What do We Mean by FDI?

An International Studies Quarterly Online symposium

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INTRODUCTION

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Andrew Kerner's ISQ paper aptly titled, "What We Talk About When We Talk About Foreign Direct Investment" (2014) asks us to consider how we conceptualize and measure foreign direct investment. FDI is a topic that has received considerable attention from international and comparative scholars working in political science, economics, and other fields. As Kerner as well as the contributors to the symposium note, FDI has been empirically modeled many different ways. What is missing though is greater thought about the concept, construct validity and then ultimately measurement. The foundation of empirical research in this domain requires it.

For this symposium, we have invited two of the foremost scholars of FDI, Nate Jensen from the George Washington School of Business and Quan Li from the Department of Political Science at Texas A & M University, to comment on Kerner's contribution. Beyond commenting, we asked them to replicate Kerner's results to engage the limits of the inferences as well as to explore new avenues for research.

Quan Li's contribution puts Kerner's piece in context and explains the key insights that flow from the article. He also pokes and prods the model to examine the sensitivity of some estimation choices. This provocative contribution will surely stimulate future research.

Nate Jensen's contribution is unique. Instead of replicating results and possibly going on a fishing expedition, Nate pre-registered his replication[1] ideas prior to doing any analysis. Pre-registration is a growing movement (Janz, 2014) to develop an analysis plan prior to implementation. This idea developed out of experimental research. The basic idea is to ensure that a public document (Mathot, 2013) was written that shows what kind of experiment a researcher has planned, how many participants will be used, and what a researcher expects to find. While it is more common in experimental research, it is exceedingly rare in quantitative work and replications.[2] Nate registered his design choices, and he even commented on his deviations from this design. It is beyond the scope of this symposium to fully engage the pros and cons of registration, but Nate's contribution is a welcome idea for future replications here and in other venues.

Finally, given the amount of novelty and critical thought that both Jensen and Li devoted to the symposium, Kerner offers a detailed response. In sum, this symposium offers a novel debate that many critics of peer review (Editors, 2006) might view as a new alternative for engagement in academic debate.

[1] This pre-registered document is here.

[2] To the best of my knowledge, this is the first pre-registered replication of a quantitative article.

Replication with Registration: Examining Andrew Kerner's "What We Talk About When We Talk About FDI"

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I was invited to contribute to this forum on Andrew Kerner's forthcoming *International Studies Quarterly* (ISQ) piece. My post will focus on a replication of his work using pre-registration to specify the details of my replication study before receiving Kerner's data from ISQ. I include an additional analysis test in the Addendum section.

Kerner's Contribution

Kerner's paper makes an important point that scholars of foreign direct investment (FDI) struggle to match their theory with appropriate data. There is no need to rehash his specific points. I think these are all very sensible arguments and that if implemented, could help further our knowledge on the links between politics and multinational enterprises. The key question is how can we use observational data to test theory?

One strategy is to move away from aggregate data on flows of investment and use alternative data. For example, Kerner cites work by Quan Li (2009) and myself (2008)

that uses expropriation and political risk insurance data to test how political institutions impact political risk for investors.

As an alternative, Kerner illustrates how different types of aggregate FDI data can be used to test theory. Specifically, Kerner argues that fixed capital (plant, property, and equipment) is a better test of how democratic institutions affect the investment decisions of firms. For firms with mobile capital, sitting on piles of cash or assets they can quickly move abroad, exit is an easy option, and political institutions are less of a concern. But for firms that have invested in a major manufacturing facility or an oil-drilling platform, exit isn't as simple.

The Perils of Replication and Re-Analysis

In Kerner's ISQ piece he shows that investment in fixed capital is more likely to be affected by political institutions. Democratic regimes help facilitate inflows of FDI for illiquid investors that worry about political risk. I was asked to perform a replication of this study.

One the main goals of replication is to help advance the production of knowledge by making data and the methods used to analyze data accessible to other scholars. Ideally, replication can also help guard against publication bias, where the incentives facing researchers are to publish results that are statistically significant. Unfortunately, replication studies can suffer from the same types of publication bias. Replications studies are difficult to publish, with few journals willing to devote pages to a re-analysis of existing work. The most publishable replication studies are those that find an alternative coding decision or methodological choice can reverse the findings of a well-established paper.

These perverse incentives of scholars attempting to replicate existing scholarship can be mitigated through the growing acceptance of registration across the social sciences. Registration is a mechanism for scholars to specify what flaws they see in the data collection or methodology before accessing the data.[3]

I registered the specific data and models I would use for my replication at the Experiments in Governance and Politics Registry and provided documentation to the ISQ prior to receiving Kerner's data.

An additional discovery from this replication process, and relevant for discussions on the costs and benefits of registration, is a recognition that many of the modeling choices made in a published article were partially the decision of the author, and partially due to the review process. As noted in the Addendum Section, Kerner's original submission to ISQ included a set of models that were more robust than the final models in the ISQ article. I incorporated an additional (unregistered) replication table in this section.

A Pre-Registered Replication

My main concern with the models of Kerner, and many studies of FDI (including my own) is the issues of endogneity, multicolinarity and post-treatment bias. Independent variables such as democracy and level of development are highly correlated and likely causally related.

Equally problematic is that the dependent variable, foreign direct investment, may be have a direct effect on the independent variables (rather than the other way around). For example, existing studies of FDI have found that FDI can increase economic growth and trade, and the firms can lobby to push for economic reforms, such as capital account liberalization. Thus many of the controls variables such as GDP per capita both affect FDI decisions and are a consequence of FDI decisions.

My replication moves away from the "kitchen sink" approach of adding more and more control variables and focuses on the two mainstay variables in most gravity models of FDI. Gravity models, used when researchers have bilateral trade or FDI data, generally focus on the size of the host and home country, and the geographic distance between the two countries. In Kerner's model, he includes these two main measures: the log of GDP and the log distance between the US and the host country.

In Table 1, I replicate models 1-3 from Kerner using robust regression but with only the log of GDP as a measure of host country size, and the log of geographic distance. Models 1-3 in Table 1 are comparable to Kerner's models. In Models 4-6 I uses substitute log of GDP with log of population as a measure of country size.

[3] See this recent Political Analysis special issue on pre-registration.

Table 1: Replication of Table 2 from Kerner (2014)

	Model 1 Flows	Model 2 d.Stock	Model 3 Capex	Model 4 Flows	Model 5 d.Stock	Model 6 Capex
Polity	0.0 (0.2)	-0.6 (0.4)	-0.1 (0.2)	0.4** (0.1)	-0.1 (0.3)	0.2 (0.1)
LGDP	7.9** (0.6)	10.1*** (1.3)	11.7*** (0.5)			
Ldist	-13.7*** (2.3)	-14.0** (4.5)	-25.5*** (2.0)	-13.3** (1.9)	-15.1*** (3.9)	-30.0*** (2.0)
LPopulation				3.4*** (0.5)	2.2 (1.1)	5.6*** (0.6)
Constant	-40.3 (25.2)	-55.4 (85.5)	-12.7 (22.3)	75.3 (18.4)	152.4 (99.1)	120.8* (50.8)
R-sq	0.2	0.1	0.4	0.1	0.0	0.2
N	1,093	991	965	1,315	1,176	1,165

Notes. *p<0.05, **p<0.01, ***p<0.001. Standard errors in parentheses. All models are estimated using the same robust regression command in Stata as Kerner (2014).

There are two important findings from these models. First, the first three models, that are directly comparable to the more complete models of Kerner (Table 2, Models 1-3), have an almost identical r-squared. At least one simple interpretation is that these additional variables have very limited explanatory power (despite being individually statistically significant). Second, in all six models, we arrive at different substantive conclusions than Kerner (2014). Capex, Kerner's key dependent variable, is not statistically significant in models 3 and 6. Only Model 4, a model of FDI flows, is statistically significant, which contrasts with the findings of Kerner (2014). On important note is that my simple models do have a slightly larger N than the models of Kerner.

A second issue is that it is well known that previous FDI flows can impact future FDI. Thus there are important theoretical reasons to include a lagged dependent variable, although this can lead to a number of serious statistical problems. Without weighing into these debates, one standard means of exploring these dynamic models is though an Arellano-Bond GMM regression. I replicate models 1-3 from Kerner using the xtabond command in Stata 11 and present these results in Models 4-6 in Table 2. Models 7-9 include only the lagged dependent variable and the two gravity variables. For the sake of brevity I only present and discuss the results from the lagged dependent variable, Polity, and the two gravity variables in Table 2.

Table 2: GMM Replication of Table 2 from Kerner (2014)

	Full Controls (Not Presented)			Gravity Controls Only		
	Model 7 Flows	Model 8 d.Stock	Model 9 Capex	Model 10 Flows	Model 11 d.Stock	Model 12 Capex
L DPV	-0.2*** (0.05)	-0.03 (0.04)	0.4*** (0.06)	-0.1*** (0.04)	-0.0 (0.04)	0.8*** (0.04)
Polity	-2.1 (27.3)	27.8 (58)	-12.7 (9.1)	-8.5 (19.7)	33.4 (42.3)	-7.1 (6.7)
LGDP	260.4 (282.9)	210.4 (575)	180.8 (99)	526.8*** (111)	826.5*** (233.1)	385 (38.1)
Ldist	46.3 (529.4)	-1071.9 (1187.2)	1.7 (272)	-1328.6*** (288.5)	-2157*** (613.1)	-1002.4*** (99.7)
N	555	589	443	850	903	653

Notes. *p<0.05, **p<0.01, ***p<0.001. Standard errors in parentheses. All models are estimated using xtabond command in Stata.

All six models find no relationship between Policy scores and any measures of foreign direct investment. Although note that the specification with a full set of controls (models 7-9) even have weak results on gravity variables that are generally strong predictors of FDI. When we only include these gravity variables (Models 10-12) these variables performance as expected (more investment in large and close countries), yet democracy is not a strong predictor of FDI flows. Although much more serious attention would be required to have confidence in this final set of models given the contrasting results on the control variables.

An Addendum:

As part of this replication process I contacted the original author, Andrew Kerner, after I had registered my study. He not only provided additional data and do files, he also provided me a copy of his original submission to ISQ. His original submission included a more classic gravity model set up, which included log of GDP, log of GDP squared, log of distance, and log of distance squared as the main gravity models, and more parsimonious set-up.

I did not pre-register any tests based on this original submission, but it does provide an interested comparison between the author's originally preferred specification and how this

changed throughout the review process. In Table 3, I present the same set of models as Table 1, but this time including the squared terms.

Table 3: Replication of Table 2 from Kerner (2014)

	Model 13 Flows	Model 14 d.Stock	Model 15 Capex	Model 16 Flows	Model 17 d.Stock	Model 18 Capex
Polity	0.1 (0.2)	-0.6 (0.4)	0.2 (0.1)	0.4*** (0.1)	-0.1 (0.3)	0.2* (0.1)
LGDP	-215.5*** (13.2)	-70.5** (28.3)	-135*** (9.6)			
LGDP^2	5.0*** (0.3)	1.8*** (0.6)	3.2*** (0.2)			
Ldist	-194.7*** (73.7)	-352.2* (142)	-367.5*** (53.8)	-35.4 (55.6)	-171.9 (122.8)	-237.3*** (48.6)
Ldist^2	10.3** (4.2)	19.2* (8.1)	19.6*** (3.1)	1.1 (3.2)	8.7 (7.0)	11.7*** (2.8)
LPop				-62.5*** (7.4)	-90.4*** (17.1)	84.4*** (6.4)
LPop^2				2.1*** (0.2)	2.9*** (0.5)	2.9*** (0.2)
Constant	3238.8*** (365.4)	2339.4*** (726.4)	3128.5*** (264.8)	694.9*** (248)	1539.3*** (553)	1810.7*** (215.8)
R-sq	0.6	0.1	0.7	0.2	0.1	0.5
N	1,093	990	965	1,315	1,176	1,165

Notes. *p<0.05, **p<0.01, ***p<0.001. Standard errors in parentheses. All models are estimated the same as Kerner (2014).

In contrast to the previous tables, the results from Table 3 are relatively close to the findings from Kerner (2014). In only one model does FDI flows or change in FDI stock appear significant, while the estimates on Capex hover around p values of 0.10 (Model 15) and 0.05 (Model 18). More importantly, the substantive of impact of democracy on Capex are remarkably similar across the original submission, the ISQ publication, and my replication (coefficients of 2.2, 1.9, and 2.0 respectively).

Concluding Thoughts

Kerner's paper is a welcome contribution to the study of FDI and this pre-registered replication study is an attempt to provide an honest evaluation of the robustness of this result prior to seeing Kerner's data. My pre-registered replication found that his results were fragile, although the specification from his original submission (which included what I judge as a better set of gravity controls) are more robust than the final published version of the paper.

One hope I have that my pre-registered replication can take some of the acrimony out of the relationship between the original author and the author replicating the work. Pre-registration allows for replication that can at least mitigate the concern that someone is simply poking at results attempting to find mistake or lack of robustness of a key result.

My replication doesn't suggest any impropriety or dishonestly on the author's part. What we did discover is that the original findings are not robust to my pre-registered analysis, but part of the reason for this is that my pre-registration was based on the final submission that didn't include the preferred models by the author. The point isn't some problem with the peer review process, but that a replication study can benefit from an exchange with the author on the process. Thus replication can, in theory, can be a process of joint discovery.

I am still not certain on the exact relationship between democracy and FDI, but Andrew's original paper and hopefully this replication get us a step closer.

COMMENTS ON ANDREW KERNER'S "WHAT WE TALK ABOUT WHEN WE TALK ABOUT FOREIGN DIRECT INVESTMENT"

Quan Li
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Cross-border investments and production activities by multinational corporations (MNCs) are a critical issue area in many fields such as economics, political science, sociology, international business, and management sciences. To scholars across these fields, an MNC often means different things—an economic actor that invests and produces abroad because it is more productive than others that do not, a political agent that pursues influence at home and abroad to maximize profit and/or to help achieve the home government's strategic objectives, a firm that internalizes transaction costs and manages various issues and risks arising from operating abroad, or a business organization that seeks to govern itself to address various agency problems. Thus MNCs are complicated and important objects of study for a wide range of scholars, not to mention businesses that have to compete or collaborate with MNCs and policymakers who seek to attract or regulate them. In political science alone, the study of MNCs has led to a lively and expanding research community of scholars who are interested in a variety of related topics. However, within this research community focusing on the political economy of foreign direct investment (FDI) and MNCs, we may not always know what we are talking about, and often we want to study one thing but we are really studying something else, according to Andrew Kerner (2014). His ISQ article is a wakeup call that exposes this weakness in the political science scholarship on FDI and MNCs.

Summary of Kerner's Argument and Findings

In his article, Kerner (2014) does several things. He rightly points out that in political science, scholars have excessively relied on using FDI net inflows and stock to understand the investment and activities of MNCs, not always with a clear and complete understanding of the boundaries and intricacies of these measures. The main conceptual confusion, Kerner (2014) argues, results from the following sources: (1) the flow and stock data do not encompass all financial assets marshaled by MNCs, (2) they do not discriminate between liquid and illiquid capital, and (3) they concern MNC affiliates in which the headquarters hold widely varying ownership shares, ranging from roughly 10% to 100%. As a consequence, these measures often do not match the concepts scholars actually have in mind with regard to the behaviors of MNCs.

Instead, Kerner (2014) advocates the use of an indicator that measures fixed capital expenditures by majority-owned affiliates. He argues that this new measure represents all illiquid assets of affiliates largely owned by foreign multinationals and therefore, should allow scholars to measure more precisely the political risks arising from illiquid assets for primarily foreign-owned firms. To verify his argument, Kerner (2014) uses this new

measure, together with the FDI flow and stock indicators, to re-investigate the democracy-FDI relationship that has produced mixed findings. According to Kerner (2014), if democracy reduces political risk and if fixed capital expenditures of majority-owned firms most closely reflect foreign firms' perceptions of such risk, then we should expect to find the effect of democracy on FDI to be most pronounced and probably observable with respect to fixed capital expenditures of majority-owned firms only rather than aggregate FDI net inflows or stock. His empirical strategy is to use robust regression[4] for estimation on a sample of some 73 non-OECD countries that received US FDI from 1997 to 2006. As expected, the level of democracy, measured by the Polity democracy scale[5], is not statistically related to US FDI inflows or stock, but has a significant positive effect on the annual expenditures on plant, property and equipment (PPE) by US majority-owned affiliates in those countries.

Two Key Insights of Kerner

Two insights in Kerner (2014) will likely get this article into the reading lists for many undergraduate and graduate international political economy (IPE) courses. First, conceptually, FDI inflows, stock, and fixed capital expenditures are overlapping and yet different in subtle ways. Their differences have often been ignored by political scientists studying MNCs. Kerner's conceptual discussion is the clearest so far. Second, by delineating subtle differences among the three concepts, Kerner (2014) usefully draws attention to the need to distinguish FDI and behaviors of MNCs, thus calling for greater care in operationalizing the concept of interest.

Caveats about Kerner's Claims and Analysis

Readers of this article, however, will be better served by keeping several important caveats in mind. First, while the limitations of the FDI net inflows measure are discussed with ample details, the strengths of the measure have gone largely unnoticed in the article. To be sure, if an analyst wants to study MNCs, their activities and impacts in the host economy, using FDI net inflows alone is incomplete. But, if the analyst wants to study foreign production capital that flows into the host, then FDI net inflow is the appropriate measure. Its usefulness depends on the research problem one is interested in. It would be most useful, for example, when attracting foreign production capital is a top priority for many development-oriented countries that are capital-scarce. This is exactly why tax incentives are so widespread. In this case, fixed capital expenditures by majority-owned affiliates would be too narrow and limiting. Thus, nothing can be more misleading than the heading of the last section of his article, "Political Scientists (Usually) Don't Care about FDI." To name just a few examples, political scientists are interested not only in the effects of democratic institutions on FDI inflows (Li & Resnick, 2003; Jensen, 2003) but also the effects of economic reforms, human rights, regional trade agreements, IMF programs, and economic sanctions on the abilities of countries to attract FDI (Biglaiser & DeRouen, 2006; Blanton & Blanton, 2007; Buthe & Milner, 2008; Jensen 2004; Lektzian & Biglaiser, 2013).

[4] (rreg routine in stata12)

[5] For details on the variable, see http://www.systemicpeace.org/polity/polity4.htm

Second, fixed capital expenditures by majority-owned affiliates is a useful measure. But it cannot be *the* solution when it comes to the study of FDI and MNCs. For example, if one wants to know the effect of *foreign* direct investment on growth and income inequality in the host, then the fixed capital expenditures measure does not have any more advantage than FDI inflows as it contains non-foreign capital. The two measures shed light on different aspects of MNC activities; neither can be *the* solution.

For another example, if one wants to know whether democracy attracts more foreign production capital than autocracy or not, it is hard to say fixed capital expenditures is necessarily the better measure than FDI net inflows unless one is merely interested in knowing how the two regime types differ in the amounts of fixed capital investment associated with majority-owned MNC affiliates. This is informative, but nonetheless points to a different research question.

Finally, Kerner's analysis is misleading in how he characterizes the democracy-FDI relationship conceptually and how he models it empirically. Theoretically, Kerner (2014) oversimplifies the relationship between democracy and FDI as merely acting on the notion of political risk, which is never clearly defined in the article. Is it referring to the risk of host government expropriating FDI? What about a seemingly innocuous regulatory policy change against the interest of the foreign investor? Will protests by a mobilized local community against drilling by a foreign oil company be considered as political risk? What about local interests hurt by foreign competition lobbying for more protection for themselves and less incentives for foreign investors? Are those activities or outcomes related to political risk for the foreign firms? How about foreign firms lobbying for a favorable policy change but failing to bring it about? Is that a type of political risk? As it becomes immediately obvious, political risk is not an umbrella concept that covers all these different processes, and yet they all are tied in some way to the democracy-FDI relationship as explored in the related literature.

Empirically, Kerner's analysis has two important weaknesses, one in interpretation and the other with the estimator choice. With respect to interpretation, he focuses on the estimated effect of the democracy variable, interpreting it as evidence supporting the link from democracy to political risk and then to FDI. This interpretation is not correct because the model already includes a measure of political risk, which is the law and order variable. So if political risk is the only intermediate variable between democracy and FDI and if law and order is capturing political risk, the estimated coefficient of democracy is capturing some theoretically unspecified process beyond what law and order is measuring. Even more curiously, the effect of law and order is acting in ways unexpected by Kerner's own argument or the literature in general. The law and order variable ranges from 0.5 (e.g., Somalia and Zimbabwe) to 6 (e.g., Canada) in the pooled sample, with higher values indicating lower risk. Hence, it should be positively correlated with FDI. Its estimated effects in Table 2 of Kerner (2014), however, are negative in five out of six models, and are even statistically significant and negative in one of the six models.

More importantly, as I discussed elsewhere (Li, 2009), the robust regression estimator is simply not the most appropriate for this problem at hand. The robust regression estimation results in Kerner's article are unreliable due to two important problems. The first one is that his robust regression estimation over-penalizes a large share of the sample; the second problem is that it essentially ignores heteroskedastic error variance and serial correlation in panel estimation. I demonstrate the consequences of these two problems below.

A Close Scrutiny of Kerner's Robust Regression Estimation and Some Replication

Kerner's substantive conclusions are based on his robust regression estimates. But his pooled sample estimation suffers two problems. The first problem relates to which observations are included or excluded in his robust regression estimation. The second problem relates to his lack of attention to the violations of i.i.d assumptions in his regression analysis. I discuss each one in turn below.

The robust regression Kerner applies assigns less weight to observations that tend to have larger influences over estimation. In fact, observations with zero weight are simply ignored in estimation. Thus, it is important for an analyst to know which observations receive zero weight and are ignored in estimation. For the sake of space, I focus on model 1 (FDI net inflows) and model 3 (fixed capital expenditures) in Kerner's Table 2, respectively. Below, Table 1 presents the number of observations given zero weight in Kerner's robust regression estimation for each relevant country in each model's sample. For model 1, about 23% of the sample (i.e., 166/730) are ignored in estimation, and for model 3, about 21% of the sample (i.e., 135/654) ignored. For net FDI inflows, China and Mexico are completely dropped from estimation while Argentina, Saudi Arabia, Thailand, and Venezuela only have one year data used for estimation. For fixed capital expenditures, Argentina, Brazil, China, Indonesia, Malaysia, Mexico, and Thailand are all dropped from estimation. With these important FDI recipient countries dropped, it makes one wonder what inferences one should draw about the population of countries one is making inferences about. Kerner's estimated effects simply do not apply to these cases.

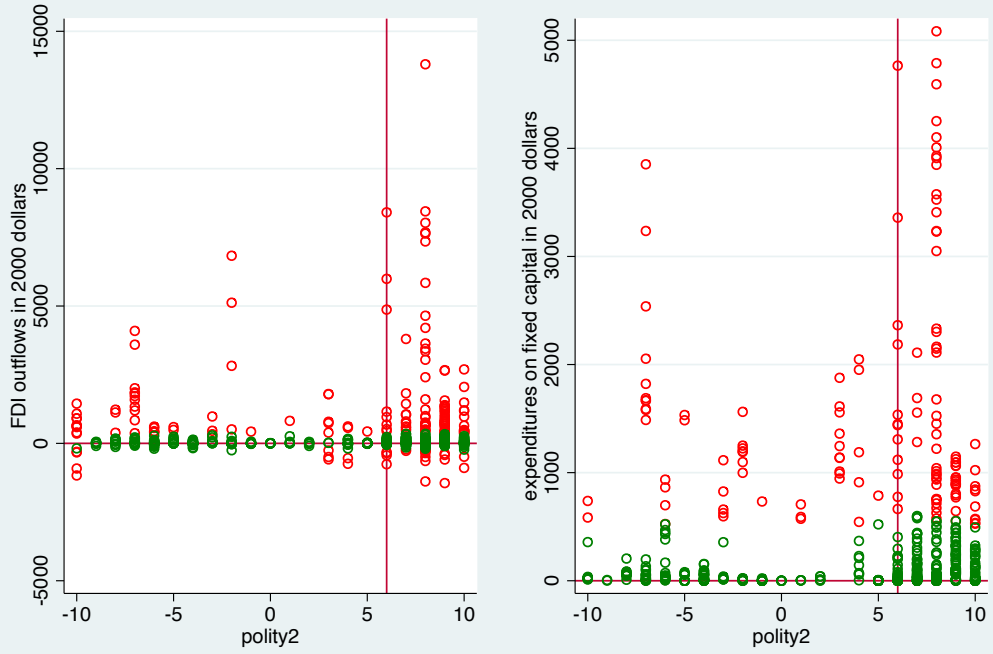
Table 1 Observations Ignored in Robust Regression for Models in Kerner's Table 2

Model 1	Ignored	Model 3	Ignored
Angola	2	Angola	5
Argentina	9	Argentina	10
Bolivia	1	Brazil	10
Brazil	8	Chile	4
Chile	7	China	10
China	10	Egypt	5
Colombia	6	India	6
Costa Rica	6	Indonesia	10
Ecuador	3	Israel	5
Egypt	5	Malaysia	10
Ghana	1	Mexico	10
Guatemala	1	Nigeria	7
Hungary	1	Peru	6
India	4	Philippines	7

Indonesia	5	Poland	1
Israel	8	Qatar	2
Kuwait	1	Singapore	5
Malaysia	8	Thailand	10
Mexico	10	Trinidad and Tobago	4
Nigeria	6	Venezuela	8
Panama	7	Total	135
Paraguay	1		
Peru	4		
Philippines	5		
Poland	1		
Qatar	5		
Saudi Arabia	9		
Singapore	4		
South Africa	4		
Thailand	9		
Trinidad and Tobago	2		
Turkey	1		
United Arab Emirates	3		
Venezuela	9		
Total	166		

Taking an even closer look, I present two scatter plots of two FDI dependent variables, respectively, and POLITY2, separating those observations used in estimation and those that are not within each plot. Figure 1 shows the patterns. The left panel of Figure 1 is for FDI net inflows and POLITY2 and the right panel for fixed capital expenditures and POLITY2. Observations in red are ignored in estimation, and those in green are used in estimation. The patterns are illuminating. While the whole range of POLITY2 values are included in the estimation of both models 1 and 3, all large values of net FDI inflows and fixed capital expenditures are essentially dropped. For model 1, the mean FDI net inflows for observations used in estimation are 28 while that for those dropped for estimation is 1290, with their difference of means test showing them to be statistically different from each other. For model 3, the mean fixed capital expenditures for observations used in estimation is 80 while that for those dropped from estimation is 1540, with their difference of means test to be statistically significant as well. Kerner's estimates are based on those country years that experienced rather small net FDI inflows and fixed capital expenditures from the US.

Figure 1 Scatterplots of Two FDI Variables and POLITY2 Used in Kerner's Robust Regressions



Note: red/green observations given zero/non-zero weight in Kerner's robust regressions

Since the two groups of observations are very different with respect to each dependent variable, it is important to assess whether the estimated effects also apply to those observations that are ignored in estimation. Table 2 provides the estimated effects of POLITY2 on net FDI inflows and fixed capital expenditures using OLS, first for observations not ignored in Kerner's robust regressions and then for those ignored. Note that this implicitly assumes that these two sample groups are potentially drawn from two different underlying populations. In Table 2, POLITY2 has a positive but insignificant effect on net FDI inflows in both sample groups; in contrast, POLITY2 has a positive significant effect on fixed capital expenditures for observations used by Kerner and yet, a negative and significant effect for those ignored by his robust regression. These results are very telling. They seem to indicate that the relationship between democracy and net FDI inflows is not sensitive to which group of countries we look at, holding the rule of law constant, and yet that the relationship between democracy and fixed capital expenditures moves in opposite directions depending on whether the US MNC affiliates have large or small fixed capital expenditures.

Table 2 OLS Regressions for Not-Ignored and Ignored Observations

	(1)	(2)	(3)	(4)
VARIABLES	**flows2000**	**capex2000**	**flows2000**	**capex2000**
polity2	0.919	2.157***	8.366	-29.57***
	(0.581)	(0.811)	(20.93)	(10.28)
lngdp	19.90***	52.15***	1,273***	643.9***
	(3.131)	(4.723)	(131.0)	(55.50)
lngdppc	-1.460	0.794	224.7	216.6***
	(3.899)	(5.808)	(145.3)	(66.75)
lntradegdp	-4.510	-6.460	1,328***	399.4***
	(8.825)	(13.42)	(267.2)	(106.8)
lndist	-24.05***	-40.03***	-1,510***	-731.5***
	(7.398)	(10.19)	(318.5)	(138.8)
gdpgrowth	29.50	6.887	231.2	446.6
	(28.79)	(40.63)	(1,035)	(407.0)
law and order	1.010	-17.48***	-287.8**	-393.3***
	(3.291)	(4.578)	(136.7)	(58.94)
capital account	-0.382	-1.982	172.3	-97.57*
openness	(2.436)	(3.421)	(130.2)	(50.37)
Constant	-185.0*	-675.3***	-23,293***	-10,108***
	(97.80)	(144.8)	(4,083)	(1,847)
Observations	564	519	166	135
R-squared	0.168	0.403	0.482	0.729

Year dummies not reported
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

A second problem with Kerner's modeling strategy is that while emphasizing the correction of undue influences of outlying observations, it ignores the consequences of the error term violating the i.i.d assumptions. Because Kerner's primary models are based on time series cross sectional samples of very different countries and sticky investment series, one should be concerned about heteroskedastic error variance and serial correlation issues. To investigate the impact of these two possible issues, I re-estimate Kerner's models 1 and 3 using OLS with robust standard errors clustered over country. We present the results in Table 3 for net FDI inflows and fixed capital expenditures based on three groups of observations: those not ignored in robust regression, those ignored, and the full sample. The effect of POLITY2 on net FDI inflows remains insignificant. Yet the effect of POLITY2 on fixed capital expenditures now turns insignificant for those observations used in Kerner's robust regression, remains negative and significant for those observations ignored in Kerner's robust regression, and is negative and insignificant in the full sample. These findings certainly contradict Kerner's expectations.

Table 3 OLS Regressions with Robust Standard Errors for Not-Ignored, Ignored, and All Observations

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	**flows2000**	**capex2000**	**flows2000**	**capex2000**	**flows2000**	**capex2000**
polity2	0.919	2.157	8.366	-29.57**	-3.622	-0.303
	(0.668)	(2.001)	(28.83)	(13.86)	(8.928)	(9.611)
lngdp	19.90***	52.15***	1,273***	643.9***	323.8**	339.1***
	(3.842)	(11.62)	(375.9)	(110.7)	(136.1)	(75.13)
lngdppc	-1.460	0.794	224.7	216.6*	-20.95	-81.01
	(3.939)	(12.15)	(190.3)	(107.2)	(65.79)	(66.28)
lntradegdp	-4.510	-6.460	1,328**	399.4**	217.3	132.1
	(8.237)	(28.57)	(553.4)	(167.0)	(230.1)	(180.1)
lndist	-24.05***	-40.03*	-1,510**	-731.5**	-373.2	-169.5
	(7.262)	(21.96)	(689.3)	(287.1)	(336.1)	(180.6)
gdpgrowth	29.50	6.887	231.2	446.6	114.0	-104.9
	(36.59)	(33.95)	(663.3)	(449.5)	(258.7)	(156.9)
law and order	1.010	-17.48	-287.8*	-393.3***	-76.22	-102.9*
	(4.121)	(11.05)	(142.4)	(97.65)	(81.09)	(60.03)
capital account	-0.382	-1.982	172.3	-97.57	20.35	32.82
openness	(2.221)	(7.596)	(166.4)	(85.83)	(41.93)	(34.04)
Constant	-185.0*	-675.3*	-23,293***	-10,108**	-4,388**	-5,682***
	(104.6)	(346.8)	(7,226)	(3,730)	(1,947)	(1,277)
Observations	564	519	166	135	730	654
R-squared	0.168	0.403	0.482	0.729	0.224	0.453

Year dummies not reported

Robust standard errors clustered over country in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Short Conclusion

Kerner's article draws our attention to two critical issues in the study of FDI and MNCs: knowing what any investment indicator really measures and distinguishing FDI and behaviors of MNCs. It is accessible and clearly written. However, his empirical effort to resolve the inconsistent findings on the effect of democracy on FDI has fallen short. The conception that political risk is the only linchpin between democracy and FDI is incomplete. The fixed capital expenditures of majority-owned foreign affiliates is not necessarily the best measure. Robust regression is definitely not the most appropriate modeling technique for resolving the issue. Replications and extensions of his empirical analysis fail to support his theoretical expectations.

Response by Andrew Kerner

Andrew Kerner
University of Michigan

As Li and Jensen note in their contributions, my article is an effort to dig more deeply into issues of construct validity and measurement in the FDI literature. It is great to have the chance to receive comments on that effort and to further that discussion in this symposium. As a field we have become quite adept at arguing over the best research design, estimator, etc. and that is, of course, an important and ongoing exercise. But we don't often hold our measures to the same level of scrutiny as we hold our models. That can be a big problem, and I've argued in my paper that this problem is particularly acute in the study of FDI. At the most recent meeting of the Academy of International Business there was an entire (and well attended) roundtable dedicated to the problems associated with using FDI flow and stock data in social scientific settings. I think that is an encouraging sign for the direction of work in this field. I'm glad that these issues are also noteworthy enough to merit a symposium at ISQ.

The comments by Li and Jensen reemphasize two critical issues that the empirical literature on FDI needs to deal with: measurement and modeling. I'll begin with measurement, as furthering that discussion was the central goal of the paper.

Jensen's and, especially, Li's comments suggest a shared concern for the importance of measurement in the FDI literature, and an appreciation that different questions about how MNCs/FDI relate to politics often demand different measures. In particular, Li notes in his response that "[net FDI inflows'] usefulness [as a measure of MNC behavior] depends on the research problem one is interested in." I couldn't agree with that more. Li's comments suggest the need to be mindful of what different quantifications of FDI measure and how well any particular quantification relates to the causal claim being evaluated. What should we do about this? Li perceptively notes that replacing one default quantification of MNC behavior (FDI inflows) with another (fixed capital investment) cannot be "*the* solution when it comes to the study of FDI and MNCs". I agree with that, too. I don't think (and didn't argue in the paper) that fixed capital investment should be *the* solution. I don't think any single measure of MNC activity should be *the* solution. As I argue in the paper, political science theories about FDI and MNCs are diverse and I think that diversity should be reflected to the extent necessary and to the extent possible in the data that we use to test them. I *do* think, and argue in the paper, that fixed capital investments are a better measure than net FDI inflows to test theories that tie MNCs behavior to politics primarily through asset illiquidity. While asset illiquidity is a prominent feature of some political science theories related to MNCs and FDI, it's certainly not the only mechanism that connects MNCs and FDI to politics. There are many, many political science questions that aren't best (or even well) answered by observing trends in the allocation of fixed capital.

There are some points on which Li and I disagree. In particular, Li and I disagree about how useful net FDI inflows are to testing political science theory. Li's comments suggest that he thinks that net FDI inflow data are more useful in political science than I do.

My pessimism on this matter is based on two arguments. First, net FDI inflows often makes a poor proxy for the value of assets that MNCs own, the scale of their operations, the

number of people they employ or other measures of MNC operations.[6] As I show in the paper, the empirical distinction between FDI inflows and other indicators of the scale of MNC activities can be substantial and non-random. To the extent that we are using net FDI inflows as a proxy for some other measure of the scale of MNCs' activities, doing so can be problematic. Second, I think that the causal mechanisms embedded in most political science theories about MNCs and FDI more often refer to the way that politics affects the value of assets that MNCs control in a country, the amount of business they conduct, the number of people they employ, etc. than they do the effect that those activities have on the balance of payments (which is what net FDI inflows measure). That is to say that I think net FDI inflows are often being used as proxy for something else.

Li objects to my assertion that most political science theories about how politics affects MNC behaviors have more to do with the distribution of MNCs' assets and operations than they do with how those activities affect the balance of payments. While I disagree with him, Li makes a very good point in this regard. Independent of what an MNC does or owns in a country, the capital inflows that it brings are an important part of what makes MNC investments attractive, especially to development oriented capital poor countries. Capital flows matter and, clearly, governments care about them. While the paper doesn't acknowledge this to the extent that it should have, it certainly wasn't meant to suggest the opposite. And, as the paper acknowledges, the problems associated with using net FDI inflows as a proxy variable for something else are irrelevant if we are actually theorizing about MNCs' effect on the balance of payments and not, for example, the scale of MNCs' host country operations.

A key question for future research that this debate raises is: when do the causal mechanisms in our theories refer to politics' effect on net FDI inflows and when do they refer to politics' effect on some other measure of MNC activity? Here is one (rough) way to answer that question: consider a hypothetical foreign owned business that chose to be in a host country for some reason, owns assets there, makes and sells products, employs people, avails themselves of whatever domestic and international legal protections exist, etc., but whose operations have a neutral effect on the host country's balance of payments.[7] The question the analyst should ask herself is: should this foreign owned firm "count" as FDI for the purposes of her theory?

Because that firm's operations do not affect the host state's balance of payments they would not affect the host country's net FDI inflows. There are clearly times when choosing a measure that codes this hypothetical business in that way makes theoretical sense. As I note in the paper, some of the causal mechanisms in political science theories about MNC behaviors really are about how politics affects the flow of foreign capital (or vise-versa). In

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[6] Among the more notable reasons for this is that, unlike more direct measures of MNC activity, net FDI inflows reflect the extent to which firms finance their operations by tapping local debt markets, the extent to which MNCs store earned income not being employed in a local productive activity in foreign affiliates rather than repatriate it to the parent firm, the extent to which parent-to-affiliate capital flows are channeled through tax havens and a variety of other factors that are profoundly informed by home and host country politics and often unrelated to MNCs' productive activities in a host country.

[7] There are a variety ways this could happen; the affiliate might eschew funding from the parent in favor of local credit markets, might remit as much earnings to the parent through reverse debt flow as they reinvest in the affiliate, etc. As the paper notes, this hypothetical scenario isn't all that hypothetical.

those circumstances I would agree that net FDI inflows is a conceptually appropriate measure.[8]

However, by my read of the literature, the causal mechanisms in many political science theories on the determinants of FDI allocation relate to politics' ability to induce MNCs to own assets/do business/employee people in a country. It is not often clear that these dynamics would apply any less to the hypothetical foreign affiliate that operates in a country but finances itself in a way that leaves the balance of payments unaffected. To use net FDI inflows in those instances is to use it as a proxy variable for something else. While net FDI inflows may in some applications make a perfectly good proxy variable, in other applications it won't and we shouldn't take its appropriateness for granted.[9]

But an *ex post* discussion of which theories are really about which phenomena doesn't do us much good. Maybe the best prescription going forward is greater conceptual clarity about the MNC behaviors that are implicated by our theories, and more justification of the measures that we use to capture those behaviors. Sometimes that measure will be FDI inflows, sometimes it won't.

On the modeling side, Li takes issue with the use of robust regression. As Li notes, the robust regression estimator works by down-weighting influential outliers in the sample. Li makes a compelling case that the robust regression estimator down-weights excessively in this case. Excessive or not, it is certainly the case that the results reported in the paper about the empirical relationship between fixed capital expenditures and democracy are sensitive to estimator being used. While I'm not fully convinced that the alternative Li presents is necessarily preferable (Cook's D statistics suggest that there *is* an issue with influential outliers in these data), Li's objections to the estimates, and his preference for alternatives, are certainly not unreasonable.

Taken as a whole, empirical findings relating politics to the scale of MNC activities have been generally mixed and sensitive to samples, estimation strategies, etc. Whatever the (in my opinion, substantial) merits of not using net FDI inflows (or FDI stock data) to test certain theories – this symposium does an admirable job of underlining that doing so does not in itself deliver us from some of those sensitivities. Importantly though, regardless of which estimator or specification is used, the results reported in the original paper and in the re-analyses all suggest that the empirical relationship between democracy and FDI is highly sensitive to how the scale of MNC activity is measured. Whatever that relationship is, this suggests the need to be as mindful of measurement as we are of other issues.

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[8] But not fully unproblematic. Like FDI stock data, much of the FDI flow data are subject to cross national differences in reporting standards, notably including the treatment of reinvested earnings. The use of tax havens is another issue with these data. For example, according to the OECD dyadic FDI flow data, which is often used in political science, in 2010 the Netherlands was the largest foreign direct investor in Mexico, with flows that were roughly 47% larger than those from the United States. Luxembourg was a larger foreign direct investor in Mexico than Germany that year. This is, of course, more a reflection on the use of tax havens in 2010 than of the actual distribution of foreign direct investors. It's hard to imagine that many of those Dutch (or Luxembourgian) investments did much to expand Dutch values or practices, that they reflected or impacted Dutch strategic interests, etc. Moreover, the problem is not just that Dutch FDI appears to be inflated (it would be easy enough to omit data from known tax havens from our analyses) it is that many of those nominally Dutch FDI flows were attached to MNCs from countries other than the Netherlands and that FDI is not noted in the data as such.

[9] Similarly, for those works considering the consequences of FDI on home or host country politics I think its often - but not always – more reasonable to suggest that the causal agent in the theory is the scale of MNCs presence in a local economy (as producers, asset owners, employers, etc) rather than the impact that presence has on the balance of payments.

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