Foreign Direct Investment and Economic Growth: New Evidence from Post-Socialist Transition Countries

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In this article, we revisit classic sociological debates regarding the growth effects of Foreign Direct Investment (FDI). First, we identify a series of theoretical and empirical issues that halted sociological research on the developmental consequences of FDI. Second, we illustrate that post-socialist transition (PST) provides a historically novel opportunity to reinvigorate the debate. These countries experienced rapid industrialization but nearly zero FDI under socialism, and we can therefore observe changes in output as FDI accumulates in real time and effectively control for alternative sources of underdevelopment that might otherwise become conflated with FDI. We then estimate growth models that correct for biases owing to country- and period-specific heterogeneity and endogeneity in the FDI→ growth link. Our results suggest that FDI penetration reduces economic growth in the short and long term, and are robust to alternative choices of measurement and econometric specification. We conclude by implicating these findings in debates about post-socialist transition and economic growth, and by posing questions for future research.

Introduction

The developmental consequences of FDI have been a subject of much sociological debate. Some argue that dependence on foreign investment slows economic growth, while others maintain that foreign investment increase it, albeit less than domestic investment (Bornschier and Chase-Dunn 1985; c.f. Firebaugh 1992). From the mid-1970s to the mid-1990s, the former understanding of the FDI-development link dominated the sociological literature. However, several criticisms eroded confidence in this understanding over time. One intervention showed that much of the empirical evidence was inconsistent with the conclusions drawn from it, and implied that the rate of FDI *promoted* growth, albeit

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less effectively than domestic investment (Firebaugh 1992). This intervention was followed by a lively round of rebuttal-and-response without a clear victor (Dixon and Boswell 1996a; c.f. de Soysa and Oneal 1999; Kentor 1998). Others claimed that even though the deleterious link between FDI and development hinged critically on long-term processes of "disarticulation" in host economies, analysts misspecified their models by regressing economic growth on long-term lags of FDI without considering contemporaneous variation on FDI (de Soysa and Oneal 1999).

Perhaps more importantly, both the development and investment landscapes changed in the latter part of the 20th century. Industrialization increased rapidly after the late 1970s in many less developed countries (LDCs), which made for an uncomfortable mismatch between actually existing LDCs and the primordial agrarian societies that FDI "*dependistas*" envisioned as the starting point of FDI penetration (Stokes and Anderson 1990). And, the FDI flows linking the developed and the developing world abated when the bulk of FDI began flowing between advanced industrial democracies (Alderson and Nielsen 1999). Sociological research into the effect of foreign capital on economic growth thus stalled out in the late 1990s, with only one article appearing in the major journals after 1999 (Kentor and Boswell 2003).

We reinvigorate this debate by providing new evidence from a strategic case. We begin by explicating plausible theoretical mechanisms for both a positive and negative association between FDI and economic growth, and by reviewing limitations in previous research that make it difficult to adjudicate between these mechanisms. We then introduce the post-socialist transition in Central and Eastern Europe and Eurasia as an ideal case to adjudicate this debate (Gerber 2002; Mahutga and Bandelj 2008). First, FDI was more or less absent prior to the collapse of communism in 1989, after which it increased rapidly and to varying degrees among transition countries (Bandelj 2008). This allows us to both theorize and observe the relation between economic growth and FDI in real time. Second, most transition countries were already highly industrialized upon their initial exposure to FDI, and therefore better represent the contemporary condition of many LDCs. Finally, and perhaps most importantly, debates about the link between FDI and development abound among analysts of transition countries, and these debates mirror those in the larger sociological literature.

The empirical core of the article includes a series of growth models that improve upon previous research by considering Firebaugh's important methodological critique, a theoretically derived set of baseline covariates, by purging parameter estimates of heterogeneity bias, and by addressing the potential for an endogenous relationship between FDI and economic growth. Our findings suggest that FDI penetration has a negative association with economic growth and can lead to economic contraction in extreme cases, while domestic investment has a positive association and always leads to expansion. We conclude by drawing out the implications of these results for the sociological debate on FDI in general and for economic growth during post-socialist transition.

Foreign Investment and Economic Growth: Boon or Bane?

The sociological literature investigating the link between FDI and economic growth is rife with contending arguments and empirical evidence. Early research by foreign investment "*dependistas*," for example, argued that FDI has both positive and negative impacts on economic growth. Yearly FDI inflow had a positive impact on development (Bornschier and Chase-Dunn 1985; Kentor 1998). Annual FDI flows represent real fixed investment, creating employment and adding new equipment and infrastructure. However, dependistas argue that the positive effect is temporary, and that growth slows as countries become increasingly *penetrated* by FDI (as accumulated FDI stocks represent a large share of domestic GDP).

Through processes of "disarticulation," foreign investment penetration prevents countries from developing organically. For example, FDI penetration creates uneven growth across sectors (Stokes and Anderson 1990; Evans and Timberlake 1980) and concentrates in capital-intensive industry, which boosts productivity but provides relatively few jobs (Evans and Timberlake 1980). Over time, penetrated sectors become more productive and develop, but this productivity does not diffuse to other sectors (Dixon and Boswell 1996a). The persistently low productivity and wages in traditional sectors allow foreign firms to pay only a minimal amount more to attract the best workers—"wages *can* be low in productive sectors because they *must* be low in unproductive ones" (Stokes and Anderson 1990, 66). Finally, disarticulation leads to over-urbanization, where large streams of migrants flow into urban centers, only to find marginal employment in the service or informal sectors (Stokes and Anderson 1990; Evans and Timberlake 1980). Further, transnational corporations often expatriate profits from their subsidiaries in developing countries rather than reinvest in the local economy (Amin 1974; Bornschier and Chase-Dunn 1985; Kentor 1998). Similarly, dependistas argue that FDI penetration limits the formation of backward and forward linkages between foreign and domestic sectors, and generates what Amin (1974) called "extraversion," where large segments of penetrated economies orient "outward" toward developed economies. This extraversion limits demand growth for domestically produced manufactures, and creates disincentives for state policies that might otherwise stimulate domestic consumption (Stokes and Anderson 1990). In combination, this restricts the development of a native bourgeoisie and the size of the domestic sector (Dixon and Boswell 1996a; Stokes and Anderson 1990).

Alternatively, others argue that FDI penetration should promote growth, particularly for less developed countries. The now classic Harrod-Domer model of economic growth provides a starting point for why foreign capital should spur growth. Here, output is largely a function of capital and is therefore a linear function of investment. If we assume that penetrated economies lack a sufficient capital stock, then foreign investment represents a substitute for domestic investment and should promote growth relative to the case of zero capital (Firebaugh 1992). Similarly, FDI also brings with it new technology to the host economy, which increases productivity (Li and Liu 2005). And, contrary to the

disarticulation thesis, some argue that this technology transfer *does* spill over to other sectors, which might make domestic investment more efficient than it would be in the absence of FDI (Li and Liu 2005; c.f. Dixon and Boswell 1996b). Thus, FDI could increase the pace and/or productivity of domestic investment, with obvious implications for growth (de Soysa and Oneal 1999). Similarly, FDI may transfer managerial expertise and provide domestic actors with access to foreign markets that would otherwise remain out of reach. In short, both rationales agree that FDI boosts productivity in host economies and grants the host economy access to foreign markets. However, they disagree over whether or not (1) productivity gains gets reinvested in the local economy; and (2) the extent to which FDI promotes or retards the productivity and/or the size and scope of the domestic sector.

Quite apart from the conflicting *theoretical* claims about the link between FDI and development, early empirical work on investment dependency was subject to a serious *methodological* critique. Firebaugh (1992) showed that the evidence purporting a deleterious impact of investment dependency was in fact a misinterpretation of OLS regression coefficients. The standard approach to investment dependency research included measures of both FDI "flow" (yearly inflows/total investment) and "penetration" (PEN; cumulative inflows/total investment). Dependency researchers interpreted a negative coefficient on FDI stock and a positive coefficient on FDI flow as suggesting that FDI increases growth in the short term, but decreases it in the long term.

Instead, Firebaugh (1992) showed that, by including both FDI stock and flow in the same equation, the coefficient on FDI stock was equivalent to that on the inverse of the *rate* (flow/stock) of FDI: "with flow constant, the larger the stock the smaller the investment rate. So when stock and flow are entered as separate variables in a regression equation it follows logically that. . .a positive flow coefficient and a negative stock coefficient indicate a beneficial investment effect" (Firebaugh 1992, 118). Thus, Firebaugh argues that investment dependency researchers showed little more than a positive association between economic growth and the rate of FDI, which, as we discuss above, is entirely consistent with orthodox conceptualization of the investment-growth link. Moreover, the PEN measure itself implied an entirely different interpretation of a negative coefficient—it might imply that foreign investment has a positive impact on growth that is simply smaller than the positive impact of domestic investment (Firebaugh 1992).

Beyond the methodological critique offered by Firebaugh, other criticisms of the PEN tradition focus on two additional empirical issues. Stokes and Anderson (1990) argue that arguments asserting a deleterious impact of FDI on economic growth commit the "banana republic" fallacy, where we begin by assuming an agricultural and mineral resource based economy that becomes slowly penetrated over time, even though the past fifty years or so have witnessed a remarkable pace of industrialization in less developed countries. Second, the very premise on which PEN research was based—that FDI penetration reduces growth via economic disarticulation over the long term—led PEN researchers to focus upon long lags between when investment actually occurred and the developmental outcome it was thought to affect, without considering

more recent FDI flows (e.g., Kentor 1998). Thus, some argue that because these models do "not take into account the flow of [contemporaneous] foreign investments, [they are] seriously misspecified" (de Soysa and Oneal 1999, 774). As we argue below, the case of post-socialist transition (PST) in Central and Eastern Europe and Eurasia, by overcoming these limitations, provides an ideal context in which to revisit the FDI-developmental link.

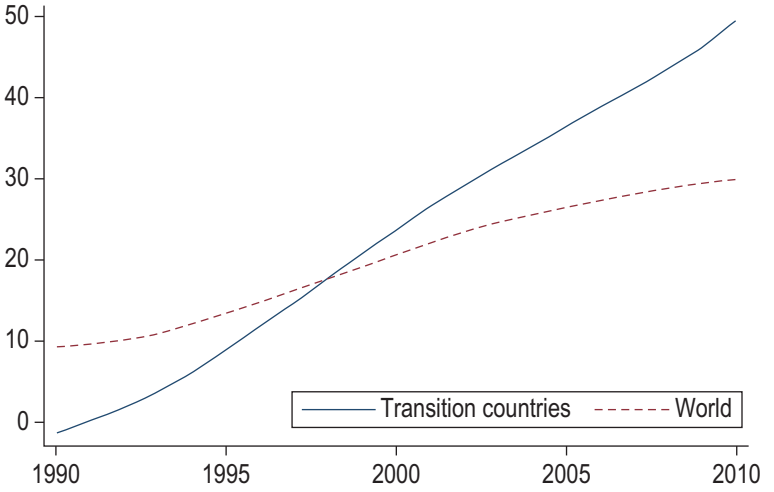
Post-Socialist Central and Eastern Europe and Eurasia: A Strategic Case

After the fall of communism, countries in Central and Eastern Europe and Eurasia began transitioning to private markets, and foreign investment was a central part of this transition for many. In 1989, most of these countries had nearly zero foreign investment and were relatively industrialized (Mahutga and Bandelj 2008; Fischer and Gelb 1991).[1] There were two general approaches to the market transition in the region— "gradualism" and "shock therapy"— and the latter was more common than the former (Hamm, King, and Stuckler 2012). The gradualist approach relied upon a strong state and governance institutions, while shock therapy promoted rapid privatization under the assumption that good institutions would develop naturally with the expansion of private markets. Proponents of shock therapy envisioned rapid privatization, and the dearth of a native bourgeoisie and domestic capital meant that FDI would play a large role in privatization programs (Bandelj 2008; Fischer and Gelb 1991; Pavlinek 2004). Not only would FDI promote the expansion of private markets, but it was also seen as a vehicle for economic modernization and a means to improve productivity in inefficient state-owned firms (Hunya 2000). FDI would allow for speedy integration into the world economy and help stabilize local prices. Thus, by 2010, these transition countries had significantly more accumulated foreign investment as a percentage of GDP than the world as a whole.

While FDI played a large role in privatization on average, the pace of inflow varied over time. For example, foreign investment in the region remained low until the mid-1990s, and was concentrated in only a few countries: over 50 percent of FDI between 1992 and 96 went to Poland and Hungary (Claessens, Oks. and Polastri 1998). An astonishing $4.5 billion in privatization-related FDI entered Hungary's domestic economy alone in 1995 (Claessens, Oks, and Polastri 1998). Subsequently, FDI began to increase rapidly in the region and by the middle of the decade, when its ratio of FDI to GDP surpassed the world's. Indeed, figure 1 shows that by 2010, foreign capital stock constituted nearly 50 percent of the sample's GDP, compared to about 30 percent of the world economy as a whole.

Still, FDI was not the only path to privatization. Many countries pursued a strategy of mass privatization (Hamm, King, and Stuckler 2012), and it was pursued independently of FDI in some. Some countries used voucher programs where shares of state-owned enterprises were made available to citizens, or sold directly to wealthy nationals (Bandelj 2009). Moreover, capital account liberalization was a key policy script for those wishing to achieve membership

Figure 1. Trend in FDI penetration among post-socialist transition countries and world



Note: Trend lines fit with locally weighted least squares. Transition countries include Albania, Armenia, Azerbaijan, Belarus, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Mongolia, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

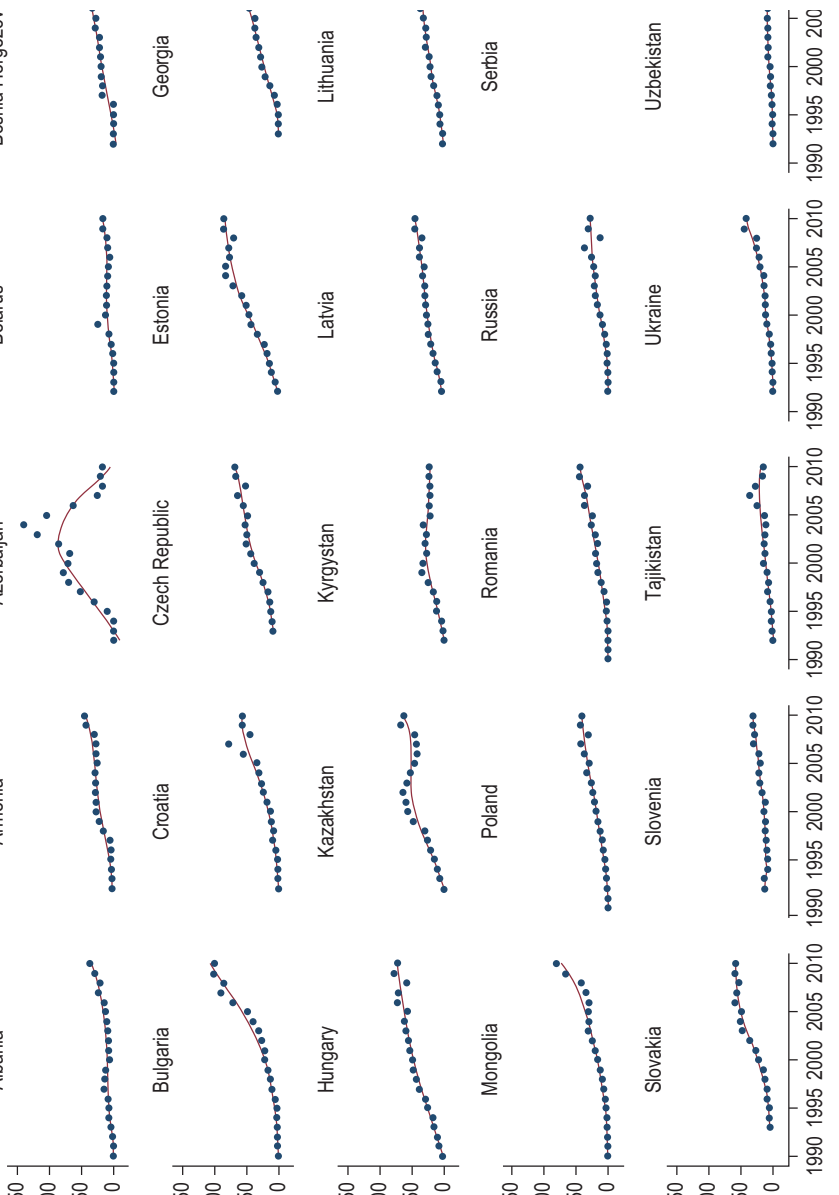
in the European Union (Fabry and Zeghni 2006). However, as we see in figure 2, not all of these countries opened their economies up to foreign investment to the same degree. Estonia's and Azerbaijan's accumulated foreign capital stocks averaged 49 and 51 percent of GDP over the period, while Uzbekistan and Belarus averaged 6 and 9 percent, respectively. Thus, while most transition countries experienced an increase in FDI over the period, actual flows of FDI varied considerably between them. Despite common starting points after the fall of the Soviet Union, these countries have taken somewhat autonomous paths toward developing market economies, which allows for a historically unique setting to assess the developmental impacts of FDI.

Perhaps unsurprisingly, the developmental consequences of FDI have been hotly contested in post-socialist countries, and many of the debates mirror those outlined above. For example, high rates of profit expatriation have been observed throughout the region. In Hungary, one company alone repatriated about 50 million USD in 1995 and 1996, and rates of expatriation among top firms ranged from about 23 percent to 97 percent (King and Varadi 2002). Similarly, political actors in post-socialist countries observe processes of disarticulation in real time:

> "…the Hungarian economy is not organically connected with these new large foreign enterprises: what Hungary provides them with is not much more than space, some infrastructure, and none-too-skilled labor" (Mihaly Varga in a 1998 Hungarian Parliamentary debate, quoted in King and Varadi 2002, 4–5).

One example of disarticulation that is particularly relevant is the purportedly weak link between FDI and backward and forward linkages, where foreign subsidiaries import a significant share of the intermediate inputs they need rather than obtaining them from domestic firms. However, proponents of FDI argue that there is a strong link between inward FDI and export growth in

Figure 2. FDI penetration by country and time



Note: Smoother fit with locally weighted least squares. FDI penetration is measured as FDI stock as a percentage of GDP.

transition countries and that, rather than representing a deleterious change in orientation toward the outside world, this link contributes directly to increases in GDP (UN 2001).

The productivity gaps between foreign and domestic firms hypothesized above have also been observed in transition countries, but the net impact of this is subject to debate (King 2000; Smith, Cin, and Vodopivec 1997). Some believe that the greater economic success of multinational corporations in transition countries strikes a critical blow to scholars of investment dependency, while others are concerned that multinationals out-compete domestic rivals, and therefore contribute to the decline of domestically oriented firms (King 2000; King and Varadi 2002). Thus, we have two possible aggregate growth outcomes. If companies that privatized with foreign capital in transition countries are, on average, more productive than those privatized by purely domestic capital, then one could expect this rising average productivity to translate into faster rates of economic growth (Megginson and Netter 2001). However, if the greater productivity of foreign-owned firms leads to less economic output by domestic firms, the aggregate impact of FDI is less clear.

Because post-socialist transition is a relatively young process, data limitations have only recently allowed for comprehensive analyses of the link from FDI to economic growth, and the results have been mixed. Some find that FDI exerts a positive impact on economic growth (Economic Commission for Europe 2011; Neuhaus 2006; Kornecki and Raghavan 2011; Prochniak 2011). Others find null effects of FDI (Hamm et al. 2012).[2] Still others report a mix of positive, negative, or null effects that depend on either the temporality of FDI or the regional context (i.e., EU versus non-EU transition countries) (Darrat, Kherfi, and Soliman 2005; Eller, Haiss, and Steiner 2006; Sapienza 2010). With the exception of Sapienza (2010), these studies examine a small subset of transition countries, a short time frame (or both), and there is a clear methodological divide between those that follow the industry standard by purging estimates of unmeasured country-specific heterogeneity bias, and those that do not. None of these analyses take into account the distinction between the rate and penetration of FDI identified above. The nature (or existence) of a link from FDI to economic growth during post-socialist transition is very much an open empirical question.

In short, the post-socialist case provides a historically unique opportunity to assess the developmental consequences of foreign direct investment. First, FDI was more or less absent prior to 1990, and the socialist model of development placed heavy emphasis on industrialization and large, monopolistic firms facilitating central control (Fischer and Gelb 1991). Second, they were not exposed to gradually increasing FDI over time, but a rapid investment after 1990, which allows us to observe how the pace of economic growth changes as FDI changes in real time. Finally, there are theoretical and empirical disagreements about FDI's growth consequences during post-socialist transition that mirror debates in the larger sociological literature. The process of post-socialist transition creates an ideal opportunity to examine the effect of foreign investment on socio-economic outcomes: so much so that these cases have been called a "natural experiment" (Mahutga and Bandelj 2008).

Data and Methods

Sample

Our sample includes all available data for Central and Eastern European and Eurasian post-socialist transition countries from 1990 to 2010. In total, there are 29 such countries, defined here as former members of the Soviet Union and/or CoMEcon (the regional economic organization of communist states in Eastern Europe).[3] However, four countries did not have sufficient data to analyze, reducing the sample to 25 countries. Moreover, missing data on either the dependent or independent variables also yielded unbalanced panels, where we observe a different number of observations across countries. In total, there were 263 country-year observations with complete data on all variables (see table A1 in the appendix). All data come from the World Development Indicators unless otherwise noted (World Bank 2012).

Dependent Variable

Economic growth is measured as the annual percentage change of per capita GDP growth, produced by logging and then differencing annual GDP per-capita observations (Jackman 1980). GDP per capita is measured in current US dollars.

Investment Variables

In order to purge our models of the spurious denominator effects discussed above, we follow previous work by including two FDI variables in the model: penetration and rate. We also control for domestic investment, both because it should have a strong and direct positive influence on economic growth and to differentiate between relative and absolute FDI effects (Alderson and Nielsen 1999; Dixon and Boswell 1996a; Jorgenson, Dick, and Mahutga 2007; Mahutga and Bandelj 2008). FDI penetration is measured as accumulated inward FDI stock as a percentage of GDP. Data were collected from the United Nations Conference on Trade and Development (UNCTADstat 2012). FDI rate is measured as inward FDI flow divided by inward FDI stock. Data were collected from UNCTADstat (2012). Domestic investment is measured with gross domestic capital formations, the percentage of GDP (World Bank 2012).

The Baseline Model of Economic Growth

In order to identify the FDI growth link in these post-socialist transition countries, we include a set of control variables that together reflect a neo-classical growth model, where economic growth is a function of three inputs—labor, capital, and technology (Clark 2010).

Human capital In addition to physical capital, *human* capital refers to the ability and skill level of a country's workforce, and is usually measured using education enrollment rates (Barro 2001). Human capital has been found to significantly affect economic growth, especially as it relates to technological development and diffusion (Romer 1990; Lucas 1988; Nelson and Phelps 1966). Our

instrument for human capital is secondary-school enrollment, which is measured as the ratio of total enrollment to the school-aged population (Barro 1991, 2001). Secondary education is also an important control for reasons that go beyond the neo-classical growth model. In Soviet Europe, socialist leaders sought to improve access to education and were successful in achieving relatively high levels of school enrollments (Boswell and Chase-Dunn 2000). However, school enrollments are on the decline in some post-socialist countries, so the stock of human capital varies increasingly among post-socialist countries (Meurs and Ranasinghe 2003).

Labor force participation Labor force participation refers to the percentage of the working-age population that is economically active. The labor force participation rate is important for two reasons. First, labor is one of three key inputs in the neo-classical growth model described above (Solow 1956). Second, labor force participation averaged between 70 and 90 percent of the working-age population among these countries prior to the fall of communism, so changes in the labor force participation rate during transition could have appreciable impacts on economic growth (Meurs and Ranasinghe 2003).

Trade openness International trade is widely held by economists to produce economic growth. International trade induces competition between domestic and foreign firms, and should thereby encourage a country to shift into the types of economic activity for which it is favorably endowed (Grossman and Helpman 1994). Moreover, what is critical for our purpose is that trade is thought to expose a national economy to the stock of global knowledge and technology, which should be particularly important for transition countries (Edwards 1992). Thus, we measure trade openness as the sum of imports and exports of goods and services over GDP.

Population Countries with rapid population growth have disproportionately large segments of the population that are below working age and will, ceteris paribus, have slower per-capita economic growth (Sheehey 1996). Thus, we include population growth in all models to avoid conflating demographic effects with other growth effects.

Industrialization Industrialization is one of the most important determinants of growth in developing countries. Most of these post-socialist countries were not very industrialized prior to socialism (Meurs and Ranasinghe 2003). However, the socialist program of rapid industrialization under the Soviet Union created larger industrial sectors in these countries relative to the prototypical poor country (Fischer and Gelb 1991; Meurs and Ranasinghe 2003). Thus, after the fall of socialism, these countries had a comparatively high level of industrialization, on average, but varied considerably *vis-à-vis* each other (Mahutga and Bandelj 2008). For example, Montenegro averaged industrial output of 21.8 percent of GDP over the period, while Azerbaijan averaged over 48 percent. Thus, we include industrialization output as a percentage of GDP to control for variation in industrial output.

Privatization With the fall of communism, post-socialist countries were faced with the unenviable task of transitioning from centralized planned economies to private market economies. Different countries took different approaches

to privatization, resulting in a significant degree of variation between cases in terms of the development of private markets (Hamm, King, and Stuckler 2012; Kalotay and Hunya 2000). Thus, we also control for private sector size to differentiate between investment and privatization effects, which is measured as the private sector's share in GDP (EBRD 1999, 2003, 2011).

Zero-order correlations and descriptive statistics for the included variables appear in the appendix (table A2).

Panel Regression Models

The contentious nature of the debate about the growth effects of FDI invites an analytical strategy that would increase our confidence in a significant coefficient on FDI in either direction. Thus, we estimate panel regression models that eliminate heterogeneity bias—that arising from time-invariant country-specific unobservables and that arising from time-varying country-invariant unobservables. While methods to address these sources of heterogeneity have been standard practice in the empirical growth literature for some time (Durlauf, Johnson, and Temple 2005), none of the past empirical disputes over the growth effects of FDI in sociology address either source (Firebaugh 1992; Dixon and Boswell 1996a; Kentor 1998; Kentor and Boswell 2003; de Soysa and Oneal 1999; c.f. Firebaugh and Beck 1994). In order to eliminate unobserved country effects, we utilize the first difference of logs variant of the "fixed-effects" estimator, which is unbiased and consistent under the same assumptions as the "within" estimator (Wooldridge 2002, 265–85). The difference of logs model has additional advantages over the "within" estimator in that it (1) minimizes the influence of outliers; (2) often renders stationary time-series data with unit roots; and (3) yields a parsimonious interpretation of the coefficients as elasticities—the percent change in Y associated with a one-percent change in X (Firebaugh and Beck 1994; Wooldridge 2002).[4] To eliminate unobserved period effects, we include the full set of T–-1 dummy variables.

Our growth models thus take the following form:

$$\Delta \log y_{it} = \Delta \log x_{it}\beta + \gamma_t + \Delta u_{it},$$

where y is GDP per capita, x are the country- *and* time-varying covariates, γ is the full set of T–1 dummy variables, u is the error term, i indexes countries, and t indexes years. Such models are sometimes accompanied by a covariate capturing the initial level of GDP per capita, either to measure the rate of "conditional convergence" or to eliminate the possibility of ceiling effects (Barro 2001; Firebaugh and Beck 1994). While the inclusion of the lagged dependent variable creates problems in the presence of unobserved country effects (Nickell 1981), we nevertheless estimated additional models controlling for the initial level of GDP per capita, which produced t-ratios less than one, and make them available upon request (also see Darrat, Kherfi, and Soliman [2005]; Hamm, King, and Stuckler [2012]; Prochniak [2011]; robustness checks below). Finally,

we conduct our hypothesis tests with standard errors that are robust to heteroskedasticity and arbitrary serial correlation within panels (Rogers 1993).

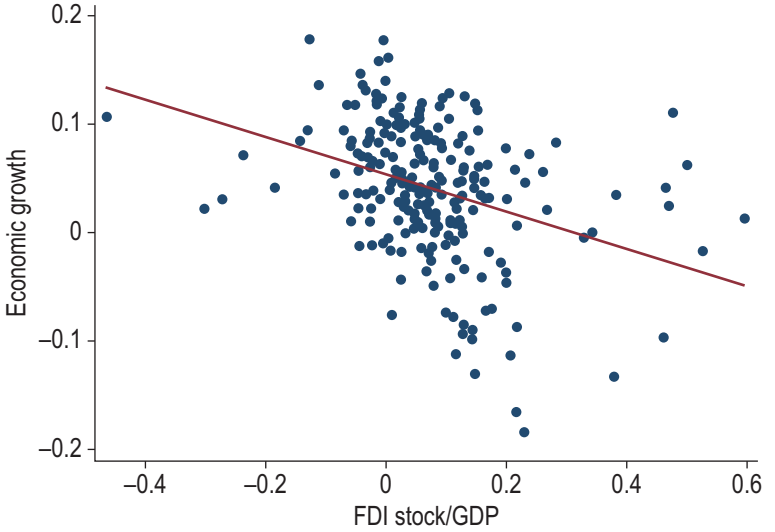
In addition to the difference of logs models, we also consider the possibility that FDI is endogenous in the growth equation (Li and Liu 2005). It is not difficult to see how this would be the case insofar as fast-growing economies become attractive destinations for FDI (UN 2001). The standard approach to endogeneity is the instrumental variable (IV) regression. In two-stage least squares, the potentially endogenous covariate is regressed on one or more excluded instruments plus the exogenous predictors in the first stage. In the second stage, the potentially endogenous variable is replaced with the predicted values from the first-stage regression. The coefficients that obtain from this second stage are unbiased in the presence of endogeneity if (1) the instruments are suitably correlated with the potentially endogenous regressor (i.e., the instruments are not weak); and (2) the instruments are uncorrelated with the second-stage error term (i.e., the instruments are valid). Clearly, the validity of the IV regression hinges critically on the availability of suitable instruments. In the absence of obvious instruments for a potentially endogenous variable, previous research suggests that lagged values and higher moments are suitable (Bollen 2012; Rudra 2005). Indeed, it is difficult to see how investors can base investment decisions on unrealized (i.e., future) cross-national variation in growth. Thus, we use the second and lagged second difference of the foreign investment variables to estimate our IV regressions (Carkovic and Levine 2005; Vandenberghe 2011). All analyses were carried out with Stata 11.2.

As an extra degree of conservatism, we draw from helpful reviewer comments and extant literature on the relationship between FDI and economic growth during post-socialist transition to assess the extent to which (1) our results are robust to alternative estimators (Carkovic and Levine 2005; Eller et al. 2006), alternative *operationalizations* of FDI (Bandelj and Mahutga 2010) and secondary education (Hamm, King, and Stuckler 2012), and perturbations in the composition of the sample; (2) the effect of FDI varies across country groups (Darrat, Kherfi, and Soliman 2005) or over the long/short term (Eller et al. 2006; Sapienza 2010); and (3) our results hold when controlling for alternative *conceptualizations* of FDI *effects* (Kentor and Boswell 2003).

Results

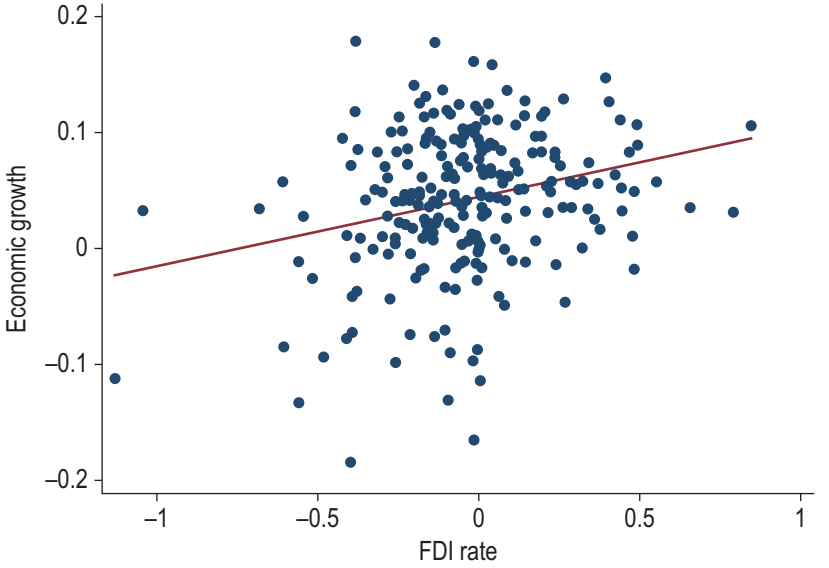
Figures 3 and 4 display the bivariate association between economic growth and FDI penetration and the rate of FDI (in differences), respectively. Consistent with the discussions above, the bivariate associations provide evidence that growth slows as post-socialist transition countries become increasingly penetrated by FDI, but also that growth increases with the rate of FDI. Do these associations hold when controlling for additional correlates of growth? In order to answer this question, table 1 reports coefficients from our regression analysis of economic growth. Model 1 introduces the baseline model and *t*–1 dummies. Only trade openness has a significant impact on growth, which is contrary to conventional wisdom but consistent with findings from broader country samples and

Figure 3. Scatterplot for economic growth by FDI penetration



Note: Variables logged with the base-10 logarithm and differenced. Smoother fit with least squares.

Figure 4. Scatterplot for economic growth and FDI rate



Note: Variables logged with the base-10 logarithm and differenced. Smoother fit with least squares.

Table 1. Unstandardized Coefficients from First-Difference Regression of Economic Growth on Select Independent Variables

	(1)	(2)	(3)	(4)	(5)	(6)
Investment						
FDI penetration					–0.097***	–0.100***
					(0.015)	(0.015)
FDI rate				0.004		–0.002
				(0.010)		(0.010)
Domestic investment			0.119*			0.122**
			(0.043)			(0.041)
Privatization						
Private sector size		–0.134+	–0.173*	–0.131	–0.140+	–0.182*
		(0.076)	(0.082)	(0.077)	(0.078)	(0.085)
Neo-classical growth						
Population	0.516	0.391	0.405	0.430	0.539	0.538
	(1.018)	(0.984)	(1.036)	(0.947)	(0.817)	(0.808)
Trade openness	–0.192**	–0.190**	–0.191**	–0.194**	–0.191***	–0.191**
	(0.055)	(0.056)	(0.059)	(0.053)	(0.050)	(0.052)
Industrialization	0.066	0.099	0.052	0.104	0.091	0.040
	(0.095)	(0.083)	(0.108)	(0.083)	(0.075)	(0.102)
Secondary education	0.209	0.226	0.183	0.219	0.094	0.048
	(0.200)	(0.194)	(0.186)	(0.197)	(0.225)	(0.215)
Labor force participation	0.173	0.208	0.122	0.195	0.001	–0.087
	(0.360)	(0.328)	(0.330)	(0.332)	(0.224)	(0.240)

Constant	−0.007*	−0.007*	−0.005 $^{+}$	0.037*	−0.005*	−0.003
	(0.003)	(0.003)	(0.003)	(0.016)	(0.002)	(0.003)
N	263	263	263	263	263	263
R^2	0.592	0.599	0.625	0.599	0.635	0.663

Note: Model includes unreported *T*–1 dummy variables; heteroskedasticity and serial correlation consistent standard errors in parentheses.
*** $p < .001$ ** $p < .01$ * $p < 0.05$ $^{+}$ $p < 0.10$ (two-tailed tests).

longer time periods (Clark 2010; Mahutga and Smith 2011; c.f. Grossman and Helpman 1994; Kentor and Boswell 2003). The lack of robust effects for the remaining neo-classical growth variables is consistent with findings observed elsewhere. For example, Darrat, Kherfi, and Soliman (2005) and Eller et al. (2006) find null effects for human capital (c.f. Hamm, King, and Stuckler 2012; Prochniak 2011). Kornecki and Raghavan (2011) find positive effects of labor force participation, but Darrat, Kherfi, and Soliman (2005) find inconsistent effects. These divergences may reflect the specificity of the post-socialist transition case (Bandelj and Mahutga 2010; Hamm, King, and Stuckler 2012). Model 2 thus builds upon the neo-classical model by introducing private sector size, which has a negative association with economic growth that is at least marginally significant. This is consistent with recent findings that privatization programs created massive fiscal shocks for post-socialist governments, which undermined the development of private-sector governance institutions and thereby slowed economic growth (Hamm, King, and Stuckler 2012).

Models 3–5 introduce the three investment variables sequentially. Unsurprisingly, domestic investment has a significantly positive impact on economic growth (model 3). However, the insignificant coefficient for the rate of FDI in model 4 is somewhat surprising given plausible arguments linking initial investments with greater growth that work through the application of new technology, managerial expertise, and job creation. Model 5 introduces foreign investment penetration, which has a negative impact on growth at a level of significance that surpasses any of the observed covariates thus far. Finally, model 6 introduces all three investment covariates simultaneously with the full battery of controls. The only significant impact of foreign investment accrues to FDI penetration, which is negative, while the impact of domestic investment remains positive and significant. In addition to the two significant investment covariates, both privatization and trade openness exert significantly negative pressure on economic growth. The elasticity interpretation of these coefficients gives a sense of the substantive importance of the effects, and the effect of FDI penetration is relatively large—a one-percent increase in FDI penetration leads to a .1-percent decrease in the rate of economic growth. However, this effect is smaller than that of domestic investment, which yields a

.122-percent increase in the rate of economic growth per one-percent increase in domestic investment. We return to this issue below.

The coefficients in table 1 are potentially biased by endogeneity. In particular, an expanding economy may create the perception of an attractive investment climate if (1) the expansion of income and domestic markets makes it possible for TNCs to exploit economies of scale; and/or (2) growth improves human capital, labor productivity, and infrastructure over the long term, which increases the marginal return to capital and thereby the demand for foreign investment (Carkovic and Levine 2005; Li and Liu 2005; UN 2001). In this case, we would expect a positive association between a one-year lag of economic growth and foreign direct investment. While this association does not bear out empirically, we nevertheless address the potential for endogeneity bias head on.[5]

Model 1 of table 2 reports coefficients from the two-stage least squares procedure described above, and treats both the rate of FDI and FDI penetration as potentially endogenous. The coefficients are substantively identical to those in model 6 of table 1. These results are not attributable to weak or invalid instruments. The two rows below the constant term report tests of instrument strength and validity. We can reject the null hypothesis that the instruments are insufficiently correlated with the excluded instruments (i.e., that the instruments are weak) and fail to reject the null hypothesis that the instruments are uncorrelated with the second-stage error term (i.e., that the instruments are valid). We thus conclude that these instruments are sufficiently correlated with the potentially endogenous regressors and sufficiently uncorrelated with the second-stage error term. What is most relevant for the present discussion is the statistic reported in the third-to-bottom row of table 2, which fails to reject the null hypothesis that the rate of FDI and FDI penetration are exogenous and allows us to treat the covariates as such.[6]

In addition to addressing the potential for endogeneity, we report five additional robustness checks that respond to issues noted above. To see if our results are robust to alternative estimation procedures reported in the literature, model 2 follows Eller et al. (2006) in adding country dummies to the difference equation. To see if our results depend on our operationalization of FDI penetration, model 3 replaces FDI Stock/GDP with FDI per capita (Bandelj and Mahutga 2010). Model 4, by controlling for FDI concentration (data from OECD 2013), addresses the important contribution of Kentor and Boswell (2003), who argue that FDI concentration (the percentage of all FDI inflows emanating from the single largest investor country) may be more important for growth than FDI penetration. In each case, the effect of FDI penetration is substantively identical to those reported in model 1 and in table 1. In order to differentiate between the effects of *changes* in FDI penetration and the *level* of FDI penetration while preserving unbiased parameter estimates, model 5 follows Eller et al. (2006) and Sapienza (2010) by including both the contemporaneous and lagged differences of FDI penetration and FDI rate. The coefficients on the contemporaneous differences of FDI are interpreted in the same way as those reported in table 1, but the coefficients on the lagged differences yield an assessment of the effect of the *level* of FDI (penetration and rate) on economic growth (Firebaugh and Beck 1994). The results for the

Table 2. Sensitivity Analysis for the Effect of FDI on Economic Growth

	(1)	(2)	(3)	(4)	(5)	(6)
Lagged dependent variable						0.439***
						(0.046)
Investment						
FDI penetration (stock/GDP)	–0.115***	–0.099***		–0.100***	–0.112***	–0.064***
	(0.033)	(0.015)		(0.018)	(0.025)	(0.016)
FDI penetration $(stock/GDP)_{t-1}$					–0.008	
					(0.009)	
FDI per capita (stock/population)			–8.775*			
			(4.382)			
FDI concentration				–0.001		
				(0.001)		
FDI rate (flow/stock)	–0.001	–0.002	0.002	–0.004	0.002	0.011
	(0.010)	(0.012)	(0.010)	(0.017)	(0.011)	(0.007)
FDI rate $(flow/stock)_{t-1}$					–0.004	
					(0.011)	
Domestic investment	0.141*	0.126**	0.118*	0.149*	0.147**	0.106***
	(0.057)	(0.042)	(0.044)	(0.059)	(0.052)	(0.024)
Privatization						
Private sector size	0.018	–0.178+	–0.171*	–0.124	–0.151+	–0.029
	(0.129)	(0.091)	(0.084)	(0.104)	(0.091)	(0.052)

(Continued)

Table 2. ***continued***

	(1)	(2)	(3)	(4)	(5)	(6)
Neo-classical growth						
Labor force participation	–0.14	0.050	0.117	–0.177	0.007	0.019
	(0.271)	(0.292)	(0.326)	(0.210)	(0.240)	(0.271)
Secondary education	–0.15	0.038	0.173	–0.037	0.032	0.032
	(0.171)	(0.236)	(0.186)	(0.198)	(0.201)	(0.159)
Industrialization	0.087	0.028	0.054	0.195+	0.006	0.148**
	(0.099)	(0.114)	(0.108)	(0.113)	(0.119)	(0.055)
Trade openness	–0.280***	–0.190**	–0.194**	–0.228**	–0.201*	–0.182***
	(0.080)	(0.054)	(0.057)	(0.067)	(0.076)	(0.032)
Population	–0.365	1.651	0.373	0.523	–0.045	0.392
	(0.638)	(1.278)	(0.995)	(1.004)	(0.891)	(0.397)
Constant	0.059***	0.059***	0.042***	0.051***	0.051***	0.033***
	(0.015)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Instruments are valid a	3.23					
Instruments are weak b	33.87†					
FDI variables are exogenous c	0.463					
Estimator	2sls	FD + CD	FD	FD	FD	AB
N	227	263	263	241	245	260
R^2	0.723	0.696	0.626	0.671	0.695	N/A

Note: Models include unreported *T*–1 dummy variables; heteroskedasticity and serial correlation consistent standard errors in parentheses. *** $p < .001$ ** $p < .01$ * $p < 0.05$ + $p < 0.10$ (two-tailed tests). In model 1, the second difference and lagged second differences are used as instruments for the first differences of FDI rate and FDI penetration. a Sargan S statistic; b minimum eigenvalue statistic (Stock and Yogo 2005); c Hausman's robust regression statistic, which is valid only if the instruments are not weak (Hausman 1978). † minimum eigenvalue statistic greater than maximum acceptable threshold for weak instruments. 2sls = two-stage least squares; FD = first differences (of logs); CD = country dummies; AB = Arellano-Bond estimator, where lagged differences are instrumented for the difference equation (Arellano and Bover 1995; Blundell and Bond 1998).

contemporaneous effects are substantively identical to those in table 1, and those for the lagged effects are negative but non-significant. Model 6 follows Carkovic and Levine (2005) in estimating an Arellano-Bond dynamic panel model, which allows for the inclusion of a lagged dependent variable (LDV) in the context of unobserved country-specific effects and yields an estimate of both the short- (β_{FDI}) and long- ($\beta_{FDI}/(1-\beta_{LDV})$) term effects of FDI, the latter of which have been of particular interest to sociologists of FDI. The main effects of the FDI covariates are substantively identical to those reported throughout. The long-term effect of FDI penetration (–.115/$p < .001$) is equal to the largest estimated effect in any of the models in tables 1 and 2, while that of the rate of FDI (.020/NS) is larger than, but substantively identical to, those reported throughout.

To assess whether our results are robust to alternative lag structures and measurements of human capital, alternative estimators, and additional operationalizations of FDI penetration and rate, we also estimated unreported models (available upon request) (1) with up to and including five-year lags of both secondary- and tertiary-education enrollment; (2) implementing the "within" version of the fixed effects estimator; and (3) operationalizing FDI penetration with $\log(\text{stock}_{t2})$–$\log(\text{stock}_{t1})$, and the rate of FDI with $\log(\text{flow}_{t2})$–$\log(\text{flow}_{t1})$. In the first case, we observe a positive effect of human capital in 1/10 models, and the coefficients on FDI are substantively identical in each replication despite significant variation in sample composition across models. In the second and third cases, the results are substantively identical. In short, our results are robust to (1) concerns over endogeneity in the FDI → growth link; (2) plausible alternative estimators and *operationalizations* of FDI and secondary education; (3) alternative *conceptualizations* of FDI *effects* (Kentor and Boswell 2003); and (4) significant perturbations in the composition of the sample (see also the second-to-last row of table 2).

Having established the reliability of the estimates in table 1, we now consider the substantive significance of these processes for economic growth among transition countries. Table 3 reports two sets of statistics to facilitate this discussion—standardized coefficients and change in BIC statistics. The former are standard—they reflect the standard-deviation change in economic growth per a one-standard-deviation change in the independent variable. The latter are obtained by comparing the BIC statistic for model 6 in table 1 with the BIC statistic that obtains when each variable included in table 1 is removed individually. Larger reductions in BIC indicate that a given variable has a greater contribution to the overall fit of the model. FDI penetration has the largest standardized coefficient and reduction in BIC of all investment covariates, which is followed by domestic investment. Consistent with the null effects in table 1, the standardized coefficient for the rate of FDI approaches zero, and the improvement in BIC is negligible. Similarly, FDI penetration has the largest standardized coefficient of any of the significant covariates, with trade openness, domestic investment, and private sector size in descending order thereafter. However, the change-in-BIC statistic suggests a slightly different ordering, where trade openness has the biggest impact on model fit, and is followed by FDI penetration, domestic investment, and private sector size. The difference

Table 3. Standardized Coefficients and Change-in-Fit Statistics for Investment and Other Significant Variables

	Beta	Change in BIC
Investment		
Foreign penetration	–.254***	–27.73###
Foreign rate	–.012	–.081
Domestic	.189**	–20.97###
Baseline		
Private sector size	–.167*	–9.26##
Trade openness	–.229**	–28.92###

Notes: BIC measures the improvement in model fit of additional covariates for "nested" models. Smaller BIC scores are better. BIC reductions from 0 to 2 indicate weak evidence; ##6 to 10 indicate strong evidence; and ###> 10 indicates very strong evidence (Raftery 1995).
*** $p < .001$ ** $p < .01$ * $p < 0.05$ (two-tailed tests).

between the change-in-BIC statistics for FDI penetration and trade openness is negligible.

The coefficients in tables 1 and 2 and auxiliary statistics in table 3 imply that FDI penetration is more important for variation in economic growth across transition countries than is domestic investment, and that FDI penetration decreases growth while domestic investment increases it. Yet, the coefficients themselves do not necessarily mean that FDI penetration results in negative growth (de Soysa and Oneal 1999), or is more important for economic growth than domestic investment *in terms of actual growth rates*. Indeed, it is entirely possible that some increases in FDI penetration result in positive growth even if countries with less penetration grow faster than those with more, and that increases in domestic investment yield greater changes in GDP per capita than do those in FDI penetration. In order to address this question, we use the results of model 5 in table 1 to compare expected growth rates across the observed range of annual *increases* in FDI penetration and domestic investment. In generating these expected growth rates, we set the other covariates in model 5 of table 1 to their observed means. Thus, the expected growth rates are a function of only (1) the coefficients for foreign and domestic investment in model 5 of table 1; and (2) the observed *increases* in foreign and domestic investment in the sample.

These expected growth rates suggest that modest increases in FDI penetration are associated with positive growth rates. Indeed, the expected growth rate for a 1-percent annual increase in FDI penetration is 10.73 percent, which is significantly greater than zero. In fact, the expected growth rate remains positive (1.88 percent) and significantly greater than zero ($p < .10$) for annual increases of FDI penetration up to and including 130 percent, a range that includes 90 percent of the cases with rising FDI penetration.[7] Expected growth rates do not become negative until annual increases of FDI penetration exceed 177 percent, and significantly negative until annual increases in FDI penetration reach 265 percent. Only seven and three percent of cases with positive growth in FDI penetration

exceed these thresholds, respectively. Contrarily, economic contraction is impossible with growing domestic investment, and even very small increases lead to rapid growth. The smallest observed *increase* in domestic investment (.007 percent) yields an expected growth rate of 8.3 percent ($p < .001$). Expected growth rates increase in size with domestic investment to 8.8 percent and 10.5 percent for the 25th and 75th percentile of domestic investment, respectively. In short, national economies can grow with FDI penetration, but those with less FDI penetration grow faster than those with more, it enhances growth less than domestic investment, and it can lead to *economic contraction* if it happens too quickly. Unlike domestic investment, FDI is a risky business.

Conclusion

The relationship between FDI and economic growth has been a subject of much debate among sociologists, but no empirical research over the past ten years or so (see Kentor and Boswell 2003). Part of this debate stems from plausible mechanisms for both positive and negative effects of FDI insofar as (1) most agree that foreign firms are more productive than domestic firms; (2) foreign firms bring with them advanced technology and managerial knowhow; and (3) FDI provides access to foreign markets for host economies. However, the aggregate consequences of these are less clear. The greater productivity of foreign firms could suggest that countries with larger foreign sectors would grow faster than those with smaller foreign sectors unless (1) foreign firms repatriate (and reinvest) economic gains to the home market; or (2) foreign firms reduce economic output in the domestic sector. Moreover, insofar as technology is a significant contribution to cross-national variation in economic output (Edwards 1992; Grossman and Helpman 1994), one would expect technological transfer to boost growth in host countries unless such technology (1) does not spill over to domestic sectors; or (2) contributes to the competitive edge of foreign firms *vis-à-vis* domestic ones. Finally, because FDI increases exports and access to larger markets, most would believe that FDI would benefit host economies unless (1) foreign firms are the primary exporters; or (2) foreign firms import a significant amount of the total value-added embodied in their exports.

Our analysis casts doubt on the more optimistic mechanisms linking FDI penetration to economic growth. First, our conservative regression results suggest that less FDI penetration is better than more, that domestic investment is better for growth than foreign investment, and that foreign investment penetration can lead to economic contraction *if it happens too quickly*.[8] These results are robust to Firebaugh's important methodological critique, concerns about a potentially endogenous relationship between FDI and economic growth, and a host of additional considerations (Carkovic and Levine 2005; Li and Liu 2005; UN 2001). Similarly, these findings do not depend on long periods of unobserved socioeconomic change between when investment dependence occurs and the outcome it purportedly causes (de Soysa and Oneal 1999), and provide a greater degree of comparability to the contemporary developing country than the "banana republics" of the 1960s, 1970s, and 1980s (Stokes and Anderson 1990). Finally,

some suggest that a country's human capital stock determines whether or not it will benefit from foreign investment, because it increases a country's "technological absorptive ability." This implies that our models may be misspecified by ignoring a *conditional* relationship between FDI and economic growth that depends on human capital (Borensztein, De Gregorio, and Lee 1998; Li and Liu 2005). Thus, we included interaction terms between FDI (both the rate and penetration) and secondary-education enrollments, which did not yield significant interaction terms.

These results also have implications for economic growth during post-socialist transition. First, our finding that FDI penetration reduces economic growth is consistent with other deleterious FDI consequences observed elsewhere (Bandelj and Mahutga 2010; Mahutga and Bandelj 2008; Darrat, Kherfi, and Soliman 2005; Eller et al. 2006; Sapienza 2010). They also corroborate the work of Hamm, King, and Stuckler (2012) and others, who suggest that gradual and thoughtful transition is preferable to "shock therapy" (Gerber and Hout 1998). However, it is not clear that FDI was an *alternative path* to mass privatization. For example, the correlation between FDI penetration and private sector size is .644, which supports the contrarian view that post-socialist countries that used FDI as the primary mechanism of privatization ended up with larger private sectors than those who eschewed it (Bandelj 2008, 206–10).[9] FDI may have a larger negative effect on economic growth that works through its positive effect on privatization. Second, they cast doubt on the argument that FDI is a *better alternative* for economic growth than domestic privatization (c.f. Hamm, King, and Stuckler 2012). That is, while there is mounting evidence that foreign *firms* do better than domestic *firms* during transition, this greater firm-level performance may not translate, for the reasons outlined above, into greater economic growth for the *country* as a whole (Hamm, King, and Stuckler 2012; King 2000). Finally, if we consider the policy goals of government officials in post-socialist countries—increasing growth in future years relative to the present—it is clear that the type of investment matters. While a small increase in FDI penetration can lead to positive growth, it can also lead to economic contraction if it increases too quickly. The upside to domestic investment is larger than that for foreign investment, and comes with zero potential downside.

In closing, we agree with others that post-socialist transition countries represent a historically unique opportunity to investigate sociological theories of socio-economic change, and we offer one future extension here (Gerber 2002; Mahutga and Bandelj 2008). One plausible mechanism for the negative association between FDI penetration and economic growth is the weak institutional environment in which FDI penetration occurred. Indeed, we are fairly confident that institutions mediate the impact of globalization processes like FDI in advanced capitalist countries (Hall and Soskice 2001; Whitley 1996; c.f. Bair and Mahutga 2012). Moreover, foreign investment entered the region during a period of dramatic institutional change and right as privatization was damaging *state* economic institutions (Hamm, King, and Stuckler 2012). We considered a version of this possibility here. First, we recognize that Central and Eastern

European (CEE) countries have undergone a more dramatic institutional restructuring than other post-socialist countries in our sample because of the process by which they gained entry into the European Union, and that private market institutions and national governments were better prepared to govern the domestic economy in the later part of the transition period than in earlier ones (Pop-Eleches 2007; Schweickert et al. 2001). Thus, we follow Darrat, Kherfi, and Soliman (2005) by decomposing the effect of FDI penetration across EU (CEE) and non-EU member countries and, in addition to recalling the analysis of long- and short-term FDI effects in model 5 of table 2, we also interact FDI penetration with time. These decompositions do not suggest that the effect of FDI varies across the EU/non-EU divide or time, but we believe this question warrants additional research, particularly as better data on state capacity and the pace and type of institutional change come online.

Notes

1. There was some regional investment among the Soviet Union and its satellite states prior to 1990. In 1949, the Soviet Union and its satellite states formed the Council for Mutual Economic Aid (CoMEcon), which oversaw some intra-regional investment among these countries (Pinto, Knakal, and Girvan 1973). However, these arrangements did not involve FDI in the traditional sense (McMillan 1987; Mahutga and Bandelj 2008). By 1988 several states, including Hungary, Poland, Estonia, Latvia, and Lithuania, legalized full foreign ownership of firms. Nevertheless, in 1989 PST countries had foreign investment stock of less than 1 percent of their total GDP.
2. Hamm, King, and Stuckler (2012) note that FDI had no effect in growth models that they do not report (316).
3. One anonymous reviewer was concerned that we include Mongolia among post-socialist transition countries. While this inclusion is justified given Mongolia's transitional status and close ties with the Soviet Union, we do note that our results do not change if Mongolia is excluded.
4. Using *STATA*'s outlier detection algorithm (*bacon*), we identified one outlier (Romania 1991) in the logged and differenced data, which we dropped from the analysis. We tested for unit roots using *STATA*'s unit root tests for panel data (*xtunitroot*). Several variables contained unit roots in levels, but none in differences.
5. In models that control for the full battery of controls in model 6 of table 1, the associations are –.190 ($p > .336$) and –.579 ($p > .459$) between the one-year lag of economic growth and FDI penetration and the rate of FDI, respectively. In models that control only for the t–1 yearly dummies, the associations are –.251 ($p > .224$) and –.568 ($p > .423$) between the one-year lag of economic growth and FDI penetration and the rate of FDI, respectively. Unsurprisingly, lagged economic growth was an exceedingly weak instrument in unreported IV regressions that included it as an extra instrument.
6. We also estimated unreported models that treat, individually, the FDI rate and FDI penetration as potentially endogenous. The coefficients were nearly identical to that in model 1 of table 2, and the diagnostic statistics were substantively identical.
7. This p-value is the probability that the expected growth rate at the fixed increase in FDI equals zero.
8. We also estimated unreported models that regressed domestic investment on foreign investment in (1) differences; and (2) levels with fixed country effects and found

no significant relationship, suggesting that FDI neither helps nor hinders domestic investment (c.f. de Soysa and Oneal 1999).

9. We also observe a large and positive effect of FDI penetration on private sector size in a regression model that controls for fixed country effects.

Appendix

Table A1. Country-Years Included

Country	Years
Albania	1995–96, 2000–01, 2009–10
Armenia	1997, 2000–02, 2005–09
Azerbaijan	1996–2002, 2005
Belarus	1993–2002, 2005–07
Bosnia and Herzegovina	2008–10
Bulgaria	1991–2002, 2005–09
Croatia	1994–2002, 2006–09
Czech Republic	1994–2002
Estonia	1993–2002, 2005–08
Georgia	1994–97, 2000–02, 2005–09
Hungary	1991–92, 1995–2002, 2005–09
Kazakhstan	1994,1998–2002, 2005–09
Kyrgyzstan	2005–10
Latvia	1993–2002, 2005–09
Lithuania	1993–2002, 2005–09
Mongolia	2005–07
Poland	1991–2002, 2005–09
Romania	1992–2002, 2005–09
Russia	1994, 2005–09
Serbia	2009–10
Slovakia	1994–2002, 2005–08
Slovenia	1993–2002, 2005–08
Tajikistan	1993–95, 2000–02, 2005–09
Ukraine	1993–94, 2000–02, 2005–09
Uzbekistan	1993–94, 2000–02, 2005–09

Note: 25 countries, 263 country-year observations.

Table A2. Zero-Order Correlation Coefficients and Descriptive Statistics

		1	2	3	4	5	6	7	8	9	10
1	Economic growth										
2	FDI stock/GDP	–0.400									
3	FDI rate	0.154	–0.075								
4	Domestic investment	0.364	–0.072	0.097							
5	Private sector size	–0.170	0.328	–0.009	0.102						
6	Labor force participation	0.223	–0.238	0.031	0.117	–0.158					
7	Secondary education	0.110	–0.231	0.042	0.061	–0.134	0.100				
8	Industrialization	0.153	–0.152	–0.130	0.259	–0.012	0.156	–0.003			
9	Trade openness	–0.208	0.091	0.231	0.000	0.051	–0.092	–0.187	–0.071		
10	Population	0.058	–0.067	–0.075	–0.045	–0.156	0.209	–0.024	–0.012	0.080	
	Mean	0.080	0.224	–0.097	0.001	0.074	–0.003	0.004	–0.011	0.012	–0.001
	S.D.	0.154	0.391	0.820	0.238	0.141	0.017	0.031	0.099	0.184	0.009

Note: Variables logged with base-10 logarithm and differenced.

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