

## ***Research Note***

# **The Effect of Outliers on Regression Analysis: Regime Type and Foreign Direct Investment**

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### **ABSTRACT**

The presence of outliers and influential cases can dramatically change the magnitude of regression coefficients and even the direction of coefficient signs (i.e., from positive to negative or vice versa). When researchers ignore abnormal observations, especially with respect to dependent variables, their empirical results can be misleading. Unfortunately, the fact remains underappreciated in studies of political science. To expound upon the outlier issue, I reexamine an empirical study that reports on two opposing effects of democratic institutions on inflows of foreign direct investment (FDI). In doing so, I illustrate the way influential outliers can drastically affect the substantive results of regression analysis. After properly reanalyzing outlying countries, I conclude that democratic countries attract more FDI than authoritarian countries.

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Detecting and correcting outliers and influential cases that violate the normal i.i.d. assumption regarding residual errors is one of the most crucial statistical diagnostics for

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ordinary least squares (OLS) regression models. In the face of a heavy-tailed (outlier-prone) error distribution, a predicted regression line tends to track more closely outlying observations, fitting them at the expense of the rest of the sample data in order to minimize the sum of squared errors. Accordingly, the estimated results are likely to lead the researcher to make incorrect inferences about the data (see Belsley *et al.* 1980, pp. 6–84, Agresti and Finlay 1997, pp. 310–311, 336–337, and 538–541, Gujarati 2003, pp. 540–542; Hamilton 2004, pp. 230–248). Unfortunately, the pitfalls of neglecting diagnostic analysis of outliers are not yet properly addressed in studies of political science, where the OLS regression model is often the standard method to fit prediction equations. This implies that many empirical findings reported by political scientists are potentially statistical artifacts. In particular, students of foreign direct investment (FDI) have been largely unaware of the outlier problem, even though each variable is not normally distributed and the errors are not identically and independently distributed.

By reexamining a recently published political study (i.e., Li and Resnick 2003), I demonstrate just how forceful the effects of outliers and influential cases can be on the substantive results of regression analysis. I argue that accounting for influential outliers can help reconcile the otherwise contradictory findings on the democracy-FDI link in the selected study. I also provide evidence that erroneous operationalization of the dependent variable (i.e., inflows of FDI) causes a serious outlier problem. If FDI inflows are measured in dollar amounts, they contain outlying observations and thus violate the normal i.i.d. assumption. However, if FDI inflows are measured as a percentage of total GDP, the influence of outliers is drastically reduced. When the FDI data are corrected for the potential outlier problem in Li and Resnick's study, the results show that democratic countries attract more FDI than authoritarian ones (see, e.g., Jensen 2003, Ahlquist 2006, Blanton and Blanton 2006, 2007).

### WHY OUTLIERS MATTER FOR STUDENTS OF POLITICAL SCIENCE (AND ESPECIALLY FDI)

Students of political science conduct empirical tests based on causal hypotheses inferred from intuition, conventional wisdom, or theoretical reasoning; “each hypothesis specifies a posited relationship between variables that creates observable implications” (King *et al.* 1994, p. 99). Since hypotheses often specify positive or negative causal relationships between dependent and independent variables, reporting estimated coefficients without outlier diagnostics can lead to incorrect inferences and compromise otherwise scientifically valuable findings.<sup>1</sup> Political studies do not routinely conduct and report outlier diagnostics; therefore, the validity of their empirical results is questionable until actual diagnostic tests of outliers are performed with replication data, which are often unavailable to the public.

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<sup>1</sup> In an OLS regression setting, extreme values on either the *Y*-variable and/or any of the *X*-variables (or even some peculiar combination of values on these variables) can cause an observation to have a disproportionate influence on the estimated coefficients and thus bias the inference we draw (see Belsley *et al.* 1980, pp. 6–84).

To help illustrate the consequences of this outlier problem I was fortunate enough to obtain replication data directly from Li and Resnick (2003) whose impressive work appears in the major international relations journal *International Organization*. Li and Resnick's study explores whether democracy leads to greater inflows of FDI, presenting two opposing causal explanations which focus on democratic constraints and property rights protection, respectively. On the one hand, democratic countries institutionally constrain the monopolistic behavior of foreign investors in order to protect their domestic economies; we would therefore expect democracies to detract from FDI inflows. On the other hand, because democratic countries rigorously protect property rights, they should attract FDI inflows. The authors' empirical analysis of 53 developing countries from 1982 to 1995 strongly supports that democratic institutions affect FDI inflows both positively and negatively.

I use outlier diagnostics to reexamine the robustness of Li and Resnick's findings on the two contrasting effects of democratic institutions and conclude that their findings are misleading because the regression analysis fails to account for influential outliers within the dependent variable. Here, influential outliers are large domestic economies that are bound to attract substantially more FDI than average size economies. For outlier diagnostics, I choose Li and Resnick's (2003, p. 195) main model (i.e., Model 1 from Table 1), which uses OLS regression (i.e., panel-corrected standard errors (PCSEs) with AR (1) correction) because the dependent variable (i.e., inflows of FDI) is continuous.

My replication of Li and Resnick's Model 1 is successful and the results are reported in my Model 1 in Table 1. Using the same significance levels (i.e.,  $*p < 0.10$ ,  $**p < 0.05$ ,  $***p < 0.01$ ) as those in the Li and Resnick study, all the replicated coefficients and standard errors concur with their original report. In particular, the replicated Model 1 predicts both the *negative* effect of the LEVEL OF DEMOCRACY and the *positive* effect of PROPERTY RIGHTS PROTECTION, which is the main theoretical and empirical interest for political scientists.

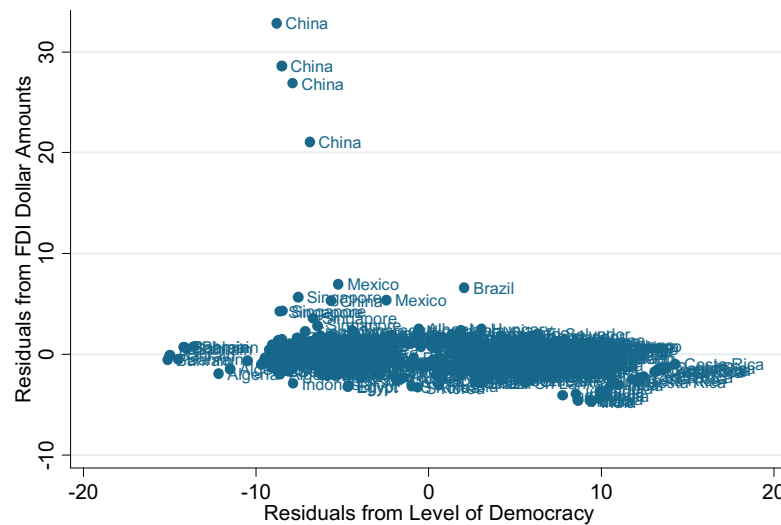
Building on the replicated model, I employ two different outlier diagnostics: a partial regression plot and DFBETAs. A partial regression plot is a visual way of detecting potential outliers by plotting residuals of variables, providing a clear graphic presentation of outliers over a simple scatter plot. It displays the relationship between the response variable and an additional independent variable, both adjusted for other independent variables. More specifically, while controlling for other variables, a partial regression plot detects multivariate outliers, which are not normal errors and have the potential to influence multiple regression estimates (see Easterly 2003, Hamilton 2004, pp. 201–202). It also enables visual detection of other possible violations of OLS assumptions, such as curvilinear relationships (Bollen and Jackman 1985, p. 514).

Figure 1 displays the partial plot for the unexplained portion of inflows of FDI against the unexplained portion of the LEVEL OF DEMOCRACY. The heavy concentration of points near zero, which is the mean of the residuals, indicates that most observations are unlikely to be *Y*-outliers. Yet, four observations from China — for the years 1992 to 1995 which fall in the upper left quadrant — are clearly identifiable as potential outliers, located far from the mean of the residuals. Based on this figure, it is plausible that these four observations from China alone could be responsible for the *negative* estimated coefficient for the LEVEL OF DEMOCRACY replicated above. Indeed, nondemocratic

**Table 1.** The effect of democratic institutions on inflows of FDI: Model 1 of Li and Resnick's study.

	OLS regression			Robust regression
	Replicated Model 1	China Dummy Model 2	AlbChina Dummy Model 3	Model 4
LEVEL OF DEMOCRACY	−0.088*** (0.025)	−0.044*** (0.014)	−0.094*** (0.025)	0.003** (0.002)
PROPERTY RIGHTS PROTECTION	0.052*** (0.017)	0.020* (0.015)	0.036*** (0.015)	0.004** (0.002)
REGIME DURABILITY	0.023*** (0.009)	0.010** (0.005)	0.025*** (0.009)	0.000 (0.001)
POLITICAL INSTABILITY	−0.017 (0.019)	−0.006 (0.008)	−0.033* (0.021)	−0.008*** (0.002)
LABOR COST CHANGE	−0.001 (0.002)	−0.000 (0.002)	−0.001 (0.003)	0.001 (0.001)
ECONOMIC SIZE	1.030*** (0.286)	0.709*** (0.198)	1.063*** (0.270)	0.126*** (0.008)
ECONOMIC DEVELOPMENT	−0.097 (0.284)	0.229 (0.190)	0.052 (0.253)	0.035** (0.017)
ECONOMIC GROWTH	0.023** (0.013)	0.007 (0.007)	0.035** (0.019)	−0.000 (0.002)
EXCHANGE-RATE VOLATILITY	−0.000** (0.000)	−0.000** (0.000)	−0.000*** (0.000)	0.000* (0.000)
CAPITAL FLOW RESTRICTIONS	−0.085** (0.045)	−0.118*** (0.039)	−0.103*** (0.044)	−0.007 (0.006)
WORLD FDI INFLOWS	0.004*** (0.001)	0.002** (0.001)	0.004*** (0.001)	0.000 (0.000)
AlbChina Dummy			4.348 (5.949)	
China Dummy		22.541*** (3.752)		
Constant	−25.319*** (5.530)	−18.836*** (4.293)	−26.102*** (5.200)	−3.208*** (0.187)
$R^2$	0.21	0.66	0.26	
Observations	483	483	483	483

Notes: OLS estimates and standard errors in parentheses are based on panel-corrected standard errors (PCSEs) with AR (1) correction. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$ .



**Figure 1.** Partial regression plot: Democracy.

China does attract huge FDI inflows. Given that Li and Resnick's data cover the period from 1982 to 1995, China's most recent and unprecedented FDI performances from 1992 to 1995 may solely be responsible for the negative relationship.

Figure 2 shows the partial plot for the unexplained portion of FDI inflow against the unexplained portion of PROPERTY RIGHTS PROTECTION. This figure again shows that China presents four possible outliers for the years 1992–1995 in the upper right quadrant, the effects of which alone could lead to the *positive* estimated coefficient for the property rights variable. It is worth noting that although the concept of property rights is conceived of as an important feature of democracy in Li and Resnick's study, nondemocratic China also appears to provide foreign investors with high levels of property rights protection. Considering that the property rights protection variable for all sample countries varies between 11.5 to 45.3 during the entire study period from 1982 to 1995, the actual level of property rights for China is found to be quite high, ranging from 33.5 to 40.7 during the last four years. Interestingly, the entire replication data show a weak correlation of 0.20 between democracy and property rights. Perhaps, as Weimer (1997, p. 8) points out, the correlation between democracy and the security of property rights is imperfect.

Since the partial regression plots in Figures 1 and 2 identify multivariate outliers, they may include simple outliers, insufficient to change the magnitude or signs of coefficients. To differentiate simple outliers from influential ones, I employ DFBETAs case statistics. DFBETAs are widely used to show by how many standard errors the coefficient of an independent variable would change if a particular observation were dropped from the regression. The larger the absolute value of DFBETAs, the greater the influence of the particular observation. Based on the threshold of  $|DFBETA| > 2/\sqrt{n}$ , I identify



**Figure 2.** Partial regression plot: property rights.

influential cases that drastically change the coefficient of the LEVEL OF DEMOCRACY or PROPERTY RIGHTS PROTECTION (see Hoaglin and Welsch 1978, Bollen and Jackman 1985, Hamilton 2004, pp. 205–210). On the democracy variable, China turns out to have the most influential observations for the years 1992–1995. For the threshold of 0.091, each value of DFBETAs is  $-0.456$ ,  $-0.725$ ,  $-0.881$ , and  $-1.151$ . On the property rights variable, China in 1993 and Albania in 1991 are considered to be the two most influential outliers for the coefficient of PROPERTY RIGHTS PROTECTION. Each value of DFBETAs turns out to be  $0.427$  and  $0.218$ . According to Figure 2, China in 1993 is the far right observation among the four in the upper right quadrant and Albania in 1991 is found in the middle upper part of the lower quadrant.<sup>2</sup>

To control influential outliers, I implement two remedial measures: (1) creating a dummy variable and (2) using robust regression estimation. As Bollen and Jackman (1985) point out, progressively dropping outliers from the sample is another possible remedial measure — by deleting outlying cases one by one, researchers can observe whether there is a pronounced change in one or more of the estimated coefficients and identify which of the outliers causes the change. I do not discuss this approach here because it is subject to a growing concern that many published works in the discipline of political science, using samples of 40 or 60 countries, would show a marked change if only five of the most outlying observations were omitted. When the approach of dropping

<sup>2</sup> Other influential outlier diagnostics such as DFITS, Cook's Distance, and Welsch Distance lead to a similar conclusion (see Belsley *et al.* 1980, pp. 6–84, Agresti and Finlay 1997, pp. 538–539, Hamilton 2004, pp. 205–210).

outliers is implemented, the results are similar to those obtained when using a dummy variable and/or robust regression, which are discussed below.

Model 2 in Table 1 includes Model 1 plus the China dummy, capturing the impact of the four most influential outliers during the period from 1992 to 1995. Model 3 incorporates the AlbChina dummy, detecting the effects of the two outliers, Albania in 1991 and China in 1993. As shown in Model 2, the coefficient of the China dummy is statistically significant at the 0.01 level; the outlying observations from the authoritarian country, China, contribute to an increasing amount of FDI inflows. The inclusion of the China dummy radically alters the magnitude of the coefficient and standard error for the LEVEL OF DEMOCRACY, decreasing each by about half, from  $-0.088$  to  $-0.044$  and from  $0.025$  to  $0.014$ , respectively. This implies that the negative sign of the democracy variable is drastically influenced by the four  $Y$ -outliers of nondemocratic China. The  $R^2$  value of 66% is much larger than the 21% of the replicated Model 1. This indicates that when taking into consideration the outlying effect, Li and Resnick's model performance is dramatically improved. As shown in Model 3, the coefficient of the AlbChina dummy shows no significance. The presence of the AlbChina dummy somewhat decreases the magnitude of the PROPERTY RIGHTS PROTECTION coefficient, but the shift in standard error is almost nil. The  $R^2$  value of 26% is only slightly larger than the 21% of the replicated Model 1. This indicates that Albania in 1991 and China in 1993 are not the only main driving forces that contribute to the positive sign of the property rights variable.<sup>3</sup>

The use of dummy variables is instrumental in explaining the impact of the observation-specific dummies, but does not account for all possible outlying cases in an effective way. Some consider robust regression estimation as the most effective remedial technique to provide resistant (stable) results in the presence of outliers. Unlike OLS regression estimation, which is inefficient and potentially biased in the presence of outliers, robust regression estimation resists the pull of  $Y$ -outliers, making them more efficient when dealing with nonnormal, heavy-tailed error distributions. Robust regression is an iteratively reweighted least-squares procedure that calculates weights. This is done for each observation using a Huber function, which down-weights observations that have larger errors and then bi-weights them from the absolute value of errors, iterating weighted least squares regression to drop the change in weights below 0.01. These Huber and bi-weight iterations are complementary to each other because the former has problems dealing with severe outliers, while the latter sometimes fails to converge or has multiple solutions.<sup>4</sup>

Model 4 in Table 1 shows the robust regression results.<sup>5</sup> The most intriguing results are that the sign of the LEVEL OF DEMOCRACY switches from negative to positive, while

<sup>3</sup> The PROPERTY RIGHTS PROTECTION coefficient indicates a positive sign without significance when (the average level of FDI for) Albania and China are omitted from the regression. This type of model specification effectively provides country fixed-effects for these two countries in a single, otherwise complete model.

<sup>4</sup> To save space, I do not discuss estimation methods for robust regression in detail. More information can be found in Western (1995), Hamilton (2004, pp. 239–256), and StataCorp (2005, pp. 159–166).

<sup>5</sup> Robust regression does not produce  $R^2$  because it is not *ordinary* least-squares estimation.

that of PROPERTY RIGHTS PROTECTION remains the same. Indeed, democratic institutions have a *positive* effect on inflows of FDI once *Y*-outlier problems are minimized; we can then say that *both* democracy and property rights are contributing factors to an increase in FDI. It appears that Li and Resnick's original analysis is greatly dictated by influential *Y*-outliers, which produce spurious results for the relationship between the LEVEL OF DEMOCRACY and FDI, but not between PROPERTY RIGHTS PROTECTION and FDI.<sup>6</sup>

It is essential to explain precisely why Li and Resnick's data causes such drastic changes to the coefficient for the LEVEL OF DEMOCRACY. As noted at the outset, the main culprit can be traced back to the way the dependent variable, inflows of FDI, is operationalized. Li and Resnick's net FDI inflows are measured in billions of current US dollars (i.e., number of FDI dollars). In doing so, their study neglects to account for the different economic size of each country, increasing the influence of potential outlying observations such as China. Due to the presence of influential outliers on the dependent variable, the democracy variable is reported to produce the *negative* effect on activities of foreign firms. However, when FDI dollars are properly reanalyzed with robust regression, a *positive* effect of the LEVEL OF DEMOCRACY is detected.

Is there an alternative measure to the outlier-prone number-of-FDI-dollars variable? It appears that the use of net FDI inflows as a percentage of total GDP (i.e., FDI/GDP ratios) may diminish the detrimental effect of outliers. In fact, Jensen (2003, p. 597) argues that "[FDI/GDP] is the best measure to examine a country's ability to attract FDI" (see also Jensen and McGillivray 2005, Choi and Samy 2008). Further, FDI/GDP is also considered a standard choice for World Bank economists, because it accounts for heterogeneous economies (e.g., Aykut *et al.* 2003). In a theoretical sense, FDI/GDP is a better choice because students of FDI are interested in investigating whether democratic or nondemocratic countries *on the whole* induce more FDI; the research focus is to find the average of all possible sample countries, for each type of regime, not just one particular country. If the behavior of one particular political regime like China is inconsistent or erratically deviates from the general pattern of the rest of nondemocratic countries, then its role should be less important in determining the activities of foreign firms. In a statistical sense, when FDI data include heterogeneous units, "the size or scale effect must be taken into account so as not to mix apples with oranges" (Gujarati 2003, p. 28).<sup>7</sup>

<sup>6</sup> One may contend that because the LEVEL OF DEMOCRACY is in competition with PROPERTY RIGHTS PROTECTION in the same model, it produces the negative effect on FDI. To account for this concern, Table 1 is reexamined without PROPERTY RIGHTS PROTECTION. Appendix 1 corroborates the main findings in Table 1: When the impact of influential outliers is minimized, democracy is *positively* associated with FDI.

<sup>7</sup> One may suggest taking the log of FDI to make the skewed distribution of FDI data more symmetrical. This suggestion, however, is impractical. Because the logarithm is a transformation that can only reduce *positive* skew, it can be applied only to data which are positive. Yet, FDI inflow data can have values that are positive, negative or even zero. This violates the positivity requirement for the logarithm transformation; hence, we cannot logically take the log of zero or negative FDI inflow values. As a result, our empirical analysis becomes meaningless; we may be able to determine the cause of multinational investment activities, but not divestment.



**Table 2.** The effect of the LEVEL OF DEMOCRACY on inflows of FDI: Model 1 of Li and Resnick's study.

	The Dependent Variable is measured in FDI/GDP				
	OLS Model 1	Robust Model 2	Robust: 2 Steps Model 3	OLS Model 4	Robust Model 5
LEVEL OF DEMOCRACY	0.016 (0.019)	0.035*** (0.007)	0.036*** (0.007)	0.016 (0.019)	0.034*** (0.007)
PROPERTY RIGHTS PROTECTION	0.055*** (0.022)	−0.000 (0.008)	0.011 (0.017)	0.050*** (0.021)	−0.002 (0.007)
REGIME DURABILITY	0.013 * * (0.007)	0.015*** (0.003)	0.013*** (0.004)	0.013** (0.007)	0.015*** (0.002)
POLITICAL INSTABILITY	−0.000 (0.007)	−0.016** (0.008)	0.006 (0.028)	−0.003 (0.007)	−0.018*** (0.007)
LABOR COST CHANGE	0.000 (0.003)	0.005** (0.003)	0.005** (0.003)	0.000 (0.003)	0.004** (0.003)
ECONOMIC SIZE	−0.131* (0.099)	−0.025 (0.032)	−0.228 (0.253)		
ECONOMIC DEVELOPMENT	0.629*** (0.238)	0.3010*** (0.073)	0.430*** (0.160)	0.574*** (0.233)	0.295*** (0.070)
ECONOMIC GROWTH	0.005 (0.013)	0.011* (0.009)	0.016** (0.009)	0.004 (0.013)	0.011* (0.009)
EXCHANGE-RATE VOLATILITY	−0.000*** (0.000)	−0.000** (0.000)	−0.000 (0.000)	−0.000*** (0.000)	−0.000** (0.000)
CAPITAL FLOW RESTRICTIONS	−0.103** (0.060)	0.021 (0.025)	0.062 (0.056)	−0.120** (0.058)	0.016 (0.024)
WORLD FDI INFLOWS	0.001 (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.001 (0.001)	0.002*** (0.001)
Constant	−1.901 (2.389)	−1.576** (0.794)	1.862 (4.362)	−4.426*** (1.731)	−1.991*** (0.572)
$R^2$	0.10			0.09	
Observations	483	483	482	483	483

Notes: OLS estimates and standard errors in parentheses are based on panel-corrected standard errors (PCSEs) with AR (1) correction. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$ .

To check the validity of the FDI/GDP ratios measure regarding its relationship with the LEVEL OF DEMOCRACY, I apply the ratios to Li and Resnick's model. The dependent variable in Li and Resnick's model, number of FDI dollars, is replaced with FDI/GDP ratios. Models 1 and 2 in Table 2 report the results. Both OLS and robust regression models indicate that the LEVEL OF DEMOCRACY is positively related to

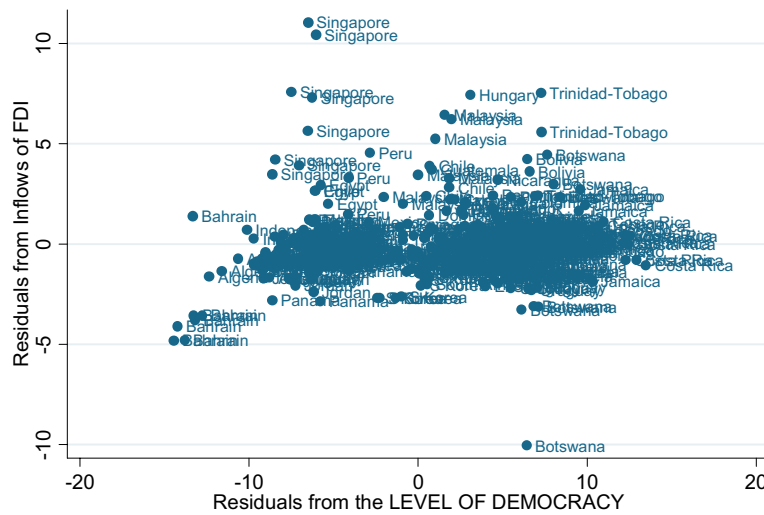


Figure 3. Partial regression plot: Democracy.

FDI, although OLS fails to achieve statistical significance, which shows some evidence that the use of FDI/GDP ratios in Li and Resnick's model reduces the outlier problem. To further demonstrate the point, I reintroduce the method of a partial regression plot. Figure 3 displays the partial plot for the unexplained portion of inflows of FDI against the unexplained portion of the LEVEL OF DEMOCRACY. The distribution of residuals from inflows of FDI goes from  $-5$  to  $10$  (note that it was between  $-5$  and  $32$  in Figure 1), indicating that the potential danger of influential outliers is minimized. Most telling is the disappearance of those four outlying observations of China from 1992 to 1995 that were identified as the most influential outliers in Figure 1.

One may argue that although the use of FDI/GDP may produce fewer outliers, it also introduces an error term i.e., correlated with GDP as well as with every variable correlated with GDP, such as democracy, perhaps resulting in an inconsistent coefficient for the democracy variable. To relieve the concern, I implement two methods: (1) two-step estimation and (2) the exclusion of GDP. First, because robust regression is not designed to run standard two-stage least-squares regression, two-step equations are instead used. Predicted values of economic size (i.e., measured as the log of GDP) are obtained from the first equation and then plugged into the second equation as an instrumental variable.<sup>8</sup> As shown in Model 3 in Table 2, the LEVEL OF DEMOCRACY is positively related to FDI inflows. Second, when the economic size variable is excluded from Models 1 and 2 to avoid the endogeneity problems, the results still indicate the positive influence of democratic governance, as reported in Models 4 and 5.

<sup>8</sup> When standard two-stage least squares within (fixed-effects) regression estimator are used, the coefficient for the LEVEL OF DEMOCRACY shows a positive sign, but is not significant.

## CONCLUSION

In this study, I have highlighted the significance of outlier problems for OLS regression analysis. Unfortunately, empirical studies of political science have yet to successfully account for such influential observations in their empirical analyses. By revisiting Li and Resnick's (2003) study, I have provided evidence that when correcting outlying observations on the dependent variable, the relationship between democracy and FDI inflows is *positive*. Simply put, democratic countries indeed attract more FDI than authoritarian ones. It is imperative that FDI researchers pay close attention to outlying countries, which may heavily influence the results. Failing to do so may produce misleading findings and compromise the scientific progress of FDI studies. Perhaps one of the best strategies to prevent future political studies from producing statistical artifacts due to outliers, is for researchers to report the results of robust regression estimation in a brief note. Just as the coefficient of determination, the  $R^2$  value, provides the reader with useful information about the proportion of variability in a data set accounted for by a statistical model, robust regression results are instrumental in evaluating the effect of potential outlier problems.

## APPENDIX 1

The effect of LEVEL OF DEMOCRACY on inflows of FDI: Without PROPERTY RIGHTS PROTECTION.

	OLS regression		Robust regression
	Replicated Model 1	China dummy Model 2	Model 3
LEVEL OF DEMOCRACY	-0.088*** (0.026)	-0.044*** (0.014)	0.003** (0.002)
PROPERTY RIGHTS PROTECTION			
REGIME DURABILITY	0.026*** (0.009)	0.011** (0.005)	0.001* (0.001)
POLITICAL INSTABILITY	-0.022 (0.020)	-0.007 (0.008)	-0.007*** (0.002)
LABOR COST CHANGE	-0.001 (0.002)	-0.000 (0.002)	0.001 (0.001)
ECONOMIC SIZE	1.083*** (0.283)	0.726*** (0.196)	0.120*** (0.007)

(Continued)

(Continued)

	OLS regression		Robust regression
	Replicated Model 1	China dummy Model 2	Model 3
ECONOMIC DEVELOPMENT	0.072 (0.248)	0.296** (0.175)	0.043*** (0.015)
ECONOMIC GROWTH	0.025** (0.013)	0.008 (0.007)	−0.000 (0.002)
EXCHANGE-RATE VOLATILITY	−0.000*** (0.000)	−0.000** (0.000)	0.000** (0.000)
CAPITAL FLOW RESTRICTIONS	−0.111*** (0.042)	−0.128*** (0.039)	−0.006 (0.006)
WORLD FDI INFLOWS	0.005*** (0.001)	0.003** (0.001)	0.000** (0.000)
China Dummy		22.689*** (3.732)	
Constant	−26.642*** (5.529)	−19.290*** (4.216)	−3.058*** (0.171)
Observations	483	483	483
R <sup>2</sup>	0.21	0.66	

Notes: OLS estimates and standard errors in parentheses are based on panel-corrected standard errors (PCSEs) with AR (1) correction. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$ .

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