Determinants of International Buyout Investments

Serdar Aldatmaz [ID]
George Mason University School of Business
saldatma@gmu.edu (corresponding author)

Greg W. Brown
The University of North Carolina at Chapel Hill Kenan–Flagler Business School
gregw-brown@unc.edu

Asli Demirgüç-Kunt
The World Bank Chief Economist, Europe and Central Asia
ademirguckunt@worldbank.org

Abstract

Using a proprietary data set on international private equity activity, we study the determinants of buyout investments across 61 countries and 19 industries over the period of 1990 to 2017. We find that countries with cyclically strong economies, more active stock and credit markets, and better rule of law experience more buyout activity. Countries also receive more buyout capital following investor protection and contract enforcement reforms. The set of determinants we identify appear somewhat unique to buyout investments, because other forms of investment such as foreign direct investment, gross capital formation, investments in R&D, and M&A activity do not respond similarly to these factors.

I.   Introduction

Global private equity (PE) investments have increased tremendously over the past two decades. Since the 1990s global investment in private equity has increased by an order of magnitude from under $10 billion per year to well over $100 billion in 2019. Another notable change in global capital markets has been the trend toward more geographically diverse private equity investment. Figure 1 shows that even though private equity fundraising has been mainly concentrated within the USA and Western Europe, portfolio company investments have become more spread across the globe. As shown in Figure 2, the share of U.S. and U.K. private equity fund investment declined from about 90% of the total in the mid-1990s to about 70% by 2017.

Even though private equity has increasingly become a global asset class playing an important role in capital formation, there is yet very little evidence on

FIGURE 1

Global Private Equity Fundraising and Investment

Figure 1 plots the time series of total global private equity fundraisings and investment over the last two decades. Graph A shows fundraising activity for the USA and Western Europe (darker shading) plotted separately from all other countries (lighter shading). Data are from Burgiss fund-level aggregates. Graph B plots the time series of total global private equity portfolio company investments over the last two decades. The USA and U.K. (USUK, darker shading) are plotted separately from all other countries (non-USUK, lighter shading). Data, provided by Burgiss, are summed across deal-level equity investments classified by location of the portfolio company corporate headquarters.

Graph A. Private Equity Fundraising

Graph B. Private Equity Investment
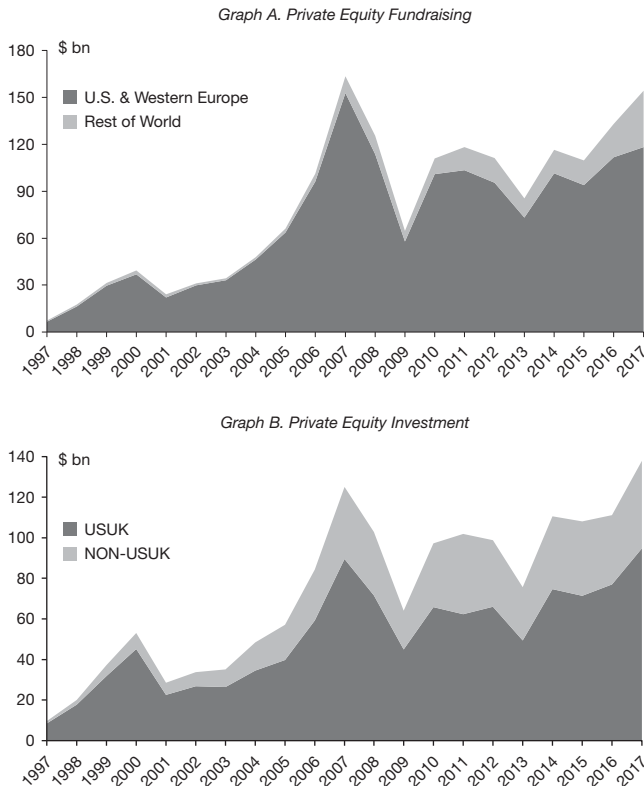
the determinants of global private equity capital flows across countries.[1] To the best of our knowledge, this article provides the first systematic study on the determinants of buyout investments using data on direct dollars invested for a comprehensive sample of developed and developing economies.[2]

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[1]The limited existing literature mainly focuses on venture capital (VC) investments and finds country-level factors such as the legal environment (Wright, Kissane, and Burrows (2004), Guler and Guillen (2010)), and stock market liquidity (Black and Gilson (1998), Jeng and Wells (2000), and Cumming, Schmidt, and Walz (2010)) to be important drivers of VC activity.

[2]A couple of other studies explore the determinants of buyout activity along with VC, however none of those studies use actual investment data, likely due to data limitations. Leeds and Sunderland (2003) and Groh and Liechtenstein (2009) rely on surveys of private equity managers and institutional investors, while Groh, Liechtenstein, and Lieser (2010) create indices of attractiveness for VC and buyout investments based on a large set of parameters. In Section III, we define the sample and further discuss the types of transactions we measure.

FIGURE 2

Total Private Equity Investment in the USA and UK as a Percentage of Global Total

Figure 2 plots the time series of the ratio of private equity investments in the USA and U.K. to global private equity investments over the last two decades. The ratio has declined from about 90% to 70%. Data are from Burgiss.

FIGURE 3

Number of Publicly Listed Companies in the USA and UK

Figure 3 plots the number of publicly listed companies in the USA and U.K. over the last two decades. There is a significant decline in the number of public companies in the USA and U.K. Data are from the World Bank.
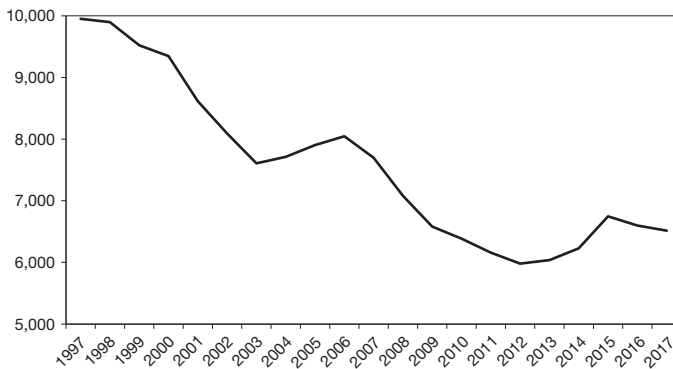
Concurrent with the increased activity in global private equity markets, there has also been a shift in the UUSA and U.K. away from public markets (see Figure 3, Doidge, Karolyi, and Stulz (2013), (2017), and Gao, Ritter, and Zhu (2013)).[3] These capital market developments are connected by the fact that small and mid-sized companies are staying private longer (and increasingly never going public) due to changes in the supply of private funding to late-stage start-ups and "growth" companies in these markets (Doidge, Kahle, Karolyi, and Stulz (2018), Ewens and Farre-Mensa (2020)). Globally, there has also been a recent leveling off and slight

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[3]Some other major economies such as Germany, France, and Brazil have also seen declines in public listings of more than 30%. Stulz (2018) discusses the causes and consequences of the shrinking universe of public firms in a recent NBER reporting.

FIGURE 4

Number of Global Public Companies Excluding the USA and U.K.

Figure 4 plots the number of publicly listed companies in the world excluding the USA and U.K. over the last two decades. Although the number has been increasing steadily, there seems to be a recent leveling off.
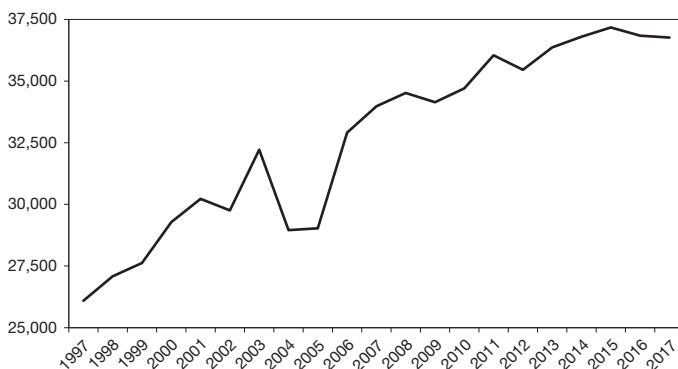
downturn in public company listings (see Figure 4) and coupled with the increase in global private equity investments, this raises important questions about the development of global capital markets. Are changes in the preference for private versus public ownership in the USA and U.K. part of a larger global trend? If so, what factors have driven growth in private equity investments historically and why? Finally, where can we expect to see further change?

Casual observation of trends in public and private markets is not very revealing. Figure 5 shows trends for the USA, Germany, China, and Brazil as examples of the heterogeneity. Germany, which has historically relied more on banking and less on public equity, has also experienced a significant decline in public listings, but less than a quarter the amount of private equity investment (of GDP) observed in the USA. While private equity investment in the USA has started to grow again in recent years, activity in Germany has remained flat. Similar disparate trends are observed in less developed countries. For example, China has experienced rapid growth in both public company listings and private equity investment activity, while other countries like Brazil have seen volatility in private equity activity concurrent and declines in public listings.

This article attempts to explain observed dynamics in global private capital markets by exploring 3 types of potential determinants of private equity buyout activity: i) country and industry macroeconomic conditions, ii) financial market development, and iii) the institutional and regulatory environment. The hypotheses we examine are not mutually exclusive, and consequently, we seek to also understand the relative importance of different determinants of buyout investment. Our larger goal is to better understand current and future trends in capital formation through financial intermediation by uncovering the historical determinants of private equity investments at the country and industry levels.

Using nearly comprehensive country-industry-level data on international private equity activity, we study buyout investments across 61 countries over the

FIGURE 5

Number of Publicly Listed Companies and Total Private Equity Investment
as a Percentage of GDP

Figure 5 plots the time series of the number of publicly listed companies (solid line, left scale) and total private equity investment as a percentage of GDP (dashed line, right scale) for the USA, Germany, China, and Brazil over the last two decades. Data are from the World Bank and Burgiss.
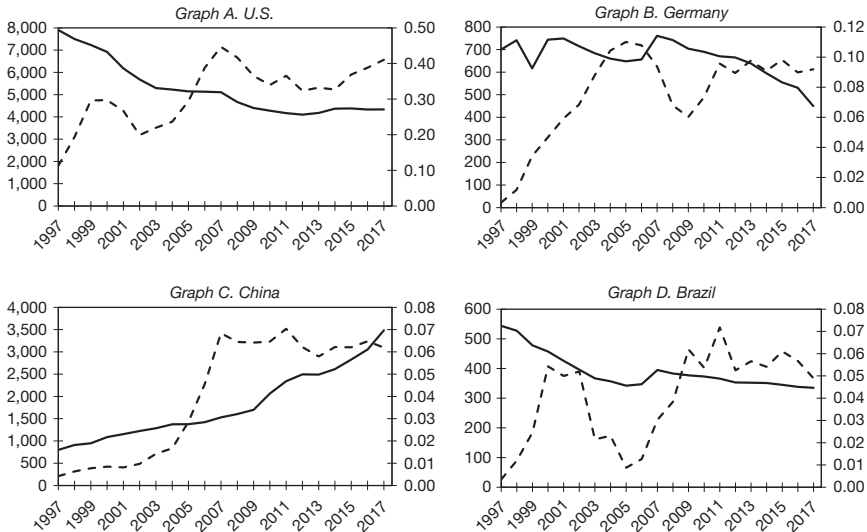
period of 1990 to 2017.[4] Our results indicate that macroeconomic conditions, financial development, and regulatory environment all play a role in determining the level of buyout investment activity at the country level. For macroeconomic conditions, we find that buyout deal activity increases more during economic expansions (as measured by a cyclically low unemployment rate). We also find similar evidence at the industry level: industries receive more buyout investment following expansions in industry-wide employment. Financial market development also plays a part as we find private equity activity to be complementary to public and credit market activity: countries with more stock trading and credit provided to the private sector experience more buyout deal activity. Finally, we find that the institutional environment significantly impacts the level of buyout investments – countries with better rule of law and countries that implement regulatory reforms for better investor protection and contract enforcement experience more buyout investment activity.

To clearly identify the effect of the various factors we are exploring, we estimate a set of fixed-effects (country, industry, and time) regressions. These allow

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[4]The countries included in our study are Argentina, Australia, Austria, Belgium, Bulgaria, Brazil, Canada, China, Croatia, Colombia, Costa Rica, Cyprus, Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Hong Kong, Hungary, Indonesia, India, Ireland, Iceland, Israel, Italy, Jamaica, Jordan, Japan, Kazakhstan, Mexico, Malaysia, Nigeria, Netherlands, Norway, New Zealand, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Singapore, Slovakia, Slovenia, South Korea, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, Uruguay, United Arab Emirates, United Kingdom, United States, Vietnam, and South Africa.

us to decompose the sources of variation from different factors as well as control for unobservable time-invariant country and industry characteristics, and thus we are better able to ensure the effects of our explanatory variables are isolated from other confounding effects. When estimating the impact of regulatory reforms, we study the change in the amount of buyout capital invested before and after passing of the reform among countries that implemented a major reform (vs. others that did not).[5] All three types of determinants are statistically important, but the credit market development and institutional factors have the economically largest effects. For example, a 1-standard deviation increase in private sector credit is associated with about 70% increase in buyout investment and a major contract enforcement reform results in about a doubling of subsequent buyout investment.[6]

Next, we study how other traditional forms of investment respond to macroeconomic conditions, financial development, and regulatory conditions (the factors we found to impact buyout investments) to examine whether the determinants we identify are unique to private investment. We take measures of foreign direct investment (FDI) inflows, gross capital formation (GCF), mergers and acquisition activity, investment in research and development, and capital expenditures (CAPEX) at the country level and repeat our main tests with those as the dependent variables. Our findings overall suggest that the set of factors we identify are fairly specific to private equity investments and do not play the same role in determining other forms of investment.

Having documented the significant impact of regulatory reforms on the amount of buyout investments, we also explore where the impact of these reforms might be strongest. The first cross-country dimension we study is the quality of existing legal conditions. On the one hand, a country with weaker existing governance may benefit more from the implementation of regulatory reforms; on the other hand, for these reforms to be instrumental in attracting more buyout capital, a country may need to have a strong country governance structure in place. Our findings suggest that reforms are more effective in countries with better regulatory quality, rule of law, and lower corruption indicating that regulatory reforms indeed need to be supported by strong country governance. Additionally, we explore if the level of education (i.e., human capital) in a country influences the effectiveness of reforms on attracting buyout capital as financial reforms have been shown to be more effective in countries with higher human capital (Li and Yu (2014)). We find the positive association between reforms and buyout investments to be more pronounced in countries with higher levels of education, suggesting that reforms need to be backed not only by a strong regulatory environment but also by high-quality human capital.

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[5]These estimates for the reform variables are akin to a difference-in-differences estimation contingent on the assumption that the reforms are exogenous. Because these reforms are typically politically motivated, we believe that they are exogenous to the decision of PE investors' investment in a specific country. Nevertheless, it is very hard to argue that the reforms are truly exogenous as reforms might potentially coincide with economic shocks which might correlate with PE investment activity, so we are not claiming causality.

[6]Please note that these are marginal effects on the latent variable based on our Tobit estimations. If we condition on our dependent variable being positive, the marginal effects are smaller.

One of our motivations for studying historical determinants of private investment at the country level is to understand how global private capital markets will evolve in the future. To this end, we conduct a comparative predictive analysis using our model on the determinants of buyout activity to examine where countries stand in terms of realized versus predicted buyout capital investment. Specifically, we estimate buyout investment activity based on our main model and compare the predicted amounts of investment with realized investment in 2017. Based on our predictions, we find countries like China, New Zealand, South Africa, and Argentina to be below predicted buyout activity and hence expect them to receive more buyout investment in coming years, while we find other countries like Poland, Qatar, Jordan, and Philippines to be above predicted levels suggesting that they are more likely to be saturated with buyout investment.

Finally, in an attempt to understand the impact of the COVID-19 pandemic on private investment, we perform one last predictive analysis. Using estimates from our main model again, we predict future buyout activity in 2021 using macro variable forecasts from before the pandemic (Oct. 2019) as well as updated forecasts from after the pandemic (Oct. 2020) and compare those figures to see the impact of changes in the forecasts on buyout investment activity.[7] Our results indicate that countries like Peru, Philippines, Turkey, and Kazakhstan are predicted to be positively impacted by the pandemic in terms of buyout investment activity, while countries like the U.K., Australia, Poland, Spain, and Brazil are expected to be impacted adversely.

Overall, while presenting the first evidence on the determinants of buyout deal activity using comprehensive investment data, our study also complements the existing evidence on the determinants of venture capital activity across nations and adds to our knowledge about the development of international private capital markets.

Our study also contributes to the literature on law and finance (La Porta, Lopez-De-Silanes, Schleifer, and Vishny (1997)) and opens new avenues for research in the area of financial development and economic growth (King and Levine (1993)). Our results are helpful in understanding how capital markets will evolve globally and identifying which other countries are most likely going to trend like the USA and the U.K. in terms of financial development, which has possible implications for the scale and type of economic growth in other developed or developing nations.

Finally, our results also have important policy implications by identifying the factors countries should focus on to attract more private equity investment. Aldatmaz and Brown (2020) find evidence for positive spillovers from private equity investments on public industry peers and Bernstein, Lerner, Sorensen, and Stromberg (2016) show that private equity capital enhances industry growth. Hence, in light of our findings, policy makers, especially those in developing economies, should improve the institutional and regulatory environment in addition to providing growth potential to attract private investments, which would

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[7]We use macro variable forecasts from IMF's World Economic Outlook data.

benefit local companies by providing capital along with management expertise to help them realize growth opportunities.[8]

The remainder of the article is organized as follows: Section II reviews the related literature and develops our hypotheses. Section III discusses the data and presents descriptive analysis to showcase how international buyout investments have evolved over the last three decades. Section IV presents our main results and the predictive analysis. Section V presents robustness checks and additional analysis on alternative explanations, and Section VI concludes.

II.   Motivation and Hypotheses

Well-functioning stock and credit markets have both been shown to promote economic growth. (King and Levine (1993), Levine and Zervos (1998), Beck, Levine, and Loayza (2001), and Beck and Levine (2002), (2004)). Given the documented impact of financial market development on economic growth and the growing prevalence of private equity in financial markets globally, it has become critical to understand the factors determining the level of private equity investment across countries and time.

Figures 6 and 7 depict that private equity investments have increased in other major economies, similar to the USA and U.K., while the number of public companies has recently leveled off since 2013. These dynamics are somewhat different than those observed for the USA and U.K., where private equity investments have grown

FIGURE 6

Total Private Equity Investment as a Percentage of GDP for the Largest 8 Economies Excluding the USA and UK

Figure 6 plots the time series of the ratio of PE to GDP for the largest 8 economies in the world excluding the USA and U.K. over the last two decades. Private equity investments have been increasing for those economies over the last two decades.

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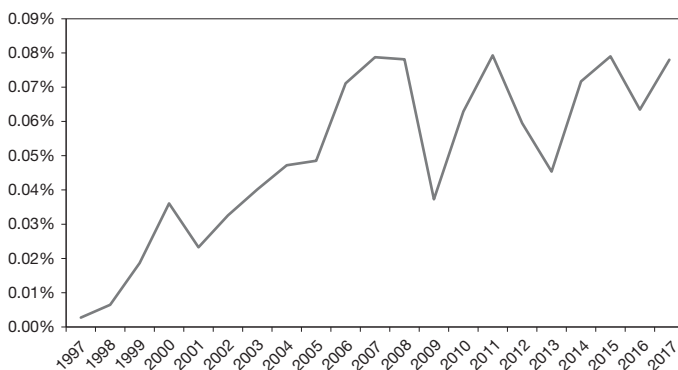
[8]It should be acknowledged that the net effect of increased buyout activity may not be positive in all economies. For instance, in a recent study of international public-to-private transactions, Cumming, Peter, and Tarsalewska (2020) finds that institutional buyouts are associated with a significant reduction in innovation output. The net effect of buyout activity on the real economy may depend on various deal and country characteristics, and although what those characteristics are is indeed a very interesting question, it is beyond the scope of this article.

FIGURE 7

Number of Publicly Listed Companies for the Largest 8 Economies
Excluding the USA and UK (1997–2017)

Figure 7 plots the number of publicly listed companies for the largest 8 economies in the world excluding the USA and U.K. over the last two decades.
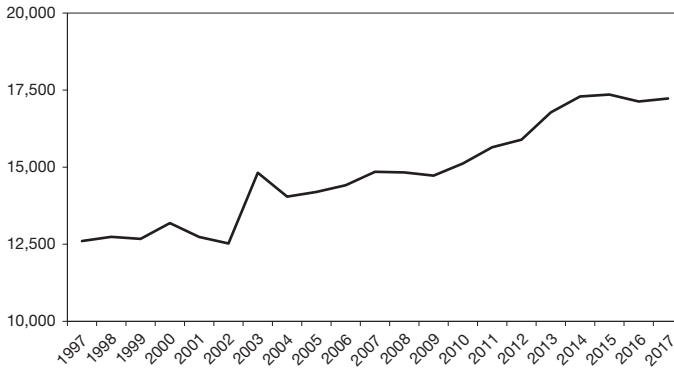
substantially, while public listings have been on the decline for more than a decade. To further highlight these different trends, we present annual measures of public and private equity markets on the 10 largest economies over the last two decades in Tables 1 and 2. Panel A of Table 1 presents the total market capitalization of public companies as a percentage of GDP and Panel B of Table 1 presents the number of publicly listed companies. Panel A of Table 2 presents the total USD-value of PE investments and Panel B presents PE investment amounts as a percentage of GDP. Like the USA and the U.K., Germany and France have seen significant increases in private equity investment, while the number of public listings has also declined in both markets. Italy and Brazil have also recently seen a big jump in private equity investment activity concurrent with a leveling off in public listings. Developing economies like China and India have also experienced rapid growth in PE deal activity. However, public listings in China have significantly increased, while they have been nearly stable in India. Overall, many countries seem to exhibit some cyclical activity at the business-cycle frequency and thus there seem to be both secular and cyclical forces at work. To understand if and how these trends are related and how capital markets evolve globally, we seek to identify factors that explain the level of private market activity in a large sample of countries, which may be at very different stages of economic, financial, and institutional development.

Despite the increased level of global buyout transaction activity, most studies examining global private capital flows have focused on venture capital deals.[9]

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[9]An exception to the lack of research regarding the determinants of international buyout activity is Groh and Liechtenstein (2009). They conduct a survey of institutional investors to gauge concerns when investing in emerging PE markets and conclude that protection of property rights and corporate governance are perceived as most important for international PE allocation decisions. In a follow-up study, Groh et al. (2010) extend their research to include 27 European countries and present a composite index using 6 key drivers – economic activity, depth of capital markets, taxation, investor protection and corporate governance, human and social environment, and entrepreneurial culture – to measure the attractiveness of a country for VC and buyout activity. They also find that their index is positively

TABLE 1

Size of Public Equity Markets for Largest 10 Economies

Table 1 presents the evolution of public markets for the largest 10 economies over the period of 1997 to 2017. Panel A presents annual total market capitalization of all publicly listed companies as a percentage of GDP for each country. Panel B presents number of publicly listed companies in each country.

	USA	China	Japan	Germany	UK	France	India	Italy	Brazil	Canada
Panel A. Public Market Cap (% of GDP)										
1997	125.6	21.5	47.2	37.2	133.1	46.4	30.4	23.3	28.8	154.8
1998	142.6	22.6	60.5	48.8	139.9	65.5	24.5	35.9	18.6	171.2
1999	153.4	30.4	97.7	65.1	177.1	100.6	39.5	58.3	37.9	214.2
2000	147.4	48.2	64.6	65.1	156.3	106.2	31.1	67.3	34.5	103.8
2001	132.1	39.3	52.6	54.9	132.2	85.3	22.3	45.4	33.3	83.5
2002	101.1	31.7	50.3	33.0	104.7	64.7	25.0	37.7	24.9	117.2
2003	124.5	30.9	66.4	43.1	118.7	73.7	45.9	39.2	42.0	102.0
2004	133.6	22.9	73.9	42.4	117.1	73.6	54.7	43.9	49.4	115.1
2005	130.4	17.6	96.2	42.0	121.1	80.1	67.4	43.1	53.2	126.7
2006	141.6	41.6	101.8	54.5	140.2	104.7	87.1	52.8	64.1	129.3
2007	137.8	126.7	95.9	61.2	124.7	103.1	149.5	48.7	98.0	149.3
2008	78.8	38.7	61.8	29.6	64.3	50.4	53.9	21.8	34.9	66.7
2009	104.3	70.0	63.2	37.8	94.0	72.3	97.4	26.3	80.2	122.3
2010	115.3	66.2	67.1	41.8	121.8	72.3	97.4	27.3	69.9	134.6
2011	100.6	45.2	54.0	31.5	118.7	54.3	55.2	21.9	46.9	106.9
2012	115.3	43.3	56.1	41.9	112.1	67.4	69.1	21.3	49.8	112.9
2013	143.2	41.3	88.1	51.6	119.0	81.9	61.3	26.2	41.3	114.8
2014	150.3	57.5	90.3	44.6	109.9	73.1	76.4	28.0	34.4	116.3
2015	137.6	74.3	111.5	50.7	106.3	85.6	72.1	34.8	27.2	102.6
2016	146.2	65.7	100.6	49.1	107.9	87.4	68.4	31.8	42.2	130.6
2017	164.8	71.7	128.0	61.2	116.9	106.3	87.9	37.8	46.5	143.7
Panel B. Number of Publicly Listed Companies										
1997	7,905	799	1,805	700	2,046	740	5,843	235	544	1,937
1998	7,499	909	1,818	741	2,399	784	5,724	243	527	1,991
1999	7,229	947	1,889	617	2,292	1,144	5,789	270	478	1,538
2000	6,917	1,086	2,055	744	2,428	1,185	5,853	297	457	1,507
2001	6,177	1,154	2,103	749	2,438	936	5,795	294	426	1,278
2002	5,685	1,223	2,119	715	2,405	874	5,650	295	396	1,252
2003	5,295	1,285	2,174	684	2,311	817	5,644	271	367	3,578
2004	5,226	1,373	2,276	660	2,486	787	4,725	269	357	3,597
2005	5,145	1,377	2,323	648	2,757	749	4,763	275	342	3,719
2006	5,133	1,421	2,391	656	2,913	730	4,796	284	347	3,790
2007	5,109	1,530	2,389	761	2,588	707	4,887	301	395	3,881
2008	4,666	1,604	2,374	742	2,415	673	4,921	294	383	3,836
2009	4,401	1,700	2,320	704	2,179	652	4,955	291	377	3,727
2010	4,279	2,063	2,281	690	2,105	617	5,034	290	373	3,771
2011	4,171	2,342	2,280	670	1,987	586	5,112	311	366	3,980
2012	4,102	2,494	2,294	665	1,879	562	5,191	303	353	4,030
2013	4,180	2,489	3,408	639	1,857	500	5,294	285	352	3,810
2014	4,369	2,613	3,458	595	1,858	495	5,541	290	351	3,948
2015	4,381	2,827	3,504	555	2,365	490	5,835	356	345	3,799
2016	4,331	3,052	3,535	531	2,267	485	5,820	387	338	3,368
2017	4,336	3,485	3,598	450	2,179	465	5,615	339	335	3,278

Although buyout and VC investors have different investment strategies and typically invest into companies at different stages of growth, we expect many of the macro factors identified as affecting VC activity to also play a role in buyout investment activity. As such, we build some of our hypotheses on known determinants of VC activity.

Gompers and Lerner (1998) study the determinants of VC activity across different states within the USA and find that states with higher GDP growth have greater VC activity indicating the importance of demand factors. Wright et al. (2004) discuss the prospects of PE activity in Central and Eastern European countries and suggest

correlated with the amount of VC and PE funds raised across countries. It is important to note that they do not use actual portfolio company investment data and rather focus on fundraisings.

TABLE 2

Size of PE Investments for Largest 10 Economies

Table 2 presents the evolution of private equity markets for 10 economies in the sample over the period of 1997 to 2017. Panel A presents the total amount of private equity capital invested per year for each country. Panel B presents the total amount of private equity capital invested as a percentage of GDP.

	USA	China	Japan	Germany	UK	France	India	Italy	Brazil	Canada
Panel A. PE Capital Invested ($ millions)										
1997	12,999	113	0	121	409	19	8	19	0	244
1998	26,059	66	11	183	1,307	119	10	119	140	549
1999	43,253	118	46	881	4,643	1,055	7	183	229	950
2000	60,372	210	216	2,018	5,489	1,253	89	1,284	362	1,099
2001	28,474	120	178	1,177	3,614	791	57	350	790	469
2002	31,590	126	311	1,855	5,739	2,042	79	457	88	592
2003	31,433	378	400	3,369	4,576	739	22	2,114	335	361
2004	40,762	513	263	3,789	5,032	2,814	27	850	72	1,650
2005	43,196	399	336	4,169	7,791	2,953	200	1,157	197	1,089
2006	64,399	1,799	883	4,327	9,387	3,451	1,072	3,342	12	980
2007	93,130	3,038	1,384	3,939	15,330	4,848	1,718	2,880	336	1,357
2008	74,367	4,398	1,697	3,100	9,117	2,727	2,426	3,443	1,386	1,908
2009	48,019	2,425	987	1,533	4,547	1,007	1,194	1,827	491	577
2010	65,277	4,897	1,484	2,819	10,473	3,288	2,103	747	2,303	805
2011	61,981	7,032	2,034	4,596	7,539	4,102	3,167	1,925	1,319	1,347
2012	63,859	5,397	1,282	4,107	8,289	2,157	1,187	935	2,151	1,754
2013	45,742	4,660	688	2,130	7,404	1,650	1,244	1,833	871	1,396
2014	71,182	7,846	749	5,545	8,123	2,248	2,498	918	1,495	1,888
2015	66,405	8,215	552	3,070	9,268	2,804	3,932	2,058	1,379	1,860
2016	74,344	5,229	456	2,736	6,158	2,632	2,195	3,513	1,003	1,832
2017	88,011	9,823	1,039	4,122	9,098	2,783	2,843	2,036	937	1,660
Panel B. PE Capital Invested (% of GDP)										
1997	0.097	0.008	0.000	0.003	0.017	0.001	0.001	0.001	0.000	0.024
1998	0.187	0.004	0.000	0.005	0.052	0.005	0.002	0.006	0.011	0.056
1999	0.298	0.007	0.001	0.027	0.185	0.047	0.001	0.010	0.025	0.093
2000	0.404	0.012	0.003	0.071	0.228	0.063	0.013	0.077	0.038	0.102
2001	0.190	0.006	0.003	0.043	0.157	0.041	0.008	0.021	0.100	0.045
2002	0.207	0.006	0.005	0.064	0.232	0.098	0.011	0.026	0.012	0.056
2003	0.201	0.017	0.007	0.099	0.164	0.029	0.003	0.099	0.044	0.030
2004	0.251	0.020	0.004	0.101	0.157	0.100	0.003	0.036	0.008	0.121
2005	0.258	0.014	0.005	0.113	0.240	0.105	0.019	0.049	0.017	0.072
2006	0.374	0.052	0.016	0.116	0.279	0.119	0.092	0.138	0.001	0.060
2007	0.532	0.071	0.025	0.095	0.410	0.151	0.117	0.108	0.020	0.076
2008	0.433	0.082	0.029	0.071	0.269	0.080	0.174	0.123	0.070	0.106
2009	0.284	0.041	0.016	0.038	0.162	0.032	0.076	0.071	0.025	0.036
2010	0.378	0.070	0.023	0.072	0.371	0.108	0.109	0.031	0.091	0.043
2011	0.357	0.083	0.030	0.110	0.256	0.128	0.156	0.076	0.045	0.067
2012	0.360	0.058	0.019	0.106	0.283	0.073	0.059	0.041	0.080	0.088
2013	0.253	0.045	0.012	0.053	0.249	0.054	0.062	0.080	0.033	0.070
2014	0.383	0.071	0.015	0.134	0.252	0.074	0.116	0.040	0.057	0.099
2015	0.344	0.070	0.012	0.086	0.302	0.109	0.176	0.106	0.072	0.113
2016	0.380	0.045	0.009	0.075	0.221	0.102	0.092	0.180	0.053	0.115
2017	0.441	0.079	0.021	0.109	0.337	0.105	0.105	0.102	0.045	0.098

that higher GDP growth should attract more PE capital. Similarly, we predict that there will be more opportunities for private capital deals in growing industries and countries due to higher demand for external capital from expanding companies that are viable targets. Hence, our first hypothesis is that there is more buyout deal activity in countries and industries with better macroeconomic conditions. To test this, we use GDP per capita growth and unemployment as measures of country-level economic conditions, and changes in overall industry employment and CAPEX as measures of industry-level economic conditions and explore if they are significantly related to buyout capital invested in a country (industry).[10]

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[10]As robustness, we also use other macroeconomic condition variables such as the interest and inflation rates, but do not find any significant relationships with those variables. Our other results remain unchanged if we include those as additional controls in our specifications.

Previous studies have shown the importance of stock markets (Black and Gilson (1998), Jeng and Wells (2000)) as well as credit markets (Green (1998)) for the development of active VC markets. Aizenman and Kendall (2012) investigate the factors that affect the market for international VC investments and find that deeper financial markets are crucial. We expect active stock and credit markets to also be important for buyout investments for several reasons. Demirgüç-Kunt and Levine (1996) show that countries with better-developed stock markets have better-developed banks and nonbank financial intermediaries suggesting that stock and credit markets complement each other. Similarly, Beck and Levine (2002) find that it is the overall financial development that spurs industry growth and having a bank-based or market-based financial system does not matter per se. As such, active stock and credit markets measure the level of financial development for a country and likely proxy for other factors, such as availability of financial infrastructure and services as well as financial knowledge, expertise, and professionalism, which could also lead to the development of private equity markets. Furthermore, private equity managers would likely favor economies with active public markets when selecting buyout deals due to additional exit opportunities available. Finally, active credit markets allow for better access to credit when financing a buyout transaction as well as operating a growing company. Relatedly, Kaplan and Stromberg (2009) discuss the importance of credit markets for buyout activity and conclude that both mispricing and agency-based theories (see Axelson, Jenkinson, Stromberg, and Weisbach (2013)) imply that credit market conditions are positively correlated with buyout deal activity. Consequently, we expect private equity market development to go hand in hand with public and credit market development as private market transactions would benefit from more developed public equity and credit markets. Thus, our second hypothesis is there is more buyout investment activity in countries with greater financial development.[11]

An extensive literature has demonstrated the importance of legal factors for financial development. La Porta et al. (1997) show that investor protection and law enforcement impact the development of capital markets. Similarly, Levine (1998), (1999) find that countries with better creditor rights[12] and contract enforcement have more-developed banking sectors. Consequently, we predict the institutional and regulatory environment should explain the development of private equity markets as well. On the VC side, Cumming, Schmidt, and Walz (2010) find that legal origin and accounting standards have a significant impact on the governance structure of VC deals and hence affect VC market success. Guler and Guillen (2010) find that countries where institutions provide regulatory stability, protect

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[11]An alternative hypothesis is that private markets substitute for public markets and provide financing in economies where financing is not available (or is too costly) through public markets. Although this might be true in some economies, we expect the complementarity argument to dominate and to find a positive association between buyout activity and public market development. In the robustness section, we repeat our main specifications with a measure of buyout investment adjusted by the size of public markets and find evidence that institutional factors are associated with more buyout investment relative to the size of public markets suggesting that some institutional factors might be associated with substitution of private for public financing.

[12]We also study the impact of creditor rights on buyout activity and discuss our findings in Section V.D.

investor rights, and facilitate exits receive more VC investments. On the demand side, Armour and Cumming (2008) find a strong link between bankruptcy laws and entrepreneurship in their study of 15 countries in Europe and North America suggesting that the legal environment is an important factor for VC activity.

As for buyouts, governance engineering is a primary channel through which private equity investors create value for their portfolio companies (Kaplan and Stromberg (2009)). Typical governance improvements include more active governance of management through the control of boards as well as alignment of management incentives through stock- and option-based compensation. We hypothesize that these types of governance changes are easier to be implemented in countries with stronger institutions and better rule of law. Moreover, since buyout transactions typically involve a large transfer of ownership and private contracting, investor protection and contract enforcement would be particularly important for private equity investors. Thus, we also use investor protection and contract enforcement reforms in additional to rule of law to measure how accommodating the overall regulatory and institutional environment in a country is for PE.[13] Consequently, our third hypothesis is there is more buyout deal activity in countries with better rule of law and following regulatory reforms.[14]

III.   Data and Descriptive Statistics

The PE investment data come from Burgiss, a financial services company providing record keeping and performance analysis support to large institutional investors. There are two major advantages of this data set over others. First, Burgiss sources its data exclusively from limited partners, as opposed to general partners (GP), so the typical biases associated with GP-sourced data sets are not present.[15] Second, Burgiss has provided us a complete data set of investments, by country, by industry, by year for their entire database of funds and these data are unavailable from any other source.

The primary variable from Burgiss data for our study is the annual amount of buyout capital invested (measured in USD) at the country level for 61 countries over the period of 1990 to 2017. We use the Burgiss definition of buyout transaction

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[13]The use of reforms rather than other traditional measures of regulatory quality, which are typically highly correlated with rule of law, also allows us to perform a difference-in-differences type of analysis where we compare buyout activity pre- versus post-reform in countries that implemented a reform versus others that did not.

[14]Alternatively, PE firms might prefer investment in countries with weaker institutions due to potential private benefits. For example, Faccio and Hsu (2017) find evidence for an exchange of benefits story between politicians and politically connected PE firms in their study of employment changes at targets of politically connected PE firms in the USA, where they find employment increases at targets of politically connected PE firms to be more pronounced during election years and in states with higher corruption. However, we expect this type of private benefits motivation to be less binding when deciding where to invest globally.

[15]GP-sourced databases on private equity may have significant biases as GPs strategically stop reporting. In many cases, Burgiss cross-checks data across different investors in the same fund which leads to a high level of data integrity and completeness. Brown, Harris, Jenkinson, Kaplan, and Robinson (2015) compare different commercial PE data sets. For detailed information about Burgiss and its coverage of the PE universe, see Brown, Harris, Jenkinson, Kaplan, and Stucke (2011) and Harris, Jenkinson, and Kaplan (2014).

which is based on the Burgiss Private Capital Classification System (PCCS). Effectively, the PCCS defines a buyout as an equity investment for control of a mature operating company whose value is derived primarily through its underlying tangible assets.[16] Thus, our sample excludes venture capital, real estate, natural resource, growth equity, and most infrastructure investments. However, our sample includes all types of buyout transactions including private-to-private (including secondary sales to other sponsors), public-to-private, spinouts, privatizations, management buyouts, etc. Unfortunately, we are not able to observe the specific transaction type in the Burgiss data.

Burgiss provides aggregated company-level PE capital data invested at the industry level based on the Industry Classification Benchmark (ICB). So, a typical unit of observation would be the USD amount of buyout capital invested in Indian portfolio companies in the technology sector in 2015. We use both industry-level and aggregated investment data at the country level in our study. We emphasize that this is the first data set with actual dollar amounts of global buyout capital invested at this level of detail.

Most of our additional country-level data are obtained from the World Bank's Development Indicators database; the institutional quality variables come from World Bank's Worldwide Governance Indicators and the reforms data come from World Bank's Doing Business Data. These data and the buyout investment data are matched at the country level using country codes. The industry-level growth data are obtained from DataStream and are matched to Burgiss data using industry codes from ICB. After matching data from all the different sources, we have a panel of 61 countries across 19 industries over 29 years. Variable definitions and data sources are provided in the Appendix.

Table 3 presents descriptive statistics on the main variables used in the study. The average amount of PE investment in the sample is $805 million per country-year and $42 million per country-industry-year.[17] As these raw investment figures are hard to compare across countries of different sizes, we measure PE investments as a percentage of GDP in the analysis. On average, new buyout investments are 0.036% of GDP at the country-level and 0.002% of GDP at the industry-level. If we exclude country- (industry-) years with zero investment, the average buyout to GDP measure goes up to 0.07% (0.01%) at the country-(industry-) level. To compare with the size of public equity and credit markets, the market value of stocks traded, a common measure for the depth of public markets, is on average 40% of GDP, while credit provided to private sector, a common measure for the depth of credit markets, is about 76% of GDP.[18] Of course, the market capitalization and credit measures are stock variables whereas the PE measures are (annual) flow variables so the interpretations are different.[19] The average GDP per capita growth is 2.08% and the unemployment rate is unchanged on average during our sample period. At the

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[16]Additional details are available at https://www.burgiss.com/burgiss-private-capital-classification-system.

[17]These averages are in 2017 dollars.

[18]As another point of comparison, over the same time period, FDI inflows on average are 4% of GDP.

[19]The size of buyout investments per GDP may seem small compared to the size of the stock and credit markets. However, the concentrated ownership and hands-on management and monitoring at the portfolio company level make private equity ownership very pivotal in portfolio company performance.

TABLE 3

Descriptive Statistics

Table 3 provides summary statistics on the main variables used in the article. Panels A and B provide summary statistics for country- and industry-level variables, respectively. Variables are defined in the Appendix.

	N	Mean	Median	Std. Dev.	Min.	Max.
Panel A. Country-Level						
BUYOUT_INVESTED ($ millions)	1,830	805.000	1.276	4,770.000	0.000	76,800.000
BUYOUT_CAPITAL_PER_GDP (%)	1,828	0.036	0.001	0.073	0.000	0.666
GDP_PC_GROWTH (%)	1,793	2.078	2.205	3.737	−22.551	23.941
UNEMPLOYMENT (% change)	1,705	−0.003	−0.048	1.233	−7.983	9.400
STOCKS_TRADED (% of GDP)	1,439	39.886	16.889	57.934	0.072	357.005
CREDIT_TO_PRIVATE (% of GDP)	1,572	75.747	62.482	51.280	7.008	218.160
FUNDS_RAISED (% of GDP)	1,817	0.044	0.002	0.217	0.000	2.675
RULE_OF_LAW	1,342	0.649	0.680	0.925	−1.427	2.100
INVESTOR_REFORM	1,830	0.067	0.000	0.250	0.000	1.000
CONTRACT_REFORM	1,830	0.063	0.000	0.243	0.000	1.000
Panel B. Industry-Level						
BUYOUT_INVESTED ($ millions)	34,770	42.000	0.000	371.000	0.000	16,700.000
BUYOUT_CAPITAL_PER_GDP (%)	34,770	0.002	0.000	0.009	0.000	0.150
EMPLOYMENT_GROWTH (%)	16,837	3.299	1.828	4.580	−1.650	9.653
CAPEX_GROWTH (%)	17,304	10.398	7.538	22.249	−15.729	39.706

industry level, annual employment grows at 3.3% and annual CAPEX grow 10.4% on average.

We conduct some univariate analyses to compare countries with different levels of buyout investments. Panel A of Table 4 provides univariate comparisons of country-years with zero versus positive amounts of buyout capital investments across different dimensions of macroeconomic and governance variables. Panel B compares average employment and CAPEX growth across country-industry-years with zero versus positive amounts of buyout investments. Panels C and D repeat the same analysis across country- and country-industry-years with positive amounts of buyout investments for high versus low amounts of capital invested. Panel A shows countries that receive buyout investments have on average lower unemployment, more developed financial markets (i.e., larger equity and credit markets), and a better regulatory environment. Panel B shows country-industries that receive buy-out investments have on average higher employment growth, while CAPEX growth is not different from country-industries with no buyout investments. If we repeat the comparisons for high versus low buyout country-years in Panels C and D, we find the same significant differences except for unemployment growth which appears to be similar across all countries with positive buyout investments.[20] We additionally find that countries with lower buyout investments have lower GDP per capita growth on average, which is likely due to the fact that more developed nations with lower growth rates receive larger investments.

Given this and the implications for PE on the broader economy (Bernstein et al. (2016), Aldatmaz and Brown (2020)), buyout investments are as important regardless of their relatively smaller size.

[20]This might suggest that unemployment affects the decision of PE managers to enter a country, but it becomes less important once they enter and decide on the amount of investment. Nevertheless, when we repeat our main analysis on a subsample of countries with positive investment in the robustness section, we still find unemployment to be significantly related to the amount of buyout capital invested across time.

TABLE 4

Univariate Comparisons

Table 4 presents mean (median) comparisons. Columns 1 and 2 present means (medians), and column 3 presents *p*-values for the difference in means (medians) using a *t*-test (Wilcoxon rank-sum test) in both Panels. Panel A compares means (medians) of country-years with and without buyout capital. Panel B compares means (medians) for country-industry-years with and without buyout capital. Panel C compares means (medians) of country-years with high versus low amounts of buyout capital among the country-years with positive buyout investments. Panel D compares means (medians) of country-industry-years with high versus low amounts of buyout capital among the country-industry-years with positive buyout investments. Variables are defined in the Appendix.

Buyout Versus *No Buyout*

	Buyout Mean (Median)	Nonbuyout Mean (Median)	*p*-Value Mean (Median) Difference
	1	2	3
Panel A. Country-Level			
GDP_PC_GROWTH (%)	2.16 (2.07)	1.98 (2.42)	0.31 (0.49)
UNEMPLOYMENT (% change)	−0.09 (−0.12)	0.12 (0.03)	0.00 (0.00)
STOCKS_TRADED (% of GDP)	56.86 (33.81)	18.42 (7.48)	0.00 (0.00)
CREDIT_TO_PRIVATE (% of GDP)	91.25 (90.66)	55.01 (39.88)	0.00 (0.00)
RULE_OF_LAW	0.81 (0.99)	0.32 (0.33)	0.00 (0.00)
INVESTOR_REFORM	0.09 (0.00)	0.04 (0.00)	0.00 (0.00)
CONTRACT_REFORM	0.10 (0.00)	0.02 (0.00)	0.00 (0.00)
Panel B. Industry-Level			
EMPLOYMENT_GROWTH	3.65 (2.87)	3.14 (1.26)	0.00 (0.00)
CAPEX_GROWTH	9.79 (7.17)	10.65 (7.75)	0.12 (0.31)

HIGH-Buyout Versus *LOW-Buyout*

	HIGH Buyout Mean (Median)	LOW Buyout Mean (Median)	*p*-Value Mean (Median) Difference
	1	2	3
Panel C. Country-Level			
GDP_PC_GROWTH (%)	2.02 (1.83)	2.29 (2.32)	0.06 (0.00)
UNEMPLOYMENT (% change)	−0.10 (−0.16)	−0.09 (−0.08)	0.90 (0.44)
STOCKS_TRADED (% of GDP)	74.20 (47.94)	40.69 (21.19)	0.00 (0.00)
CREDIT_TO_PRIVATE_(% of GDP)	102.56 (101.47)	79.36 (69.95)	0.00 (0.00)
RULE_OF_LAW	1.14 (1.48)	0.44 (0.36)	0.00 (0.00)
INVESTOR_REFORM	0.07 (0.00)	0.10 (0.00)	0.00 (0.00)
CONTRACT_REFORM	0.13 (0.00)	0.07 (0.00)	0.00 (0.00)
Panel D. Industry-Level			
EMPLOYMENT_GROWTH	3.82 (3.23)	3.48 (2.53)	0.01 (0.00)
CAPEX_GROWTH	9.45 (7.13)	10.16 (7.34)	0.22 (0.29)

Overall, the univariate comparisons suggest that countries with lower unemployment, more developed financial markets, and a better regulatory environment receive more buyout capital. However, as the countries differ in various other dimensions, it is difficult to draw any conclusions with these simple univariate comparisons. Consequently, we next conduct a multivariate analysis to examine the determinants of buyout investment activity more accurately.

IV.   Results

A.   Determinants of Buyout Investments

The univariate comparisons indicate that developed countries receive more buyout capital. However, additional analysis is required to fully understand how different factors determine the level of buyout investment as countries with more developed financial markets, lower unemployment, and better institutions differ from other countries in various other dimensions. As such, we estimate multivariate panel regressions with country, industry, and year fixed effects to identify the drivers of buyout investments more clearly. Our sample contains many country-years (or country-industry-years) with 0 buyout investment (i.e., the data is naturally truncated at 0). For this reason, we estimate Tobit models of the form

$$\begin{aligned}
\text{PE}_{i,j,t} = {}& \alpha_1 \text{MACRO\_ACTIVITY}_{i,j,t} + \alpha_2 \text{MACRO\_ACTIVITY}_{i,j,t-1} \\
& + \alpha_3 \text{MACRO\_ACTIVITY}_{i,j,t-2} + \beta \text{FINANCIAL\_DEVELOPMENT}_{i,t-1} \\
& + \gamma \text{REGULATORY\_ENVIRONMENT}_{i,t} + \mu \text{FUNDRAISING}_{k,t-1} + \delta_i + \theta_j + \varepsilon_t.
\end{aligned}$$

$\text{PE}_{i,j,t}$ is buyout capital invested at the country-level or country-industry-level divided by country GDP. $\text{MACRO\_ACTIVITY}_{i,j,t}$ includes GDP per-capita growth and the change in unemployment rate for country-level specifications or GDP per-capita growth and the change in unemployment rate along with employment growth and CAPEX growth at the industry-level for industry-level specifications. We also include 1- and 2-year lags for macroeconomic variables to allow for PE firms considering 2 years of past macro activity when making investment decisions as well as the natural lag from the time it takes to identify and close a deal. $\text{FINANCIAL\_DEVELOPMENT}_{i,t}$ includes measures of stock and credit market activity. $\text{REGULATORY\_ENVIRONMENT}_{i,t}$ includes rule of law and dummies for investor and contract reforms. The reform dummies are indicator variables that take the value 1 for country-years following a country's implementation of a regulatory reform toward greater investor protection or better contract enforcement as identified by the business reforms section of World Bank's Doing Business data.[21] To control for the supply of local private capital, we also include a

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[21]INVESTOR_REFORM captures regulatory changes adopted in a country that strengthens shareholder rights leading to an increase in the country's doing business score. Common examples include requirements of greater corporate transparency and disclosure, increased access of shareholders to information, and increased role of shareholders in major corporate decisions. CONTRACT_ENFORCEMENT_REFORM captures regulatory changes adopted in a country that make contract enforcement easier leading to an increase in the country's doing business score. Common examples

measure of regional fundraising, FUNDRAISING$_{k,t-1}$. δ_i, θ_j, and ε_t are country, industry, and year fixed effects, respectively. By including year fixed effects, we are controlling for global shocks that might be affecting the amount of buyout capital invested. The country (industry) fixed-effects control for any time-invariant country (industry) characteristics and allow us to identify the impact of within-country (industry) variables that vary over time.

Table 5 presents country-level results. In column 1, we find that UNEMPLOYMENT is negatively associated with buyout investments suggesting that more buyout capital is invested when the economy is relatively strong and labor markets are tight. STOCKS_TRADED has a positive and significant coefficient suggesting that more buyout capital is invested in countries with more developed stock markets. The coefficients on RULE_OF_LAW and CONTRACT_REFORM are also positive and significant. In columns 2 and 3, we add a time trend and year fixed effects, respectively, and results hold except for CONTRACT_REFORM

TABLE 5

Determinants of Buyout Investments: Country Level

Table 5 presents results of our Tobit regressions where the left-censored dependent variable is the annual total dollar amount of buyout capital invested in a country scaled by its GDP. Variables are defined in the Appendix. Standard errors are clustered by country and reported in parentheses. Models include differing fixed effects (FE) noted in the bottom section of the table. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5
GDP_PC_GROWTH$_t$	−0.039	−0.005	−0.059	−0.019	−0.163
	(0.096)	(0.096)	(0.108)	(0.100)	(0.109)
GDP_PC_GROWTH$_{t-1}$	−0.028	−0.004	−0.031	0.002	−0.027
	(0.083)	(0.081)	(0.092)	(0.080)	(0.089)
GDP_PC_GROWTH$_{t-2}$	−0.024	0.004	0.008	−0.035	−0.082
	(0.082)	(0.082)	(0.093)	(0.082)	(0.090)
UNEMPLOYMENT$_t$	−0.525**	−0.374*	−0.398*	−0.596***	−0.526***
	(0.225)	(0.226)	(0.228)	(0.208)	(0.201)
UNEMPLOYMENT$_{t-1}$	−0.130	−0.036	0.022	−0.071	0.057
	(0.290)	(0.293)	(0.298)	(0.271)	(0.267)
UNEMPLOYMENT$_{t-2}$	−0.312	−0.305*	−0.279	−0.289	−0.205
	(0.219)	(0.209)	(0.207)	(0.202)	(0.201)
STOCKS_TRADED$_{t-1}$	0.033**	0.031**	0.028**	0.029***	0.018**
	(0.014)	(0.013)	(0.014)	(0.009)	(0.008)
CREDIT_TO_PRIVATE$_{t-1}$	0.021	0.015	0.017	0.087***	0.048**
	(0.021)	(0.019)	(0.020)	(0.024)	(0.023)
FUNDS_RAISED$_{t-1}$	−5.416	−5.800	−6.701*	19.837***	15.477***
	(3.772)	(3.632)	(3.841)	(2.937)	(3.996)
RULE_OF_LAW	3.108***	3.421***	3.464***	5.292**	6.754**
	(0.642)	(0.646)	(0.654)	(2.366)	(2.678)
INVESTOR_REFORM	1.587	0.155	0.612	2.436**	2.874**
	(1.291)	(1.348)	(1.368)	(1.129)	(1.337)
CONTRACT_REFORM	3.761***	1.842	2.668*	3.467**	3.374**
	(1.477)	(1.474)	(1.537)	(1.605)	(1.586)
N	1,013	1,013	1,013	1,013	1,013
N uncensored	747	747	747	747	747
Time trend	No	Yes	No	No	No
Year FE	No	No	Yes	No	Yes
Country FE	No	No	No	Yes	Yes
Pseudo-R^2	0.043	0.049	0.058	0.106	0.121

include introduction of electronic systems for case management for the use of judges and lawyers, for filing for complaints, or for paying court fees.

which loses statistical significance with the time trend. In the last 2 columns of Table 5, we focus on the changes of our explanatory variables over time. In column 4, we include country fixed effects (i.e., we compare the level of buyout investments within a country across years) and observe additional significant relations in the time series. Specifically, the coefficients on CREDIT_TO_PRIVATE and INVESTOR_REFORM also become positive and significant suggesting that credit markets and investor reforms are significantly and positively associated with buyout investments within a country. In column 5, we include country and year fixed effects together and the results are very similar to column 4.[22,23]

In addition to these cross-sectional specifications with time fixed effects, we also perform "between regressions" following Jeng and Wells (2000) by taking averages across time and estimating OLS regressions using those country averages. These untabulated results indicate that stock market activity and rule of law are positively and significantly associated with buyout investment activity across countries. The coefficients on unemployment and credit market activity are also consistent with the results from Table 5 but are statistically insignificant suggesting that cyclical variation in these variables is more pivotal for buyout investments than cross-country variation.[24]

Overall, results in Table 5 suggest that macroeconomic conditions, financial development, and regulatory environment all play a role in determining how much buyout capital is invested in a country: countries with lower unemployment, more active stock and credit markets, stronger rule of law, and better investor protection and contract enforcement receive more buyout investment. It is important to note that with country and year fixed effects included, the estimation of coefficients on the reform variables is akin to a difference-in-difference model where we are comparing buyout investments among countries that adopted an investor protection or contact enforcement reform versus those that did not pre- and post-reform.[25] Thus, the positive coefficients on the reform variables indicate that there is more buyout investment following regulatory reforms.

The effects we document in Table 5 are economically large as well. For example, taking coefficients from column 5, a 1-standard-deviation reduction in UNEMPLOYMENT (-1.2%) is associated with a 0.006 increase in PE_t (buyout investment / GDP). This suggests an increase of about 17% relative to the sample mean of 0.036. Similarly, a 1-standard-deviation increase in STOCKS_TRADED

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[22]Results are unchanged when a time trend is included together with year and country fixed effects.

[23]Results are unchanged when a measure of country-level M&A activity is included in the models.

[24]Note that these between regressions do not include the reform dummies because averages of those would not be meaningful. In addition to repeating our main specification, we also test if inflation, tax, or interest rates are related to buyout activity across countries, but do not find any significant association. These between regression results are available upon request.

[25]It is important to note that this is only true assuming those regulatory reforms are exogenous. As the reforms are mostly politically motivated, we do not suspect any reverse causality where reforms are implemented in expectation of more buyout activity in a country. Another concern could be that reforms proxy for some omitted variable correlated with higher buyout activity. If that were the case, we would expect buyout activity to also increase following other types of business reforms reported in World Bank's Doing Business data; however, we do not find any significant relation between buyout activity and other reforms we examine. Table 15 presents results on one such reform, credit reform, where we explore the effect of creditor rights on buyout activity.

would be associated with a 30% increase in buyout investment relative to the sample mean, while a 1-standard-deviation increase in the amount of credit provided to the private sector would be associated with a 70% increase in buyout investment. A country's buyout investment would increase by 0.029 (80% increase relative to the sample mean) following an investor protection reform, and by 0.034 (95% increase relative to the sample mean) following a contract enforcement reform.[26]

Table 6 repeats the analysis in Table 5 at the industry level. In column 1, we find that EMPLOYMENT_GROWTH is positively associated with the amount of buyout capital invested, while CAPEX_GROWTH is not significant. The country-level variables are the same as in column 1 of Table 5 (UNEMPLOYMENT, STOCKS_TRADED, RULE_OF_LAW, CONTRACT_REFORM are positive and statistically significant). In columns 2 and 3, we add a time trend and year fixed effects, respectively, and results are unchanged. In column 4, we include industry fixed effects and those absorb the effect of EMPLOYMENT_GROWTH except for 2-year lagged EMPLOYMENT_GROWTH, while the coefficients on UNEMPLOYMENT, STOCKS_TRADED, RULE_OF_LAW, and CONTRACT_REFORM remain the same. In column 5, we include country fixed effects (i.e., we compare the level of buyout investments in an industry within a country across years and get more significant coefficients). In addition to what we find in columns 1–4, the coefficient on CREDIT_TO_PRIVATE and INVESTOR_REFORM also become positive and significant. In column 6, we include industry, country, and year fixed effects altogether and the results are very similar to column 5 except for EMPLOYMENT_GROWTH, which becomes significant only when lagged for 2 years.[27]

Overall, results in Table 6 confirm what we have found in Table 5: unemployment, stock and credit market depth and regulatory environment all determine the level of buyout capital invested in a country-industry. Additionally, both contemporaneous and past industry employment growth is positively associated with buyout investments across industries, but only past employment growth remains significant within industry.

B.   Determinants of Other Country-Level Investment Activity

Our results so far have shown that macroeconomic conditions, financial development, and institutional factors are drivers of country-level buyout investment activity. Although interesting on their own, these factors may be important for other forms of investment and consequently, our findings may not be specific to private equity investment. To mitigate this concern and to better understand the

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[26]These are marginal effects on the latent variable. If we condition on our dependent variable being positive, the marginal effects are smaller. For instance, the marginal effect of a 1-standard-deviation decrease in unemployment conditional on buyout per GDP being positive is 0.004% which would refer to an increase of about 10% in buyout per GDP on average relative to the sample mean.

[27]To test if industry valuation drives buyout activity, we add measures of industry multiple, both level and annual growth; but do not find any significant relationship between industry valuation and buyout investments. The inclusion of a valuation multiple does not change any of our other results.

TABLE 6

Determinants of Buyout Investments: Industry Level

Table 6 presents results of our Tobit regressions where the left-censored dependent variable is the annual total dollar amount of buyout capital invested in a country-industry scaled by the GDP of the country. Variables are defined in the Appendix. Standard errors are clustered by country and industry and reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5	6
EMPLOYMENT_GROWTH$_t$	0.016**	0.019***	0.017***	0.006	0.014**	0.000
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
EMPLOYMENT_GROWTH$_{t-1}$	0.012*	0.014**	0.014**	0.004	0.010	0.000
	(0.006)	(0.007)	(0.007)	(0.006)	(0.006)	(0.007)
EMPLOYMENT_GROWTH$_{t-2}$	0.025***	0.028***	0.029***	0.016***	0.024***	0.016**
	(0.007)	(0.007)	(0.007)	(0.006)	(0.007)	(0.006)
CAPEX_GROWTH$_t$	−0.003	−0.001	−0.002	−0.002	−0.002	−0.000
	(0.003)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
CAPEX_GROWTH$_{t-1}$	−0.003	−0.002	−0.003	−0.002	−0.002	−0.000
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
CAPEX_GROWTH$_{t-2}$	−0.001	−0.000	−0.000	0.000	0.000	0.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP_PC_GROWTH$_t$	−0.011	−0.004	−0.006	−0.011	−0.002	−0.023
	(0.012)	(0.012)	(0.015)	(0.012)	(0.013)	(0.016)
GDP_PC_GROWTH$_{t-1}$	−0.001	0.008	0.005	0.003	0.006	0.002
	(0.012)	(0.012)	(0.013)	(0.012)	(0.013)	(0.014)
GDP_PC_GROWTH$_{t-2}$	−0.011	−0.006	−0.013	−0.009	−0.013	−0.030
	(0.012)	(0.012)	(0.014)	(0.011)	(0.014)	(0.019)
UNEMPLOYMENT$_t$	−0.052**	−0.017	−0.016	−0.052**	−0.089***	−0.057*
	(0.025)	(0.028)	(0.029)	(0.027)	(0.030)	(0.034)
UNEMPLOYMENT$_{t-1}$	−0.010	0.031	0.042	0.016	0.014	0.043
	(0.028)	(0.030)	(0.031)	(0.028)	(0.031)	(0.035)
UNEMPLOYMENT$_{t-2}$	−0.036	−0.035	−0.061**	−0.035**	−0.059*	−0.066*
	(0.029)	(0.031)	(0.030)	(0.029)	(0.032)	(0.035)
STOCKS_TRADED$_{t-1}$	0.005***	0.004***	0.004***	0.005***	0.002***	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
CREDIT_TO_PRIVATE$_{t-1}$	0.003**	0.003	0.003*	0.003**	0.016***	0.006**
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
FUNDS_RAISED$_{t-1}$	−7.133**	−8.242**	−9.668**	−7.215**	4.763*	−0.542
	(2.824)	(3.207)	(3.848)	(2.895)	(2.752)	(2.265)
RULE_OF_LAW	0.586***	0.683***	0.705***	0.556***	0.788**	0.901**
	(0.103)	(0.110)	(0.119)	(0.093)	(0.339)	(0.379)
INVESTOR_REFORM	−0.122	0.389	0.276	0.146	0.565**	0.481*
	(0.245)	(0.247)	(0.258)	(0.233)	(0.257)	(0.277)
CONTRACT_REFORM	0.492***	0.128	0.244	0.564***	0.561***	0.508***
	(0.177)	(0.180)	(0.193)	(0.167)	(0.181)	(0.188)
N	10,784	10,784	10,784	10,784	10,784	10,784
N uncensored	3,894	3,894	3,894	3,894	3,894	3,894
Time trend	No	Yes	No	No	No	No
Year FE	No	No	Yes	No	No	Yes
Industry FE	No	No	No	Yes	No	Yes
Country FE	No	No	No	No	Yes	Yes
Pseudo-R^2	0.042	0.049	0.054	0.078	0.093	0.143

determinants of buyout activity relative to other investments, we next study how other traditional forms of country-level investment such as FDI, GCF, research and development (R&D) and CAPEX respond to these factors. As buyouts can be seen as a special form of mergers and Acquisitions (M&A), we also explore how M&A activity responds to the factors.

We take various measures of country-level investment as dependent variables (instead of buyout investment) and estimate OLS regressions with the macro,

TABLE 7

Other Investment Activity

Table 7 presents results of our OLS regressions where the dependent variable is Foreign Direct Investment Inflows in column 1, gross fixed capital formation in column 2, Mergers and Acquisitions Volume in column 3, Capital Expenditures in column 4, and Research and Development Expense in column 5, all measured as a percentage of GDP. Variables are defined in the Appendix. Standard errors are clustered by country and reported in parentheses. Models include differing fixed effects (FE) noted in the bottom section of the table. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	FDI/GDP	GFCF/GDP	M&A/GDP	CAPEX/GDP	RND/GDP
	1	2	3	4	5
GDP_PC_GROWTH$_t$	0.227**	0.088	0.076	0.000	−0.002
	(0.093)	(0.068)	(0.199)	(0.000)	(0.004)
GDP_PC_GROWTH$_{t-1}$	0.089**	0.242***	−0.015	0.000	−0.005
	(0.035)	(0.066)	(0.078)	(0.000)	(0.003)
GDP_PC_GROWTH$_{t-2}$	0.047	0.196**	−0.029	0.000**	−0.001
	(0.056)	(0.076)	(0.106)	(0.000)	(0.004)
UNEMPLOYMENT$_t$	−0.307**	−0.207**	−0.429**	−0.000	−0.006
	(0.151)	(0.102)	(0.165)	(0.000)	(0.007)
UNEMPLOYMENT$_{t-1}$	−0.092	−0.175*	−0.209	−0.000	−0.005
	(0.158)	(0.094)	(0.173)	(0.000)	(0.006)
UNEMPLOYMENT$_{t-2}$	0.084	−0.163	0.116	−0.000	−0.001
	(0.119)	(0.105)	(0.184)	(0.000)	(0.007)
STOCKS_TRADED$_{t-1}$	0.013	−0.003	−0.003	0.000	0.001
	(0.013)	(0.007)	(0.009)	(0.000)	(0.001)
CREDIT_TO_PRIVATE$_{t-1}$	0.028	0.038***	−0.024	0.000***	0.001
	(0.019)	(0.012)	(0.019)	(0.000)	(0.001)
RULE_OF_LAW	1.857	0.882	3.890**	0.002	−0.013
	(1.312)	(2.153)	(1.508)	(0.002)	(0.117)
INVESTOR_REFORM	0.347	0.183	0.512	0.000	0.092
	(0.594)	(1.117)	(1.198)	(0.000)	(0.087)
CONTRACT_REFORM	−1.326	1.874**	−0.477	0.000	0.043
	(0.899)	(0.895)	(1.443)	(0.001)	(0.062)
N	1,011	1,002	723	842	788
Year FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.613	0.679	0.571	0.812	0.960

financial, and institutional factors from our main model on the right-hand side.[28] Results are presented in Table 7. In column 1, our dependent variable is the total amount of FDI inflow into a country adjusted by GDP. We find significant coefficients on GDP_PC_GROWTH and UNEMPLOYMENT, indicating that FDI also responds to macroeconomic changes similar to buyout investment and there is more FDI inflow following economic expansions. Financial and institutional factors do not have significant coefficients on the other hand (i.e., FDI does not respond to financial development and institutional factors after accounting for other determinants and fixed effects).

In column 2, we use the investment component of GDP, gross fixed capital formation (GFCF), on the left-hand side and find evidence for a significant response from CREDIT_TO_PRIVATE and CONTRACT_REFORM in addition to GDP_PC_GROWTH and UNEMPLOYMENT. The response of GFCF is the closest to buyout investment, but the responses are smaller in magnitude and there is not a significant response to stock market activity and investor reforms.

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[28]These regressions are very similar to our fixed effects specification from Table 5 with two main differences: first, we use OLS instead of Tobit because the data on other investment are not truncated as the data on buyout investments; second, we do not include buyout fundraising as a control variable.

In column 3, we present results on M&A activity where the dependent variable is country-level M&A volume over GDP. We find that M&A activity is significantly associated with UNEMPLOYMENT and RULE_OF_LAW like buyout investment (i.e., there is more M&A activity in countries with lower unemployment and better rule of law). On the other hand, M&A activity is not significantly related to financial development or regulatory reforms unlike buyout investment activity.

When we examine CAPEX or research and development expenses (aggregated at the country-level) as a percentage of GDP as our dependent variable (columns 4 and 5, respectively), we do not find any significant relations to our macroeconomic, financial, or institutional factors. Overall, the results in this section suggest that the set of determinants we have identified in Table 5 are generally unique to buyout investments. While other forms of investment show some response to changes in macroeconomic conditions, financial development and institutional factors do not play a consistent role in determining the level of FDI, CAPEX, R&D, or M&A at the country level.[29]

Given the existing evidence on the positive impact of buyout investments on portfolio companies (Cumming, Wright, and Siegel (2007), Kaplan and Stromberg (2009), and Guo, Hotchkiss, and Song (2011)) as well as the positive spillover effects documented on industry peers (Aldatmaz and Brown (2020)) and overall industry growth (Bernstein et al. (2016)), our findings potentially have important policy implications for developing economies. Our findings highlight the importance of institutional factors and suggest that developing countries should focus on improving the institutional environment in addition to providing active public and credit markets along with growth opportunities to attract more buyout capital relative to other traditional forms of investments. In the next section, we explore where the institutional factors we identified are more effective in this regard.

C.   Where Are Reforms More Effective?

Our main results have shown that investor protection and contract enforcement reforms are associated with more buyout investment on average, but prior research suggests the effects of the regulatory reforms can differ across countries. To understand if reforms are more effective in some countries, we study 2 such dimensions across which the impact of reforms might vary: legal environment and human capital.

While reforms are needed more in countries with weaker regulatory environments and might be more effective in such economies, well-functioning institutions and a strong and established legal system on the other hand could enhance the effectiveness of investor and contract reforms in attracting buyout capital. We explore this question by adding interactions of the reform dummies with various measures of the legal environment. Results are presented in Table 8. Specifically,

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[29]In untabulated analysis, we perform a similar test using the amount of buyout investment adjusted by FDI, GCFC, R&D, and CAPEX as dependent variables and find evidence that relative buyout activity significantly responds to macroeconomic conditions, financial development, and institutional factors. This confirms that buyout investment responds to our factors more so than other forms of investment.

TABLE 8

Impact of Legal Environment on Contract Enforcement Reforms

Table 8 presents results of our Tobit regressions where the left-censored dependent variable is the annual total dollar amount of buyout capital invested in a country scaled by its GDP. Interactions of reforms with measures of country governance are included. Standard errors are clustered by country and reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5	6
$GDP\_PC\_GROWTH_t$	−0.161	−0.165	−0.170	−0.177	−0.172	−0.159
	(0.108)	(0.109)	(0.109)	(0.109)	(0.117)	(0.116)
$GDP\_PC\_GROWTH_{t-1}$	−0.024	−0.027	−0.047	−0.049	−0.054	−0.045
	(0.087)	(0.089)	(0.090)	(0.091)	(0.092)	(0.089)
$GDP\_PC\_GROWTH_{t-2}$	−0.068	−0.081	−0.119	−0.125	−0.077	−0.079
	(0.091)	(0.089)	(0.090)	(0.089)	(0.086)	(0.084)
$UNEMPLOYMENT_t$	−0.521***	−0.525***	−0.449**	−0.441**	−0.478**	−0.482**
	(0.198)	(0.201)	(0.201)	(0.202)	(0.202)	(0.199)
$UNEMPLOYMENT_{t-1}$	0.055	0.058	0.068	0.073	0.023	0.051
	(0.267)	(0.267)	(0.270)	(0.271)	(0.263)	(0.262)
$UNEMPLOYMENT_{t-2}$	−0.211	−0.204	−0.241	−0.240	−0.298	−0.297
	(0.201)	(0.201)	(0.204)	(0.203)	(0.188)	(0.189)
$STOCKS\_TRADED_{t-1}$	0.012**	0.012**	0.013**	0.014**	0.011**	0.011**
	(0.005)	(0.005)	(0.006)	(0.004)	(0.005)	(0.006)
$CREDIT\_TO\_PRIVATE_{t-1}$	0.044*	0.048**	0.042*	0.044*	0.057***	0.060***
	(0.024)	(0.024)	(0.024)	(0.024)	(0.020)	(0.020)
$FUNDS\_RAISED_{t-1}$	15.334***	15.473***	15.860***	15.893***	7.235	
	(4.070)	(4.005)	(3.903)	(3.903)	(4.884)	
INVESTOR_REFORM	1.897	2.823*	1.279	2.371*	1.116	2.578*
	(1.185)	(1.506)	(1.423)	(1.391)	(1.762)	(1.439)
CONTRACT_REFORM	2.749*	3.226*	3.088**	2.235	2.893*	2.362
	(1.606)	(2.113)	(1.454)	(1.945)	(1.553)	(2.199)
RULE_OF_LAW (RL)	6.621**	6.737**			6.289**	6.153**
	(2.629)	(2.687)			(2.574)	(2.592)
RL × INVESTOR_REFORM	3.292***					
	(1.133)					
RL × CONTRACT_REFORM		2.284***				
		(0.806)				
REGULATORY_QUALITY (RQ)			6.741***	6.779***		
			(2.467)	(2.461)		
RQ × INVESTOR_REFORM			2.971***			
			(1.133)			
RQ × CONTRACT_REFORM				1.806***		
				(0.514)		
CORRUPTION_INDEX (TI)					0.042	0.042
					(0.039)	(0.043)
TI × Investor reform					0.110**	
					(0.052)	
TI × CONTRACT_REFORM						0.026**
						(0.012)
N uncensored	1,013 (747)	1,013 (747)	1,013 (747)	1,013 (747)	959 (728)	959 (728)
Year and country FE	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-R^2	0.122	0.122	0.124	0.124	0.124	0.123

we use scores on rule of law and regulatory quality from World Bank's Governance Indicators and the corruption index from Transparency International to proxy for the strength of overall governance in a country.[30] Columns 1, 3, and 5 show that the coefficients on the interaction of INVESTOR_REFORM dummy with the governance variables are positive and statistically significant suggesting that the investor

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[30]The results are robust to the use of other governance indicators from the World Bank data.

protection reforms are indeed more effective in attracting more buyout capital in countries with a strong governance environment. The coefficients on the interactions with CONTRACT_REFORM dummy in columns 2, 4, and 6 are positive and significant and thus provide a similar conclusion: contract enforcement reforms are more effective in attracting buyout capital in countries with stronger governance systems.

Next, we consider the impact of human capital on the effectiveness of reforms in attracting buyout capital. Li and Yu (2014) have shown both theoretically and empirically that financial reforms are more effective in countries with higher human capital. Similarly, we expect investor and contract enforcement reforms to be more effective in countries with higher human capital for several reasons. First, human capital would likely enhance the enforcement of the financial reforms. Second, regulatory reforms are expected to encourage entrepreneurship and hence create more demand for private capital, which would be more pronounced in the presence of higher human capital due to a larger pool of educated population. To explore this, we interact the reform dummies with various measures of education and human capital: enrollment in tertiary education, government spending on education, and country-level internet usage. Results are presented in Table 9. In columns 1, 3, and 5, we find positive and significant coefficients on the interaction variables suggesting that investor reforms are more effective in countries with improving education levels. Columns 2, 4, and 6 present results for contract enforcement reforms and the interactions are again positive and significant: the positive impact of contract reforms on buyout activity is more pronounced in countries with increasing human capital.

One natural concern with these cross-country results is that reforms could be more prevalent in countries with stronger governance or better education which might be driving the results we find in Tables 8 and 9. As such, we compare average numbers for investor and contract reform dummies across countries with high versus low governance and education and present them in Table 10. Mean differences across subsamples are statistically insignificant (i.e., there is no evidence that reforms are more common in high rule of law or high education countries). On the contrary, the only significant difference we find is that investor reforms are more common in countries with lower rule of law, which, if anything, should bias us against finding the results we present in Table 8.

Overall, our results on regulatory reforms suggest that investor protection and contract enforcement reforms are pivotal in private equity companies' decision to invest in a specific country and their effectiveness is more pronounced in countries with better governance and education systems. In other words, investor protection and contract enforcement reforms are effective in attracting more buyout capital, but they need to be supported with a strong country-level governance as well as a strong supply of human capital.

D.   Comparative Statistics

An additional motivation for our analysis is to develop a better understanding of whether other economies will experience trends like the USA and

TABLE 9

Impact of Higher Education on Contract Enforcement Reforms

Table 9 presents results of our Tobit regressions where the left-censored dependent variable is the annual total dollar amount of buyout capital invested in a country scaled by its GDP. Interactions of reforms with measures of education are included. Variables are defined in the Appendix. Standard errors are clustered by country and reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5	6
GDP_PC_GROWTH$_t$	−0.268	−0.277	−0.307	−0.305	−0.164	−0.167
	(0.226)	(0.225)	(0.248)	(0.249)	(0.110)	(0.109)
GDP_PC_GROWTH$_{t-1}$	−0.099	−0.100	0.124	0.124	−0.025	−0.029
	(0.105)	(0.106)	(0.134)	(0.136)	(0.088)	(0.089)
GDP_PC_GROWTH$_{t-2}$	0.071	0.059	0.128	1.125	−0.074	−0.083
	(0.113)	(0.112)	(0.129)	(0.129)	(0.090)	(0.089)
UNEMPLOYMENT$_t$	−0.684***	−0.648***	−0.519**	−0.515**	−0.532***	−0.541***
	(0.214)	(0.213)	(0.243)	(0.245)	(0.203)	(0.202)
UNEMPLOYMENT$_{t-1}$	−0.276	−0.262	−0.111	−0.098	0.061	0.065
	(0.275)	(0.275)	(0.289)	(0.286)	(0.267)	(0.267)
UNEMPLOYMENT$_{t-2}$	−0.102	−0.102	−0.144	−0.156	−0.209	−0.206
	(0.254)	(0.254)	(0.268)	(0.267)	(0.205)	(0.204)
STOCKS_TRADED$_{t-1}$	0.018**	0.019**	0.028***	0.027**	0.013**	0.012**
	(0.008)	(0.008)	(0.011)	(0.011)	(0.006)	(0.005)
CREDIT_TO_PRIVATE$_{t-1}$	0.036	0.040	0.065**	0.068**	0.041*	0.049**
	(0.029)	(0.029)	(0.032)	(0.032)	(0.024)	(0.023)
FUNDS_RAISED$_{t-1}$	17.765***		18.090***	17.902***	15.448***	15.612***
	(2.498)		(2.825)	(2.901)	(3.883)	(3.873)
RULE_OF_LAW	7.796**	6.869**	3.938	3.874	7.113***	6.886**
	(3.425)	(3.401)	(3.851)	(3.883)	(2.683)	(2.711)
INVESTOR_REFORM	1.365	3.456**	3.089	1.465***	3.187	2.986**
	(2.367)	(1.684)	(2.143)	(0.574)	(2.224)	(1.519)
CONTRACT_REFORM	2.291*	1.123	4.160**	5.337	2.965**	3.513
	(1.222)	(3.555)	(1.802)	(4.883)	(1.455)	(5.644)
EDUCATION (EDUC)	0.022	0.042				
	(0.085)	(0.081)				
EDUC × INVESTOR_REFORM	0.083**					
	(0.035)					
EDUC × CONTRACT_REFORM		0.061***				
		(0.026)				
EDUCATION_EXPENSE (EXP)			0.604	0.900		
			(1.639)	(1.797)		
EXP × INVESTOR_REFORM			3.890***			
			(1.419)			
EXP × CONTRACT_REFORM				3.761***		
				(1.294)		
INTERNET_USAGE (INT)					−0.009	−0.002
					(0.045)	(0.046)
INT × INVESTOR_REFORM					0.119***	
					(0.043)	
INT × CONTRACT_REFORM						0.107**
						(0.046)
N uncensored	760	760	629	629	1,010	1,010
	(562)	(562)	(562)	(562)	(744)	(744)
Year and country FE	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-R^2	0.119	0.119	0.126	0.125	0.123	0.123

the U.K. toward greater private capital formation. In this section, we conduct a comparative analysis to identify countries that are below predicted buyout activity versus others that are likely saturated (or even over-allocated) with buyout investment.

As a starting point, we predict buyout investment using our model with country fixed effects (Table 5, column 4) and examine residuals to explore how

TABLE 10

Are Reforms More Prevalent in OECD, High Rule of Law, and High Education Countries?

Table 10 presents mean comparisons of investor and contract reform dummies across subsamples created based on OECD versus non-OECD, High Rule of Law versus Low Rule of Law, and High Education versus Low Education. Results indicate that the prevalence of reforms is not significantly different across the subsamples on average.

Subsample	OECD	Non-OECD	High Rule-of-Law	Low Rule-of-Law	High Education	Low Education
INVESTOR_REFORM	0.062	0.072	0.054	0.075	0.065	0.068
p-Value of mean difference		0.410		0.078*		0.822
CONTRACT_REFORM	0.058	0.078	0.067	0.068	0.077	0.064
p-Value of mean difference		0.093*		0.928		0.334

countries compare in terms of realized versus predicted investment amounts.[31] To facilitate comparison, we consider each investment amount relative to the USA. For example, we find that buyout investment (adjusted by GDP) in China is only 6% of the level of the USA in 2017 while our model predicts that it should be around 45% of the USA level in 2017. This suggests that China could experience more buyout investment in the coming years. Similarly, New Zealand experiences only 18% as much activity as in the USA, versus a prediction of about 42%. In contrast, buyout investment relative to GDP in Poland in 2017 is about 90% of the USA level while our model predicts it should be significantly lower. This suggests Poland is a saturated market and therefore should expect less buyout activity in coming years. More broadly, like China and New Zealand, we find South Africa, Argentina, and Austria to be those countries with the lowest relative buyout investment, and hence expect to see more activity in those countries. Like Poland, we find Qatar, Jordan, Philippines, and Vietnam to be at (or above) USA levels of relative buyout investment, and hence predict those markets to be likely saturated with buyout investment. Panel A of Table 11 shows the countries with the 10 largest estimated differences in predicted versus realized investment.

Finally, we attempt to estimate the impact of the COVID-19 pandemic on private investment. As world economies are struggling with the adverse economic consequences of the pandemic, it is unknown how private equity investments will fare. On one hand, the pandemic might create opportunities for private equity to provide operational, financial, and governance expertise to help reposition companies. On the other hand, the uncertainty about the real economy and unfavorable stock and credit market conditions might deter private equity investments in some sectors and geographies. Although it is not an easy task to forecast how individual economies will be impacted, we use our model on the determinants of buyout activity combined with current macroeconomic forecasts in an attempt to understand predicted changes in activity. We use the IMF World Outlook forecasts of macroeconomic variables from Oct. 2019 (pre-COVID-19) and predict country-level buyout investment activity using our main model. We then repeat this exercise using the updated macro forecasts from Oct. 2020 (post-COVID-19) and compare the two sets of country-level predictions. The differences across those predictions

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[31]We acknowledge that this is far from perfect and our predictions carry information to the extent that our model is perfectly and fully specified. Nevertheless, ours is the first study to systematically examine the determinants of international buyout investments and our predictions can be useful to policy makers.

TABLE 11

Comparative Statistics

Table 11 presents comparative statistics of predicted buyout activity based on determinants from 2017. Panel A presents countries with the highest and lowest differences between predicted and actual buyout activity relative to U.S. buyout activity based on our model from Table 5, column 4. Countries with the highest positive differences are the ones where we expect to see more buyout investment in coming years, while countries with the highest negative differences are those that are likely saturated for more buyout investment. Panel B presents countries with the highest and lowest level of changes in predicted buyout activity due to updated economic forecasts due to COVID-19 pandemic.

Panel A. Difference in Predicted Versus Realized Buyout Activity as of 2017

Country	Highest Difference	Country	Lowest Difference (%)
China	38.54	Poland	−85.10
New Zealand	24.00	Qatar	−35.48
South Africa	19.07	Jordan	−30.35
Argentina	18.89	Philippines	−22.02
Austria	16.51	Vietnam	−19.66
Thailand	15.92	Croatia	−19.20
Australia	15.21	Saudi Arabia	−17.99
Singapore	14.91	Nigeria	−16.59
Hungary	11.16	Hong Kong	−15.75
Indonesia	10.80	Peru	−15.28

Panel B. Difference in Predicted Buyout Activity With Macro Forecast Updates due to COVID-19

Country	Highest Increase (%)	Country	Highest Decrease (%)
Peru	7.30	U.K.	−7.53
Philippines	5.99	Australia	−4.67
Turkey	4.42	Egypt	−4.32
Kazakhstan	3.14	Croatia	−4.22
Slovenia	2.92	Poland	−4.21
Hungary	2.73	Spain	−4.12
Malaysia	2.64	Brazil	−3.67
Jordan	2.17	New Zealand	−3.55
Qatar	2.16	Ireland	−2.92
Argentina	2.09	Switzerland	−1.90

of buyout activity give us an estimate of the pandemic's impact on buyout investment activity. Panel B of Table 11 reports the countries we predict will be most positively and adversely affected. Results suggest that Peru, Philippines, Turkey, and Kazakhstan will be most positively impacted, while the U.K., Australia, Egypt, Croatia, and Poland will see the largest reductions in buyout investment activity.[32]

V.   Robustness Checks and Other Analysis

A.   Country-Years With Positive Buyout Investment

Our main analysis relies on estimations of Tobit models left-censored at 0 given the nature of the global private equity investment data which contains many country-years (or country-industry-years) with no buyout investment. To address concerns about the truncation in the data and the estimation method used, we also estimate OLS regressions on a subsample of country-years with positive buyout investment and present results in Table 12. The results are very similar to those presented in Section IV.A. Among country-years with positive investment, we find

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[32]Note that we keep using the US as the benchmark in these comparative predictions and measure a country's level of buyout activity relative to the activity in the USA. The differences we report represent how the predicted level of a country's buyout activity relative to the predicted level of activity in the USA changes with updates in the macroeconomic forecasts due to COVID-19.

TABLE 12

Determinants of Buyout Investments: Country-Years With Positive Investment

Table 12 resents results of OLS regressions where dependent variable is the annual total dollar amount of buyout capital invested in a country scaled by its GDP on a subsample of country-years with positive investment. Variables are defined in the Appendix. Standard errors are clustered by country and reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5
GDP_PC_GROWTH$_t$	−0.098	−0.074	−0.146	−0.017	−0.119
	(0.093)	(0.096)	(0.111)	(0.109)	(0.114)
GDP_PC_GROWTH$_{t-1}$	0.048	0.051	0.048	0.110	0.068
	(0.081)	(0.079)	(0.079)	(0.086)	(0.087)
GDP_PC_GROWTH$_{t-2}$	−0.043	−0.031	−0.026	0.007	−0.052
	(0.077)	(0.077)	(0.097)	(0.074)	(0.086)
UNEMPLOYMENT$_t$	−0.454**	−0.384**	−0.349*	−0.448**	−0.385**
	(0.189)	(0.175)	(0.180)	(0.187)	(0.167)
UNEMPLOYMENT$_{t-1}$	0.126	0.161	0.206	0.191	0.239
	(0.261)	(0.257)	(0.264)	(0.254)	(0.251)
UNEMPLOYMENT$_{t-2}$	−0.219	−0.208	−0.172	−0.148	−0.072
	(0.243)	(0.233)	(0.239)	(0.239)	(0.232)
STOCKS_TRADED$_{t-1}$	0.029**	0.028**	0.028**	0.035***	0.024**
	(0.013)	(0.013)	(0.013)	(0.011)	(0.011)
CREDIT_TO_PRIVATE$_{t-1}$	0.002	−0.005	−0.006	0.088***	0.065***
	(0.018)	(0.017)	(0.017)	(0.024)	(0.022)
FUNDS_RAISED$_{t-1}$	5.448**	5.293**	4.211	−22.956***	−26.741***
	(2.226)	(2.334)	(2.791)	(8.326)	(5.627)
RULE_OF_LAW	2.770***	2.929***	2.979***	2.493	3.663
	(0.568)	(0.567)	(0.583)	(2.533)	(2.511)
INVESTOR_REFORM	0.881	0.034	0.519	0.703	1.594
	(1.357)	(1.404)	(1.376)	(1.313)	(1.413)
CONTRACT_REFORM	1.582	0.667	1.191	2.765**	3.486**
	(1.383)	(1.453)	(1.492)	(1.330)	(1.516)
N	747	747	747	747	747
Time trend	No	Yes	No	No	No
Year FE	No	No	Yes	No	Yes
Country FE	No	No	No	Yes	Yes
R^2	0.177	0.187	0.185	0.352	0.374

that countries with lower unemployment, more active financial markets, and a stronger regulatory environment receive higher amounts of buyout capital.

B.   OECD Versus Other Countries

We next explore how our main results differ across OECD countries versus others to alleviate concerns about our results being driven by OECD countries only. We repeat our main tests from Table 5 across OECD countries and others and report the results in Table 13. In column 1, we include a dummy for OECD countries and our main results are unchanged.[33,34] In columns 2 and 3, we compare the reform results for OECD countries and others by interacting our reform variables with the OECD dummy. We find that the impact of reforms is more pronounced in OECD countries, which is expected based on our analysis

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[33]We also find a positive coefficient on the OECD dummy suggestive of more buyout investment in OECD countries.

[34]We also repeat our main tests from Table 5 on a subsample of countries excluding the USA and UK and our results remain unchanged.

TABLE 13

Determinants of Buyout Investments: OECD Versus Rest

Table 13 presents results of our Tobit regressions where the left-censored dependent variable is the annual total dollar amount of buyout capital invested in a country scaled by its GDP. We include an OECD dummy and interact it with the reform and public and credit market development variables. Variables are defined in the Appendix. Standard errors are clustered by country and reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5
GDP_PC_GROWTH$_t$	−0.163	−0.166	−0.165	−0.164	−0.166
	(0.109)	(0.108)	(0.109)	(0.108)	(0.109)
GDP_PC_GROWTH$_{t-1}$	−0.027	−0.023	−0.027	−0.022	−0.031
	(0.089)	(0.086)	(0.089)	(0.088)	(0.089)
GDP_PC_GROWTH$_{t-2}$	−0.082	−0.069	−0.081	−0.076	−0.071
	(0.090)	(0.092)	(0.090)	(0.090)	(0.091)
UNEMPLOYMENT$_t$	−0.526***	−0.520***	−0.524***	−0.530***	−0.538***
	(0.200)	(0.199)	(0.201)	(0.205)	(0.204)
UNEMPLOYMENT$_{t-1}$	0.057	0.052	0.059	0.074	0.037
	(0.267)	(0.266)	(0.267)	(0.269)	(0.265)
UNEMPLOYMENT$_{t-2}$	−0.205	−0.214	−0.203	−0.204	−0.225
	(0.201)	(0.202)	(0.201)	(0.202)	(0.193)
STOCKS_TRADED$_{t-1}$	0.016**	0.018**	0.021**	0.015	0.019**
	(0.008)	(0.009)	(0.009)	(0.013)	(0.009)
CREDIT_TO_PRIVATE$_{t-1}$	0.048**	0.043*	0.048**	0.047**	0.016
	(0.023)	(0.024)	(0.023)	(0.023)	(0.045)
FUNDS_RAISED$_{t-1}$	15.477***	15.172***	15.484***	15.810***	14.926***
	(3.996)	(4.039)	(4.002)	(3.978)	(3.742)
RULE_OF_LAW	6.754**	7.249**	6.757**	6.906***	7.171***
	(2.678)	(2.669)	(2.674)	(2.634)	(2.712)
INVESTOR_REFORM	2.874*	0.517	2.805*	2.784*	2.711*
	(1.537)	(1.197)	(1.527)	(1.526)	(1.445)
CONTRACT_REFORM	3.375**	3.008**	3.115	3.399**	3.479**
	(1.586)	(1.465)	(2.237)	(1.555)	(1.549)
OECD	7.808**	7.976**	7.813**	4.501	2.580
	(3.816)	(3.770)	(3.815)	(4.126)	(6.559)
OECD × INVESTOR_REFORM		5.020**			
		(2.096)			
OECD × CONTRACT_REFORM			4.630*		
			(2.668)		
OECD × STOCKS_TRADED				0.025	
				(0.016)	
OECD × CREDIT_TO_PRIVATE					0.045
					(0.047)
N	1,013	1,013	1,013	1,013	1,013
N uncensored	747	747	747	747	747
Year FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Pseudo-R^2	0.122	0.123	0.122	0.122	0.122

in Section IV.C on reforms being more effective in countries with better governance and education. If we compare governance and education measures across OECD countries versus others, we find that OECD countries have significantly higher levels of governance and education. We further explore how the financial development results differ among OECD versus other countries in columns 4 and 5 in a similar fashion but find that the impact of stock and credit markets does not vary in a statistically significant way among OECD countries and others.[35]

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[35]In untabulated results, we find that the impact of unemployment and rule of law are lower in OECD countries, but differences are not statistically significant.

TABLE 14

Determinants of VC Investments: Country Level

Table 14 presents results of our Tobit regressions where the left-censored dependent variable is the annual total dollar amount of venture capital invested in a country scaled by its GDP. Variables are defined in the Appendix. Standard errors are clustered by country and reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5
GDP_PC_GROWTH$_t$	0.053*	0.062*	0.056	0.011	0.009
	(0.032)	(0.033)	(0.036)	(0.017)	(0.020)
GDP_PC_GROWTH$_{t-1}$	0.000	0.008	0.007	0.004	0.004
	(0.033)	(0.034)	(0.037)	(0.025)	(0.027)
GDP_PC_GROWTH$_{t-2}$	0.023	0.031	0.062**	0.009	0.033
	(0.028)	(0.029)	(0.030)	(0.022)	(0.026)
UNEMPLOYMENT$_t$	−0.049	−0.010	−0.024	−0.083	−0.055
	(0.091)	(0.087)	(0.087)	(0.073)	(0.067)
UNEMPLOYMENT$_{t-1}$	−0.062	−0.035	−0.000	−0.091*	−0.034
	(0.071)	(0.070)	(0.072)	(0.050)	(0.047)
UNEMPLOYMENT$_{t-2}$	−0.092*	−0.095	−0.105	−0.034	−0.029
	(0.050)	(0.069)	(0.074)	(0.059)	(0.058)
STOCKS_TRADED$_{t-1}$	0.014**	0.014**	0.013**	0.009***	0.006**
	(0.006)	(0.006)	(0.006)	(0.003)	(0.003)
CREDIT_TO_PRIVATE$_{t-1}$	0.008	0.006	0.006	0.019***	0.013**
	(0.005)	(0.006)	(0.006)	(0.007)	(0.006)
RULE_OF_LAW	0.283	0.365	0.402*	0.091	0.118
	(0.239)	(0.246)	(0.245)	(0.820)	(0.867)
INVESTOR_REFORM	0.994	1.388*	1.404**	0.344	0.171
	(0.685)	(0.715)	(0.716)	(0.537)	(0.524)
CONTRACT_REFORM	0.486	0.035	0.030	0.173	0.147
	(0.355)	(0.428)	(0.418)	(0.359)	(0.406)
N	1,013	1,013	1,013	1,013	1,013
N uncensored	591	591	591	591	591
Time trend	No	Yes	No	No	No
Year FE	No	No	Yes	No	Yes
Country FE	No	No	No	Yes	Yes
Pseudo-R^2	0.070	0.077	0.083	0.280	0.301

C. Venture Capital Investments

To study if our findings would apply to VC investments, we repeat our main analysis with country-level VC investments on the left-hand side and present results in Table 14 in the same fashion as in Table 5. In column 1, we have no fixed effects and find that GDP per capita growth and stock market activity are positively associated with VC investments, while unemployment growth is negatively associated with VC. If we add a time trend and year fixed effects in columns 2 and 3, respectively, investor protection reform dummy also becomes positive and significant. In column 4, we add country fixed effects, and only the coefficients on stock and credit market activity remain significant. Results are unchanged when year fixed effects are added in addition to country fixed effects in column 6. Overall, these results indicate that financial development is the only important driver of VC investments within and across countries in our sample after controlling for time-invariant country characteristics and time fixed effects.[36]

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[36]We find the same results when we estimate OLS regressions on country-years with positive VC investment instead of Tobit with left censoring.

D.   Creditor Rights and Institutional Ownership

Cao, Cumming, Qian, and Wang (2015) have shown that leverage buyouts (LBOs) are more active in countries with stronger creditor rights and that cross-border LBOs are more common from strong to weak creditor right countries. We also explore if creditor rights play a role in the amount of buyout capital a country receives and report results in Table 15. We use three different measures of creditor rights. In column 1, we include a measure of creditor reforms – a dummy variable that takes the value of 1 for country-years following the implementation of a credit

TABLE 15

Determinants of Buyout Investments: Institutional Ownership and Creditor Rights

Table 15 presents results of our Tobit regressions where the left-censored dependent variable is the annual total dollar amount of buyout capital invested in a country scaled by its GDP. Column 1 adds a measure of country-level institutional ownership and columns 2–4 add different measures of creditor rights to the main model from Table 5. Column 2 adds Creditor Reform, a dummy variable that takes the value of 1 for country-years following a credit reform as identified by World Bank's Doing Business data. Column 3 adds Creditor Index 2002, the creditor rights index score for year 2002 from Djankov, McLiesh, and Shleifer (2007). Column 4 adds Legal Rights Index, the strength of legal rights index from World Bank. Country fixed effects are excluded from columns 1, 3, and 4 as the institutional ownership and creditor rights index values do not have variation over time. Standard errors are clustered by country and reported in parentheses. Models include differing fixed effects (FE) noted in the bottom section of the table. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4
GDP_PC_GROWTH$_t$	−0.171	−0.162	−0.135	−0.163
	(0.127)	(0.110)	(0.114)	(0.139)
GDP_PC_GROWTH$_{t-1}$	−0.072	−0.026	−0.028	0.067
	(0.095)	(0.089)	(0.093)	(0.131)
GDP_PC_GROWTH$_{t-2}$	−0.134	−0.081	−0.117	0.001
	(0.180)	(0.090)	(0.089)	(0.122)
UNEMPLOYMENT$_t$	−0.385*	−0.519***	−0.531**	−0.615*
	(0.223)	(0.202)	(0.207)	(0.392)
UNEMPLOYMENT$_{t-1}$	0.291	0.059	0.029	0.625
	(0.294)	(0.268)	(0.267)	(0.458)
UNEMPLOYMENT$_{t-2}$	−0.048	−0.205	−0.272	−0.825**
	(0.168)	(0.201)	(0.181)	(0.351)
STOCKS_TRADED$_{t-1}$	0.027***	0.012**	0.009**	0.010**
	(0.008)	(0.006)	(0.004)	(0.005)
CREDIT_TO_PRIVATE$_{t-1}$	0.001	0.048**	0.067**	0.024
	(0.015)	(0.024)	(0.020)	(0.020)
FUNDS_RAISED$_{t-1}$	−39.511**	15.515***	−24.255	−17.828***
	(15.491)	(4.013)	(23.058)	(3.821)
RULE_OF_LAW	3.034***	6.834**	6.145**	4.167***
	(0.596)	(2.669)	(2.686)	(0.876)
INVESTOR_REFORM	2.124*	3.060*	2.488*	2.167*
	(1.140)	(1.693)	(1.443)	(1.117)
CONTRACT_REFORM	2.604**	3.369**	3.443**	3.083**
	(1.299)	(1.563)	(1.599)	(1.423)
INSTITUTIONAL_OWNERSHIP	0.163***			
	(0.046)			
CREDIT_REFORM		−0.598		
		(1.640)		
CREDITOR_INDEX_2002			0.198	
			(2.525)	
LEGAL_RIGHTS_INDEX				0.863***
				(0.300)
N	770	1,013	958	576
N uncensored	654	747	727	454
Year FE	Yes	Yes	Yes	Yes
Country FE	No	Yes	No	No
Pseudo-R^2	0.073	0.122	0.064	0.061

reform that strengthens access to creditor information and facilitates access to credit for businesses. We do not find a significant association between buyout capital invested and those types of credit reforms. In column 2, we include another measure, the creditor rights index introduced by Djankov, Mcliesh, and Shleifer (2007).[37] The coefficient on the creditor rights index is positive, but insignificant controlling for all the other factors we consider. In column 3, we include a similar measure on creditor rights from World Bank's Doing Business data (strength of legal rights index). We find a positive and significant coefficient on this index suggesting that countries, where rights of borrowers and lenders are better protected by law receive more buyout capital, consistent with the evidence provided in Cao et al. (2015).

In a recent study of public-to-private transactions in 33 countries around the world, Cumming, Peter, Sannajust, and Tarsalewska (2018) find that public-to-private transactions are more common among countries with more institutional and corporate ownership. Given that our global buyout investment sample likely includes many public-to-private transactions, we also explore if the extent of institutional ownership in a country influences buyout activity. We include a measure of the extent of country-level institutional ownership[38] (measured as a fraction of a country's market capitalization) as a control variable in our main model and present the results in column 4 of Table 15. We find a positive and statistically significant coefficient on institutional ownership indicating evidence for more buyout investment in countries with higher institutional ownership, while our main results remain unchanged.[39]

E. Corporate Taxes, Cyclicality, and Extreme Regulation

We perform further robustness checks that we do not tabulate for brevity.[40] First, we consider two additional control variables that might be related to buyout investments and impact our results: corporate taxes and cyclicality.

Djankov, Gasner, McLiesh, Ramalho, and Schleifer (2008) present data on effective corporate tax rates across 85 countries and find that effective corporate tax rates have an adverse impact on entrepreneurial activity leading to less demand for VC. Groh et al. (2010) include taxation as 1 of the key drivers in their PE attractiveness index. Similarly, in untabulated analysis, we also test if taxation plays a role in how much buyout capital is invested across countries but do not find any statistically significant relationship regardless of the corporate tax data used.[41]

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[37]Following the literature, we include scores from 2002 as the index does not vary over time.

[38]We use the time-series average of country-level institutional ownership as a fraction of a country's market capitalization for the period of 2000 to 2010 presented in Faias and Ferreira (2016).

[39]This finding should be taken with a grain of salt as we exclude country fixed effects from the specification due to our institutional ownership measure being time-invariant and potentially proxying for other time-invariant country characteristics.

[40]In addition to all these robustness checks discussed in this section, we also conduct a number of other tests. In these tests, we examine alternative measures for regulatory environment and financial development as well as different subsamples by country and by time period. Our key results remain unchanged regardless of the measures or subsamples used.

[41]We use other data on corporate taxes from different sources like the OECD and the World Bank's Doing Business Data. Our results remain unchanged if we include corporate tax rates as an additional

Private equity managers have to deliver returns to their investors and hence might be looking for opportunities to buy companies at a discount when economies are going through downturns. To explore this, we create an across country and time recession dummy based on jumps in the unemployment rate and include it as a control variable in our country-level models. We do not find a significant association between this recession dummy and buyout activity. Next, given that our sample period covers many financial crises globally, we further explore if buyout investment activity is related to these crises. We use data on global stock market crashes[42] and include a stock market crash dummy in our main models. We find evidence for lower buyout investment following a stock market crash in a country; however, this effect is temporary and disappears after 1 year. We also repeat the same analysis for banking crises, but do not find any significant association between banking crises and buyout investment activity. Overall, if anything, we find less investment following financial crises and our evidence suggests that PE funds are not systematically "bottom-fishing" during times of economic dislocation.

Private equity transactions have been subject to some extreme regulations, especially in Europe, directly aimed at buyout transactions. One such example is that in Italy over 1999–to 2004, the legal certainty of LBOs was in question, and many Italian courts deemed LBOs to be illegal (Cumming and Zambelli (2010), (2013)). To address concerns about the impact of those types of regulations on our findings, we repeat our main models from Table 5 excluding those country-years and find our findings to be robust to the inclusion or exclusion of this period for Italy suggesting that extreme regulations concerning PE do not alter our results.

F.   Impact of Institutional Factors Across Industries

We next examine if the response of buyout investments to institutional factors differs across industries given that the level of regulatory involvement varies across industries. To explore this, we repeat our industry-level specification on subsamples created based on various industry groupings. We find that the effect of the regulatory environment on buyout investment activity is more pronounced in nontraded versus traded industries, and in services versus goods-producing industries. These findings suggest that private equity managers face more regulatory hurdles when making investments into portfolio companies in these industries and thus respond more to regulatory reforms. However, these differences are statistically weak.

G.   Substitution for Public Markets

To better understand the relationship between public markets and buyout investments, we estimate models where our measure of buyout investments is adjusted by the total market capitalization of public firms instead of including

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control in our models. The reason we do not include it in the main analysis is that the tax data is either only available for a subset of countries or a subset of years and hence leads to a big drop in the number of country-years in the sample.

[42]We use global financial crises data from Harvard Business School's Behavioral Finance and Financial Stability Project available from https://www.hbs.edu/behavioral-finance-and-financial-stability/data/Pages/global.aspx.

public market activity as a control variable on the right-hand side. If institutional reforms made being public more costly for firms and hence led to a substitution of private for public financing, we would expect to find a positive coefficient on our reform variables. The results indeed support this hypothesis: buyout activity relative to public market activity increases following investor protection reforms.

VI.   Conclusion

Despite the tremendous increase in global buyout investments over the last two decades, there is a significant lack of systematic studies exploring the country-level drivers of buyout investments. Our study aims to fill that gap by using comprehensive data on buyout investments across 61 countries from 1990 to 2017. We find evidence that macroeconomic conditions, financial development, and regulatory environment are important determinants of global buyout investment activity. For example, our findings suggest that countries with lower unemployment and higher stock and credit market activity receive more buyout investments. We also explore regulatory reforms regarding investor protection and contract enforcement and find that countries receive more buyout capital following the implementation of these reforms. Our cross-sectional results indicate that strong institutions and high-end human capital are necessary for investor protection and contract enforcement reforms to be more effective in attracting more buyout capital. We also show that the factors we identify are most strongly related to buyout investment activity rather than other traditional forms of investment (such as FDI, aggregate investment, M&A, CAPEX, or R&D). Finally, we provide predictions on where countries stand in terms of realized versus predicted buyout investment activity as well as the impact of the COVID-19 pandemic on private investment trends.

Overall, our findings make important contributions to our understanding of how capital markets will evolve in developed and developing economies by identifying what macroeconomic and regulatory factors are driving the explosive growth of private markets. For example, our results and predictive analysis can be used to identify which economies are more likely to trend like the USA in terms of private capital formation and thus where to expect more private equity investment in upcoming years.

In future work, we are planning to further investigate the determinants of buyout investments focusing on PE investment flows across borders and regions. First, we want to explore how our factors play a role conditional on the location of the GP. Another facet to this could be the location of the LP investor base (e.g., it is certainly possible that a British pension fund invests with a U.S.-based GP who then invests back into a U.K.-based buyout deal and understanding the factors impacting these types of cross-border transactions would be very interesting. Lastly, it would also be interesting to condition our analysis on the characteristics of the GP reputation or past performance to examine how various factors influence specific GPs differentially.

Given the importance of overall financial development as well as private equity activity for the real economy, our results are important for enhancing our understanding of the relation between finance and growth. Future research in this

area can further examine how private market development contributes to economic growth over and above the contributions from public equity and credit markets.

Appendix. Variable Definitions

BUYOUT_INVESTED (BURGISS): The annual total amount of buyout capital invested in a country (or industry) ($ million).

BUYOUT_CAPITAL_PER_GDP (BURGISS): The amount of buyout capital invested in a country (or industry) as a percentage of GDP (%).

GDP_PC_GROWTH (WDI): The annual growth in gross domestic product over population (%).

UNEMPLOYMENT (WDI): The annual change in the year-end national unemployment rate (%).

STOCKS_TRADED (WDI): The sum of the number of shares traded multiplied by their respective matching prices in a country-year as a percentage of GDP (%).

CREDIT_TO_PRIVATE (WDI): The total amount of financial credit provided to the private sector as a percentage of GDP (%).

FUNDS_RAISED (BURGISS): The amount of buyout capital raised in the country's geographical region over country's GDP.

RULE_OF_LAW (WGI): Rule of law estimate capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

INVESTOR_REFORM (DOING BUSINESS): A dummy that takes the value 1 for country-years following a country's implementation of an investor protection reform. The reforms are identified based the World Bank's Business Reforms Data. Investor reform captures regulatory changes adopted in a country that strengthens shareholder rights leading to an increase in the country's doing business score. Common examples include requirements of greater corporate transparency and disclosure, increased access of shareholders to information, and increased role of shareholders in major corporate decisions.

CONTRACT_REFORM (DOING BUSINESS): A dummy that takes the value 1 for country-years following a country's implementation of a contract enforcement reform. The reforms are identified based on the World Bank's Business Reforms Data. Contract enforcement reform captures regulatory changes adopted in a country that make contract enforcement easier leading to an increase in the country's doing business score. Common examples include introduction of electronic systems for case management for the use of judges and lawyers, for filing for complaints, or for paying court fees.

EMPLOYMENT_GROWTH (DATASTREAM): The annual growth rate in industry employment of all public companies (%).

CAPEX_GROWTH (DATASTREAM): The annual growth in industry capital expenditures of all public companies (%).

REGULATORY_QUALITY (WGI): Regulatory quality estimate capturing perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

CORRUPTION_INDEX (TRANSPARANCY INTERNATIONAL): Corruption index from Transparency International that ranks countries by their perceived levels of public sector corruption, as determined by expert assessments and opinion surveys.

EDUCATION (WDI): Ratio of total tertiary enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Tertiary education is the successful completion of education at the secondary level (%).

EDUCATION_EXPENSE (WDI): General government expenditure on education expressed as a percentage of GDP (%).

INTERNET_USAGE (WDI): Number of people using the internet as a percentage of total population (%).

FDI_INFLOWS (WDI): It is the sum of equity capital, reinvestment of earnings, and other capital. Direct investment is a category of cross-border investment associated with a resident in one economy having control or a significant degree of influence on the management of an enterprise that is resident in another economy.

GROSS_FIXED_CAPITAL_FORMATION (WDI): It includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings.

MERGERS_AND_ACQUISITIONS (IMAA): Total annual M&A transaction volume in a country, expressed as percentage of GDP.

RESEARCH_AND_DEVELOPMENT_EXPENSE (WDI): Gross domestic expenditures on research and development (R&D), expressed as a percentage of GDP. They include both capital and current expenditures in the 4 main sectors: Business enterprise, Government, Higher education, and Private nonprofit. R&D covers basic research, applied research, and experimental development.

CAPITAL_EXPENDITURES (DATASTREAM): The total amount of industry capital expenditures of all public companies aggregated at the country level, expressed as a percentage of GDP.

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