Prospectus: The effect of corruption on FDI technological spillover

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1 Empirical Puzzle

In recent decades, foreign direct investment (FDI) global flow has steadily increased, rising to over $1.5 trillion dollars in 2014. For developing countries, FDI flow is also remarkably robust to global downturn, leading to enthusiastic endorsement by major international organizations as a key factor to economic development (Figure 1).[1] This assumption is also shared widely within political science, where much of the literature starts with the assumption that countries want to seek FDI for its many benefits. The question that these works focus on is *how* countries can attract FDI, not *whether* they want to do so (Jensen 2003; Li and Resnick 2003; Li 2006; Ahlquist 2006).[2]

Underlying this mode of thinking is the assumption that FDI brings various benefits to developing countries, including capital and employment. However, the most important promise that FDI holds to growth is the spillover of productivity between foreign firms and domestic firms. This can happen if local firms hire workers that were trained in a foreign firms, improve productivity through backward and forward linkages, or imitate foreign technology. According to growth theory, it is FDI's spillover, not capital or employment, that brings the technological innovation that is requisite for economic growth (Findlay 1978). In this view, FDI is also a public good, providing spillover benefits to the local firms in ways that foreign firms do not take into account in their private calculations. This provides the justification for countries' using investment incentives to rectify the undersupply of FDI, closing the gap between private and social returns.

Despite this prevailing view, there is little conclusive evidence of FDI having a positive effect on growth (Nair-Reichert and Weinhold 2001; Carkovic and Levine 2002) or poverty reduction (Guerra et al. 2009) (Figure 2). A substantial literature has developed to explain this puzzle, concluding that the growth-enhancing and spillover effect of FDI is conditional on the absorptive capacity of local firms. Cross-nationally, scholars find that FDI is more likely to have a positive growth effect when the technological gap between the local and foreign firms are small (Nunnenkamp and Spatz 2004) and when host countries have strong financial

[1] http://www.imf.org/external/pubs/ft/fandd/1999/03/mallampa.htm, http://www.weforum.org/reports/foreign-direct-investment-key-driver-trade-growth-and-prosperity-case-multilateral-agreement

[2] Two recent exceptions are Pinto (2013); Pandya (2013), which are the first to investigate the demand for FDI.

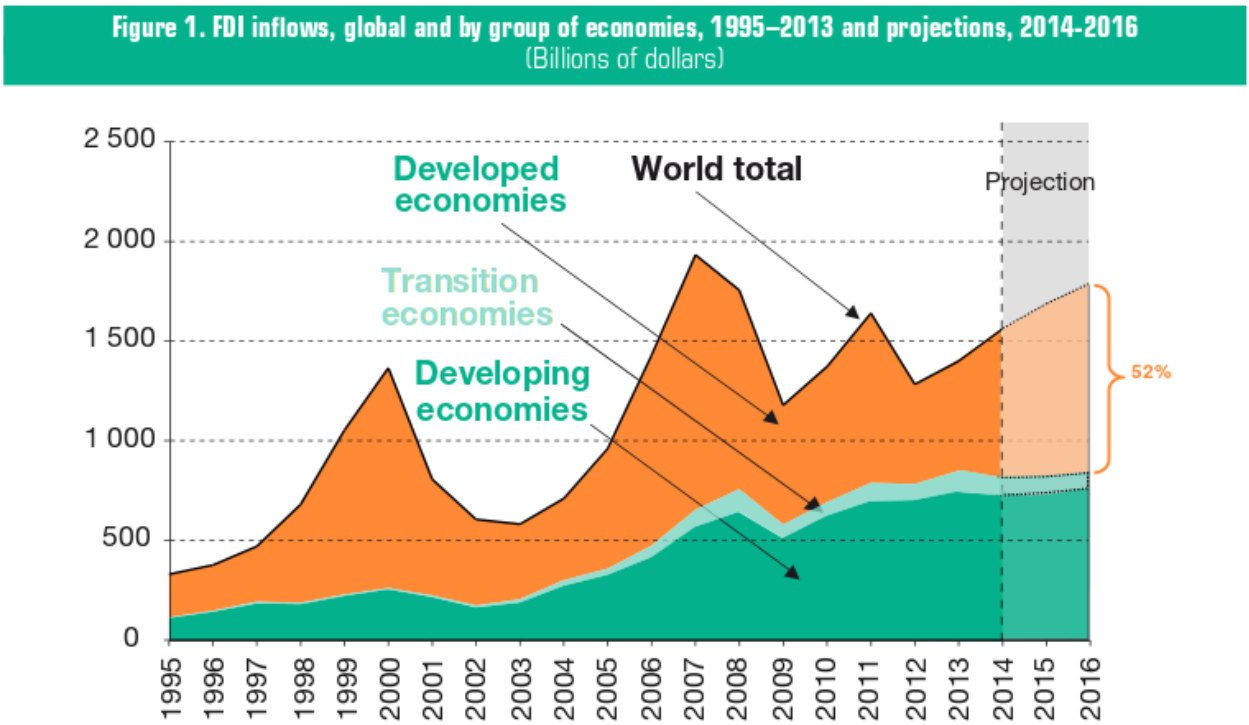
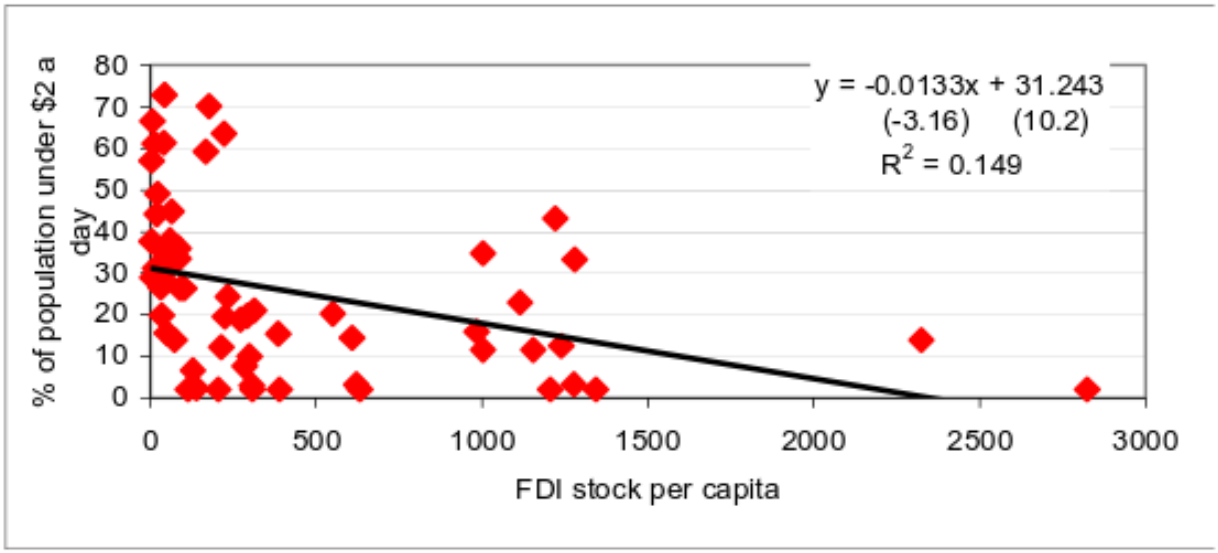


Figure 1: Source: World Investment Report, 2014

and institutional development (Durham 2004). Similarly, absorptive capacity, measured by the level of schooling in host economy, conditions the transfer of technology between foreign and local firms across regions in China (Fu 2008) and countries in Latin America (Willem 2004).

Despite the resounding conclusion that the effect of FDI is highly conditional and that investment incentives do not work, why do countries still fixate so much on bringing in FDI instead of developing local absorptive capacity (Blomström 2002)? For example, Ireland provided foreign investors with lower tax rate, lower land price, and cash grants for R&D that do not need to be repaid. China also used a tax holiday (two years of no tax and three year of half the normal tax rate) in special economic zones to attract more foreign firms (Telford and Ures 2001). We see the same widespread use of investment incentives in Southeast Asia (Fletcher 2002). In Vietnam, the race to offer incentives to foreign firms rages on even among sub-national units, as provincial governments defied the central government's directive and offered extra-legal incentives to FDI firms (Anh et al. 2007). Not only do these measures not work in attracting more FDI, they also deprive countries of revenues that could be spent on improving the local labor quality and investment climate, which are much more conducive to spillover effect and growth.

Thus, my dissertation project focuses on this empirical puzzle: if the positive effect of FDI is uncertain, why is there so much focus on attracting it? If developing absorptive capacity is so crucial to making FDI growth-enhancing, why is it often neglected? To understand this puzzle, I propose that we need to take into account the calculus of government officials,



Source: Own elaboration, from UNCTAD and UNDP data (data for the year 2000). T-statistics in brackets.

Figure 2: Relationship between FDI and poverty

who may be more interested in the potential rents from foreign firms than the spillover and growth-enhancing effect of FDI. This is a potential reason why we often see countries (i.e. government officials) being so enthusiastic about attracting FDI, yet not so passionate about developing the local capacity that enables FDI to actually have a positive effect on growth.

Starting with this empirical puzzle, my project also contributes to various literatures. First, it investigates the collusion of FDI firms and host countries' officials. This is a understudied phenomenon as the existing literature often assumes a foreign firm trying to fend off extortion and harassment from host countries. Second, it examines the political drivers behind private sector development, an issue whose welfare impact is well-known yet whose political determinants are ill-understood. Third, I engage with the decentralization literature in the case study of Vietnam, where I argue that the decision by provincial officials to seek rent from FDI instead of developing the domestic sectors depends on their interest in promotion.

2 Tentative Evidence

I present some evidences that motivate the puzzle and the hypothesized link between FDI and corruption:

- The spillover effect of FDI on growth is highly variable. For example, FDI is found to be growth-enhancing in East Asia, but not in Latin America (Zhang 2001). Similarly, the effect of FDI on domestic investment also varies across countries and regions. FDI is found to crowd in investment in some countries (e.g. Ghana, Senegal, South Korea, Pakistan, Thailand, etc.) but crowd out in others (Agosin and Machado 2005).

- Despite the prevalent concern with discrimination against foreign firms, the World Bank Enterprise Survey finds that foreign firms actually face fewer obstacles while doing business (Batra et al. 2003). The gap in the treatment of foreign and domestic firms also varies across countries (**??**).

- The correlation between corruption and FDI is negative. However, there is a lot of unexplained variance at the high end of FDI. Countries with high level of FDI run the gamut of corruption (Figure 3).

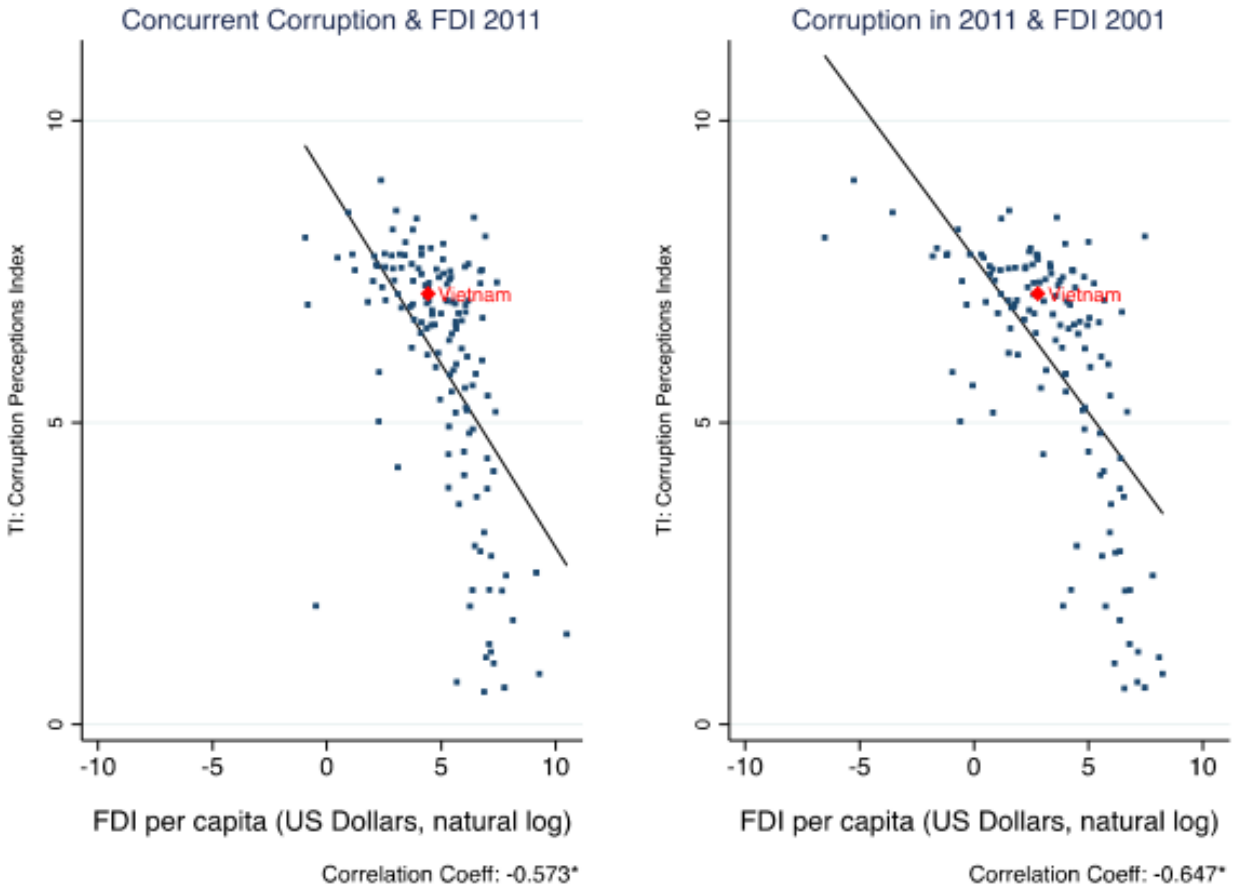


Figure 3: Source: (Malesky et al. 2015)

3 Generalized theory

3.1 Budget constraint

In order to attract FDI, the government official offers foreign firms with benefits such as market size or cheap labor. These resources are finite, thus imposing a budget constraint on the FDI that the official can attract.

When considering a FDI project, the government official decides between two benefits that the project may bring, i.e. technological spillover and private benefits. While there are other benefits to FDI, such as employment generation and capital, technological spillover is crucial to the improvement in total factor productivity, an ingredient of economic growth. Private benefits of FDI to government officials can be either illegal (e.g. bribes) or legal (e.g. informal network with foreign firms that leads to contracts for friends and families, campaign finance contribution).

There is a trade-off between these two benefits. To encourage technological spillover, governments frequently impose conditions on foreign firms, such as forming a joint venture or local content requirement. These requirements constrain the ability of firms to use their physical and management capital optimally, reducing the efficiency and thus profitability of firms. Similarly, when firms are forced to offer private benefits to officials (e.g. bribes, contracts with officials' relatives), it introduces both an upfront cost as well as the cost of uncertainty (as these private benefits are informal and not encoded transparently). Therefore, offering officials private benefits also reduces the profitability of firms. Given that firms themselves have to maintain a minimum amount of profitability (akin to reservation wage), when they offer one type of benefits they would have to reduce the others. Therefore, if the government official demands one type of benefit, they will get less of the other. In this way, technological spillover and private benefits are two separate goods that the officials have to choose given the budget constraint that they have to attract FDI.

(Basically the "budget" comes from the fact that the country's endowment is turn into profit to the firm. When the firm makes profit, it can use part of that profit to pay for either private benefits of technological spillover.)

The location of the budget constraint depends on the endowment of the official. The better endowment the official has, the budget constraint shifts to the right, meaning that he will be able to get both more technological spillover and more private benefits. For example, in Figure 4, the official with more endowment has the budget constraint on the right. As we can see, he is capable of attaining the (s_2, b_2) bundle, with both $s_2 > s_1$ and $b_2 > b_1$.

3.2 Relative price (slope of the budget constraint)

The intercepts of the budget constraint is determined by the "price" of the two goods, i.e. how easily the official can obtain technological spillover and private benefit from the foreign investors.

The "price" of technological spillover would be the absorptive capacity of the local economy, which I argue to be the presence of private firms that are able to absorb technology from foreign firms. This absorption can happen via two channels. First, private firms enter into the supply chain of the foreign firms, thus subject to higher standards of foreign firms and can also imitate the foreign firms' management techniques via exposure. Second, local employees employed by foreign firms may learn from the experience in the foreign firms and take that knowledge when they transfer to local firms. This channel also requires the presence of private firms that are able to compete with foreign firms for these high quality labor.

The "price" of private benefit would be how easily the government officials can extract these benefits from the foreign firms. This parameter would capture real world elements such

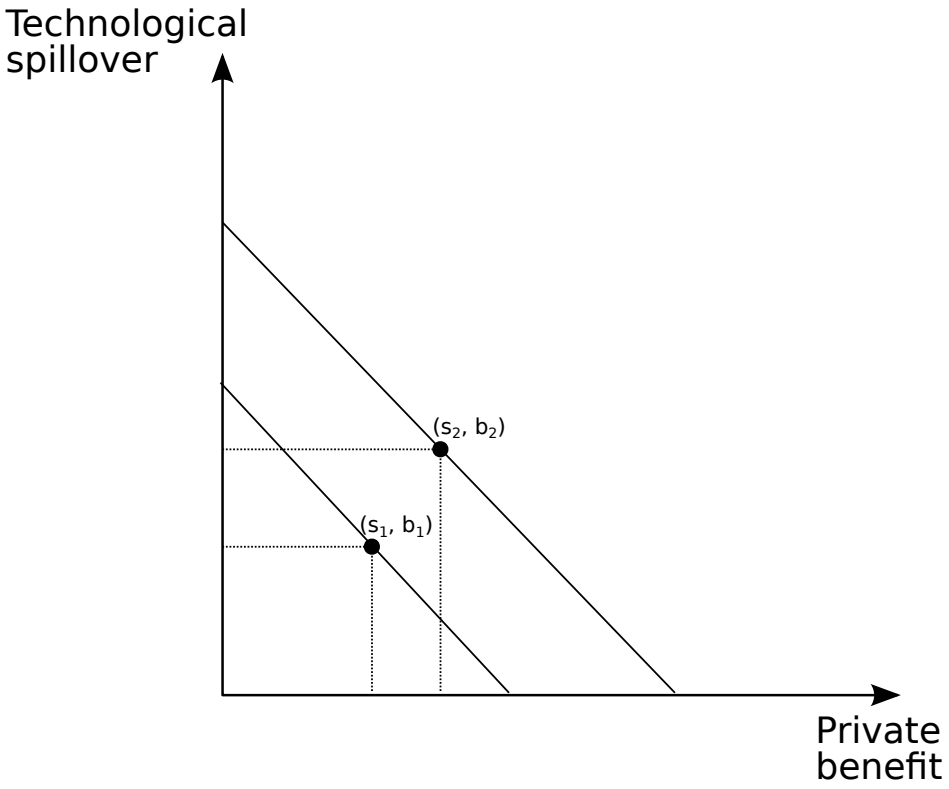


Figure 4: Budget constraint

as the background of the firm. For example, firms that come from countries where corruption is more prominent or accepted would have a higher propensity to bribe. Or if firms come from countries who have signed onto the OECD anti bribery conventions would be more hesitant to bribe, given the punishment that they may face from their home governments for bribing.

Together, these two prices determine the slope of the budget constraint. See Figure 5

3.3 Indifference curve

The official has a convex indifference curve, meaning that there is decreasing marginal utility to both spillover and private benefit. This assumption is standard and makes intuitive sense. As the official accumulates more and more private benefit, there are fewer and fewer things to spend them on, his consumption is satiated and produces less utility. Similarly, when more and more technological spillover happens, it becomes less of a bottleneck to the economy, thus voters (or higher-ups) may be come less concerned, and it brings less electoral (or promotional) benefits.

The shape of the indifference curve denotes the relative weight the official assigns to the two goods, spillover and private benefit. When the curve is steep, it means that the official is willing to trade a lot of spillover for a small increase in private benefit. Vice versa, a flatter curve indicates that the official values spillover more.

Politically, the steepness of the indifference curve depends on the time horizon of the

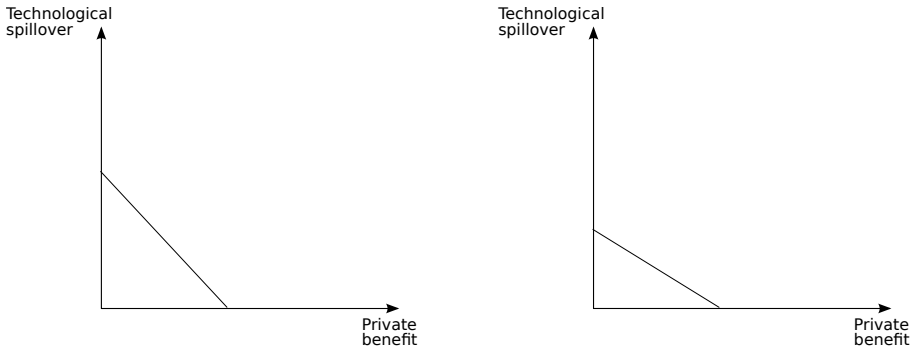


Figure 5: Relative price of spillover and rent

official. This is because technological spillover takes time to happen and leads to increase in economic growth, whereas private benefit is immediate. The longer time horizon does the official have, the more heavily does he weigh technological spillover effect. In Figure 6, the blue indifference is flatter and signifies more weight assigned to spillover effect. As we can see, the official does choose a bundle that has more spillover effect than private benefits.

What affects this time horizon? Term limits, the stability of the regime, the probability of electoral success.

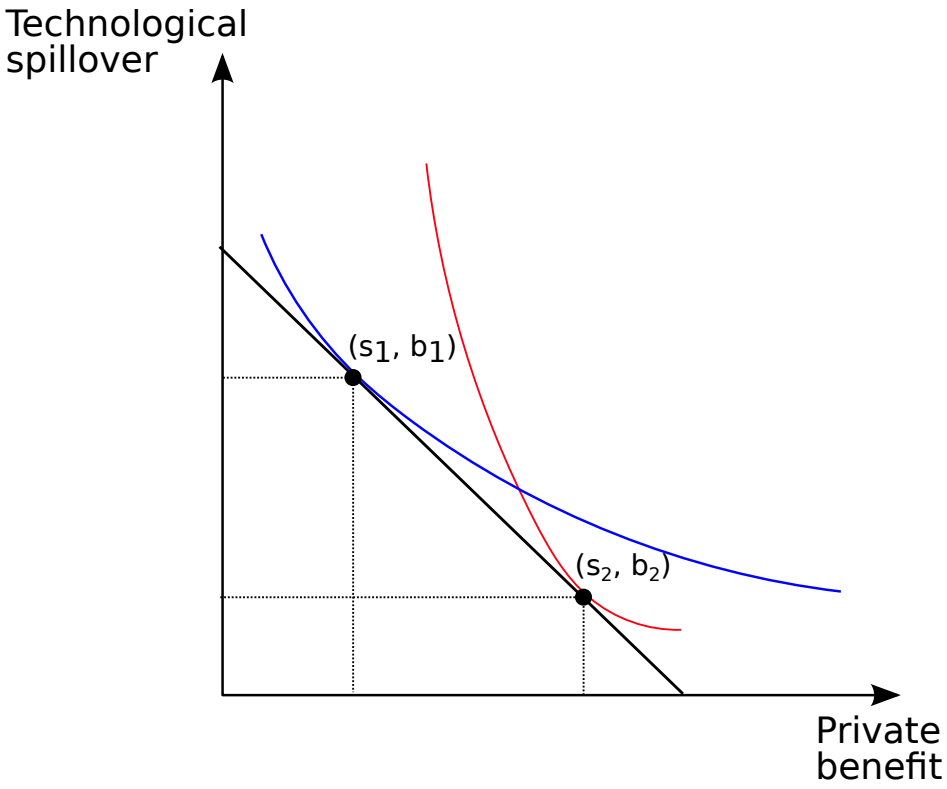


Figure 6: Time horizon and the shape of the indifference curve

3.4 Implication

4 Theory

Definition

My theory aims to explain the lack of technological spillover from foreign firms to private firms. I define

- *foreign firms* as firms with over 50% ownership belonging to private foreign individuals, companies, or organizations
- *private firms* as firms with over 50% ownership belonging to private domestic individuals, companies, or organizations
- *state firms* as firms with over 50% ownership belonging to the host government,

  and
- *technological spillover* as the beneficial effects of foreign firms' technological knowledge on the productivity and innovative ability of private firms

The argument in three steps

1. I argue that for FDI to have a growth enhancing effect, there must be technological spillover from foreign firms to private firms. Therefore, if we see that there is little

technological spillover, it must mean that the government is attracting FDI for reasons other than growth.

2. I argue that corruption (i.e. bribes from foreign firms) is one reason (besides growth) that the government wants FDI for. The testable implication is that corruption in a country (sector) is associated with a lack of technological spillover between foreign and private firms in that country (sector). At this step, the level of corruption in a country (sector) is treated as exogenous.

   For this argument to be convincing, one must take into account alternative explanations, i.e. reasons besides corruption and growth that governments may want FDI for:

   - Employment: under strong pressure for employment generation, the government may want FDI purely for the jobs it brings instead of long-term economic growth. To account for this alternative explanation, I will control for the growth rate of the labor force. Since labor force growth is largely determined 18-20 years prior, it is plausibly exogenous to other variables in the current period and thus well-behaved statistically.
   - Capital: In the early-stage of development, a country may deliberately pursue a capital-driven instead of technology-driven growth. To account for a country's immediate need for capital, I will control for the aggregate capital stock.
   - Election cycle: Much research has shown that the election calendar puts populist pressure on the incumbent government, leading to manipulation of macroeconomic factors such as the exchange rate (Blomberg et al. 2001). Similarly, one may argue that the government attracts FDI to generate positive headlines near election dates even though these FDI projects do not have a large impact on long-term growth. To account for this alternative explanation, I will control for whether a foreign firm establishes in an election year.

3. Finally, I endogenize the choice of government officials to engage in corruption by explicitly considering their utility maximization. To get a handle on the options available in the officials' calculus, I hold the political system constant by focusing on the case of Vietnam. With its variation in FDI attraction and private sector development, Vietnam's provinces serve as an insightful microcosm of the cross-national differences. I argue that, in Vietnam, whether FDI creates technological spillover depends on whether provincial officials prefer bribes by foreign firms or promotions by the central government, of which private sector development is an important criterion.

4.1 Step 1: The growth enhancing effect of FDI depends on technological spillover

As well-known from neoclassical growth theory, the diminishing return to capital will at one point stop capital from accumulating further, preventing long-run economic growth to be permanently driven by capital accumulation alone (Solow 1956). Therefore, long-run growth

ultimately requires technological innovation, which continually increases the productivity of capital and counteracts the diminishing returns.

This insight implies that FDI cannot promote the host country's growth simply from the amount of capital it brings. Therefore, FDI only has a highly uncertain impact on growth and poverty reduction (Nair-Reichert and Weinhold 2001; Carkovic and Levine 2002; Guerra et al. 2009). Scholars have further confirmed that FDI can only a growth-enhancing impact if there is technological spillover from the foreign to the domestic sectors (Nunnenkamp and Spatz 2004). This empirical finding provides support for Findlay (1978)'s groundbreaking model of FDI and growth, in which technology spillover from foreign firms shift the domestic factor-price frontier to the right, allowing more output from the same input, resulting in higher profits and higher wages (i.e. higher savings) for the domestic sector. This ultimately leads to a continually increasing domestic capital stock.

Since FDI can only be beneficial to growth if there is technological spillover, if one does not observe spillover, it must mean that the host government is attracting FDI for reasons other than growth. In the next step in the theory, I argue that bribe from foreign firms is one such reason.

4.2 Step 2: FDI and corruption (cross-nationally and cross-sectorally)

4.2.1 Defining corruption

Defining corruption has been a long-standing and inconclusive debate (Johnston 1996). The contention stems from the normative nature of the "corruption" concept, which shifts significantly across context and thus difficult to build an analytical edifice upon.

Consider the most common definition of corruption as "the abuse of public roles for private gains." Make no mistake, this definition is not always clear cut. What constitutes "abuse"? The term implies the violation of certain standards, which only further asks: what standards are supposed to be adhered to? Some scholars emphasize law-based standards, but the law is not always legitimate (Johnston 2004, 17). Yet others argue for norm-based standards, but difference in norms across societies can be so extensive and unsystematic that renders a cross-country analysis untenable. Indeed, nepotism and cronyism in one society may be social capital in another, with all shades of favoritism in between (Rosen 2010).

In addition, the distinction between "public" and "private" are not always clear, especially during rapid economic liberalization and privatization. As the rules change continuously, the dividing line between an innovator and a rule-breaker is but a thread left blowing in the political wind (Sun 2004).

In spite of its shortcomings, the definition of corruption as the "abuse of public role for private gains" works well for my research. While this definition may fail as a universal classification of corrupt act, within the scope of my research project its unclarities are largely resolved. First, regarding the unclarity over "abuse," I focus on a law-based definition because of its precision, stability, and broad coverage. The legitimacy of the "law" is not as big of a concern because the vast majority of countries with substantial FDI maintain sovereignty over their territory and have laws with a binding impact on their economic life, especially the formal sector in which foreign firms operate. (List the countries in the doing business survey, and whether any of them is a failed state). In addition, a law-based

definition fits well with the way corruption is often framed in business surveys, my main source of data, as "paying informal fees." Regardless of whether the respondents think these fees are legitimate or acceptable, it is clear to both the officials and the firms whether these fees are official, as documented in formal laws.

Second, the "public" and "private" divide is also clear cut within the scope of my project. I focus on corrupt acts in the context of officials exchanging public resources under their control for bribes from foreign firms (e.g., expedited bureaucracy, access to land, harass-free inspections, etc.). It is clear that these public resources and services should be distributed fairly, and that the payments are going to the officials' private wealth instead of the state's coffer.

4.2.2 The relationship between corruption and FDI

The majority of literature on the relationship between corruption and FDI focuses on showing that a high level of corruption deters FDI (Wei 2000; Hakkala et al. 2008; Al-Sadig 2009). (Summarize a bit here)

But what about foreign firms that choose to invest in a highly corrupt environment nonetheless? One strain of the literature argues that foreign firms can help reduce corruption in host country via regulatory pressure effect, demonstration effect, and professionalization effect (Kwok and Tadesse 2006); or via competing away the rents of the domestic firms, reducing the supply of bribes (Sandholtz and Gray 2003). In these works, corruption between the host government and the foreign firm has been conceptualized as *predatory*.

My research offers a new perspective, recognizing that, compared to domestic firms, foreign firms always have the freedom to move out of the country or at least stop bringing in capital. Therefore, the exchange between the government and foreign firms are always more voluntary compared to private firms.[3] In this angle, corruption between the government and the foreign firm can be *collusive*, with government officials getting bribe and foreign firms getting advantages over domestic firms (e.g. an expedited bureaucracy or privileged use of public resources) (Hellman et al. 2002). Indeed, there are evidence of foreign firms bribing to get an upper hand in the local market[4] or to pursue rent in protected industries (Malesky et al. 2015).

Such collusive corruption between the government and foreign firm can be the key to explain the puzzle why governments may want to attract a lot of FDI despite the lack of developmental impact. One may say that (corrupt) institutions matter, but not only to *how much* FDI a country can attract as the literature has studied, but also *which kind*.

4.2.3 The model of interaction between foreign firms and officials

The sequencing of the game is as follows:

1. *At the start of the game, the level of corruption in a country (sector) is given.*

[3] There is an argument about FDI being harder to relocate, and thus subject to creeping expropriation. However, corruption doesn't tend to change that quickly, and a foreign investor looks into a country knows relatively well the level of corruption that they are getting involved with.

[4] http://www.nytimes.com/2012/04/22/business/at-wal-mart-in-mexico-a-bribe-inquiry-silenced.html?pagewanted=all

It is reasonable to assume that the level of corruption is exogenously given. High level of corruption in a country may be largely the result of a political system that fails to produce accountability. Such political system is more likely to be the cause than the result of lacking technological spillover. Similarly, high level of corruption in a sector may be largely due to the nature of that sector, e.g. resource-intensive, high fixed cost leading to natural monopoy, etc. which is exogenous.

If the level of corruption is high, the government is mainly interested in FDI as a source of rent, not as a source of growth.

There are several reasons why the government is interested in seeking rent from FDI firms instead of domestic firms. First, if foreign firms are more profitable than domestic firms, they have more rent to be extracted. Second, if foreign firms are larger than domestic firms, they facilitate coordination and allow corruption to be better kept secret among fewer actors. Third, if the interests of firms and the government misalign in the future, foreign firms have both the options of "exit" and "voice," whereas domestic firms only have "voice." The government would much prefer an exiting foreign firm to a domestic firm voicing its interest. The first and second reasons also indicate that my theory is most applicable when the entering FDI firms are large.

2. *The foreign firm weighs the cost of corruption against the benefits of entering the country (sector), such as natural resource, local market, or cheap labor. If the benefit outweighs the cost, the firm enters the country (sector).*[5]

3. Since the government brings in the foreign firm for rent, not for long-term growth, we will see less technological spillover in this country (sector).

The theory leads to two testable hypotheses:

Hypothesis: The presence of large FDI firms in corrupt countries is associated with a lack of technological spillover in those countries.

Hypothesis: The presence of large FDI firms in corrupt sectors is associated with a lack of technological spillover in those sectors.

4.3 Step 3: Endogenizing government officials' decision to engage in corruption with foreign firm

In the model presented above, the level of corruption is exogenous and deterministically dictates whether government officials attract low-spillover FDI. There is not yet a strategic component in the officials' decision.

This section endogenizes the decision by government officials to engage in corruption with foreign firm. To get a handle on this question, we need to know the utility calculation of government officials, which in turn requires knowing the options provided to the officials within the country's political economic system.

[5] Figure 3 shows that among countries with a lot of FDI, the level of corruption runs the full gamut. This confirms that foreign firms often enter a country despite the cost of corruption.

Such is a big and difficult question to study with a cross-national design due to an insurmountable degree of endogeneity stemming from unobservable and unmeasurable differences across political systems. Therefore, at this step, I focus on the case of Vietnam, whose sub-national variation in FDI flow and private sector development serve as an excellent testing ground.

In addition to the endogeneity problem, a cross-national study of corruption suffers from well-known conceptual and measurement issues. Conceptually, corruption means different things in different countries (Rosen 2010). Empirically, even if we restrict corruption to a narrow but clear-cut definition, i.e. the act of bribery in exchange to public goods that should be equally available, it is still very difficult to measure corruption well due to sensitivity bias in surveys. Focusing on the case of Vietnam does not only keep constant the locale-dependent definition of corruption but also takes advantage of a survey list experiment conducted by Malesky et al. (2015) to accurately measure the level of corruption across provinces and sectors without sensitivity bias.

4.3.1 Theory: Corruption with foreign firms as a choice by Vietnamese officials

I argue that the key to provincial variation in corruption with foreign firms is the principal-agent relationship between Vietnam's central and the provincial governments. On the one hand, the central government cares more about the spillover effect of FDI and uses promotion to reward local officials that attract high-spillover FDI. On the other hand, local officials have more opportunities to engage in corruption with foreign firms, and should they decide that the private benefit of corruption is greater than that of promotion, they will prioritize foreign firms that bring bribes over those that have high spillover effects.

The reason behind such difference in the preference of central and local governments is the fact that FDI projects are approved and managed at the provincial level. While the central law may be uniform in the book, its implementation varies widely across sub-national units in Vietnam (Meyer and Nguyen 2005).[6] Therefore, the provincial government holds valuable services for sale to foreign firms. In contrast, the central government is more removed from direct contact with FDI firms and thus less likely to benefit from corruption than provincial leaders.

In addition, the central government is much more concerned with overall economic growth, which is central to the longevity of the regime (Malesky 2008). It wants to attract high-spillover FDI and uses promotion to reward local officials that accomplish this goal. On the other hand, each provincial leader is incentivized to free-ride on the developmental effort of other provinces and of the central to keep the entire regime stable. Therefore, local officials value the spillover effect of FDI only insofar as the opportunities for promotion that it brings.

Fortunately for the central government, the principal-agent problem in this context is partially solved because monitoring is not too difficult. Indeed, the central government can observe the economic performance of the provinces and use personnel management to punish and reward provincial officials (Sheng 2007; Li and Zhou 2005).[7] Therefore, the principal-

[6] Vietnam's sub-national variation in implementation generalizes well to other cases, such as China (Thun 2006)

[7] Shih et al. (2012) recently argue that economic performance does not matter to cadre promotion. How-

agent problem is only severe when provincial officials are not interested in further promotion to the central government. This suggests that there will be a variation in the level of FDI's spillover effect across provinces according to provincial officials' interest in promotion.

By looking at this variation in the career interest of provincial officials, my theory contributes a fresh angle to the current literature on the relationship between decentralization and corruption. So far, scholars have only postulated a one-way relationship: either decentralization increases bribery (Fan et al. 2009) or reduces it (Guerra et al. 2009). In my model, how decentralization affects corruption is conditional on the local officials' interest in the promotions offered by the central as carrots.

4.3.2 The model of interaction between the local and central governments

The game has two players: the central government and the provincial official. The sequencing of the game is as follows:

1. At the start of the game, the endowment of a province is given.[8]

2. The provincial official observes his endowment and calculates his current wealth, i.e. the bribes from FDI firms that chose his province due to its endowment.

3. The provincial official calculates the return of pursuing a promotion, which is a "gamble" with uncertainty. In this gamble,

   the return of pursuing a promotion = the return of the promotion $\times$ the probability of getting the promotion (p).

   In addition, $p = p_0 + p_1$, with p_0 being the base chance of getting the promotion, and p_1 being the added chance if the official decides to develop the domestic sector as the central government desires.

4. The provincial official has to decide between keeping his current wealth (i.e. seek rents from FDI) or gambling (i.e. focus on private sector development to get a $p_0 + p_1$ chance of getting the promotion). Assuming that the official is risk averse, he prefers a small gamble over a large one. In this way, the base chance p_0 matters. If p_0 is small, it is highly uncertain that the official will get the promotion even with the added p_1. Therefore, the official is more likely to seek rent from the foreign firm instead of pursuing a promotion when the base chance p_0 is small.

Three key assumptions in the theory above deserve further examination:

ever, they investigate all members of the Chinese Central Committee, including the central party apparatus, the army, and the central economic bureaucracy. These actors are not the important decision-makers in our theory.

[8]The assumption that the endowment is exogenous is reasonable. First, if it is the kind of endowment that cannot be affected by past provincial policies, e.g. natural resources, proximity to market, then it is truly exogenous. Second, even if it is the kind of endowment that can be affected by past policies, e.g. quality of the labor force, infrastructure quality, etc., it is usually good for both foreign and domestic firms. Therefore, at the start of the game, there is not yet any discrimination between foreign and domestic firms.

1. Why wouldn't Vietnam's central government worry that a developed private sector may lead to social change that ultimately undermines its rule?

   First, there is a large scholarship showing that authoritarian regimes are very adept at using institutions to manage regime outsiders in general and business in particular (Gandhi and Przeworski 2006; Gandhi 2008; Wright 2008; Le 2015). Second, if the legitimacy of the regime rests heavily on delivering economic growth, then the short-term risk of an economic downturn creating instability features much more prominently than the long-term concern with social changes. Third, it is possible to foster economic growth while restricting political freedom (e.g. Singapore). Indeed, growth can make a regime, both democratic and authoritarian, more stable, and creates room for political control (Przeworski et al. 1997).

2. Why don't provincial leaders seek rent from the domestic sector?

   First, Vietnam's private sector was very small when FDI was first allowed into Vietnam. The size and the profitability of the average domestic firm is still smaller than those of foreign firms today. Therefore, there are both fewer rents and more coordination problems if provincial officials want to seek rents from domestic firms. Second, ironically, if officials want to grow the private sector for future rent-seeking, they must promote an enabling business environment that are free from rent-seeking. In contrast, engaging in corruption with large and existing FDI firms is much more convenient. Essentially, corrupt provincial officials have shifted the cost of building a thriving domestic sectors to the home countries of FDI firms and now extract rents from the high productivity and high profitability of these firms.

3. Is it reasonable to frame seeking rents and seeking technological spillover from FDI as a dichotomous choice for provincial officials?

   In the above model, provincial officials have to choose between attracting FDI for spillover or for bribes. One may argue that this trade off does not exist. Indeed, if the fact that a foreign firm engages in corruption does not affect its level of spillover, then even if provincial officials prioritize FDI for rents it would not have any effect on the level of spillover.

   However, the trade off does exist. This is because, in exchange for bribes, provincial officials must offer some advantages over domestic firms to foreign firms. This can be lower tax rate, easier access to land, more attention to concerns of firms, etc. Without efforts by the local government to nurture the private sector, it is unlikely that private firms have the necessary sophistication to engage in contracts with foreign firms or to imitate foreign firms' technology.

   Figure 7 provides evidence that when provincial officials are biased towards foreign firms, private firms are poorly supported. The x-axis shows how helpful the province is according to private firms. The y-axis shows the fairness of provincial officials in treating foreign and private firms (as perceived by private firms). The graph shows that if a province is biased towards foreign firms, it will also treat private firms poorly (the lower-left quadrant). The relationship is even stronger among provinces with a lot of FDI (blue labels and line).

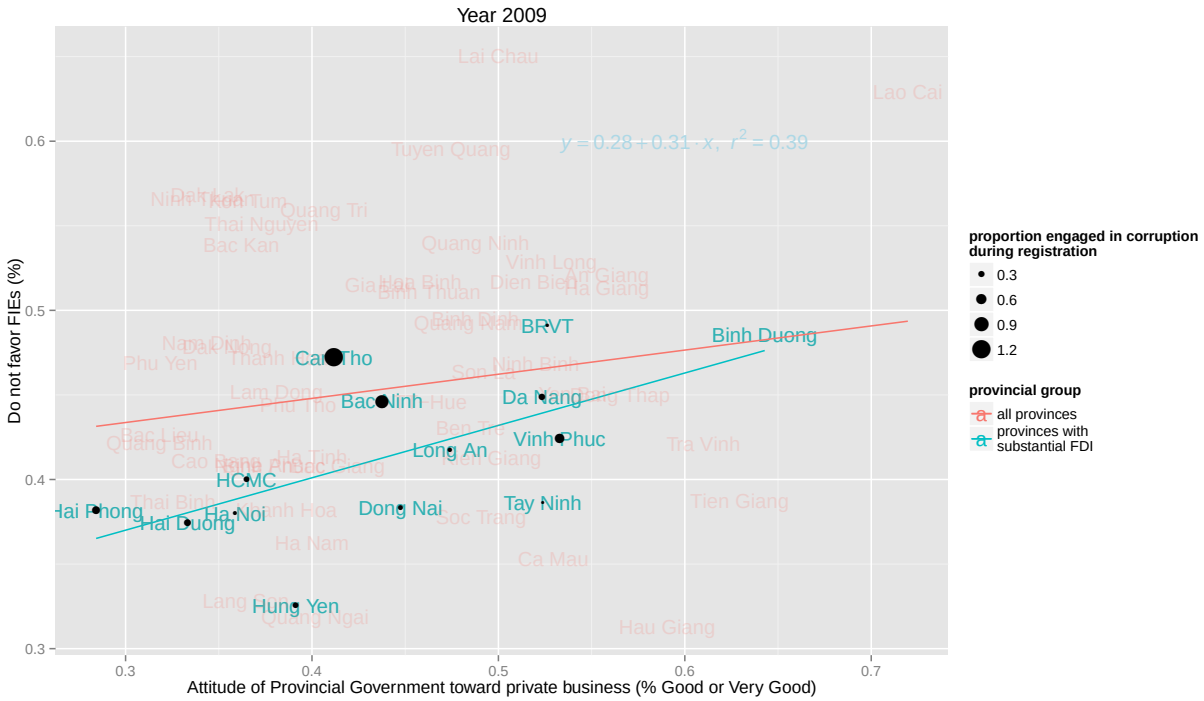


Figure 7: The relationship between a province's FDI bias and attitude towards the private sector

In sum, I propose a hypothesis about variation across Vietnam's provinces:

> Hypothesis: The presence of large FDI firms in provinces whose leaders are not interested in promotion is associated with a low level of spillover effect.

5 Research Design

5.1 Measuring the main dependent variable: spillover effect

Measuring spillover indirectly

Similar to how growth economists start endogenizing technological change, FDI researchers investigate how technology spillover from FDI may happen instead of assuming its inevitability (Romer 1994). Several channels for spillovers have been proposed, some of which suggest an indirect measure of technology spillover.

These channels are:

- imitation: private firms may reverse engineer a production or management technique (Wang and Blomstrom 1992), which is facilitated by backward linkage between local and foreign firms (Javorcik 2004). This motivates my first measure of spillover effect: % of private firms that participate in contracts with foreign firms.

- competition: similar to the effect of competition from arm's length trade on productivity, the presence of foreign firms in the domestic market put pressure on local firms to reduce inefficiency (Glass and Saggi 2002). (Doing Business has firm-level data on the number of private/state/foreign competitors in the last year)

- export demonstration: foreign firms are more knowledgeable about exporting, which involves high fixed cost to set up a distribution and transport infrastructure, or learning about foreign taste and regulatory environment. Domestic firms can learn this "export know-how" from foreign firms (Aitken et al. 1997). This motivates my third measure of spillover effect: % of private firms that export.

- skills acquisition: workers trained in foreign firms bring along their human capital when they move to domestic firms (Djankov and Hoekman 2000). This presumes a healthy domestic sector that can offer competitive wages to workers.

Among these channels, *imitation* and *export demonstration* forms the theoretical basis of my two proxy measurements of spillover:

1. frequent business contacts between foreign and domestic firms,

2. percentage of domestic firms engaging in export

Measuring spillover directly

As standard in the economic literature that studies whether there is a spillover effect for FDI, we can also measure spillover directly. This is done in two steps.

- First, measure the level of technology or productivity of a firm.

  Level of technology: R&D spending

  Level of productivity: Consider the familiar Cobb-Douglas production function:

$$Y = AL^{\alpha}K^{\beta} \tag{1}$$

  where Y is value added, A is total-factor productivity (TFP), L is labor, and K is capital. y, L, and K are observable, while A is not. Log transform both sides of the equation, we attain a linear form:

$$y = a + \alpha l + \beta k \tag{2}$$

  where the lowercase variables are the log-form of the uppercase variables (e.g. $y = \log(Y)$ and so on). Equation 2 can then be estimated with OLS:

$$y_i = \beta_0 + \beta_1 l_i + \beta_2 k_i + \epsilon_i \tag{3}$$

where β_0 is the average total-factor productivity of all firms and ϵ is the firm-specific deviation from that mean. From the estimated coefficients of Equation 3, we can estimate firm-level TFP as follows:

$$a_i = \hat{\beta}_0 + \hat{\epsilon}_i \tag{4}$$

$$A = \exp^{\hat{\beta}_0 + \hat{\epsilon}_i} \tag{5}$$

- Having estimated firm-level TFP (or technology), we then regress TFP (or technology) on the presence of FDI in a country / sector. FDI presence can be measured as:
  - amount of FDI or number of foreign firms in a country (sector). This measure focuses on the horizontal, or intra-sector, linkage of FDI
  - number of foreign firms that the domestic firms are in contact with. This measure focuses on the vertical, or inter-sector, linkage of FDI

5.2 Hierarchical model using cross-national, cross-sectoral data

To measure corruption, presence of FDI, and treatment of firms across countries, I utilize the World Bank's Enterprise Survey (ES), which includes a wealth of firm-level data across 125 countries, spanning various topics from investment, labor, to business-government relation (World Bank 2015). The Enterprise Survey uses stratified random sampling (using three strata: firm size, business sector, and region) in order to ensure representativeness. The survey data comes from face-to-face interviews with upper management and is anonymized to ensure confidentiality at all times.[9] This dataset has a wealth of firm-level data that helps us operationalize key concepts as detailed below.

Recall our hypothesis:

> Hypothesis: The presence of large FDI firms in corrupt countries is associated with a low level of spillover effect in those countries.

> Hypothesis: The presence of large FDI firms in corrupt sectors is associated with a low level of spillover effect in those sectors.

Operationalization of independent variables:

- FDI in countries: available via UNCTAD data on FDI flows and stocks to countries.
- FDI in sectors: available via the Enterprises Survey dataset. The "largeness" of FDI firms can be measured by constructing a Herfindahl-Hirschman Index based on the size of sale, labor, or capital of firms. This allows us to calibrate the "largeness" of FDI firms according to the size of the host country's market.

[9] For more on the methodology of the Enterprise Survey, visit http://www.enterprisesurveys.org/methodology

- Corruption: can be measured in two ways. 1) Firms' perception about corruption as an obstacle. This measure is frequently used but not accurate since firms' perception of corruption depends not only on the level of corruption but also the characteristics of firms. 2) Hard measure of prevalence and depth of bribes, e.g. "Was an informal payment expected or request (when applying for a license)?", "How much do establishments like this one give in informal payments?"

5.3 Vietnam case study: addressing issues of endogeneity and measurement error of corruption

In the cross national design, the corruption variable is problematic for two reasons. First, corruption, due to its complex institutional causes, is likely to be endogenous to a host of unobserved factors that also affect spillover. Second, a direct measure of corruption tends to suffer from sensitivity bias. In this section, I address both of these issues in turn, using 1) an exogenous shock to the level of corruption in Vietnam following the Phase 3 (Enforcement) of the OECD's anti-bribery convention in 2009, and 2) data from a list experiment by Malesky et al. (2015) to measure corruption.

Phase 3 of OECD Anti-Cribery Convention (ABC) as an exogenous shock

In December 1997, all members of OECD and an additional five non-members, accounting for nearly 61% of world trade, signed the ABC. The ABC criminalizes the bribery of foreign public officials and upholds its principles with a peer-monitoring system, in which member countries visit and review one another's legislation and implementation. According to legal experts, these reports are often quite harsh and effective in shaming countries into improving their practices (Tyler 2011).

Important for my research design, in December 2009 the OECD's Working Group on Bribery (WGB) annouced that following Phase 1 and 2 (Evaluation and Assessment) there would be a Phase 3 (Enforcement). The goal of Phase 3 is to continually monitor countries' anti-bribery practices and to exhort inactive enforcers. Noticeably, Phase 3 also removed a previous exception that allowed firms to make "small facilitation payment" (Strauss 2013). Researchers have argued that following the announcement of Phase 3, member countries ramped up enforcement to avoid a negative review, and causing their firms to reduce bribery abroad (Malesky and Jensen 2015).

Given that FDI to Vietnam only accounts for a small fraction of OECD countries' total foreign investment, it is plausible that Vietnam is not a major factor driving the initiation of Phase 3. Therefore, the announcement of Phase 3 serves as an exogenous shock to the level of corruption in Vietnam. With OECD firms being reluctant to offer bribes, we expect corrupt officials to become uninterested in OECD firms. Post 2009, OECD firms would be attractive only to non-corrupt officials for their developmental impact, and we should observe them having more spillover effect.

With 2009 as an exogenous shock we have a difference-in-difference design. First, we estimate the difference in spillover between OECD and non-OECD firms, pre-2009. We then find the same difference in spillover post-2009. Subtracting these two differences, we can estimate the effect of corruption on the level of spillover.

List experiment to better measure corruption

As mentioned earlier, despite the wealth of firm-level, cross-national data in the ES dataset, its measure of corruption is still plagued by a host of measurement issues.

Asking directly about firms' experience with corruption is unlikely to get an accurate answer due to sensitivity bias (Coutts and Jann 2011). Researchers, including the ES team, often address this problem by framing the question about the experience with corruption of "firms like yours." However, with this technique, firms may not read between the lines and actually answer about the experience of others (Ahart and Sackett 2004).

I remedy these problems with a research design focusing on the case of Vietnam, taking advantage by a survey list experiment by Malesky et al. (2015), which uses unmatched count technique to accurately measure the experience of firms with corruption while avoiding sensitivity bias.

Recall the hypothesis:

> Hypothesis: The presence of large FDI firms in provinces whose leaders are not interested in promotion is associated with a low level of spillover effect.

Operationalization of independent variables:

- FDI in province: provincial statistics of FDI flow (government website)
- FDI in sectors: government website
- Corruption: list experiment (Malesky et al. 2015)
- Interest in promotion:
  - base chance of promotion: years until retirement (retirement age is 60 for male, 55 for female)
  - appearance in centrally controlled newspapers as a proxy for the decision to pursue promotion

5.4 Conjoint analysis of Vietnamese officials' preference

A crucial causal mechanism in my theory is the utility calculation of provincial officials, which weighs between the developmental impact and the potential for bribes of FDI. It is difficult to fully examine this key step with only observational data because what officials truly want may not be fulfilled due to external factors and thus cannot be observed. Furthermore, what an official wants from a FDI firm is often hard to tease out completely. A big FDI firm is an attractive source of rent, but it also brings job and technology. Indeed, perhaps this high correlation is precisely why it is so easy for officials to extract rent from FDI under the guise of promoting economic development.

To truly get at the utility calculation of provincial officials, I plan to conduct a survey experiment using conjoint analysis to ask provincial officials about their preference between two hypothetical FDI firms (Hainmueller et al. 2014). The characteristics of these firms will be randomly varied across several dimensions: size of labor force, capital, technology age, and most importantly, need for land, which proxies for corruption opportunities.

5.4.1 Why choose land as a proxy for corruption?

To discern provincial officials' preference for corruption opportunity versus developmental impact, one must vary the hypothetical FDI projects along a characteristic that can only be attractive to officials because of its potential for corruption and not because of any other reasons. In this regard, the amount of land a project requires is the best proxy for corruption. Since land is such a scarce resource with rapidly rising value in Vietnam, acquiring land from current tenants and farmers is a difficult, sometimes violent, process. Therefore, there is neither good developmental nor political reason for local officials to prefer a project that needs a large amount of land.

In contrast, other characteristics of a FDI project can be preferred by officials for many different reasons. For example, a well capitalized project may signify a large pot of money to dip in, but it may also be attractive for the labor productivity enhancing effect of its capital. Similarly, a FDI firm with a large labor force may need to curry favor with officials to suppress their workers, but it may also be appealing for the jobs it creates. Unlike those factors, land is unambiguously an indication of corruption opportunities. With a high level of *monopoly* and *discretion*, local officials are able to sell land access, something that investors are eager to buy.

1) Monopolistic control over land supply: At the start of Vietnam's liberalization (under Land Law 1993), any exchange of land between land users and investors must go through the local government. Investors had to negotiate with all levels of local governments (i.e. commune, district, and province level people's committees) to acquire land—a complex process that encouraged investors to use informal procedures and fees to expedite. Importantly, the price of land was solely determined by the local government, which was usually 10-30% of the market price. Therefore, officials were able to extract bribes with both their gate-keeping and price-setting powers over land.

Subsequent land law reforms (2003 and 2013) attempted to bring the land acquisition process closer to a market approach and lessen the monopolistic control of the local government over land. For example, Land Law 2003 specified two methods for investors to acquire lands: voluntary and compulsory. Under compulsory land acquisition (akin to eminent domain), local governments retain the power to acquire land with compensation then allocate to approved investors. Under the newly-introduced voluntary land acquisition, investors negotiate with and buy from land users in a private market transaction. Despite the option of buying lands from private users, in practice most investment projects tellingly opted for compulsory land acquisition by the state. With the local government's coercive power and legal ability to set compensation value on their side, investors find compulsory land acquisition both faster and cheaper, and thus worth paying for.

Similarly, despite many calls for removing the state's control over land, Land Law 2013 disappointed with its insistence on "people's ownership" of land instead of adopting a fully private ownership system. Furthermore, the law preserves the state's right to acquire land for the vaguely defined "socioeconomic development" and "national interest," which expansively includes the development of industrial zones.

2) Discretionary allocation of land to selected investors: Opportunities for corruption also arise from two discretionary powers of the local governments. First, land acquired by the government is allocated directly to approved investors instead of through public auction, an

option allowed by law but rarely practiced by local governments. Second, in many cases, local officials even modify the existing land use plans according to the suggestions of investors, making available land that was previously not zoned for business development. Without any standard guideline for investor approval, this process relies heavily on personal contacts and is prone to bribery and kickback.

An important symptom of this corrupt practice is the lack of transparency in the land allocation process and decision. Key information, such as the criteria of project approval, the shortlist of investors, the profile of the selected projects and investors, and the (dictated) price of land, are kept among selected investors and a few state officials involved. Even a straightforward compliance with transparency regulation, i.e. the public posting of investment site maps, is not fulfilled. In a 2010 study, DEPOCEN researchers could only access the investment site maps in 2 of the 12 visited provinces (Anderson and Davidsen 2011).[10]

5.4.2 Conjoint analysis design

Two FDI projects want to enter your province. Please carefully read the following description of the projects. Then, please indicate which project you prefer.

	Project 1 (Du an 1)	Project 2 (Du an 1)
Industry		
Labor force		
Capital		
Land		
Technology age		

If you have to choose, which project do you prefer to grant investment license? Project 1 / Project 2

The five dimensions will be given random values as follows.

- Industry: textile, electronics, automobile, consumer product
- Labor force: 5, 50, 100, 200, 500 employees
- Capital:
- Land:
- Technology age:

If desired, it is possible to:

- adjust the design so that implausible hypotheticals will not appear (i.e. there should not be a high-tech company with very small capital).

[10]But Land law 2013 does remove the direct allocation of land to approved project, instead try to increase the number of land auctions. Does this have an effect?

- randomize the ordering of the characteristics between respondents to test for the ordering effect (i.e. knowing a firm's industry first changes how the respondent thinks about the other characteristics)

I am mainly interested in the "average marginal component effect" (AMCE) of *land*, which is the marginal effect of *land* on the likelihood of a project being preferred, averaged over the distribution of all the other components. This allows us to back-out what provincial officials truly want from a FDI project.

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