institutions broadly in section II. The data used to test my hypothesis is detailed in section III. To perform the analysis, I employ two measures of institutional quality, rule of law and control of corruption, from the World Governance Indicators dataset, which annually reports the quality of political institutions in a country. New business start-ups is measured using the number of newly registered LLCs per 1,000 working age people from the World Development Indicators dataset.

Section IV contains my empirical analysis. I begin by presenting and discussing scatter plots of the relationship between business start-ups and my measures of institutional quality. I find that higher rankings of institutional quality correspond to more new business start-ups. I investigate this relationship in depth throughout the econometric analysis by estimating cross-sectional and panel regressions. I find that institutional quality has a positive and significant effect on the number of newly registered LLCs in an economy.

In Section V, I return to the notion of informality. First, informality is defined. Second, estimates on the magnitude of the informal economy and informal start-up rates in the former socialist states are given, which show that both are significant. Next, I elaborate on the role institutions play in an individual's decision of whether or not to register her business. Finally, I highlight the impact informal employment has on the overall economy. Section VI concludes.

II. INSTITUTIONS

i. Definition of institutions

 "Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction. In consequence they structure incentives in human exchange whether political, social, or economic" (North 1990, 3)

A few important aspects of institutions are emphasized in this definition. First, they are "humanly devised," meaning that the rules that govern a society are within human control and created with specific objectives. Thus, institutions will operate to the benefit of their creators, which is not always advantageous to the social welfare. For example, extractive institutions allow a small ruling elite to extract wealth and resources from those living under them. While profitable to the elite, these institutions are found to have long-term adverse effects on those subjugated to them, including lower levels of investment and income (Acemoglu, Johnson, and Robinson, 2001).

Second, institutions are the "rules of the game" that place "constraints" on individuals' behavior. Individuals in a society must take the institutions as given and make political, social and economic decisions accordingly. People adapt to the institutions and work within the limitations given by these institutions to devise strategies that optimize the opportunities provided. For example, in many of the former Soviet and socialist states, the institutions constrained the formal economy giving rise to, in some countries, rather extensive, informal economies to meet demand and overcome shortages from central planning.

Third, institutions' principal effect will be through incentives. Incentives, or as William Baumol (1990) states, "the structure of payoffs in an economy," motivate people to pursue their preferences and can encourage or discourage certain behavior. People weigh the costs and benefits of different types of economic activities to determine which to engage in. One such economic activity is investment. Baumol argues institutions that incentivize innovation and the

production of goods and services will encourage productive investment or activities that contribute positively to economic growth, like new business start-ups. Conversely, if the profits from rent seeking or engaging in illegal activities that benefit the entrepreneur but not the economy outweigh the risks and costs of doing so, unproductive and even destructive forms of investment will dominate. Thus, the incentive structure plays a dominant role in the allocation of resources in an economy.

This definition of institutions allows us to begin to understand how institutional quality directly impacts the economic conditions of a nation. Although the term "new institutional economics" was coined in 1975 by Oliver Williamson, economic theory has long attributed differences in economic performance to the institutional structure of a society. For example, in *The Wealth of Nations*, Adam Smith notes the importance of private property rights, rule of law, and the judiciary, laying the foundation for our modern understanding of institutions' impacts on economic prosperity. North and Weingast (1989) further examine the value of institutions and argue that the government's ability to commit credibly to upholding property rights is a main determinent of economic development in England.

Empirical evidence corroborates the significant role the organization of a society plays in shaping various economic outcomes like income levels (Acemoglu, Johnson, Robinson, 2001), productivity (Hall and Jones, 1999), and entrepreneurial activity (Baumol, 1990, 1993; Acs et al. 2008). It was long hypothesized that geographic (e.g. Diamond 1997) or trade (e.g. Frankel and Romer 1999) related factors could explain global income differences but the work of Rodrik, Subramanian, and Trebbi (2002) substantiate the supremacy of institutions in determining economic success. Kaufmann et al. also find "that there is a strong causal relationship from good governance to better development outcomes such as higher per capita incomes, lower infant

mortality, and higher literacy" (1999, 1). Given the consensus in the literature of the importance of institutions, I hypothesize that greater institutional quality will accompany better economic performance in the form of more business startups. I test my hypothesis in section V, but first I emphasize a few significant aspects of good institutions.

ii. Good institutions

Good institutions secure and define property rights. Property is an expansive term which includes both tangible assets such as capital, plot of land, or tools, and intangible assets such as ideas and inventions. Property rights refer to the ownership of resources and grants owners the ability to use their property how they chose and to collect the residual claims. The protection of private property rights is essential for individuals to invest in private assets. As North and Weingast highlight, "the more likely it is that the sovereign will alter property rights for his or her own benefit, the lower the expected returns from investment and the lower in turn the incentive to invest" (1989, 803).

Secure property rights protect against expropriation and predation from public and private agents, such as confiscation of land by the government or theft of capital and other forms of property by other individuals. Predation can be prevented by placing constraints on government officials' behavior that are enforced through an independent judicary. Effective institutions feature well-defined property rights. This is best achieved by instituting enforceable laws that outline the full liberties granted by owning a resource.

Institutions directly impact transaction costs, and thus, essentially set the price to conduct business. "Transaction costs are the costs of specifying and enforcing the contracts that underlie exchange and therefore comprise all the costs of political and economic organization" (North 1984, 7). These costs include those to identify potential business opportunities and inputs, assess

the market to set appropriate prices, and negotiate and enforce implicit and explicit contracts with vendors and customers. While forming new business relationships will never be void of transaction costs, institutions reduce transaction costs borne by individuals by "reducing uncertainty and establishing a stable structure to facilitate interactions" (Meyer 2001, 358).

James Madison highlights one of the main distinctions between good and bad institutions in *Federalist Paper* No. 51, "in framing a government which is to be administered by men over men, the great difficulty lies in this: you must first enable the government to control the governed; and in the next place, oblige it to control itself" (1788). Good institutions check the power of the governing class. Weak institutions are often altered to benefit those in power or government officials renege on their commitment to uphold the institutions in place to satisfy their personal needs or desires. Corruption or collusion by those with enforcement capabilities weakens institutions. For this reason, strong institutions often incorporate a system of checks and balances to prevent such activities, like an independent court system or well-defined process by which rules and laws can be amended. In addition, strong institutions are able to adapt and integrate new, relevant information to maintain successful governance throughout generations.

iii. Example of the effect of institutions on investment

As noted in the introduction, I am looking at the relationship between institutional quality and new business start-ups. I have defined the importance of institutions and the qualities of good institutions, but how do institutions affect business start-ups? To illustrate the relationship between institutional quality and start-ups, I juxtapose the hypothetical career progression of equally skilled builders. Damien works in a society with bad institutions. Gabriel works in a society with good institutions.

From an early age, Damien and Gabriel both showed a natural aptitude for construction, building a kitchen table, bookshelf, or desk, useful items to help their families go about their day to day activities. Both are ambitious and actively seek out opportunities to turn their skills into a lucrative professional career. Where Gabriel lives, real estate is seen as a stable and profitable investment. Many contract with builders to build personal homes or rental properties. Potential owners can acquire loans from banks and the courts ensure that all involved parties uphold their parts of the contract. Additionally, real estate values tend to increase overtime, providing risk-adjusted returns to owners. However, where Damien lives, real estate is a risky investment due to insecure property rights. The courts are unpredictable, often siding with the party who holds the most political power, which is often purchased. High transaction costs and interest rates inhibit reputable borrowers from getting loans from banks. Many live in government housing due to the onerous practices required to acquire and secure private property.

With his skills, Gabriel soon becomes a licensed general contractor and decides to open his own construction firm. He registers his company as a limited liability corporation (LLC), receives a loan from a local bank to open a storefront and begins operations within a matter of weeks. He hires a few employees to work under him paying them through payroll services. He also pays federal and state taxes each year, thus contributing to the welfare of his community. He rents out machinery and contracts with plumbers, electricians, welders, and many other tradesmen to build new homes. His business quickly excels. He advertises his services across the county and receives a plethora of high profile contracts to build grandiose residences. Given the heavy workload, he expands his business and employs over 50 full-time employees. At the end of his career, he transfers the ownership rights of his now million dollar corporation to his son who will continue on the family legacy of crafting residential masterpieces.

Without secure property rights, Damien takes a position working in the government and retires his carpentry to that of a hobby. Soon Damien's paycheck at the government agency does not cover his bills and he needs a supplemental income. He begins building furniture for friends and family, and soon opens a business in the informal economy. Despite his inability to advertise, Damien expands his client base through word of mouth. Demand grows steadily for his quality goods, and faced with an overwhelming variety of orders, he hires a few relatives to work for him and pays them cash. He must keep his operation concealed to avoid detection by the government who will surely extract his assets if made aware, so he only pays taxes on his income from his government position and hides the remainder of his income in cash.

Careful to not draw notice from the exploitative auditors of his local government, Damien finds himself unable to expand his business beyond that of a garage-based enterprise. Eventually, though, he acquires enough capital to move out of his country in search of a land with more secure property rights to pursue his dreams of becoming a homebuilder.[2]

While a fictional example, this highlights a few important consequences of institutional quality. When individuals believe that their property rights are well defined and protected, they become more inclined to engage in business ventures, especially those requiring a large sunk investment. "Without property rights, individuals will not have the incentive to invest in physical or human capital or adopt more efficient technologies" (Acs, et al. 2018, 505). Bad institutions, those that facilitate corruption or a weak rule of law, often reward rent seekers while disadvantaging producers thus crowding out firm creation. Lower property rights decreases economic returns. Gabriel was able to reap high returns on his investment, leading him to start

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[2] Across the Western Balkans, there is an exodus of educated and trained workers seeking to reap higher returns on their skills elsewhere. Bosnia and Herzegovina, Croatia, North Macedonia, and Serbia suffer from the greatest brain drain earning the Western Balkans the nickname 'human capital exporters.' (Vračić 2018)

his own company, whereas Damien was only able to achieve enough of a return on his investment to remove himself from participating in the oppressive institution's economy at all. Damien may have ultimately been as personally satisfied as Gabriel, but while Gabriel continues to contribute to the formal economy, Damien's departure removes at least one worker from the formal economy, and eliminates his potential contributions to the welfare of his community.

Good institutions incentivize productive entrepreneurship. Gabriel was able to use his skills to start his own company, knowing his contracts would be enforceable. Damien was deterred from contracting with others due to the unreliable court system. When the threat of expropriation is mitigated, individuals have more opportunities and incentives to make long-term investments. However, where predation by public officials is common, people may choose to invest elsewhere, as shown by Damien's decision to leave the country.

The above discussion suggests that there will be a strong relationship between new business start-ups and institutional quality. I build upon this notion and attempt to empirically substantiate the importance of institutions to new firm creation in the former socialist states located in Eastern Europe and Central Asia. I focus on this set of countries due to their comparable former institutional structures and shared history. Since the dissolution of the U.S.S.R. and Yugoslavia, some countries have improved their institutions by undergoing vast structural reforms, like Romania and Serbia.[3] Other institutions, like Poland and Hungary, have worsened. "In the case of Poland this occurred because of limited constitutional power and frequent government changes, in Hungary, it is due to inconsistent policy making" (Horváth and

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[3] Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia are all EU countries. Albania, Montenegro, North Macedonia, and Serbia are all candidate countries for the EU, meaning that they are undergoing structural reforms, as a part of the accession process, to conform and align their institutions with EU legislation. While EU membership does not necessitate higher quality institutions, the accession process and membership can have a positive effect on the quality of institutions in these states.

Kozenkow 2016). Some countries' institutional quality has stagnated, neither declining or improving, like Estonia, Slovenia, and Bulgaria. I empirically analyze the "Gabriels" in a society, the individuals who are able to own, register, and operate a business in the formal economy. Are the institutions within the former socialist states conducive to firm creation?

III. DATA SOURCES AND VARIABLES

I will use cross-sectional and panel data models to specify the relationship between institutions and new firm creation in 26 of the former socialist states. To empirically estimate the effect of the quality of institutions on new business start-ups I use measures of firm creation, institutional quality, regulation to entry, and economic development. This section discusses the principal variables and some of their limitations. A full description of the methodology used to construct and report each variable and its sources is included in the appendix. Because data on business start-ups is only available from 2006 onward, I focus on the years between 2006 and 2018. Turkmenistan and Bosnia and Herzegovina are excluded from the analysis due to the lack of data on new businesses.[4]

i. New business start-ups

My dependent variable is the number of new business start-ups per 1,000 working age people. Collected from the World Bank's Doing Business database, this variable captures new business density in a country. It gives the gross new entry, meaning the number of newly registered LLCs in a given year. The number of business start-ups is indicative of how many

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[4] According to the World Bank "statistical capacity is a nation's ability to collect, analyze, and disseminate high-quality data about its population and economy" (2020). A country's inability to provide statistics as a public good or maintain effective statistical systems can reflect poor quality institutions. Data allows governments to make better informed public-policy decisions and can enhance transparency and accountability. Therefore, a low statistical capacity can reflect a desire to maintain discretionality.

people in a society view operating an independently owned business in the formal economy as a viable career option.

New firm start-ups are based on the number of newly formally registered businesses with limited liability as the definition of these corporations is globally consistent making it a suitable measure for cross-country analysis. [5] It is important to note that this measure has a few drawbacks that may lead to the underreporting of the true number of start-ups. First, this measure does not capture the total number of businesses operating in a country as the annual number of closed businesses is not recorded. Second, all companies not of limited liability are excluded, such as sole proprietorships and partnerships, due to differences in definition. However, for many small business owners, LLC is an attractive choice of firm structure due to the flexibility and protections offered, making this variable a useful proxy for formal firm registration of new start-ups.

Most importantly, this measure's coverage is limited to the formal sector due to the lack of data on the number of businesses operating in the informal sector. The informal sector, especially within the former Socialist states, is a significant component of the economy. The informal economy, often stigmatized as the "black market" or characterized as illegal activity, merely refers to unofficial or unregistered enterprises. The size of the informal sector varies among countries, but it is estimated that 25 percent of the employed population engages in informal employment in Europe and Central Asia (World Bank Group 2019). I expand upon the significance and magnitude of informality in this region in section V, the case study.

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[5] Limited liability companies (LLC) refer to a firm structure for small business owners globally whereby the firm's owners and members, while the residual claimants, are legally separate from the firm. Personal assets of the firm's owners and shareholders will not be used to cover the debts and liabilities of the firm. There is no limit to the number of shareholders an LLC can have and some countries only require one member, the owner, to incorporate the business.

ii. Institutional quality

My variable of interest is institutional quality. Institutions are deeply embedded within a society and are much easier to capture theoretically than empirically. The importance of institutions – the rules of the game – are widely acknowledged, although differences in institutional quality across countries are difficult to measure.

To measure institutional quality, I will be using two aggregate measures that are a part of the World Governance Index. This dataset was developed by Daniel Kaufmann, Aart Kraay and Pablo Zoido-Labton in their paper "Governance Matters" (1999) to "measure subjective perceptions regarding the quality of governance in different countries" (2). In association with the World Bank, this dataset is updated annually.

The perception that predictable rules will govern society informs the decisions of relevant parties including entrepreneurs, foreign investors, and denizens of a country. Economically active people are less likely to invest where corruption is perceived to be high and the rule of law weak (Wei 2000). The Rule of Law (*law)* and Control of Corruption (*corrupt*) indexes are relevant proxies of institutional quality as "the confidence of residents of a country in these institutions is required if they are to contribute to good governance" (Kaufmann, Kraay and Zoido-Labton, Governance Matters 1999).[6] Additionally, objective differences in governance may not yield comparable measures for a cross country analysis. As Rodrik et al. explain "institutional solutions that perform well in one setting may be inappropriate in other settings without the supporting norms and complementary institutions" (2002, 22). Simply measuring objective differences may distort what is truly happening within the countries.

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[6] Kaufmann, Kraay, and Zoido-Labton define governance "broadly as the traditions and institutions by which authority in a country is exercised. This includes (1) the process by which governments are selected, monitored and replaced, (2) the capacity of the government to effectively formulate and implement sound policies, and (3) the respect of citizens and the state for the institutions that govern economic and social interactions among them".

Rule of law "measures the extent to which agents have confidence in and abide by the rules of society. These include perceptions on the incidence of both violent and non-violent crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts" (Kaufmann, Kraay and Zoido-Labton, Governance Matters 1999, 8). Control of corruption measures the "perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests" (8).

I use both the rank of a country's quality of rule of law and control of corruption to capture different aspects of good governance. However, unsurprisingly, the rule of law and control of corruption variables are very highly correlated, 96.61 percent. A government who exercises the rule of law more effectively is likely to have a greater ability to control corruption. Additionally, citizens who lose trust in the government's ability to control corruption are less likely to trust the government's ability to enforce contracts. It is expected that positive changes in institutional quality will be associated with more business start-ups.

Measuring the practical effect of institutional quality is very difficult. Rule of law and the control of corruption are only crude proxies of the multifaceted institutions that govern social, political, and economic interactions. While the perceptions of institutional quality may change, the actual institutions that govern may not. For example, citizens may perceive a reduction in corrupt activities, while in reality, the same activities take place more covertly. In the next section, empirical analysis, I attempt to estimate the magnitude of influence institutions have on the decisions of economically active people.

iii. Ease of starting a business

The primary variable I control for is the ease of starting a business. Studies on firm creation are attentive to the regulatory environment potential owners face. Djankov et. al (2002), Klapper et. al (2006), and Klapper and Love (2010), among others, find that the costs, days, and procedures required to start a business are important predictors of the number of new firm registrations. In particular, when the cost to register and operate a business decreases, individuals who were previously burdened by regulation may be inclined to start a new business. Following their work, I include the variable (*Ease of Starting a Business*) to capture the amount of regulation in a country.

This indicator was developed by Djankov et. al (2002) and the World Bank (2003) as a part of the Doing Business database to measure how efficiently an entrepreneur can legally open and operate a business in a given country. Estimates of "the number of procedures that firms must go through, the official time required to complete the process, and it's official cost" are gathered from five LLCs owned by married men and five LLCs owned by married women. In this context, a procedure refers to all required interactions with third parties, like government officials, to obtain the necessary licenses, permits, and approvals to officially run a business. Thus, a one-step increase in *Ease of Starting a Business* alleviates a non-trivial burden to starting a business.

This indicator is an informative measure of the regulation faced by individuals in this study as the data is collected from LLC owners. While the principles embedded within *Ease of Starting a Business*, may be indicative of institutional quality, there is a very weak linear relationship between *Rule of Law* and *Control of Corruption,* indicated by a correlation coefficient of 0.1678 and 0.1204 percent respectively. Rather than denoting the economic and

financial institutions within a country this measure captures the cost of starting a business in the formal economy.

iv. Economic Development

I control for economic development by including two covariates, GDP per capita and human capital. Studies, such as Klapper and Love (2010) and Djankov et. al (2010), find that more economically developed countries have a higher entry rate of new businesses in the formal sector. Therefore, it is expected that countries with higher income levels and human capital accumulation, will have more business start-ups in the formal economy. Expectedly, GDP per capita is highly correlated to the rule of law and control of corruption measures, 83.87 and 80.38 percent respectively, meaning that changes in institutional quality are associated with shifts in income levels and vice versa. This correlation can cause the effect of institutional quality to become muddled, however, it is important to control for income as it is expected that more wealth can stimulate more business start-ups.

Human capital refers to the amount of skills, experience, and knowledge people have within an economy. A knowledgeable workforce can disseminate innovation within a community or drive skilled individuals to capitalize upon their know-how by starting a business. Davidsson and Honig (2003) substantiate the importance of education for young entrepreneurs and find that formal education and experience both influence an individual's decision to start a new business. I control for education using the human capital index from Penn World Tables 9.1 which is "based on average years of schooling from Barro and Lee (2013) and an assumed rate of return to education, based on Mincer equation estimates around the world" (Feenstra, Inklaar and Timmer

2015). It is important to note that six of the former socialist countries do not have data on human capital which restricts the analysis, when human capital is included, to 20 countries.[7]

Summary statistics for the cross-sectional dataset and are reported in table 1. Table 2 states the summary statistics for the panel dataset. I now turn to my empirical analysis. I use the variables stated above to test my hypothesis that higher quality institutions will stimulate new business start-ups to enter the formal economy.

IV. EMPIRICAL ANALYSIS

In this section, I will run a variety of regressions to best estimate the strength and significance of the relationship between institutional quality and new business start-ups. Charts 1 and 2 illustrate the relationship between new business startups and institutional quality, as measured by rule of law and control of corruption respectively. This is consistent with my hypothesis that higher institutional quality will correspond to more business start-ups. To test my hypothesis econometrically, I first perform a cross-sectional analysis, treating each country as a single observation, to analyze the average effect of each variable on the number of business start-ups in former socialist states between 2006 and 2018. Next, I set up my data as a panel and run a fixed effects estimation to capture the contemporaneous relationship between new business start-ups and institutional quality.

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[7] Azerbaijan, Belarus, Georgia, Montenegro, Republic of North Macedonia, Uzbekistan are excluded due to lack of data on human capital.

i. Cross-Section

The cross-sectional model presented in this paper assumes that new business start-ups lead to economic growth and seeks to specify only the relationship between institutions and new firm creation. The cross-sectional model is specified in equation 1:

$$NewBusinessStart\text{-}ups_i = b_1 InstitutionalQuality_i + b_2\ EaseofStartingaBusiness_i + b_3 GDP_i +$$
$$(1) \qquad b_4\ HumanCapital_i + b_5\ RegionalDummy_i + \alpha + \varepsilon_i$$

NewBusinessStart-ups$_i$ denotes the average number of new LLCs per 1,000 working age people for country i. The parameter α is the intercept and the mean zero error term are denoted by ε_i. I average each variable for the years 2006 – 2018. In other words, the model examines how the quality of institutions, regulations on business start-ups and other factors affect new business start-ups over the twelve-year time period. Averaging each variable minimizes year-to-year variation and provides a picture of the long-term relationship between new business start-ups, institutional quality and the other covariates.

As previously stated, institutional quality is difficult to measure so I will employ two variables, *Rule of Law* and *Control of Corruption* to capture institutions in a country. To avoid problems due to multicollinearity, I test each measure of institutional quality on new business startups separately. I start by regressing the institutional quality variables alone. Column 1 in table 3 and 4 report the results when rule of law and control of corruption are regressed on new business startups. The effect of institutional quality on the number of new LLCs registered in an economy is statistically significant and of similar magnitude regardless of the measure institutional quality. Consistent with my predictions, improvements in institutional quality are associated with greater firm creation. A country with a positive one standard deviation change in institutional quality, whether measured by *Rule of Law* or *Control of Corruption,* is associated with approximately two additional LLCs registered per 1,000 working age people.

Of course, other things affect new business start-ups. The second specification, reported in column 2, controls for the cost of registering a business by including the score indicating the difficulty of starting a business in a given country, *Ease of Starting a Business*. Remember that a larger score on this index means less government regulation to enter the formal economy. The estimated coefficient on ease of starting a business is positive, statistically significant, and of considerable magnitude when regressed with institutional quality. A country with a one standard deviation improvement in the efficiency of registering a business in the formal economy is associated with approximately one new LLC registered per 1,000 working age people. These results align with my expectations, less regulation to entry allows new business startups to enter the formal economy.

To control for the country's development, the third specification adds *GDP per Capita* and *Human Capital*. Finally, I include dummy variables for each of the former regime types, *Soviet, Satellite, Yugoslavia,* to control for shared history, internal trade patterns, stability, and other regional characteristics. Results are reported in columns 3 and 4 respectively. None of these variables have statistical significance. However, the addition of these variables does not reduce the magnitude on the coefficients of institutional quality, on the contrary, the coefficients on both rule of law and control of corruption actually increase. On average, if a country's ability to control corruption increases by one standard deviation, there will be approximately 2.8 new LLCs registered per 1,000 working age people, when all variables are controlled for.

The effect of institutional quality on new business start-ups is statistically and economically significant in all eight specifications. The fact that the magnitude of the coefficient on rule of law and control of corruption does not decrease with the addition of variables indicates that the relationship between institutional quality and firm creation is stable. However, this model has a

few drawbacks. The cross-sectional model can be problematic for countries whose economies have dramatically changed over this time span, as variation within countries is averaged out. Additionally, there are many unobservable differences across countries that the regime dummy variables do not capture, like cultural and business practices, that could influence individuals in their decision to register and operate an LLC. I will further parse out the effect of institutional quality on new business start-ups by running a fixed effects model using panel data.

ii. Fixed Effects

The cross-sectional results are consistent with the model's prediction. To further test my hypothesis, I use a panel dataset. This approach allows me to analyze the relationship between institutional quality and new business start-ups over time. While I include dummy variables to control for regional effects, the cross-sectional model may suffer from omitted variable bias due to unobservable characteristics that are correlated with new business start-ups such as business practices or attitudes toward entrepreneurial activities. With a fixed effects model, omitted variable bias is less of a concern because many factors not controlled for in the cross-sectional analysis are picked up by the inclusion of dummy variables for each country.

The main advantage and disadvantage of this approach is that it excludes time invariant characteristics. To accurately estimate the effect of institutional quality on new business start-ups there must be sufficient variation in institutional quality over time. This may seem paradoxical as institutions are persistent and evolve slowly. However, as charts 3 and 4 show, many of the former socialist states do see changes in trends of institutional quality from 2006 to 2018, such as Hungary and Belarus. Furthermore, countries that exhibit institutional changes will have greater influence on the estimates than countries whose institutional quality remains steady.

To capture the contemporaneous relationship between new business start-ups and institutional quality I run a fixed effects model, specified in equation 2:

$$NewBusinessStart\text{-}ups_{it} = b_1 InstitutionalQuality_{it} + b_2\ Start\text{-}upRegulation_{it} + b_3 GDP_{it} +\quad (2)$$
$$b_4\ HumanCapital_{it} + \alpha_i + \varepsilon_{it}$$

NewBusinessStart-ups$_{it}$ denotes the average number of new LLCs per 1,000 working age people for country i in year t. The parameter α is the intercept and the mean zero error term is denoted by ε_{it}. As in the cross-sectional model, I will first regress the number of new business start-ups with each measure of institutional quality as the sole independent variable. Results are reported in column 1 of tables 5 and 6.

Consistent with my hypothesis, institutional quality has a significant effect on the number of newly registered LLCs when both rule of law and control of corruption are used to measure institutions. When a country improves their rule of law ranking by one standard deviation there is a positive association with roughly 1.4 new LLCs registered per 1,000 working age people. Unlike in the cross-sectional model, a country's ability to control corruption has a much higher effect on new business start-ups. A positive improvement by one standard deviation in a country's control of corruption ranking is associated with approximately 2.4 new LLCs registered per 1,000 working age people.

I now detail the principal findings when the other covariates are included. Estimates are stated in column 2 and 3. The inclusion of *Ease of Starting a Business* reduces the explanatory power of the rule of law measure significantly where a one standard deviation improvement is associated with less than 0.5 new LLCs registered per 1,000 working age people. When control of corruption is used to measure institutional quality, the inclusion of *Ease of Starting a Business* decreases the magnitude of the coefficient but the estimate remains economically significant. A

one standard deviation improvement in the control of corruption ranking is associated with roughly 2.3 new LLCs registered per 1,000 working age people.

Moving to the third specification, the addition of proxies for economic development further diminishes the explanatory power of institutional quality. The coefficient on *Rule of Law* becomes negative although its magnitude is reduced by a similar amount as in the second specification, suggesting that there is not enough variation in the rule of law measure to accurately estimate its effect on new business start-ups. GDP per capita is statistically significant although it has a nominal effect on new business start-ups regardless of the measure of institutional quality. The control of corruption holds statistical and economic significance when all variables are included in the model. A one standard deviation increase in the control of corruption ranking is associated with 1.5 new LLCs registered per 1,000 working age people. Human capital and the ease at which an individual can start a business in a given economy both have a positive but individually insignificant effect on new business start-ups regardless of the measure of institutional quality used.

iii. Summary of results

The quality of institutions plays an important role in the development of new business start-ups in the former socialist states. All of the estimated coefficients for each measure of institutional quality in both the cross-sectional and fixed effects models are statistically significant. With one exception, rule of law in the final version of the fixed effects model, the coefficients on institutional quality are all positive. Further, again with the exception of rule of law in the fixed effects model, a one standard deviation increase in institutional quality has an economically significant effect on new business start-ups. The estimated coefficients for institutional quality in the cross-sectional model are more stable than the estimates in the fixed

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effects model. I attribute this to differences in model specification, averaging each variable removes year-to-year variation and could yield more stable estimates. Also, insufficient variation in institutional quality could lead to unstable estimations in the fixed effects model.

Human capital is statistically insignificant in every regression. The ease at which individuals can start a business is only statistically significant in the cross-sectional model and in only half of the regressions. GDP per capita is only statistically significant in the fixed effects model. Insignificance can be explained for a few reasons. First, improvements leading to less regulation or greater human or physical capital accumulation may take a few years to take effect. Given the small-time frame of 12 years, the effect may not be fully discernible within this framework. Second, this analysis only covers 26 countries, expanding the dataset to include more countries, and thus more observations, would increase the accuracy of the estimates. Overall, insignificance does not mean that these measures do not have an effect on an individual's decision to register a new LLC but rather that the data is not sufficient to make a conclusion about the effect on new business start-ups. Overall, the results of these regressions support my hypothesis that institutional quality has a positive effect on the number of new business start-ups in a country.

The empirical analysis presented in this paper utilizes available data on new business start-ups registered in the formal economy. However, one cannot understand the full economic and institutional conditions of the former socialist states without considering the informal economy. "The informal economy was an essential part of the former communist economies and is now an important part of the transition economies of Central and Eastern Europe" (Wallace and Latcheva 2006, 84). In these nations, under central planning, shortages of necessary goods were commonplace and the informal economy arose to meet demand. Without data on firms in

the informal economy, the empirical analysis is limited in portraying a full picture of new business start-ups in the region. In the next section, I elaborate upon the definition and determinants of informality as well as the relationship of the informal economy to the formal.

V. A LOOK INTO THE INFORMAL ECONOMY

There is an innumerable amount of decisions required to register and operate an LLC. Chief among those, the decision to run a business or not and, subsequently, the decision to register the business or not. Those living in a country with secure and well-defined property rights may not consider the decision to register their business or not, preferring the protection of the law. However, in some former socialist states "many firms chose to operate in the informal sector to avoid burdensome regulations, taxation or corruption" (Okawa 2019, 76). Others may choose to test out their start-up in the informal sector to determine if their business is profitable enough to undertake the cost of registration.

This section begins with a definition of informality. Then, estimates on the size of the informal economy and informal start-up rates in the former socialist states are given. Next, I explore how the quality of institutions influence the decision among nascent business owners to operate in the informal or formal sector. Finally, I briefly discuss the impact informal employment has on the economy.

i. Definition of informality

The informal economy is sometimes referred to as the "black market" or "shadow market" and is kept "underground." There is a lack of consensus within the literature on the definition of informality. In this paper, I utilize a definition of informality that aligns with the new institutional economics classification system. According to Edgar L. Feige, "the informal

economy comprises those economic activities that circumvent the costs and are excluded from the benefits and rights incorporated in laws and administrative rules covering property relationships, commercial licensing, labor contracts, torts, financial credit and social security systems" (1990, 992). [8] Therefore, individuals who evade the established 'rules of the game' that govern economic activity or whose activities are denied protection of those rules are agents in the informal economy.

ii. Size of the Informal Economy in Eastern Europe and Central Asia

Measuring informality is quite elusive. Individuals risk penalties for evading institutional regulations so many conceal their work to avoid detection. This penchant for concealment makes informality difficult to analyze empirically.

I use direct estimates from an International Labor Organization (ILO) report on informality, *Women and Men in the Informal Economy: A statistical picture.* The ILO used criteria developed by global policy experts to differentiate between informal and formal employment and derive employment figures based on national household surveys. In Eastern Europe and Central Asia, many individuals hold multiple jobs simultaneously. Such as Damien from our previous example: he held a governmental position in the formal economy while operating a carpentry business in the informal sector from his garage. To account for multiple job-holdings I employ a job-based measure of informal employment.

Informal economies vary in size and visibility. It is estimated that 41.3 percent of total employment in Central Asia and 31.5 percent in Eastern Europe was informal in 2016. The magnitude of informality varies significantly among each region. Table 7**,** from the ILO's report

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[8] Feige argues that "there is no single underground economy; rather, there are many." He continues, "different types of underground activities are distinguished according to the particular institutional rules that they violate" (1989, 991). In this paper, informal transactions are legal activities but are not declared for tax, labor law, etc. purposes.

on informality, reports the distribution of informal employment within the informal sector, formal sector, and household sector. Eastern Europe and Central Asia each have a greater incidence of informality then the regional average. Tajikistan and Albania have the highest share of informal employment in the overall economy at 74.8 and 61.0 percent respectively while Slovenia, Estonia, and Czech Republic each have shares in the single digits.

In the former socialist states "state officials and enterprise managers are often linked to nonstate activities and firms to operate more flexibly and generate 'private income' flows" (Kaufmann and Kaliberda 1996, 6). Most notably, Eastern Europe has the largest share of informal employment in the formal sector at 9.5 percent. Informal employment in the formal sector includes all positions that "labor legislation does not specifically cover" which can include part-time or temporary work and many subcontracting arrangements (Hussmanns 2004, 6). This type of informality is often only partially undeclared, such an employee who is reported to work part-time but in actuality, works full-time. This definition also covers situations in which employees are officially paid a portion of their salary while the remainder is paid in cash 'tax free'.

Across Europe and Central Asia, employees represent the largest group of those operating in the informal economy. Informal employment refers to transactions that are lawful in nature but not reported or declared to government officials. This type of work excludes employees from employment benefits like severance pay, sick leave, or social security pensions. Further, a 2011 study finds that informal self-employment is generally more prevalent informal wage employment across all former socialist states included in the analysis, except Russia and Latvia (Hazans) (Table 8). It is evident that the informal sector is a significant facet of the economies in the former socialist states.

Data on informal business start-ups is less available than on informality as a whole. Some Informal start-ups rates refers to the proportion of individuals who, based on their calculations on the perceived costs and benefits, choose to operate in the informal sector rather than the formal. Table 9 reports estimates of informal start-up rates, expressed as the number of new business entries per 100 adult-age population, for 13 former socialist states from Autio and Fu (2014).[9] Kazakhstan, North Macedonia, and Serbia have the highest informal start-up rates. Further, they find a negative correlation between formal and informal start-up rates; where informal start-up rates are high, formal start-up rates tend to be low. In Poland, for example, it is estimated that there are sixteen unregistered businesses operating in the informal economy for every new formal business start-up. "This points to a substitution effect in the entrepreneur's choice between whether or not to register his business, a choice which is affected by economic and institutional conditions" (OECD 2015, 7).

iii. Relationship between formal and informal economies

The informal and formal economy are linked together by the institutions of a country. As stated previously, individuals will decide whether to register their business start-up or not depending on the costs and benefits of doing so. Institutions "determine the evolution and composition of the formal and informal sectors" by setting the price of conducting economic activities in the form of transaction costs (Feige 1990, 990). Individuals in each sector face different transaction costs based on the institutional rules they adhere to or circumvent.

Individuals may chose informal employment options to avoid the higher costs of complying with onerous regulations in the formal economy including an abundance of time-

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[9] Informal start-up rates are estimated through an econometric model where the total start-up rate derives from the GEM and the informal start-up rates is the simple difference between total estimate and formal start-up rates based on the World Bank Entrepreneurship Survey Dataset.

intensive procedures to start a business and register property. Other individuals, like hairdressers or caretakers, may choose to evade licensing requirements by working in the informal sector. While seemingly straightforward, in reality, the relationship between the formal and informal sector can be quite convoluted, especially in the former socialist states where "the state sector is rather active in unofficial activities" (Kaufmann and Kaliberda 1996, 6).

Charts 5 and 6 depict the relationship between the rule of law and control of corruption ranking and the estimated share of informal employment in each country for which there is data in 2016.[10] The charts show that higher quality institutions are associated with smaller informal economies. Stronger, more reliable institutions grant business owners economic stability and higher expected gains to registering their operations while weaker, corrupt institutions lack the protections and incentives business owners require to entrust their investments to those who govern the formal economy.

Governments also create barriers to enter the formal economy by requiring individuals to comply with labor and market regulations. "An important reason why many of these permits and regulations exist is probably to give officials the power to deny them and to collect bribes in return for providing the permits" (Shleifer and Vishny 1993, 601). Institutions also may impose direct costs on firms such as high tax rates, mandatory social security contributions and payments to corrupt officials. Those who do not register their business can make extra profits through lower start-up costs and tax evasion. Widespread corruption can also influence businesses to enter the informal economy to avoid predatory behavior, such as bribes and extortion, at the hands of government officials.

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[10] I use the share of total informal employment instead of informal start-up rates to include more countries.

If the government cannot credibly commit to the institutions in place, there may be only trivial benefits to formally registering business activities as the courts are unable to enforce contracts or protect private property rights. "A weak judiciary system, excessive bureaucracy, lack of transparency, and directed credit to connected borrowers and strategic enterprises exacerbate the incentives to informality" (Abdih and Medina 2013, 7). Further, uncertainty about future institutional changes can increase the likelihood that individuals will operate in the informal sector where they rely on personal networks and reputation to enforce contracts and protect their property rights.

iv. The impact of informality in the economy

While all businesses, whether formal or informal, directly benefit the wellbeing of its owners by allowing them to generate personal income, only businesses operating within the formal economy contribute to the overall economic growth of a nation through taxes, social security contributions and more. Tax evasion results in lower tax revenues that compromise the government's ability to provide social programs and invest in infrastructure. Insufficient spending can inhibit those most in need of such programs from receiving assistance. A recent study finds that informality is associated with "lower, less durable economic growth and greater financial instability" (Georgieva 2019). Operators of informal businesses face limited possibilities of individual wealth accumulation and business growth, as their need to remain under the government's radar necessitates small-scale operations (in most cases).

VI. CONCLUSION

This paper examines the impact of institutional quality on the level of new business formation in 26 of the former socialist states from 2006-2018. Using cross-sectional and panel

data, I find that the quality of a nation's institutions, as measured by the rule of law and control of corruption, has a statistically and economically significant effect on the number of newly registered LLCs. Economies willing to improve their institutional quality can expect more businesses start-ups to register in the formal economy. Specifically, improving the control of corruption by one standard deviation is associated with between 1.5 and 2.4 new businesses registered per 1,000 working age people. However, my empirical analysis is only able to capture the growth of the formal economy, which may exclude a far greater amount of startups existing outside the bounds of available data, due to their existence in the informal economy.

Institutions govern the allocation of resources throughout the economy and determine the cost of economic exchange by establishing the incentive and payoff structure. In turn, people adapt to the rules of the game and work within the limitations given by these institutions to devise strategies that optimize the opportunities provided. The number of new business start-ups captures the view that operating an independent business in the formal economy is a profitable investment and is influenced by the presiding institutional arrangement.

Potential business owners become more inclined to declare employment and invest in official activities when the costs to comply with formal institutions are low and property and economic rights are secure. "When profits or potential profits are taken away from firms through regulation, taxation, or corruption, entrepreneurs choose not to start firms or expand less rapidly than they might otherwise" (Johnson, Kaufmann and Shleifer 1997, 160). Further, overwhelming transaction costs and weak enforcement capabilities can impede firm creation in the formal sector and drive workers and entrepreneurs into the informal economy. As institutional quality increases, so should the opportunities in the formal sector and, inversely, the amount of

businesses in the informal sector should decrease as their operators migrate into more legitimate market spheres.

An informal operation may be a stepping stone to a formal business start-up, i.e. individuals who start their business in the informal sector later register in the formal economy. Many countries are already working with organizations, including the ILO and OECD, to create national formalization strategies that will help facilitate the transition to the formal economy. Many of these policies are aimed at improving the institutional framework and reducing the barriers to business by simplifying entry regulations, reforming stringent labor market regulations, and reducing the tax burden.

This study contributes to literature that finds that strengthening the rule of law and tackling corruption is associated with better economic outcomes, such as more business start-ups in the formal economy and a lower incidence of informality.

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Table 1: Variable Summary Statistics for Cross Sectional Data

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
New LLC Firm Registration	26	3.7556	3.4354	0.3257	15.4498
Rule of Law	26	48.4316	24.0782	8.9662	86.0177
Control of Corruption	26	45.0791	23.8176	9.51	84.0177
Ease of Starting a Business	26	84.4260	5.6882	69.8538	94.4231
GDP per capita	26	15,475.18	6,886.555	3,087.595	27,213.15
Human Capital	20	3.2486	0.1880	2.9143	3.6523

Table 2: Variable Summary Statistics for Panel Data

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
New LLC Firm Registration	323	3.8146	3.6492	0.0627	23.5931
Rule of Law	338	48.4316	24.0042	3.76	88.04
Control of Corruption	338	45.0791	23.8049	3.79	89.9
Ease of Starting a Business	329	84.2581	10.2557	25.5	97.8
GDP per capita	312	15,475.18	7,088.321	2,045.375	31,140.9
Human Capital	240	3.2486	0.2008	2.878	9.79379

Table 3: Cross- sectional regression results
OLS regressions, where rule of law measures institutional quality

New LLC Registrations per 1,000 working age adults	Iterations				Variable Name
	1st	2nd	3rd	4th	
Rule of Law	0.0882***	0.0833***	0.0879*	0.0973*	*law*
	(0.0229)	(0.0220)	(0.0464)	(0.0494)	
Ease of Starting a Business		0.1690*	0.1999	0.1686	*start_bus*
		(0.0933)	(0.1237)	(0.1407)	
GDP per capita			-0.0001	-0.0000	*gdp_pc*
			(0.0002)	(0.0001)	
Human Capital Index			1.7960	1.3320	*hc*
			(5.0675)	(5.2952)	
Former Soviet Socialist State				2.4318	*ussr*
				(2.2388)	
Former Yugoslavian Socialist Republic				omitted	*yugoslavia*
Satellite State of the Soviet Union				1.3706	*satellite*
				(2.2286)	
constant	-0.5172	-14.5516*	-22.4112	-20.9673	*_cons*
	(1.2132)	(7.8341)	(20.3991)	(22.1558)	
observations	26	26	20	20	
Adjusted R-squared	0.3566	0.4125	0.2834	0.2425	

Standard errors are given in parentheses
*** significant at the 1% level   ** significant at the 5% level   * significant at the 10% level

Table 4: Cross-sectional regression results
OLS regressions, where control of corruption measures institutional quality

New LLC Registrations per 1,000 working age adults	Iterations				Variable Name
	1st	2nd	3rd	4th	
Control of Corruption	0.0914***	0.0872***	0.0965**	0.1192**	*corrupt*
	(0.0228)	(0.0217)	(0.0434)	(0.0455)	
Ease of Starting a Business		0.1751*	0.2209*	0.1804	*start_bus*
		(0.0908)	(0.1194)	(0.1288)	
GDP per capita			-0.0001	-0.0001	*gdp_pc*
			(0.0002)	(0.0002)	
Human Capital Index			2.1860	1.6513	*hc*
			(4.9012)	(4.8822)	
Former Soviet Socialist State				5.7598	*ussr*
				(4.5198)	
Former Yugoslavian Socialist Republic				omitted	*yugoslavia*
Satellite State of the Soviet Union				1.8945	*satellite*
				(2.0531)	
constant	-0.3656	-14.9610	-24.8683	-23.4443	*_cons*
	(1.1562)	(7.6492)	(19.7595)	(20.4136)	
observations	26	26	20	20	
Adjusted R-squared	0.3768	0.4402	0.3322	0.3565	

Standard errors are given in parentheses

*** significant at the 1% level   ** significant at the 5% level   * significant at the 10% level

Table 5: Panel data regression results
Fixed effect regressions, where rule of law measures institutional quality

New LLC Registrations per 1,000 working age adults	Iterations			Variable Name
	1st	2nd	3rd	
Rule of Law	0.0582***	0.0196***	-0.0660**	*law*
	(0.0184)	(0.0208)	(0.0260)	
Ease of Starting a Business		0.0125	0.0007	*start_bus*
		(0.0172)	(0.0109)	
GDP per capita			0.0002***	*gdp_pc*
			(0.0000)	
Human Capital Index			1.5139	*hc*
			(1.3801)	
constant	0.9604	0.2212	-1.7197	*_cons*
	(0.9054)	(1.0442)	(4.1777)	
observations	323	314	221	
groups	26	26	20	
R-sq. within	0.0327	0.0448	0.1524	
R-sq. between	0.3831	0.3950	0.0002	
rho	0.8057	0.8052	0.9091	
Prob > F	0.0017	0.0014	0.0000	
F test all u_i = 0 Prob >F	0.0000	0.0000	0.0000	

Standard errors are given in parentheses
*** significant at the 1% level   ** significant at the 5% level   * significant at the 10% level

Table 6: Panel data regression results
Fixed effect regressions, where control of corruption measures institutional quality

New LLC Registrations per 1,000 working age adults	Iterations			Variable Name
	1st	2nd	3rd	
Control of Corruption	0.1010***	0.0978***	0.06316**	*corrupt*
	(0.0167)	(0.0176)	(0.0264)	
Ease of Starting a Business		0.0123	0.0029	*start_bus*
		(0.0092)	(0.0110)	
GDP per capita			0.0001**	*gdp_pc*
			(0.0001)	
Human Capital Index			1.6442	*hc*
			(1.3830)	
constant	-0.8202	-1.7900*	-7.0958*	*_cons*
	(0.7710)	(1.0037)	(4.2629)	
observations	336	314	221	
groups	26	26	20	
R-sq. within	0.1097	0.1163	0.1495	
R-sq. between	0.3999	0.4085	0.3126	
rho	0.8050	0.8000	0.8621	
Prob > F	0.0000	0.0000	0.0000	
F test all u_i = 0 Prob >F	0.0000	0.0000	0.0000	

Standard errors are given in parentheses
 *** significant at the 1% level   ** significant at the 5% level   * significant at the 10% level

Table 7: Share of Informal Employment in Total Employment (%)

Country	Total	In the informal sector	In the formal sector	In households
Kyrgyzstan	48.6	37.2	9.6	1.8
Tajikistan	74.8	54.4	14.4	5.9
Armenia	52.1	39.2	1.4	11.6
Bulgaria	15.9	15.0	0.9	0.0
Czech Republic	9.2	8.6	0.6	0.4
Hungary	12.2	11.8	0.4	0.0
Moldova	28.9	21.9	6.6	0.0
Poland	38.0	20.1	17.8	0.0
Romania	28.9	27.4	1.5	0.4
Russian Federation	35.9	24.4	11.5	0.0
Slovakia	16.7	16.4	0.3	0.0
Estonia	6.9	5.4	1.5	0.0
Latvia	13.2	11.2	2.0	0.0
Lithuania	12.6	8.2	4.4	0.0
Albania	61.0	29.1	0.5	31.4
Bosnia and Herzegovina	30.1	30	0.1	0.0
Croatia	13.0	12.8	0.2	0.0
Serbia	22.1	6.4	10.7	5.0
Slovenia	5.0	4.8	0.3	0.0

Table 8: Informal Employment in 12 former socialist states, 2008-2009
(% of total informal employment)

Country	Informal Wage Employment	Informal Self-Employment
Estonia	3.2	6.3
Bulgaria	5.3	6.7
Czech Republic	1.3	10.7
Hungary	2.6	6.2
Slovakia	1.2	11.0
Latvia	3.7	3.6
Lithuania	2.2	4.2
Slovenia	6.2	7.2
Poland	4.1	16.6
Romania	5.1	5.9
Russia	6.1	5.4
Ukraine	6.9	7.3

Table 9: Informal Start-up Rates in 13 former socialist states, 2001-2010
Number of new business entries per 100 adult age population

Country	Informal Start-up Rate
Bosnia and Herzegovina	0.65
Croatia	0.32
Czech Republic	0.33
Hungary	0.57
Kazakhstan	1.42
Latvia	0.5
Montenegro	0.58
North Macedonia	1.11
Poland	0.8
Romania	0.35
Russia	0.34
Serbia	0.85
Slovenia	0.27

Chart 1: New business start-ups and rule of law
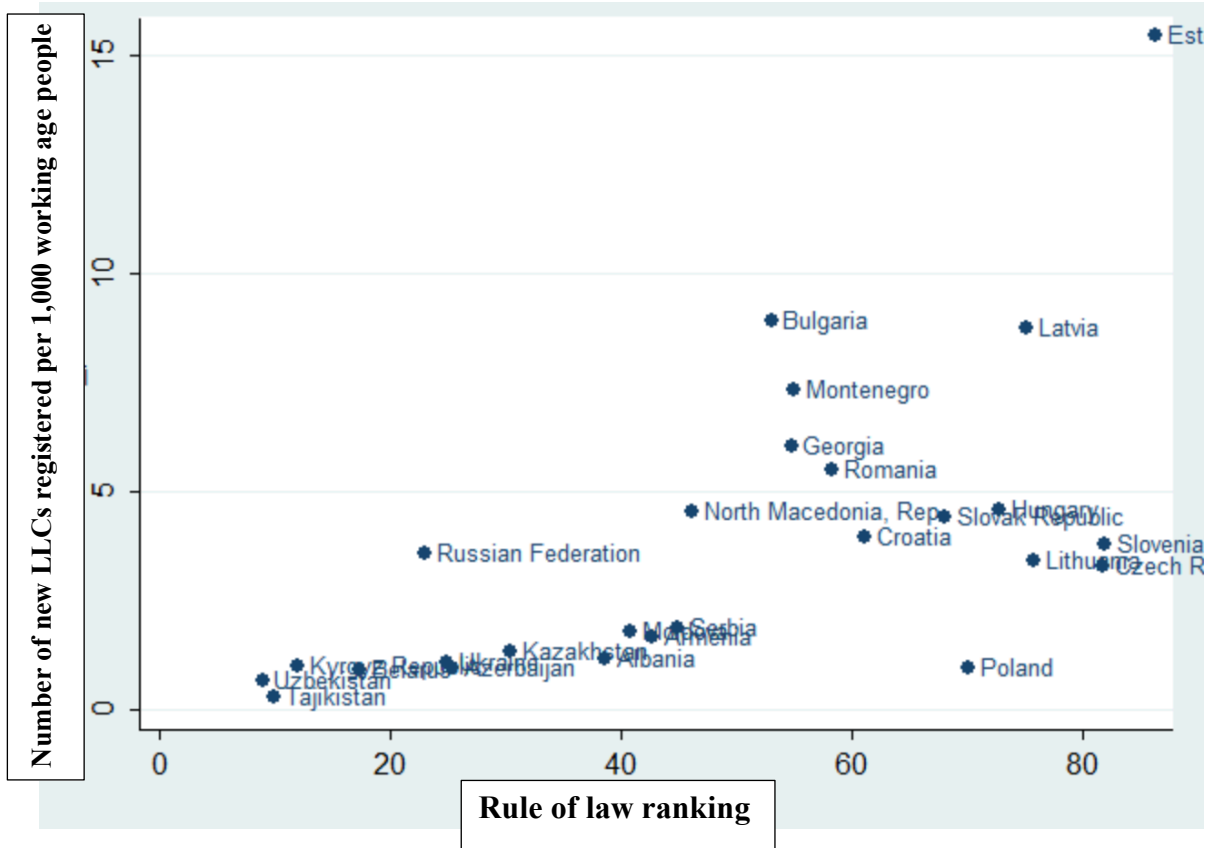
Chart 2: New business start-ups and control of corruption
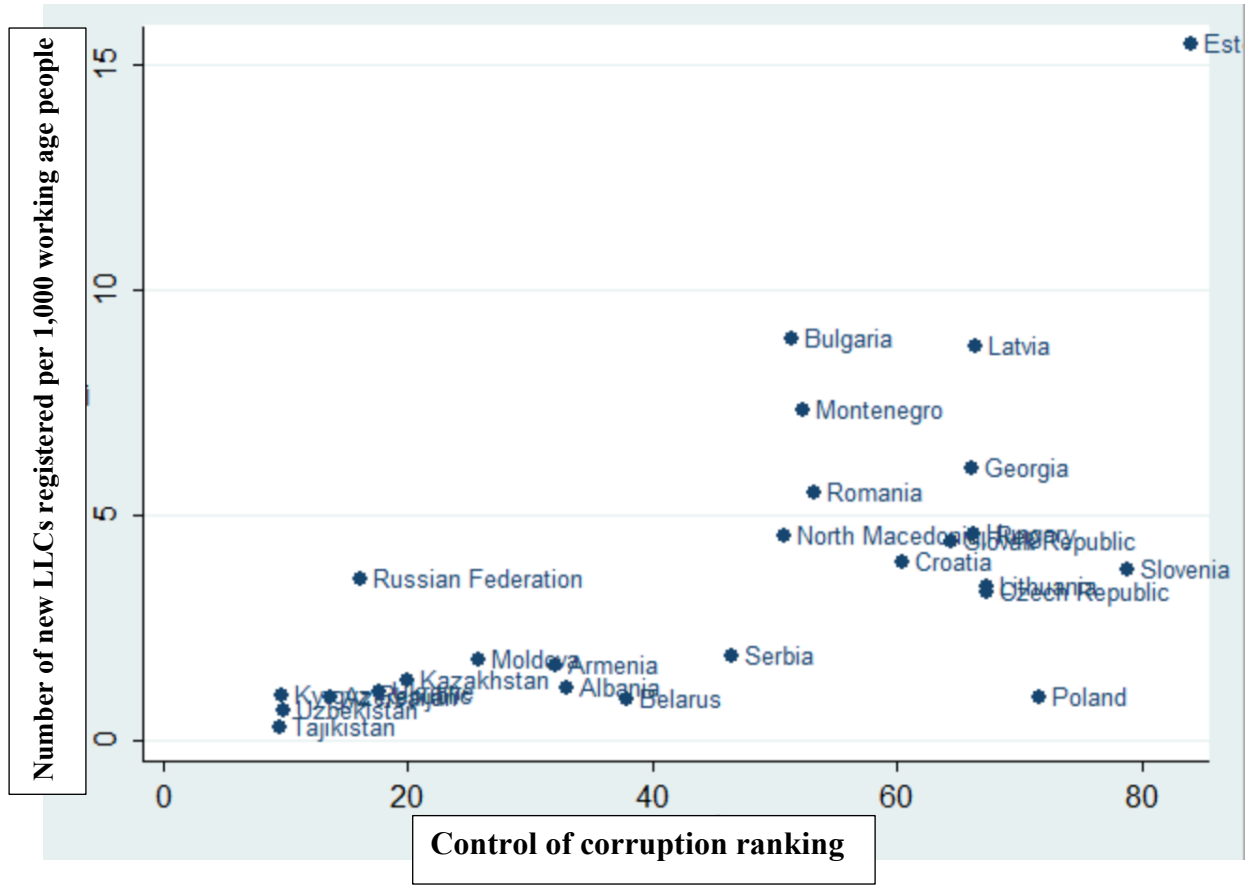
Chart 3: Rule of law ranking from 2006 to 2018
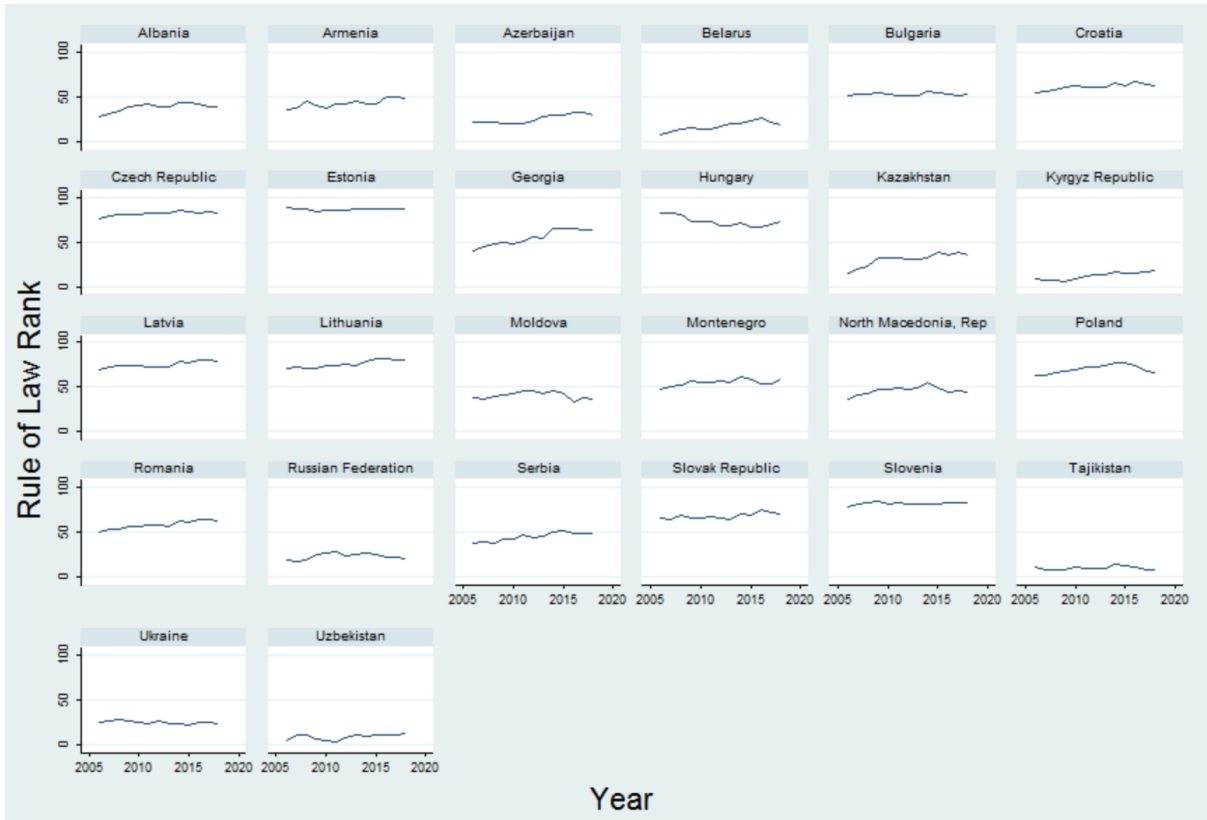
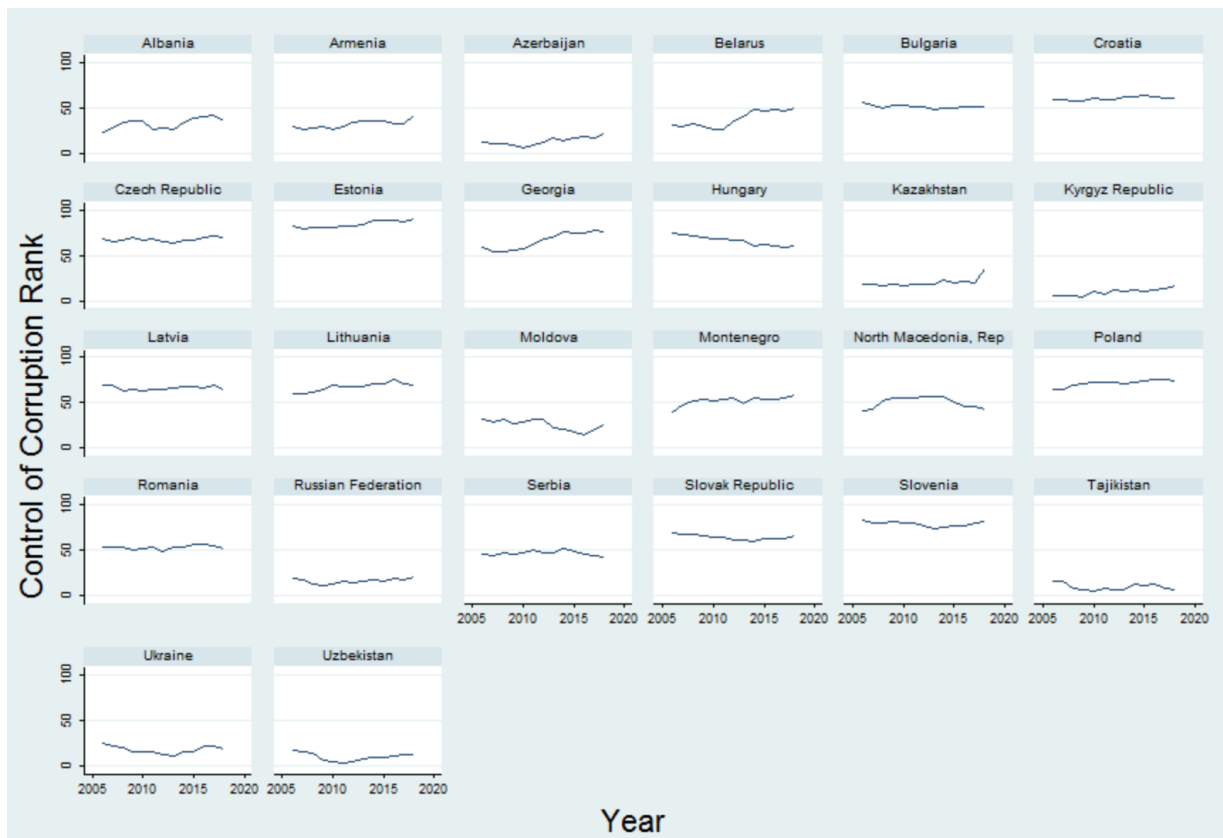**Chart 4: Control of corruption ranking from 2006 to 2018**

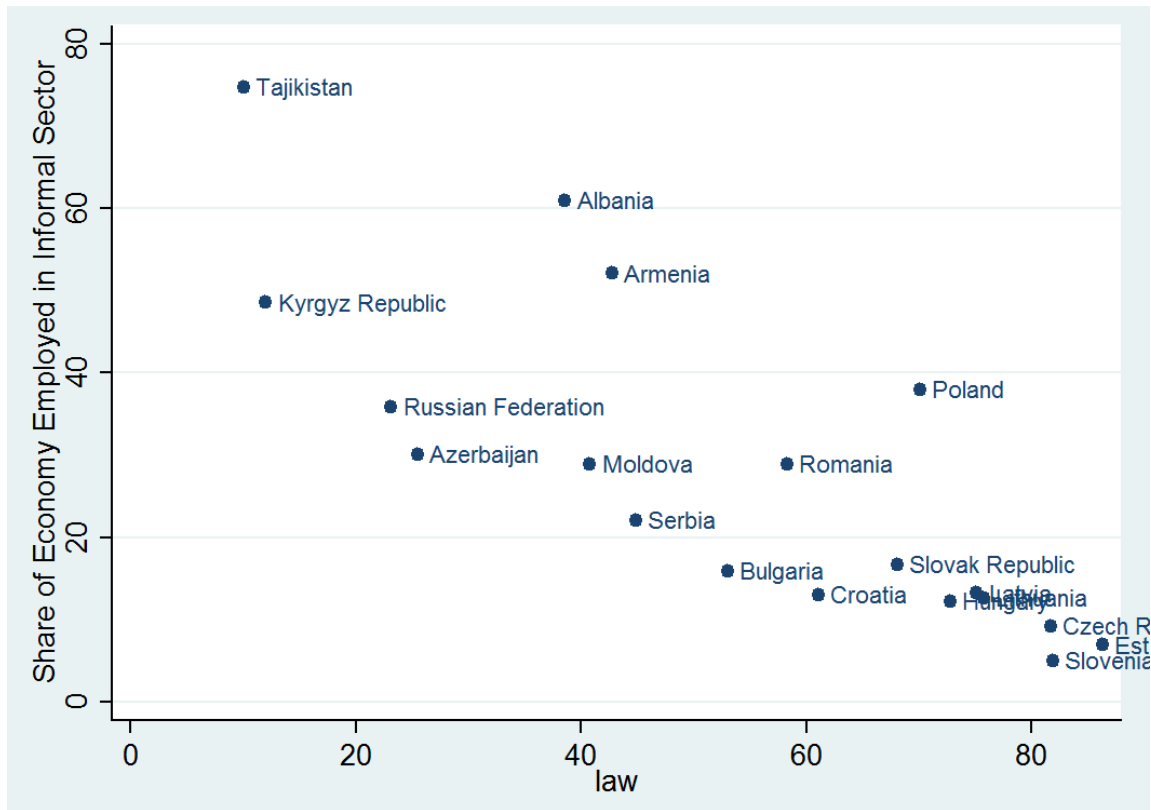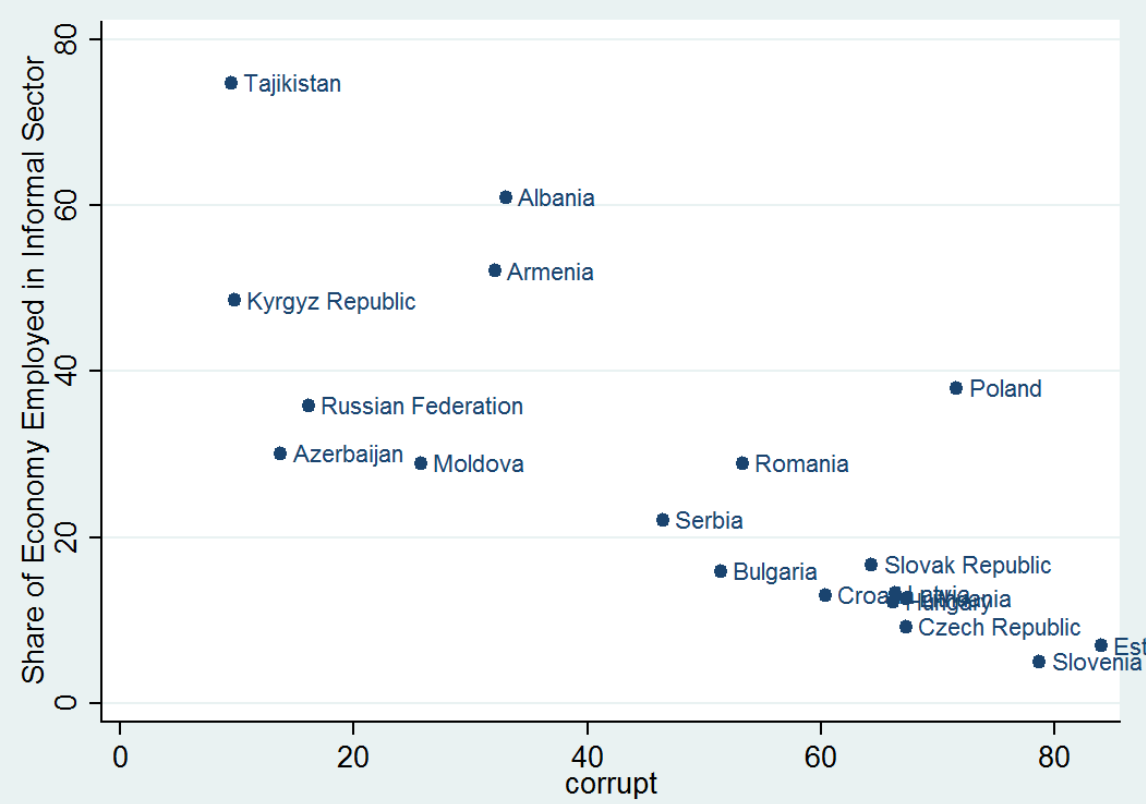**Chart 5: Share of total employment that is informal and rule of law ranking in 2016**

Chart 6: Share of total employment that is informal and control of corruption ranking in 2016

Variable Explanations:

New LLC Registration Density (*new_llc_pw*): From the World Development Index, the number of new limited liability companies registered in the calendar year per 1,000 people ages 15-64. Serves to proxy the density of business in a country given the lack of data on the total number of businesses operating in a country.

Rule of Law Index (*law*): From the World Governance Index, a measure of relevant parties' perceptions that predictable rules will govern social and economic decisions in a society. Annual data is collected from an average of 15 data sources including surveys of households and firms, experts, non-governmental organizations, and public sector organizations. Reported by the percentile rank, which indicates the country's score relative to all countries covered by the indicator, from 0 to 100 with larger values indicating better governance.

Control of Corruption (*corrupt*): From the World Governance Index, a measure of how well a country controls corruption. Annual data is collected from an average of 15 data sources including surveys of households and firms, experts, non-governmental organizations, and public sector organizations. Reported by the percentile rank, which indicates the country's score relative to all countries covered by the indicator, from 0 to 100 with larger values indicating better governance.

Ease of Starting a Business (*start_bus*): From the Doing Business dataset, a measure of how efficiently an individual can start up and formally operate an LLC in a given economy. An economy's score is generated using data on the number of formally required procedures, the time and cost needed to comply with each procedure, and the paid-in minimal capital requirement.

Data is based upon responses and research of all publicly available information on two types of LLCs, five companies owned by married men and five companies owned by married women. Scores are computed by averaging the scores collected for each of the components. The overall score for starting a business is calculated in the same fashion using the score of each indicator in an economy. Local experts, including government officials and lawyers, review and confirm the results.

Human Capital Index (*hc*): From Penn World Tables, a measure of human capital stock in a country based on the average years and return rate of schooling. The Human Capital Index measures the amount of human capital a child born today could expect to attain by age 18 and "is based on average years of schooling from Barro and Lee (2013) and an assumed rate of return to education, based on Mincer equation estimates around the world from Psacharopoulos (1994)" (Feenstra, Inklaar and Timmer 2015).

Real GDP per capita (*gdp_pc*): From Penn World Tables, output side real GDP per capita in PPP in 2011 USD. Measures the productive capacity of an economy by including quality adjusted prices of exports and imports.

Yugoslavia (*Yugoslavia):* Dummy variable, 1 if state was formerly a part of the Federal Socialist Republic of Yugoslavia, 0 otherwise.

U.S.S.R. (*ussr):* Dummy variable, 1 if state was a former Soviet Socialist Republic, 0 otherwise.

Satellite State (*satellite):* Dummy variable, 1 if state was formerly a satellite state of the Soviet Union, 0 otherwise.