Foreign direct investment, growth, and spillover effects

by

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Abstract

The literature on foreign direct investment is expansive but somewhat fragmented, and as a result can sometimes be hard to disentangle in a meaningful way. The purpose of this paper is to examine foreign direct investment in a comprehensive but straightforward way. We hope to do this by examining FDI in a generalized and historical sense, FDI's relationship with growth, and the means by which FDI influences growth and productivity.

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Chapter 1 - Introduction

"Faced with the choice between changing one's mind and proving that there is no need to do so, almost everyone gets busy on the proof." – John Kenneth Galbraith, OC. Foreign Direct Investment (FDI) has existed in some form or another since before the historical record, but post World War II it elevated from mere existence to a primary means by which the developing world sought to grow. And although it has been a topic in academic journals for more than half a century, the literature on FDI still remains somewhat entangled. The purpose of this paper is to help cut through some of that confusion. This paper will discuss three primary topics: FDI in a generalized and historical sense, FDI's relationship with growth, and the means by which FDI influences growth and productivity.

The three subsequent chapters will all focus on one of these three topics. Chapter 2 will define FDI, talk about its development over the past half-century, explain its measurement and differentiate it from other similar types of investment (most of the data from Chapter 2 will come from the United Nations Council on Trade and Development's (UNCTAD) *World Investment Report 2018).* Chapter 3 will discuss FDI's relationship to growth and will feature papers by Balasubramanyam et al., Batten and Vo, Lenka and Sharma, and Elkomy et al. Chapter 4 will focus on the pathway by which FDI effects growth, and will include papers from Javorcik, Blalock and Gertler, and Lu et al.

Chapter 2 - FDI in Context

To understand how FDI affects growth we must first understand FDI. Chapter 2 looks to not only define FDI, but to put it into context. By focusing on the dual-nature of FDI as both an income and control strategy, this chapter hopes to explain both what FDI is, and what sets it apart from other types of investment. FDI is far more than just an investment into a foreign nation, and to further illustrate this I will: define it (2.1), cover its history (2.2), sub-divide it (2.3), discuss its measurement (2.4), and differentiate it from other types of investment (2.4).

2.1 Defining FDI

Unlike other similar types of investment (like portfolio investment), FDI gives the foreign investor partial or total ownership of the firm they are investing in, and as a result, the ability to influence that firm's decision-making process. Investors, in general, are motivated by a pursuit for higher income, and, as such, look to invest in firms that will allow them to widen their profit margins. In search of a more active investing strategy, many investors look towards FDI as a means for not only increasing their income but also directly controlling their investment.

For the sake of both clarity and continuity I will utilize the definition of FDI as outlined in the Organisation for Economic Co-operation and Development's Detailed Benchmark Definition of Foreign Direct Investment: Fourth Edition (2008) (BD4).

> Foreign direct investment reflects the objective of establishing a lasting interest by a resident enterprise in one economy (direct investor) in an enterprise (direct investment enterprise) that is resident in an economy other than that of the direct investor. The lasting interest implies the existence of a long-term relationship between the direct investor and the direct investment enterprise and a significant degree of influence on the management of the enterprise. The direct or indirect ownership of 10% or more of the

voting power of an enterprise resident in one economy by an investor resident in another economy is evidence of such a relationship. (pg. 48)

This is the same definition utilized by the United Nations Conference on Trade and Development (UNCTAD), the largest compiler of FDI statistics since the 1960s (and from whom I derived most of my data). Furthermore, even if the definitions of other multinational groups, like the Organisation for Economic Cooperation and Development (OECD), differ slightly on what they consider a "significant degree of influence" or a "lasting interest," the 10% ownership requirement exists in all of them; so, they work effectively the same. As mentioned before, control is a centralized part of FDI.

2.2 FDI from a Historical Standpoint

To understand how FDI affects growth, we must first understand FDI, and to understand FDI, we must first understand how it has grown and changed over the years. Section 2.2 starts by discussing how Hymer's "Control Theory" changed the global understanding of FDI and finishes by covering the development of FDI over the past century. Hymer's Control Theory might be more than half a century old, but the preeminent emphasis he places onto control makes it a good place to start the discussion.

2.2.1 Neoclassical FDI & Hymer's Control Theory

Prior to the release of Dr. Stephen H. Hymer's *The International Operations of National Firms: A Study of Direct Foreign Investment* (1977), economists and statisticians primarily explained FDI through neoclassical economic devices. FDI, like all other types of investment, was another means of exploiting production difference for capital gain, but unlike other types of investment, there were clear disadvantages to investing into foreign firms over their domestic counterparts.

First, an obvious information asymmetry exists between domestic and foreign firms (1977). This problem is fairly small and can easily be overcome with time or market research, but that is resources that the domestic firm does not have to invest; allowing them to garner larger profits than their foreign counterpart (making them more attractive to investors). Second and more significantly, when investing into a foreign firm there is the chance that shifting government policy might negatively affect one's investment (1977). If a domestic investor's government chooses to levy trade restrictions on a foreign economy, then the foreign firms profit margins are undoubtedly going to suffer. Considering that domestic firms are usually sheltered from trade restrictions, they are often a much safer investment (even in the case of offsetting tariffs, they are *at least* as well off as their foreign counterpart). Taking these disadvantages into consideration, the only real way that FDI made economic sense was if there were additional positive benefits that weren't being considered.

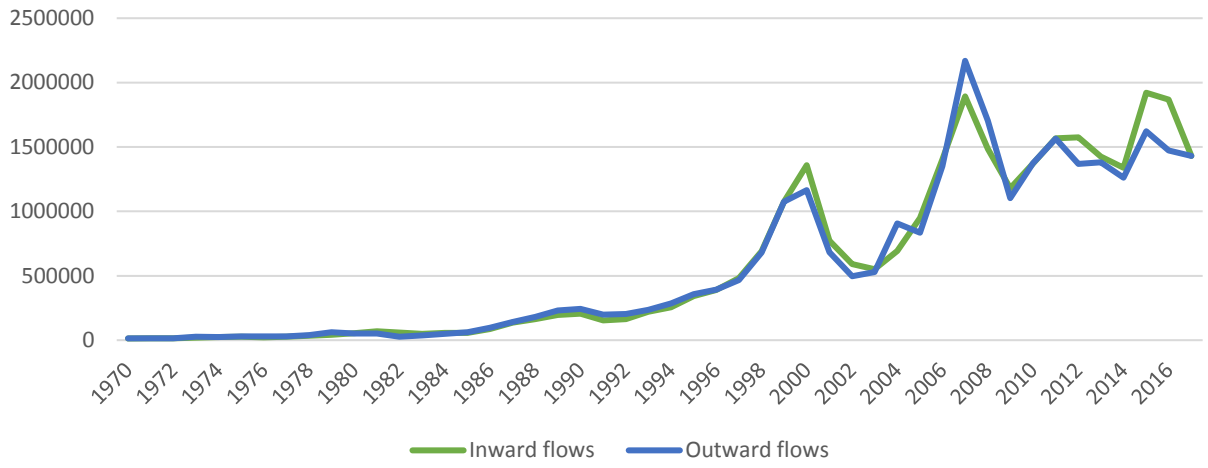
Hymer proposed two main theories for why investors choose FDI and argued that, in tandem with traditional models, these new determinants would give a more complete understanding of an investor's decision-making process. His first argument was that FDI helps to disincentivize conflict between firms. According to Hymer, sometimes it is profitable to control enterprises in more than one country in order to remove competition between them (1977). Akin to a domestic merger, seizing control of foreign competitor allows a domestic firm to decrease competition in their market, which, in turn, will increase the profit margins of the domestic firm. Second, firms that have an advantage in a particular activity might find it profitable to exploit these advantages by establishing foreign operations (1977, pg. 38). This idea very clearly reflects the traditional neoclassical idea of leveraging production advantages, but much like the first theory, has an emphasis on control. Hymer's Control Theory is multifaceted, but its many

subpoints all root back to idea that FDI is more than just an income strategy, it is a control strategy. This concept might be taken as canon today, but prior to Hymer it was largely unheard of.

2.2.2 The Growth of FDI

Organizations like the United Nations (UN) and World Bank have been measuring FDI since the early 1970s, and while the first twenty years of measurement were categorized by slow and deliberate growth; the past thirty have been anything but. FDI growth in the 70s and 80s was largely contained by relatively restrictive financial markets throughout Europe and East Asia. Combined with the growing tensions between the Eastern and Western Blocs, investors, especially in the United States (US), were wary of sending their money abroad

Figure 2.1 Global FDI, 1970-2017 (in millions of US at current prices)



Source: UNCTADSTAT's Foreign direct investment: Inward and outward flows and stock, annual (2018)
Note: these statistics can be very easily accessed at www.unctadstat.unctad.org/wds/ (in the folder named "Foreign direct investment")

The early 90s would see not only the end of the Cold War, but the loosening of financial markets in Europe, and as evidenced in figure 2.1 above, FDI grew at extreme rates over the course of the 90s. After the fall of the Soviet Union, European financial markets experienced a

wave of liberalization. The rapid influx of new investors and new investment opportunities coupled with extreme speculation surrounding the Internet (the World Wide Web was released in 1990) caused global FDI values to double, triple, and even quadruple in a matter of only a few years. Fledgling online retailers, like eBay and Amazon, were drawing increased attention from global investors, and by 2000, investment levels were at an all-time high.

FDI continued to rise as the global economy continued to boom, but when the dotcom bubble finally burst in March of 2000, the global economy crashed. Many investors, having lost massive profits in the speculative dotcom bubble, became more conservative with their investment strategy, and as figure 2.1 shows, global FDI values plummeted at nearly the same rate at which they had expanded. Investment was not as profitable as it had been in years prior, and many investors found that it was much safer to save their income for better opportunities. Considering that even domestic investment was very hazardous at this time, the inherently riskier foreign investment opportunities (discussed in subsection 2.2.1) were extremely unattractive to the already thinning number of global investors. Furthermore, the US (the largest exporter of FDI since the 1970s) experienced the September 11th terror attacks in late 2001, which further stoked investors' fears about interacting with foreign markets. As noted by UNCTAD's World Investment Report (2018) (WIR), the US at the time, and to this day, had both the largest inflows and largest outflows of FDI (pg. 4). Being such a centralized force in the global financial market meant that when the US started to withdraw from the international marketplace, it disincentivized investment not only in the US, but globally.

By 2004, most of the global economy had recovered from the economic recession caused by the dotcom bubble and the September 11th terror attacks, and again, as figure 2.1 notes, firms were ready to invest at unprecedented rates. By 2006, global FDI had returned to pre-bust levels,

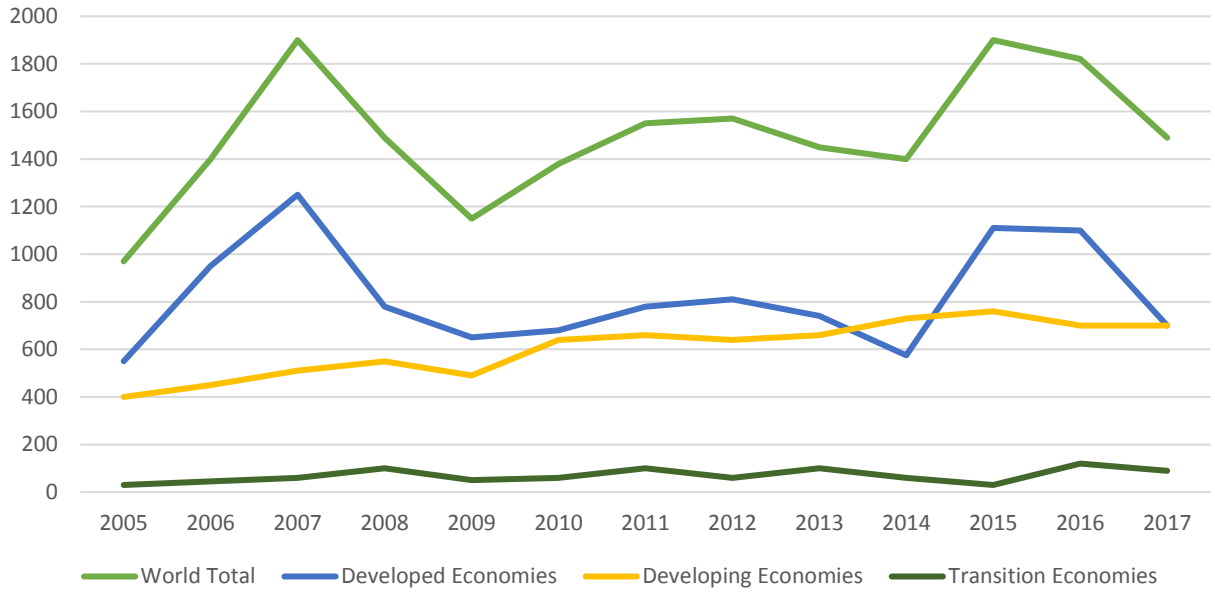
and by 2008, global FDI had nearly doubled its previous peak value. But much like the dotcom crash before it, the housing crash would send shockwaves through global economy. The "Great Recession" as it would come to be called had an admittedly shorter recovery period than the post-dotcom bubble, but it would have nearly identical short-term effects; global FDI nosedived. As figure 2.1 notes, FDI would cease to decline in 2009, and see a slight upward trend until late 2011.

Despite increasing GDP, growing trade and employment levels, and a strong global economy, FDI would decline sharply in 2012. Fears revolving around the Eurozone crisis, and the US fiscal cliff caused investment into developed countries to decline massively. According to UNCTAD's Global Investment Trends Monitor (2013) (GIT), FDI flows into the US fell by $80 billion and flows into the EU fell by almost $150 billion (USD) (pg. 1). Fearing the dual debt crises facing most of the developed world, many investors chose to instead invest into the developing world, and in 2012, FDI flows to developing economies would surpass that of flows to developed economies (for the first time ever). Although the overall value of FDI sharply declined, this was mostly driven by the fall of FDI into developed economies. FDI flows to Asia declined by less than 5%, and there were actually slight increases in flows to Latin America and Africa (2013, pg. 1).

As evidenced in figure 2.2 below, post-2012, FDI inflows to developed economies would continue to decline, while flows to developing countries would continue to increase. A surge in cross-border Mergers and Acquisitions (M&As), for "strategic reasons" and "tax inversion purposes," caused an influx of capital into developed economies throughout 2014 (WIR 2018, pg. 3). Although it seemed like capital flows into developing economies would continue to trend

upward, they flatlined for most of 2016, and ended the year slightly below their 2014 total. Capital flows to developing economies also declined during this period.

Figure 2.2 FDI inflows, global and by group of economies, 2005-2017 (in billions of USD)



Source: UNCTAD, FDI/MNE database (www.unctad.org/fdistatistics)

Even though global GDP and trade were both on strong upward trends, FDI plummeted in 2017. As figure 2.2 shows, FDI values decreased by more than 20%. Even when considering the unusually large number of M&As in 2016 this decline is still extremely significant. Furthermore, the creation of foreign subsidiaries (greenfield investment), which is often utilized as an indicator for future investment trends, also decreased by 14%. The WIR is predicting "fragile growth" for 2018, and while they forecast global flows to increase by 10%, this is still a much smaller number than previous years (2018, pg. xi).

Overall, FDI has been nothing short of cyclical. Although lag has occurred, and post-2012 FDI growth does not really track GDP growth, FDI, in general, has responded to the global economy in the ways we expect it would: snowballing during booms, and plummeting during

busts. The volatility in the growth of FDI says much more about the instability of the global economy than it does about the unpredictability of investors.

2.3 Subcategories of FDI

Having now defined FDI generally, it is important to explain the different subdivisions of FDI and what they mean for international investment. Section 2.3 looks to differentiate two different subcategories of FDI: the brownfield/greenfield distinction and the horizontal/vertical distinction.

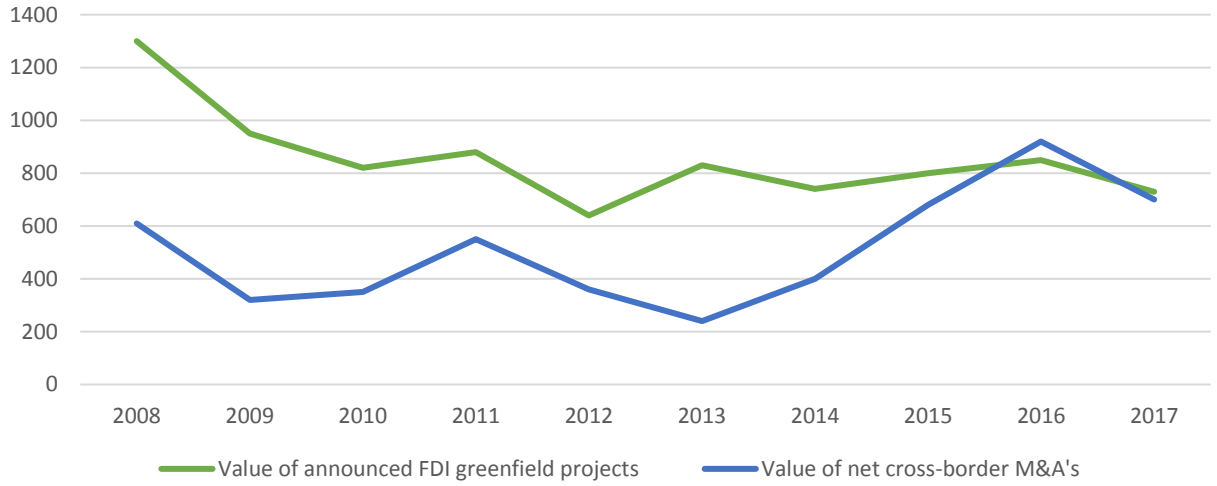
2.3.1 The Brownfield/Greenfield Distinction

FDI that is channeled into the creation of a new company is referred to as a "greenfield," while investment into a pre-existing infrastructure is referred to as "brownfield." Again, both types of FDI still involve direct ownership (at least 10%) from the foreign parent company, and act in very much the same way, but the distinction between green- and brownfield is an important one, especially when looking into the comparative dynamics of FDI into developed and developing countries.

There is no catch-all rule, but a majority of greenfield FDI tends to be in developing countries, while most brownfield FDI is clustered in more developed nations (brownfield is often referred to as Mergers & Acquisitions). This is fairly intuitive; developing countries do not have the same level of economic infrastructure as developed nations, and resultantly have many aspects of their market that are underserved. The reason these under-developed markets attract new investments is two-fold. First, by investing in an underdeveloped market a foreign firm can access resources (both human and physical) that are largely untapped, which, in turn, allows them to access larger profit margins due to a lack of competition in the fledgling market (traditionally on the supply side of the equation). Second, developing countries are just that:

developing, and often have not fostered environments that are conducive to a multifaceted, multi-industry economy. If the type of company that a firm is trying to invest in does not yet exist in that marketplace, then brownfield is simply not an option.

Figure 2.3 Value of net Cross-border M&As and announced greenfield projects, 2008-2017 (in billions of USD)



Source: UNCTAD, cross-border M&A database (www.unctad.com/fdistatistics)

As evidenced in figure 2.3 above, the value of both greenfield and brownfield projects declined in the wake of the 2008 housing crisis, but the value of greenfield projects jumped significantly in 2012. As mentioned in subsection 2.2.2, fears revolving around debt crises in the developed world caused an influx of investment into the developing world, and as a result the value of M&As fell by nearly 41% to their lowest level since 2009. M&As would start to recover in 2013 and continue to increase throughout the mid-2010s. Strangely, the increase in M&As wasn't being driven by developed economies, but rather by developing ones, who increased their share of cross-border purchase by 37% in 2012 (GIT 2013, pg. 4). This again illustrates that while greenfield investment traditionally occurs in developing nations, and brownfield investment typically happens in developed nations, there are many exceptions to this rule.

2.3.2 The Horizontal/Vertical Distinction

Another primary distinction between different types of FDI is how exactly that new investment fits into a firm's existing production model. According to Paul Krugman, Maurice Obstfeld, and Marc Melitz in their book, "International Economics: Theory and Policy, 10th Edition, (2015) if a firm were to invest in a company that, "replicates the production process that the parent firm undertakes in its domestic facilities elsewhere in the world," these types of investment would be characterized as horizontal FDI; whereas an investment into a company that, "breaks up the production chain and transfers part of the parts of the domestic production process to the affiliate location," would be referred to as vertical FDI (pg. 193).

Firms that invest in horizontal FDI are often trying to locate their production closer to a consumer base, and hopefully widen their profit margin through the diminishment of transportation costs. Firms that invest in vertical FDI are often looking to take advantage of production cost differences between the more expensive domestic and cheaper foreign markets (Krugman 2015, pg. 193). Although the directional distinction is not quite as important as the greenfield/brownfield distinction, it still provides an important look into the reasoning behind why firms are choosing to invest in foreign economies, and what kind of benefits they are hoping to receive.

2.4 Measuring FDI

Like many other economic variables measured at the national level, FDI is calculated as both a flow and a stock. First, it is important to note that while a flow and a stock are unique measurements, they both are attempting to describe the same value, and when used correctly and consistently, both stocks and flows are an acceptable means of describing FDI. In this section, I

will differentiate stocks from flows generally, and then I will discuss how stocks and flows interact with FDI.

A stock represents the overall accumulation of value, whereas a flow represents the change between two values (usually measured over a year-long period). Put differently, a stock occurs at a point in time, while a flow occurs over a period of time. This simple distinction helps to illustrate why FDI values for stocks and flows can be so drastically different but have similar interpretations. For example, in 2016 inward flows of global FDI were equal to $1.9 trillion while inward stocks of global FDI were equal to $27.6 trillion. These numbers without context tell us very little, only that FDI stocks were much higher than FDI flows in 2016. When we consider that inward flows in 2017 were $1.4 trillion and inward stocks were $31.5 trillion, these measurements start to make more sense. Since stocks measure the overall accumulation of a value, FDI stocks should effectively tabulate the amount of FDI that has occurred since the "beginning of time" (more accurately, the beginning of measurement). FDI flows, on the other hand, measure the change in FDI from one year to the next, hence why the yearly values of FDI flows are much smaller than their stock counterparts.

It is important to note that while these measurements are somewhat interchangeable, they are unique. An FDI flow is not just the yearly changes in FDI stock, and an FDI stock is not just the overall accumulation of yearly FDI flows. Utilizing our example, an inward stock of $31.5 trillion in 2017 would mean that at the time of measurement in 2017 the total accumulation of global FDI would equal $31.5 trillion; however, when we subtract $27.6 trillion (the previous year's FDI stock value) from $31.5 trillion we end with $3.9 trillion, not $1.4 trillion (the value of FDI flows for 2017). This differentiation in value would suggest that flows and stocks are unique measurements. There are multiple reasons for this differentiation, but most of it occurs

due to changes in value over time. Investments often appreciate (or depreciate) with time, and since stock-based measurements tabulate over a much longer period than their flow-based comparatives, relative changes in value are captured more completely by stock-based measurements (hence why "yearly changes" in stocks are often more volatile than the ones in flows). Again, FDI can be measured as either a flow or a stock, as long as it is done correctly and consistently.

Measuring FDI often involves looking at changes in a country's balance of payments account (traditionally for flows) or tabulating the sales of multinational affiliates (traditionally for stocks). According to UNCTAD, FDI flows primarily consist of three main components: "acquisition or disposal of equity capital (including the initial equity transaction that meets the 10% threshold and all subsequent financial transaction and positions between the direct investor and the direct investment enterprise), reinvestment of earning which are not distributed as dividends, and inter-company debt" (UNCTAD definitions: FDI flows). FDI stocks, on the other hand, are the "value of the share of capital and reserves (including retained profits) attributable to the parent enterprise, plus the net indebtedness of affiliates to the parent enterprises" (UNCTAD definitions: FDI stock). Again, these measurements attempt to describe the same value, but are unique in their approach. Since UNCTAD, my main source of statistics, primarily focuses on flows this paper will as well, but again, a stock-based measurement, like the one utilized by the U.S. Department of Commerce's Bureau of Economic Analysis (BEA), is also acceptable.

2.5 Related Types of Investment

Now that I have discussed how FDI is measured, it is important to look at types of investment that are similar to and often confused with FDI. It is important to note that even after a direct investment enterprise has been identified, not all capital flows though it are considered

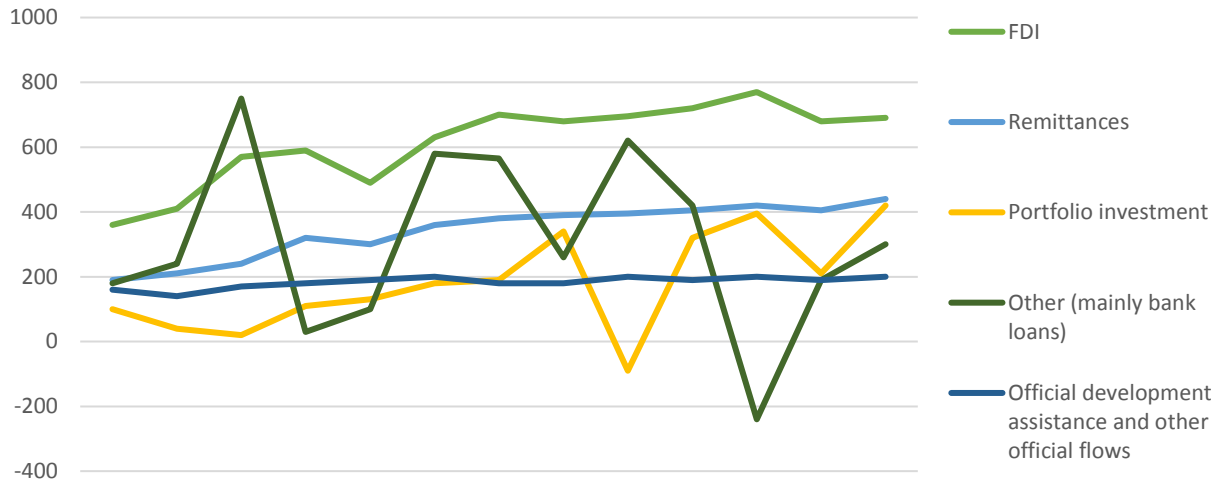
FDI. Tracing funds throughout a direct investment enterprise is a great way to track FDI, but it also catches other investments that cannot qualify as FDI. Only funds that are provided straight from the direct investor should be classified as FDI. This point should not be glossed over. The measurement of FDI is often an attempt at determining the "true" effects of a direct investor onto an enterprise, which is often hard to determine when other spurious relationships exist in the dataset.

One of the main types of investment that is often confused with FDI is foreign portfolio investment (FPI). FPI, much like FDI, involves the investment of capital abroad, but does not have the same 10% ownership requirement that FDI does. As such, FPI often occurs in much smaller amounts than FDI, and resultantly is much more liquid. Since FDI makes the investor a partial owner in an enterprise, the investor now has a greater interest in the well-being of the company, both in the short- and long-term. With FPI, when an investment is facing declining profits it is fairly easy, relative to FDI, to withdraw, but when a foreign direct investor is facing declining profits their ownership-stake in the company often makes it very costly to leave. Admittedly, this is both a virtue and a vice, because while a foreign direct investor might be stuck with a declining enterprise, their increased levels of control allow them to respond to economic downturn in the way that they best see fit. Lacking any real form of control, a foreign portfolio investor only has two choices when facing declining profits: 1. Hope the investment turns around in the future, or 2. Withdraw. This ultimatum, caused by a lack of control, helps to explain some of the extreme volatility in portfolio investments.

As discussed in section 2.3, global FDI values have seen a strong amount of variance post-1990, but as figure 2.4 shows FPI growth has been even more uneven. FPI somewhat tracks FDI (many of the variables that affect FDI also affect FPI), but with slightly higher peaks and

much lower troughs. Again, this is explained by the liquidity of FPI, by having less of a vested stake into an enterprise a foreign portfolio investor has less reason to stick out economic downturn. The increased control that a foreign direct investor has gives them greater incentive to stay with the foreign enterprise and often leads to the creation of long-term relationships between the investor and investment enterprise. Control differentiates FPI from FDI not only in definition, but in practice.

Figure 2.4 Sources of external finance for developing economies, 2005-2017 (in billions of USD)



Source: UNCTAD, based on World Bank World Development Indicators (for remittances), UNCTAD (for FDI), IMF World Economic Dataset (for portfolio investment and other investment), and OECD (for ODA and other official flows)
Note: ODA and other official flows is the sum of net disbursements from Development Assistance Committee (DAC) countries, non-DAC countries, and multilateral donors, from OECD DAC Table 2a, and net other official flows from all donors, from OECD DAC Table 2b.

Chapter 3 - FDI and Growth

Having now put FDI into context, we can begin to discuss the association between FDI and growth. Despite robust research on this topic, the exact nature of the relationship between FDI and growth is still very much contended. Chapter 3 will discuss some of the prevailing studies about this relationship.

Chapter 3 will utilize four primary papers to discuss the empirical connection between FDI and growth: *Foreign Direct Investment as an Engine of Growth* by Balasubramanyam, Salisu, and Sapsford (1999) (henceforth, BSS), *An Analysis of the Relationship Between Foreign Direct Investment and Economic Growth* by Batten and Vo (2009) (henceforth, BV), *FDI as a Main Determinant of Economic Growth: A Panel Data Analysis* by Lenka and Sharma (2014) (henceforth, LS), and *Economic and Political Determinants of the Effects of FDI on Growth in Transition and Developing Countries* by Elkomy, Ingham and Read (2016) (henceforth, EIR).

3.1 Balasubramanyam, Salisu, and Sapsford: From Exports to Investment

As noted by BSS (1999), there was almost no empirical research on the direct relationship between FDI and growth prior to the year 2000. Since most research had been clustered into the relationship between exports and growth, the relationship between FDI and growth was still of much debate (BSS, 1999). Most economists could agree that FDI had at least some positive effect on growth, but the size of that effect and the mechanism by which that growth took place were still disputed. BSS (1999) claimed that while there was no official consensus on how FDI affects growth, there were four principal concepts about FDI that most of the academic community could agree on.

3.1.1 The Four Principal Concepts

First, FDI is a, "composite bundle of capital, know-how and technology" (BSS, 1999, pg. 28). This is a fairly basic claim that mostly serves as a reminder that FDI involves more than just capital flows. The inclusion of the words know-how and technology suggest that the foreign direct investor brings a certain set of skills and benefits to the foreign firm that also must be considered. When examining FDI's impact on growth it would be incomplete to only measure the flow of capital.

Second, FDI's main contribution to growth is "through technology transfer and technology and skill diffusion in the countries importing FDI" (BSS, 1999, pg. 28). Again, FDI is more than just a flow of capital. Since a foreign direct investor is (by definition) a partial owner of the foreign firm that they are investing in, they have an incentive to widen that firms profit margins. Technological transfers are a fairly easy and cheap way to do this (the technology already exists; it just is not in the hands of the foreign firm). Furthermore, the concept of skill diffusion suggests that even if technological advancements only occur within a single firm, workers and information from that firm will eventually seep out into the marketplace; increasing the productivity of both other firms and the economy as a whole. Technological diffusion and skill seepage will be discussed more completely in chapter 4.

Third, FDI's effectiveness in promoting growth is primarily a function of the type of trade regime that exists in the host county. "FDI in the presence of a protectionist regime is likely to immizerize[sic] growth, whereas a liberal trade regime is likely to promote growth" (BSS, 1999, pg. 28). This topic is covered more heavily in another Balasubramanyam, Salisu, and Sapsford paper, *Foreign Direct Investment and Growth in EP and IS Countries* (BSS, 1996), in which they argue that liberal trade regimes often provide a better environment for learning, and

thus a stronger means for FDI to positively affect growth. The distortive nature of protectionist regimes means that FDI might not promote growth, but rather just the redistribution of income in favor of new agents of production (1996, pg. 96). This suggests that FDI into authoritarian regimes will not affect growth in a positive manner but a distortionary one, which will worsen inequality in these countries and further distort the market.

Finally, when comparing foreign-owned firms to similar locally-owned firms, the foreign firms exhibited "superior productive efficiency" (1999, pg. 28). As mentioned in subsection 2.2.1, investment into a foreign firm is inherently risker than investment into a domestic one; so, investment will traditionally only occur in foreign firms that have productive efficiency that is high enough to counterbalance their risk. Moreover, when multinational corporations (MNC) and other types direct investors choose to invest into a foreign firm they are effectively signaling that that foreign firm is more productive than its domestic counterparts (this is only true in open trade regimes). A rational investor would not deliberately take on increased risk without the possibility for increased reward.

Most economists could agree with these four statements, but with the lack of empirical studies specifically linking FDI to GDP growth, the effectiveness of FDI as an "engine of growth" was still largely undetermined. BSS (1999) was one of the first papers that attempted to find that link.

3.1.2 Model and Results

BSS (1999) tested multiple hypotheses in an attempt to find a direct relationship between FDI and growth. Their first hypothesis was that in the presence of a liberal trade regime the benefits of FDI should be transferrable abroad by investors, and thus, FDI should promote growth. In other words: "FDI, economic growth and exports are intertwined" (1999, pg. 29).

Recall that prior to 2000, most of the literature surrounding FDI's relationship to growth was primarily focused on the interaction between exports and growth. By connecting FDI to exports, BSS (1999) were able to tap into many of the export-based growth hypotheses that had been popular in the 80s and 90s. Furthermore, by including exports as a primary factor in their production function they are able to bridge the gap between previous export-based literature and their new more FDI-based approach. Utilizing cross-sectional data from 46 countries between the years of 1970 and 1985, their production function is as follows:

(3.1) $y = \alpha + \beta l + \gamma k + \psi f + \varphi x$

where: y is the growth rate of gross domestic product (GDP) in real terms

l is the growth rate of labor

k is the growth rate of domestic capital stock*

f is the growth rate of foreign capital stock*

x is the growth rate of exports

Because of the problems associated with the measurement of capital stocks, both k and f will be approximated values. As is done in previous literature, the growth rate of domestic capital stock will be approximated by the share of domestic investment in GDP (I/Y), and the growth rate of foreign capital stock will be approximated by the share of FDI in GDP (FDI/Y). Furthermore, by utilizing FDI/Y as our proxy for the growth rate of foreign capital stock, FDI is now a direct determinant of growth.

Table 3.1 Cross-section regression analysis of determinants of growth rate of real GDP, 1970-1985 (annual average)

Eq. No.	Sample	Constant	FDI/Y	I/Y	l	x	R^2	Method
1.1	All Countries (N=46)	-0.20 (0.16)	1.84** (3.86)	-0.004 (0.09)	1.07** (2.73)	0.22** (4.74)	0.57	OLS
1.2	EP Countries	-0.63	1.83**	0.01	0.95	0.30**	0.79	OLS

	(N=46)	(0.39)	(3.71)	(0.19)	(1.67)	(4.45)		
1.3	IS Countries (N=46)	0.72 (0.34)	1.77 (1.39)	-0.03 (0.45)	1.07* (1.85)	0.16** (2.35)	0.37	OLS
1.4	All Countries (N=46)	-0.18 (0.14)	1.65** (2.68)	-0.02 (0.005)	1.07** (2.73)	0.22** (4.76)	0.57	GIVE
1.5	EP Countries (N=46)	-0.52 (0.32)	1.54* (3.43)	0.01 (0.21)	0.93 (1.62)	0.30** (4.49)	0.79	GIVE
1.6	IS Countries (N=46)	-2.14 (0.40)	10.16 (0.90)	0.22 (0.79)	1.21 (0.94)	0.30 (1.52)	0.0	GIVE

Notes: Figures in parentheses are absolute 't' values. * is significant at 5 percent, ** is significant at 1 percent. GIVE = Generalized Instrumental Variable Estimator, OLS = Ordinary Least Squares. Real GDP growth data derived from Summers and Heston (1988). Domestic investment, import shares, and real export data derived from the IMF's *International Financial Statistics.*

As table 3.1 shows, the φ parameter, which represents the growth rate of exports, is positive and statistically significant (at 1%) in nearly all cases. In accordance with previous literature, BSS's (1999) model predicts a positive relationship between exports and GDP growth. However, unlike the β and ψ parameters which are never less than one, the φ parameter only ranges from 0.16 to 0.30. Although it is statistically significant in nearly all cases (besides 1.6), the φ parameter is much smaller than the other statistically significant parameters in the model. This would suggest that while exports do positively affect GDP growth, their overall impact might be less than previously thought.

The ψ parameter (attached to our foreign capital stock proxy: FDI/Y) is of particular interest to us because it represents the elasticity of output with respect to foreign capital. As shown in table 3.1 below, ψ for "All Countries" is equal to 1.84 and is statistically significant at the 1% level. This suggest a strong positive relationship between FDI and growth. Whether or not that relationship is casual is still somewhat uncertain. BSS (1999) focus heavily on the differentiation between FDI in export promoting (EP) and import subsidizing (IS) countries, and

while they do make claims about FDIs effect on growth in general, their paper is primarily focused on how FDI affects growth in different types of trade regimes.

BSS (1999) was one of the first papers to truly connect FDI and growth. While Balasubramanyam, Salisu, and Sapsford do this in an indirect manner (utilizing FDI/Y as a proxy for foreign capital stock) they still created one of the first models empirically linking FDI and growth. Moreover, they found that the elasticity of output with respect to foreign capital was not only positive and greater than one, it was statistically significant in nearly all cases.

3.2 Batten and Vo: A Comprehensive View

According to BV (2009), while it is common to model growth with a regression framework (e.g. Barro, 1991), there is no clear direction for which set of variables should be included in the regression equation. In an attempt to create a robust model, BV (2009) chose to employ four different proxy indicators for FDI in their growth regression: gross stock of FDI (inflows and outflows) as a share of GDP (FD01), stock of FDI inflows as a share of GDP (FDI02), gross FDI flows (inflows plus outflows) as a share of GDP (FDI03), and FDI inflows as a share of GDP (FDI04). By creating four different indicators for FDI, BV (2009) have not only given themselves a much broader base for analysis, but if all of their FDI indicators are shown to be statistically significant and of similar value, their conclusions will be much more robust than if their regression only had one explanatory variable proxying for FDI. Moreover, since BV's (2009) dataset covers 79 countries over a 23-year period (1980-2003), their results should be much more robust than similar studies which cover only a single country or region. As such, their analysis should provide an opportunity for a comprehensive investigation into the role of FDI on economic growth.

3.2.1 Model and Results

When examining the correlation matrix for BV's (2009) explanatory variables, we see what most theory would suggest: inflation (-0.10) and the size of the government (-0.07) are negatively correlated with economic growth, while the international risk index (0.28) and domestic investment (0.24) are positively correlated with growth (BV, 2009, pg. 1628). Moreover, a strong positive correlation exists between all of their FDI proxies which would suggest that while unique, they share many similarities. Taking these things into consideration, BV's (2009) explanatory variables seem to be interacting correctly with each other and in accordance with previous literature; their model seems to be working as intended.

Table 3.2 Panel regression (gross FDI as a share of GDP)

	(1) FE	**(2) GMM**	**(3) FE**	**(4) GMM**	**(5) FE**	**(6) GMM**	**(7) FE**	**(8) GMM**
GDP(-1)	-0.0635** (-4.57)	-0.1544** (-3.82)	-0.0680** (-4.95)	-0.1471** (-3.74)	-0.0832** (-6.06)	-0.1905** (-4.73)	-0.0824** (-5.99)	-0.1901** (-4.71)
INV	0.1413** (3.35)	0.0850 (0.62)	0.1625** (3.88)	0.2005 (1.42)	0.1782** (4.34)	0.1675 (1.18)	0.1771** (4.31)	0.1676 (1.18)
EDU	0.0203* (1.68)	0.1022** (2.95)	0.0276** (2.30)	0.1022** (3.16)	0.0295** (2.51)	0.1019** (3.07)	0.0274** (2.29)	0.1020** (3.07)
POPU	-0.0118** (-6.19)	-0.0024 (-0.68)	-0.0136** (-7.06)	-0.0055 (-1.51)	-0.0137** (-7.30)	-0.0066** (-2.25)	-0.0137** (-7.27)	-0.0065** (-2.21)
FDI01	0.1212** (3.72)	0.1020* (1.77)	0.1085** (3.37)	0.0939* (1.93)	0.0677** (2.07)	0.0277 (0.56)	0.0674** (2.06)	0.0278 (0.56)
GovCon			-0.2958** (-4.15)	-0.5933** (-2.49)	-0.2645** (-3.79)	-0.5875** (-2.18)	-0.2614** (-3.74)	-0.5801** (-2.09)
Trade					0.0650** (4.68)	0.1372** (3.88)	0.0651** (4.69)	0.1371** (3.88)
Inflation							-0.0007 (-0.86)	0.0003 (0.26)

Notes: GMM = Generalized Method of Moments, and FE = Fixed Effects. The dependent variable is annual rate of GDP per capita growth. The FDI indicator of interest is FDI01: Gross FDI as a share of GDP. The t-statistics are in parentheses. * = significance at the 10-percent level, and ** = at the 1-percent level.

Table 3.2 shows some of the panel regression for FDI01, and while the results remain statistically significant throughout the first nine regression, as more fixed effects are accounted for the effects of FDI becomes less statistically significant (even falling below the 10% threshold in regressions 10-14). This result is consistent across all of their FDI proxies (the panel regressions for FDI02, FDI03, and FDI04 were not included, but can be found in BV (2009) on pages 1631- 1635), and while it does suggest that their results might lack some robustness in the later regressions, there are still some noteworthy relationships in the dataset. First, FDI appears to positively affect growth in most scenarios (although the statistical significance of this effect does decreases with added controls). Second, countries with lower per capita GDP, which are represented by our GDP(-1) variable, are associated with higher rates of economic growth relative to other countries. This will be discussed further in subsection 3.3.3. Third, domestic investment (INV) and education (EDU) are both positively associated with economic growth and remain statistically significant throughout all fourteen regressions. This will be expanded upon in table 3.3, but also relates to the discussion of human capital and technology spillover and will thus be covered in chapter 4. Fourth, countries that exhibit lower risk relative to their peers (LOG(ICRG)) experience both higher economic growth rates and higher levels of FDI. In the same way that domestic investment is often preferred to the inherently risker foreign investment (subsection 2.2.2), countries with a lower international risk rating would be preferred to ones with a higher rating.

BV (2009) also ran regressions on the impact of gross FDI inflows (as well as gross FDI flows, which again, was not included but can be found in BV (2009) on pg. 1637) on economic growth under various economic and institutional conditions. Shown in table 3.3. below, FDI inflows have significantly stronger impacts on countries with higher openness to international

trade, and higher educational attainment. The idea of a free-trade environment being more conducive to FDI inflows is fairly intuitive, but it is also heavily supported by the literature (BSS (1999) amongst others). Higher educational attainment being positively correlated with larger inflows of FDI is also expected and will be discussed more completely in chapter 4.

Table 3.3 Impact of FDI inflows on economic growth under different conditions

	GDP(-1)	EDU	POPU	GovCon	Trade	Inflation
GDP(-1)		-0.1691** (-4.27)	-0.1490** (-3.97)	-0.1861** (-4.20)	-0.1637** (-3.71)	-0.1798** (-4.09)
INV	0.1862** (2.62)	0.1814** (2.80)	0.1832** (2.28)	0.2094** (2.84)	0.1797** (2.07)	0.2168** (2.87)
EDU	-0.0104 (-0.73)		0.0201 (1.58)	0.0250 (1.43)	0.0283 (1.48)	0.0308* (1.81)
POPU	-0.0132** (-7.13)	-0.0147** (-17.46)		-0.0140** (-12.02)	-0.0156** (-9.37)	-0.0155** (-12.41)
FDI01 x interaction	-0.0037 (-1.08)	0.0495* (1.76)	-0.1030 (-1.60)	0.2601* (1.70)	0.0931** (2.17)	-0.683 (-0.58)
GovCon	-0.2547** (-2.14)	-0.2039* (-1.65)	-0.0302 (-0.12)		-0.2683** (-2.06)	-0.2414** (-1.98)
Trade	0.0640** (2.75)	0.0902** (3.72)	0.1034** (3.52)	0.0968** (3.79)		0.0989** (3.82)
Inflation	-0.0003 (-1.13)	-0.0009** (-2.68)	-0.0007** (-2.11)	-0.0004 (-1.44)	-0.0007 (-1.76)	

Notes: The dependent variable is annual rate of GDP per capita growth. The FDI indicator of interest FDI01: Gross FDI as a share of GDP. The t-statistics are in parentheses. * = significance at the 10-percent level, and ** = at the 5-percent level.

Overall, BV (2009) stands as an expansive empirical study into the relationship between FDI and growth. Although they do run into some significance issues in the later parts of their panel regressions, FDI remains a statistically significant determinant throughout the first nine regressions (traditionally at 5%, but at least at 10%). The interaction that occurs between FDI and economic growth seems to be extremely intricate. While BV (2009) do a great job of drawing conclusions from their regression, they are far from simple. In their own words, “this

analysis supports the view that FDI helps to promote economic growth, although the picture that emerges is one of a complex relationship where FDI flows are leveraged within the economy by key societal variables: particular attention is drawn to the importance of the levels of education and the quality of institutional and financial environment in maximizing benefits." Put simply, FDI (in most cases) helps to promote economic growth, but the rate at which that growth occurs is largely dependent on relevant economic and policy variables. The method by which FDI actually effects growth will be discussed in chapter 4.

3.3 Lenka and Sharma & Elkomy, Ingham, and Read: On Income

3.3.1 Lenka and Sharma

Recognizing that FDI has been an important mechanism for growth creation in the developing world, LS (2014) wanted to look at the relationship between FDI inflows and growth underneath different levels of national income. Utilizing cross-sectional data from 62 countries over the period of 1991 to 2010, LS (2014) broke their dataset down into four different income groups. As discussed previously in BV (2009), countries with lower per capita income are associated with higher rates of economic growth, by breaking down their dataset into different income groupings LS (2014) are able to look into this further. Unlike previous papers in this section, LS (2014) only looks at inflows of FDI but considering that their goal is to look at the growth benefits of FDI in the developing world this is not too farfetched (not only are outflows of FDI pretty small in the developing world, they tend to have less of a developmental effect than inflows).

Table 3.4 Estimation of Result Using Dummy Variables (1991-2010)

Variable	I	II	III
RGDP71	1.056 (0.91)	-0.614** (-2.36)	-0.664** (-2.34)

POP	1.078*** (7.56)	0.948*** (8.00)	0.910*** (3.21)
SSA	NA	0.015 (1.33)	0.016* (1.67)
SAV	0.086*** (4.30)	0.055*** (4.05)	0.049*** (3.81)
IFDI	0.073*** (2.97)	0.068*** (3.03)	0.066*** (3.05)
INF	-0.001 (-1.24)	-0.001 (-1.11)	-0.001* (-1.80)
D1	NA	0.001 (0.02)	0.038 (0.07)
D2	NA	0.938*** (2.86)	0.974*** (3.27)
Constant	-6.688 (-0.91)	3.874*** (2.86)	4.304** (2.44)
Model	FEM	REM	PCSE
Hausman	9.8		
BP	3.32		
Cross sect. depend.	30.435		
Collinearity	0.634		
Heteroskedasticity	3659.66		
Observation	1240		

Note: Bracket value of first, second, and third model indicates t-value, z-value and again z-value respectively. * = significance at the 10-percent level, ** = at the 5-percent level, and *** = at the 1-percent level.

Table 3.4 above shows the result of LS's (2014) regressions when considering their income dummies. The first column represents a fixed effect model (FEM), the second column represents a random effect model (REM), and the final column represents a panel-corrected standard error model (PCSE) (which has been corrected through various means such as the Wooldridge autocorrelation test and the Wald groupwise heteroskedasticity test). The binary dummy variable D1 identifies high income (includes countries like Canada, Finland, and the

U.S.), D2 controls for the presence of upper-middle income (includes countries like Brazil, Turkey, and Venezuela), D3 (which has been removed from the graphic) is their income dummy for lower-middle income (includes countries like Egypt, Ghana, and India), and their benchmark category is low income (countries like Benin, Kenya, and Rwanda). As with previous papers in this section, FDI, savings, and population are all highly significant determinants with respect to GDP growth. D1 and D2 are both positive, but only D2 is statistically significant. D3 had to be removed from the model due to high levels of multicollinearity (primarily with D2, the other middle-income dummy), but the differentiation between our D1 and D2 dummies would still suggest that less-developed economies will see greater growth benefits from FDI inflows than their more well-developed counterparts. In both the second and third regression the value of our D1 dummy is very small (0.001 and 0.0038, respectively), while the value of our D2 dummy is much larger (0.938 and 0.974, respectively). This would suggest that FDI inflows have a much larger effect in upper-middle income countries than in high income countries, and while both remain positive, it seems that FDI has a greater potential for success in countries that are not fully developed.

Although it might be tempting to extrapolate that data into both the lower-middle income, and low-income brackets, previous papers (such as BV (2009)) have shown us that FDI has greater returns in countries with a strong educational attainment. So, while it might be the case that lower-middle- and low-income countries see even greater positive benefits from FDI inflows, it might also be the case that lower-middle- and low-income countries lack the level of educational attainment to truly incentivize foreign investment. There are many potential outcomes, but since LS (2014) run into multicollinearity issues in the lower-income brackets we

cannot make claims about them. Nevertheless, LS (2014) still show an extremely important relationship between FDI inflows and growth, specifically in upper-middle income countries.

3.3.2 Elkomy, Ingham and Read

EIR (2016) further expand upon points made by LS (2014) by looking into the impact of quality of political institutions on the gains from inflows of FDI. They examine 61 transition and developing economies, and in doing so find that the "extent of positive effects… are dependent on the host-country stock of human capital" (EIR, 2016, pg. 358). This would augment the point we made in the previous subsection, that while middle-income countries have greater returns on FDI than higher-income countries, lower-income countries usually have very low educational quality indicators and low human capital stock in general.

3.4 Summary

In conclusion, the empirical relationship between FDI and growth seems to be both positive and statistically significant. Starting with BSS (1999), we saw that the empirical relationship between FDI and growth prior to 2000 was largely based on export-based metrics. BSS (1999) was one of the first papers to try and find a direct link between FDI and growth, and while they do so by utilizing FDI as a proxy for foreign capital stock, they still find FDI to be both positive and statistically significant. BV (2009) was a much more comprehensive study than BSS (1999) but found similar results. They created four separate proxies for their FDI parameter, and while they ran into some significance issues in later regressions, FDI was still found to be both positive and statistically significant across most cases. They also suggest that higher educational attainment/investment also has a strong positive effect on growth. LS (2014) focused on the effects of FDI on growth across different income brackets but ran into some multicollinearity issues in their lower income countries. Nevertheless, they still showed FDI to

be positive and statistically significant (especially in the middle-income case), and their dataset is much more comprehensive and includes recent years (which suggests that FDI's positive effect on growth has not diminished over the years). EIR (2016) served as a short augmentation to LS (2014), and primarily noted that FDI will have greater effects in countries that have invested more heavily in their human capital, but this will be discussed in the next chapter.

Chapter 4 - Spillover

Having already discussed FDI generally and as a determinant for growth it is important to examine an important mechanism by which FDI affects growth. We begin by considering *Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers Through Backward Linkages* by Javorcik (2004), which argues that productivity spillovers are the primary methodology by which FDI affects growth. While this section will focus heavily on Javorcik (2004), we will also provide detailed information on *Welfare gains from Foreign Direct Investment through technology transfer to local suppliers* by Blalock and Gertler (2008) (BG), and *Identifying FDI spillovers* by Lu, Tao, and Zhu (2017) (LTZ).

4.1 Javorcik: A Seminal Contribution

According to both Javorcik (2004) and to the papers described in Chapter 3, FDI seems to generate positive growth underneath most economic conditions, and thus it would make sense why many developing, and transition economies would seek to incentivize FDI as a way to foster economic growth. Javorcik (2004) shows that, while previous literature has talked about productivity spillovers as a means for growth generation, they have found trouble providing evidence of a conclusive relationship due to data limitations and difficulties "disentangling the different effects at play" (Javorcik, 2004, pg. 605). Javorcik (2004) argues that the existing literature on productivity spillover takes one of three forms. First, case studies, which while very informative often pertain to particular projects or specific countries and as a result cannot be generalized. Second, industry-level studies, which will often show a positive correlation between FDI and growth but rely on cross-sectional data and are thus usually incapable of explaining the channel through which FDI affects growth. Third, and more recently, the literature has considered studies based on firm-level data. Strangely, most of the research based on firm-level

data (such as Haddad and Harrison, 1993, or Djankov and Hoekman, 2000) seemed to, "cast doubt on the existence of spillovers from FDI in developing countries… with researchers either failing to find a significant effect or producing evidence of negative horizontal spillovers (the effect that the presence of an MNC has on domestic firms in the same sector)" (Javorcik, 2004, pg. 606).

While this outcome might seem counterintuitive, Javorcik (2004) argues that these firm-level studies are not incorrect, they are just examining the incorrect pathways. "Multinationals have an incentive to prevent information leakage that would enhance the performance of local competitors, but at the same time may benefit from transferring knowledge to their local suppliers" (Javorcik, 2004, pg. 606). Put differently, spillovers from FDI are more likely to be vertical than horizontal in nature. Thus, the previous studies that found either insignificant or negative values for firm-level spillover make perfect sense, by examining the effects of MNCs on other competitors in their marketplace previous firm-level research was focusing primarily on horizontal spillovers (which MNCs are incentivized to decrease). By focusing on spillovers between domestic suppliers of intermediate goods and their multinational contacts (those who purchase their goods), Javorcik (2004) hopes to capture these vertical linkages (intuitively, backward linkages in particular) that were not captured in previous studies. Moreover, by focusing on these vertical channels, Javorcik (2004) can also examine how FDI spillovers affect different parts of the production chain and whether or not it is more beneficial to be in a "downstream" (customer) or "upstream" (supplier) sector.

4.1.1 Model

Using firm-level data collected in Lithuania (a former Soviet Republic) from 1996 to 2000, Javorcik looks to examine whether the productivity of domestic firms is correlated with

the presence of foreign MNCs in that marketplace. Although previous papers (such as those in Chapter 3) have focused primarily on two-way flows (both inflow and outflows), Javorcik (2004) focuses only on FDI inflows. This might seem somewhat incomplete, but since FDI outflows have very little effect on productivity increases in their own domestic market (they are already present in the marketplace), Javorcik (2004) can effectively ignore them, not to mention that Lithuania, as with most transition and developing economies, has relatively small FDI outflows to being with. Furthermore, Javorcik (2004) makes use of an extremely comprehensive dataset that was conducted by the Lithuanian Statistical Office which includes nearly 85% of output in each included sector. Javorcik (2004) argues that transition countries serve as a perfect example for analysis due to their "high endowment of skilled labor, which makes them particularly likely locations for productivity spillovers" (Javorcik, 2004, pg. 611).

To note, not only does this dataset have a large amount of coverage it is of extremely high quality; a study by Belkindas (1999) examining the quality of data collected by statistical offices ranked the Lithuanian data second among 20 different transition economies (further solidifying the excellence of this dataset). That is not to say this dataset is not without faults, due to financial constraints the panel is unbalanced (varying between 12,000 firms in 1996 and 21,000 firms in 1999), but since the same sampling techniques were used the data should still be comparable from year to year. One important thing to note about Javorcik's (2004) model is that the while the left side of her equation is at the firm level, due to limited information most of the right side of Javorcik's equation is proxied for at the industry level; meaning that while observations pertain to firms, the variables of interest are at the industry level (they have corrected the standard errors to account for this fact).

To examine the correlation between FDI and firm productivity Javorcik (2004) follows the estimation strategy utilized by many previous firm-level panel studies. The equation (4.1) is as follows:

(4.1) $\ln Y_{ijrt} = \alpha + \beta_1 \ln K_{ijrt} + \beta_2 \ln L_{ijrt} + \beta_3 \ln M_{ijrt} + \beta_4 \, Foreign\ Share_{ijrt} + \beta_5 \, Horizontal_{jt} + \beta_6 \, Backward_{jt} + \beta_7 \, Forward_{jt} + \alpha_t + \alpha_r + \alpha_j + \varepsilon_{ijrt*}$

Where: Y_{ijrt} = the real output (of firm *i* operating in sector *j* and region *r* at time *t)*

K_{ijrt} = capital (of firm *i* operating in sector *j* and region *r* at time *t)*

L_{ijrt} = labor (of firm *i* operating in sector *j* and region *r* at time *t)*

M_{ijrt} = materials (of firm *i* operating in sector *j* and region *r* at time *t)*

$Foreign\ Share_{ijrt}$ = the share of a firm's total equity owned by foreign investors (of firm *I* operating in sector *j* and region *r* at time *t)*

$Horizontal_{jt}$ = a spillover proxy for the extent of foreign presence in sector *j* at time *t*

$Backward_{jt}$ = a spillover proxy for the foreign presence in the industries that are being supplied by sector *j* at time *t*

$Forward_{jt}$ = a spillover proxy for the weighted share of output in upstream sectors produced by firms with foreign capital participation

Y_{ijrt} is calculated by adjusting the reported sales by the changes in inventories of finished goods and deflating the resulting value by the Producer Price Index. K_{ijrt} is the value of fixed assets at the beginning of the year deflated by averages for various manufacturing sectors. L_{ijrt} is found by dividing the wage bill by the minimum wage (here, Javorcik (2004) is utilizing an approach by Griliches and Ringstad (1971), but defining employment solely as the number of workers also has similar results). M_{ijrt} is computed by determining the value of material inputs deflated by the value of intermediate inputs. The *Horizontal*, *Backward*, and *Forwards* proxies

are all varied by "sector *j* at time *t*" which allows Javorcik (2004) to determine how much each sector depends is dependent on another and the rate at which MNCs are participating in each sector (hence why all of them have subscript *jt*).

Table 4.1 OLS with Lagged and Contemporaneous Spillover Variables

	All firms	**Domestic**	**All firms**	**Domestic**
Foreign share	0.0025*** (0.0002)		0.0025*** (0.0003)	
Backward	0.0105** (0.0048)	0.0086* (0.0051)		
Backward lagged			0.0173*** (0.0060)	0.0177*** (0.0066)
Forward	-0.0030 (0.0024)	0.0001 (0.0027)		
Forward lagged			-0.0029 (0.0040)	-0.0007 (0.0044)
Horizontal	0.0029** (0.0013)	0.0040** (0.0014)		
Horizontal lagged			0.0038* (0.0021)	0.0046** (0.0023)
Intercept	5.2323*** (0.0805)	5.2082*** (0.0876)	5.1599*** (0.1007)	5.1582*** (0.1108)
Number of observations	11,630	10,216	8,214	7,118
R^2	0.93	0.92	0.93	0.92

Notes: Robust standard errors are presented in parentheses. The dependent variable is ln firm output. Each regression includes ln capital stock, ln effect employment, and ln materials as well as industry, region, and year fixed effects. * = significant at 10-percent level, ** = at the 5-percent level, and *** = at the 1-percent level.

Table 4.1 shows the OLS estimates for a regression on equation 4.1. Table 4.1 is split up into four columns, with the first two columns showing the current estimates while the second two show lagged estimates. Notably, *Foreign share* is statistically significant at the 1% level in both the contemporaneous and lagged regressions, and while the number of observations does dip

significantly (~40%) when switching to lagged estimates, a high R^2 throughout the regressions suggests a strong quality of data.

Table 4.1 indicates that firms that have been buffered by foreign capital are more productive than firms financed solely through domestic means. Furthermore, there are significant and positive coefficients on both our *Backward* and *Horizontal* proxies (0.0105 and 0.0029, respectively). The *Forward* proxy, however, seems to lack statistical significance in both the contemporaneous and lagged regressions. This supports Javorcik's (2004) claim that productivity spillovers from FDI take place both intra-industry and by flowing from MNC's to their domestic suppliers. That being said, there are many contributing factors that can potentially influence firm productivity.

In an attempt to isolate the effect of productivity spillover, Javorick (2004) controls for various factors that could influence firm productivity. The two primary controls she places on her regression are first, using the Herfindahl index to proxy for industry concentration and second, utilizing an input-output matrix to help control for the added demand of intermediate goods in downstream sectors. The Herfindahl index is an important control here, because while multinational entry might decrease industry concentration and resultantly force domestic firms to improve their efficiency, this is not a knowledge transfer as much as "very broadly defined spillover effect" (Javorcik, 2004, pg. 614), and as such, is controlled as to not overestimate the potential effects of knowledge transfer. Javorcik (2004) also notes the omission of several unobserved variables but helps to control for these by implementing a full-set of fixed effects for year, industry, and region. When taking the controls into consideration the model becomes:

(4.2) $$\Delta \ln Y_{ijrt} = \alpha + \delta_1 \Delta \ln K_{ijrt} + \delta_2 \Delta \ln L_{ijrt} + \delta_3 \Delta \ln M_{ijrt} + \delta_4 \Delta \textit{Foreign Share}_{ijrt} + \delta_5 \Delta \textit{Horizontal}_{jt} + \delta_6 \Delta \textit{Backward}_{jt} + \delta_7 \Delta \textit{Forward}_{jt} + \delta_8 \Delta H4_{jt} + \delta_9 \Delta \ln \textit{Demand}_{jt} + \alpha_t + \alpha_r + \alpha_j + \varepsilon_{ijrt}$$

4.1.1 Results

In an effort to give greater weights to more consistent change and to decrease the potential for noisy data, Javorcik (2004) estimates this model at the first, second, and fourth differences (while this does somewhat decrease sample size, it greatly increases the quality of data). Furthermore, Javorcik (2004) notes the argument that OLS-based regression does not accurately capture productivity due to its treatment of labor and other inputs as exogenous variables, and as an augment to her OLS-based estimation she has included an Olley-Pakes semiparametric estimation (also referred to as the Olley-Pakes method [OP]). The benefit of the OP method here is that the OP method measures the observable characteristics of the firm as direct monotonic functions of productivity (as opposed to OLS which assumes that its observations are exogenous). Included below is the coefficient comparison of the OLS and OP regressions.

Table 4.2 Comparison of Coefficients from OLS and Olley-Pakes Regressions

Sector Code	**15**	**17**	**18**	**19**
Panel A – Coefficients from the Olley-Pakes Regressions				
Number of Obs. in Stage I	1,150	271	498	68
ln(labor)	0.3395***	0.3823***	0.6211***	0.3201***
ln(materials)	0.5036***	0.4356***	0.2312***	0.5256***
ln(capital)	0.1002***	0.0176	0.0221	0.0547*
Sum of coefficients	0.94	0.84	0.87	0.90
Panel B – Coefficients from OLS Regressions				
ln(labor)	0.4114***	0.4500***	0.7357***	0.3318***
ln(materials)	0.5180***	0.4816***	0.2483***	0.5490***
ln(capital)	0.0396***	0.0028	-0.0003	0.0038
Sum of coefficients	0.97	0.93	0.98	0.88

Included in table 4.2 above are some of the coefficients for both OLS and OP regressions in five separate sectors. As we would expect, the OP regressions have decreased labor and material inputs and increased capital ones. In the 20 sectors she regressed, the OP method had decreased labor and material coefficients in 17 cases, and increased capital coefficients in 16, which suggests that the OP correction is working as intended. The OP method is employed here to account for endogeneity of input demand.

As noted before, Javorcik (2004) estimates at the first, second, and fourth differences (the relatively small sample size constrains her from going further), but for the sake of brevity only the first difference has been included (table 4.3, below). The first two columns of table 4.3 represent the OLS regression, while the final two represent the OP regression. Though there is slight numeric variation between the methods, both the OLS and OP methods return a positive and significant (at the one percent level) coefficient on the backward spillover proxy in both the full and domestic-only samples. Moreover, Javorcik (2004) argues that while the numbers might be somewhat small, they are certainly economically meaningful. "A one-standard-deviation increase in the foreign presence in the sourcing sectors (that is, an increase of four percentage points in the *Backward* variable) is associated with a 15-percent rise in the output of each domestic firm in the supplying industry" (Javorcik, 2004, pg. 621).

Table 4.3 Results from OLS and Olley-Pakes Regressions (in First Differences)

	All	**Domestic**	**All (OPM)**	**Domestic (OPM)**
Foreign share	0.0006 (0.0007)		0.0009 (0.0007)	
Backward	0.0382*** (0.0101)	0.0360*** (0.0103)	0.0407** (0.0163)	0.0347* (0.0193)
Forward	-0.0050 (0.0033)	-0.0073** (0.0034)	-0.0060 (0.0055)	-0.0118* (0.0063)
Horizontal	-0.0003	-0.0006	-0.0019	-0.0022

	(0.0013)	(0.0013)	(0.0025)	(0.0024)
H4	0.0000 (0.0000)	0.0000 (0.0000)	0.0001*** (0.0000)	0.0001*** (0.0000)
Demand	0.6103*** (0.1945)	0.6752*** (0.1929)	0.3699 (0.2934)	0.5341* (0.2806)
Number of observations	6,853	5,916	3,756	3,084
R^2	0.49	0.49	0.08	0.08

Note: "Demand" here represents the demand for intermediate goods calculated based on information sourcing patterns from an IO matrix, which we anticipate being positive (due to the fact that foreign entry into downstream sectors may increase demand for intermediate products).

Table 4.3 also confirms Javorcik's (2004) theory that while positive productivity spillovers do occur (as show by the positive and significant value on the *Backward* proxy), they are not horizontal in nature. In both the OLS and OP regressions the value of the *Horizontal* proxy is not statistically significant. Furthermore, the value is negative, which would support Javorcik's (2004) belief that most firms are averse to horizontal information transfer as they traditionally only benefit less-developed competitors. The *Forward* proxy, while statistically significant) in the domestic sample of both the OLS and OP regressions, is not significant in the overall sample (in either OLS or OP), which suggests that it most likely is not a significant spillover effect. Moreover, much like the *Horizontal* proxy, the *Forward* proxy is negative in all cases, which again suggests that the *Backward* proxy is the only robust source of spillover effects. This makes perfect economic sense, a firm has no real incentive to share trade secrets with another firm that it is competing with or selling products to, as in most cases, this will have either a nonexistent or net-negative effect on their profits. However, if a firm can potentially decrease their input prices by sharing trade secrets upstream, they have a strong positive incentive to share that information (this concept is discussed further in section 4.2). Javorcik (2004) also ran models in second and fourth differences and found nearly identical results: the *Backward* proxy is positive and statistically significant in all cases, and the *Horizontal* and

Forward proxies lack significance in the majority of cases. Unfortunately, Javorcik does not include a rationale for why the *Forward* proxy lacks significance, but this idea will be explored later in Section 4.2

Javorcik (2004) continues her examination of FDI through backward linkages by next examining the effects of full and partial foreign ownership on a firm, and which produces stronger productivity spillover. Table 4.4 below is effectively the same as Table 4.3, but the *Backward* proxy has now been subcategorized into *Backward (full ownership)* and *Backward (partial ownership)* (partial being anything above 10 percent and below 99 percent). As Table 4.4 shows, while the values for partial ownership remain positive and statistically significant (at the one percent level) in all cases, the full ownership proxy does not return a statistically significant coefficient in any case. Although this outcome might seem somewhat surprising, Javorcik notes that "projects owned jointly by domestic and foreign entities are more likely to source locally, thus creating greater scope for spillovers to firms operating in upstream sectors" (Javorcik, 2004, pg. 622).

Table 4.4 Share of Foreign Ownership and Productivity Spillovers (in First Differences)

	All	**Domestic**	**All (OPM)**	**Domestic (OPM)**
Foreign share	0.0006 (0.0007)		0.0010 (0.0007)	
Backward (Partial Ownership)	0.0444*** (0.085)	0.0394*** (0.0096)	0.0499*** (0.0146)	0.0401** (0.0190)
Backward (Full Ownership)	0.0040 (0.0110)	0.0154 (0.0133)	0.0020 (0.0171)	0.0090 (0.0223)
Forward	-0.0053* (0.0030)	-0.0074** (0.0032)	-0.0066 (0.0053)	-0.0121* (0.0062)
Horizontal	-0.0009 (0.0012)	-0.0009 (0.0012)	-0.0025 (0.0024)	-0.0026 (0.0023)
H4	0.0000	0.0000	0.0001***	0.0001***

	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Demand	0.6181*** (0.1778)	0.6817*** (0.1825)	0.3794*** (0.2810)	0.5427* (0.2698)
Number of observations	6,853	5,916	3,756	3,084
R^2	0.49	0.49	0.08	0.08
F-stat (BKFO = BKPO)	12.01	2.91	6.41	1.68
Prob F > 0	0.00	0.09	0.01	0.20

Notes: Standard errors in parentheses have been corrected for clustering for each industry in each year. In the regressions without the Olley-Pakes correction, the dependent variables is Δ ln firm output and the right-hand side includes Δ ln capital stock, Δ ln labor, and Δ ln materials. In models employing the Olley-Pakes procedure, the dependent variables is Δ ln total factor productivity. All regressions include industry, region, and year fixed effects. BKFO = Backward (Full Ownership), and BKPO = Backward (Partial Ownership). * = significant at the 10-percent level, ** = at the 5-percent level, and *** = at the 1-percent level.

Overall, Javorcik (2004) stands not only as an extremely well-researched, and comprehensive paper, but as landmark literature for the way in which we understand productivity spillovers from FDI. Although previous literature on the subject might not have been wholly incorrect, Javorcik (2004) was certainly pioneering in examining backward linkages as the primary method for information transfer. Furthermore, she provides interesting insight into the differentiation between fully-owned and partially-owned foreign firms, and how that difference affects productivity spillover. Moreover, due to both the high quality of Javorcik's (2004) data and the highly significant results outputted, a very strong argument is made to suggest that information transfer through backward linkages is the primary way in which FDI positively impacts development.

4.1 Blalock and Gertler: On Public Costs and Private Returns

BG (2008) begin their paper with a question, "many countries try to attract FDI with costly public programs such as tax holidays, subsidized industrial infrastructure and duty exemptions, but is this enthusiasm for FDI warranted?" (BG, 2008, pg. 402). Investment decisions do not exist in a vacuum, and while certain investments might have inherent value

others might need government aid to sufficiently entice investors. The question becomes whether or not the cost of the government subsidy is outweighed by its societal benefit.

Although BG (2008) agree with Javorcik (2004) that MNCs might intentionally transfer technology to local suppliers as a way to streamline the global supply chain, they suggest that since the primary motive of the information transfer is to decrease the input costs of the MNC, the subsidy would be captured as a private cost-reducing benefit for the firm. Unless there are additional social benefits, there should not be a case for public subsidizations as a means to stimulate technology transfers from MNCs. This is not to say that social benefits cannot develop from information transfer, once an MNC has shared their technology (even with just one supplier) they have very little control over how widely that information diffuses. After an upstream firm has benefited from the technological transfer, there is no real methodology to stop them from passing that benefit onto downstream firms other than the MNC. As such, there is a clear pathway by which technology transfer can positively benefit the economy as a whole.

Citing Pack and Saggi (2001), BG (2008) also note that, "theoretically, as long as there is not too much entry, profits will rise in both the downstream and upstream markets… if so, the new surplus generated from increased productivity and the deadweight loss reduced from the increased competition will be split between consumers and producers in a Pareto-improving decision" (BG, 2008, pg. 403). BG (2008) hope to test the hypothesis that FDI leads to increases in productivity and welfare. They have broken their analysis into two parts: first, measuring the effect of FDI on local supplier productivity, and second, examining the market and welfare effects of technology diffusion from FDI. To do this, they utilize data from an annual survey of Indonesian manufacturing establishments with more than 20 employees (from the Republic of Indonesia's Central Bureau of Statistics).

4.2.1 Results

BG's (2009) methodology for identifying the effects of downstream FDI on productivity is to examine whether domestic establishments which sell more to foreign-owned firms produce more (*ceteris paribus*). They estimate this effect using a translog production function with establishment fixed effects, industry-year dummies, and measures of FDI (they also control for input-level and scale effects). Table 4.5 below includes their results, where the first column represents downstream FDI, the second column represents horizontal FDI, the third column represents the combination of both, and the fourth column represents an OP estimation.

Table 4.5 Production Function Estimation on Domestic Establishments

	(1) log(output)	**(2) log(output)**	**(3) log(output)**	**(4) log(output)**
Downstream FDI	0.087 (4.33)		0.090 (4.40)	0.091 (4.48)
Horizontal FDI		-0.004 (0.34)	-0.009 (0.88)	-0.010 (0.96)
Observations	108,100	108,100	108,100	108,100
Number of establishments	23,815	23,815	23,815	23,815
R^2	0.81	0.81	0.81	0.81

Note: absolute value of t-statistics in parentheses.

In accordance with Javorick (2004), BG (2009) find the coefficient for *Horizontal FDI* to be negative and close to zero. Furthermore, they find the effect of *Downstream FDI* to be large, positive, and statistically significant, "indicating that firms with growing FDI downstream acquire technology through the supply chain" (BG, 2009, pg. 413). Since the estimation of the production function is log-linear, the coefficients have straightforward interpretations: a coefficient of 0.87 on *Downstream FDI* suggest that firm output will increase by 8.7% as the share of foreign ownership downstream increases by one percent. Moreover, according to BG (2009), "in practice, an increase in the share of downstream FDI of approximately 20% are not

unusual, suggesting that the actual realized productivity gain might be closer to 2% (0.2 times 0.087)" (pg. 414). This suggests that productivity increases when the share of output purchased by a foreign firm rises, further bolstering the idea that FDI positively affects growth through backward linkages. As BG (2009) put it, "on the basis of outcomes we have observed, we conclude that host economy policy makes should, at a minimum not raise barriers to FDI, and in cases where there is potential for multinationals to source supplies from local suppliers, policymakers should consider providing incentives to encourage FDI" (pg. 420).

4.2.2. Market and Welfare Effects

To measure welfare effects, BG (2009) test the hypothesis that technology transfer upstream to suppliers resulted in entry, lower prices, increased output, higher profitability in the upstream market; and that the lower supply prices lead to entry, lower prices, increased output, and increased profitability in the downstream market. They do this by, "examining the effects of changes in foreign ownership by industries purchasing from the focal supply industry on the performance of other industries supplied by that focal industry (in other words, what is the effect of buying from industries that supply multinationals)" (BG, 2009, pg. 418). To determine the magnitude of the welfare effect, BG (2009) estimate producer and consumer surplus gains from FDI during the period of their panel. They calculate that producer surplus increased by 1.1% for intermediate goods and 0.7% in final goods, while consumer surplus increased by 5.8% for total sales in final goods industries (BG, 2009, pg. 420).

4.3 Lu, Tao, and Zhu: On Horizontal Spillover

LTZ (2017) argue that while the choice for MNCs to enter into a particular industry is an endogenous one, by nature this makes it difficult to identify spillover effects. In late 2001 during China's WTO accession, Chinese manufacturing experienced massive waves of deregulation that

caused 112 of its 424 four-digit manufacturing industries to open up for FDI (LTZ, 2017, pg. 76). By examining an exogenous shock to the Chinese manufacturing industry in the early 2000's LTZ (2017) are able to break their dataset into a test group (the 112 deregulated industries) and a control group (the 312 industries that weren't deregulated), and in doing so examine the effects of FDI in a very clear-cut format. Rather than focusing on vertical spillover effects (like most previous literature), LTZ (2017) chose to examine horizontal spillover and the rationale behind why most previous literature often finds horizontal spillovers to have either negative or statistically insignificant effects.

4.3.1 Agglomeration vs. Competition

The primary purpose of LTZ (2017) is to examine why previous literature consistently finds horizontal spillovers to be net negative or statistically insignificant. They examine two explanations proposed in previous literature: the agglomeration effect, and the competition effect. The agglomeration effect is positive, and, "hinges on the absorptive capacity of domestic firms," while the competition effect is negative and is a result of MNCs forcing out less competitive domestic firms (LTZ, 2017, pg. 76). Resultantly, if the agglomeration effect were to outweigh the competition effect then the resulting horizontal spillover would be positive, and if the competition effect were to outweigh the agglomeration effect then the result would be negative. In an effort to disentangle these effects, LTZ (2017) chose to implement various distinctions within the dataset that break down FDI by various metrics including by source country (based on income levels) and by location of investment (urban or rural). Their main dataset is the *Annual Survey of Industrial Firms* by the National Bureau of Statistics of China for the period of 1998-2007, which covers all state-owned and non-state-owned enterprises with annual sales over 5 million Chinese Yuan.

4.3.1 Results

LTZ (2017) use total factor productivity (TFP) as their main measure of firm performance. They calculated the TFP of 20 two-digit industries and then calculated the total TFP per industry per year. In general, most firms experienced increased productivity after China's introduction to the WTO, but industries in which China holds a comparative advantage (such as timber processing which increased by 86.33%, and furniture manufacturing which increased by 46.2%) seemed to have the greatest increases, while industries that China holds a competitive disadvantage in (such as petroleum processing) experienced a decline in their TFP (LTZ, 2017, pg. 82). Prior to WTO entry the treatment and control groups were fairly balanced, but after WTO entry the treatment group experienced gradual declines in TFP in relation to the control group, suggesting that the relaxation of FDI regulations had a negative effect on firm productivity in the treatment group. This would suggest that, at least in the case of the treatment group, the competition effect seems to be outweighing the agglomeration effect, and as shown in previous literature, horizontal productivity spillovers from FDI have a net negative effect on intra-industry firms.

Table 4.6 Main Results of Estimation

	IV (1)	**IV (2)**	**IV (3)**	**RF (4)**	**OLS (5)**
Panel A – First-stage estimation (dependent variable: FDI sector)					
$Treatment_i$ x $Post02_r$	0.014** (0.007)	0.014** (0.007)	0.014** (0.007)		
Panel B – Second-state estimation (dependent variable: log firm TFP)					
$FDI\ sector_{it}$	-3.414*** (0.115)	-3.396*** (0.114)	-3.407*** (0.114)		
Panel C – Weak instrument test					
Anderson-Rubin Wald test	(5.45)**	(5.49)**	(5.48)**		
Stock-Wright LM S statistics	(9.87)***	(10.14)***	(10.69)***		

Panel D – Reduced form and OLS estimation (dependent variable: log firm TFP)					
Treatment x Post02				-0.048** (0.021)	
FDI sector					-0.182*** (0.064)

Note: Panels A and B report the results of first and second-stage IV estimation, respectively. Panel C reports the results of the weak instrument test. Panel D reports the reduced-form and OLS estimations. The sample for analysis is that of domestic firms. In panels A and D, robust standard errors are clustered at the four-digit industry level in parentheses. In Panel B, bootstrapped standard errors are clustered at the four-digit industry level in parentheses. ** = significance at the 5-percent level, and *** = at the 1-percent level.

Table 4.6 above includes the results of LTZ's (2017) regressions where first-stage estimates are reported in panel a, and the second-stage estimates are reported in panel b. $Treatment_i$ indicates whether or not an industry *i* belongs to the treatment group and $Post02_t$ is a dummy variable indicating the post-WTO period (1 if t > 2002, ¾ if t = 2002, and 0 if t < 2002). *FDI sector* captures the extent of FDI in industry *i* during year *t*. The *Treatment x Post02* coefficient (in panel a) has a positive and statistically significant effect on its dependent variable *FDI sector,* which confirms the argument that the relaxation of FDI regulations triggered inflows of FDI after China's entry into the WTO (LTZ, 2017, pg. 83). Furthermore, panel b shows that the *FDI sector* variable is both statistically significant and negative in all cases. This, again, supports the belief that the presence of FDI harms TFP for intra-industry firms. Although the TFP of the treatment and control groups were balanced in the control period, in the post-WTO period, the treatment group experienced a gradual and persistent decline in TFP compared with the control group, again indicating the relaxation of FDI regulations actually had a negative effect on firm productivity in the treatment group.

In conclusion, by examining a situation in which the FDI decision is arguably exogenous, LTZ (2017) provide an important contribution to the productivity spillover literature. In addition to disentangling the agglomeration and competition effects, they comprehensively examined Horizontal FDI and the effect that it has on firm productivity. Moreover, they found negative and

statistically significant coefficients in all of their regression of *FDI sector*, further cementing the idea that when positive spillovers occur, they are vertical in nature; horizontal spillovers traditionally result in reduced firm productivity (as a result of the competition effect outweighing the agglomeration effect).

Chapter 5 - Conclusion

Having now disentangled some of the literature around FDI, it is important to look back on what we've learned. Chapter 2 served primarily as a baseline to give some theoretical and historical context to the rest of the paper, but there were some important topics discussed within. Chapter 2 introduced Hymer's Control Theory, and the idea that FDI is more than just an investment strategy, it is a control strategy. By definition, FDI requires a 10% ownership requirement, but it wasn't until Dr. Hymer that FDI's dichotomous nature became more fully understood. Chapter 2 also showed us that, while not quite as volatile as portfolio investment, FDI has had its share of ups and downs over the course of the last half century, and while a large part of that is due to various shocks (stock market crashes, natural disasters, terrorist strikes etc.) FDI has clearly seen a large amount of variation in direct response to government intervention (regulation and subsidization alike). Chapter 3 included a discussion on FDI and growth. BSS served as an introduction and one of the first papers to link previous export-based literature to an FDI-based growth model, and in doing so paved a pathway for subsequent literature. BS utilized information set out in BSS and expanded that idea to a much larger dataset. LS and EIR served as a solid capitulation to the chapter and talked about the benefits of FDI in upper-middle-income countries and the importance of education and human capital in reference to successful outcome from FDI. Furthermore, all of these papers found similar results, an influx of FDI, in most cases, resulted in growth.

Chapter 3 began the discussion on backward linkages, which according to Javorcik (2004) and most of the literature that followed, is the primary methodology by which FDI affects productivity and growth. Javorcik's contribution was an important one and serves as a primary

explanation as to why a lot of the previous FDI-based literature had trouble finding definitive answers on the relationship between FDI and productivity spillover. Understanding that competition disincentives MNCs from creating productivity spillovers intra-industry, she instead looked to vertical spillovers as a means to better explain the confusion. BG and LTZ expanded upon this idea: BG, by examining the differentiation between private benefits to a firm and public benefits to an economy, and LTZ, by examining horizontal spillovers more closely and determining why exactly they resulted in net-negative or statistically insignificant results.

In conclusion, the FDI literature seems to point to a singular conclusion: FDI will positively effect growth by means of backward linkages, but these positive effects will be most pronounced in economies that have not yet reached productive capacity and economies that have a strong base of human capital.

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