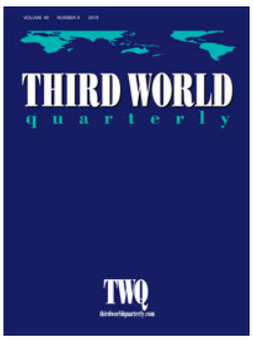

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Observing FDI spillover transmission channels: evidence from firms in Uganda

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ABSTRACT

We observe and analyse three intra-industry foreign direct investment (FDI) spillover transmission channels using unique firm-level data collected from on-site interviews and observations regarding domestic and foreign firms operating in Uganda in 2015. Our main results are: (1) the spillover effects mainly depend on the channel(s) by which they occur (the competition channel is most important while spillover benefits through the worker mobility and the imitation channels are less prevalent) and (2) both positive and negative spillover effects occur within the same channel and, moreover, effects differ by channel for the same case. These are novel and challenging findings that have not yet been recognised in theoretical and empirical research on FDI spillovers. Our results suggest that long-term pecuniary spillover effects are predominantly stimulated via the competition channel and show that only limited short-term and long-term technological spillover effects occur through the imitation and the movement of workers channels. These channels are not only less prevalent, but also appear to be constrained by competition-determined spillovers. We are confident that these directions for future research will have a high pay-off because, as shown by this exploratory fieldwork, a more complete picture of the spillover effects is reached when the channels are considered simultaneously.

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1. Introduction

This paper is driven by the research puzzle of contradictory findings on spillover effects that was uncovered by the most recent meta-analysis of foreign direct investment (FDI) spillovers.[1] We provide one of the pieces of that puzzle, by investigating the transmission channels by which the spillover effects are assumed to emerge: imitation of foreign firms, movement of workers from foreign to (new) domestic firms and competition between foreign and domestic firms. These three theoretically well-established transmission channels of intra-industry spillovers can be discussed in the context of non-market or market transactions and the associated technological versus pecuniary character of the spillovers.[2] The imitation/demonstration channel is a non-market spillover (technology): local firms are exposed to foreign affiliates' superior technology in the host market. Before the entry and operation of foreign

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firms, domestic firms may neither be aware of the existence of a specific superior technology, nor consider it profitable to try to access it. The competition effects are related to markets and generate pecuniary spillovers. These may be positive, for example when competition stimulates domestic firms to adopt new technology or efficiently use existing resources, but can also be negative when foreign firms capture (part of) the local market in which domestic firms operate: the market stealing or market reallocation effect.[3]

The labour mobility channel operates through technological (knowledge) or pecuniary spillovers. Technological spillover occurs when a domestic firm hires workers previously employed and/or trained by foreign firms (or when these workers set up a new firm), allowing a domestic firm to benefit from the experience and knowledge acquired in the foreign firms.[4] However, foreign firms may attract skilled local workers by paying higher wages than domestic firms. The gap in wages between foreign and domestic firms can change the potential for technological spillovers into pecuniary spillovers in two ways. First, the additional experience and knowledge acquired by local workers while working for foreign affiliates might be available to the domestic firms at a price equivalent to this wage premium, thereby transforming potential technological spillover into pecuniary spillover. Second, the presence of higher wages may put upward pressure on the overall industry wage rate, resulting in a negative effect on the profits of domestic firms.

While existing theories distinguish the three different spillover channels, empirical studies by necessity only appear to deal with one specific spillover channel. The contradictory spillover findings could therefore be due to a 'single variable approach': the (often implicit) assumption is that the share of FDI presence captures all spillover effects and/or that the effects are identical across channels. While the imitation-determined spillover channel has explicitly been covered by the empirical literature, insights about competition and worker mobility-determined spillover channels are limited.[5]

Examination of FDI spillovers has so far been predominantly carried out by way of econometric analysis (often based on proxy variables and secondary data) and hardly ever on field observations. Many authors argue that it is impossible for econometric studies to provide many of the subtle insights that can be obtained through personal fieldwork interviews and observations of firms.[6] The econometric analysis uses the indirect approach in the measurement of net FDI spillovers: significant statistical association between productivity of domestic firms and increased presence of foreign firms (FDI) are interpreted as productivity spillovers from foreign affiliates to local firms. For instance, studies predominantly use the share of foreign firms in total sales in an industry as a proxy for the imitation effect.[7] However, this is *potential* spillovers as opposed to actual spillovers. In addition, the econometric approach is still challenged in identifying the labour mobility channel, as this mechanism differs from the other transmission mechanisms as the skills and knowledge embodied in human capital move only via the physical mobility of workers across firms and needs to trace individual workers. To our knowledge, exceptions are Poole, Liu et al., and Demena and Murshed.[8]

Our qualitative interview approach helps to avoid a number of the pitfalls of econometric studies. Since we rely on direct observation, we can tune the data to our research needs directly and do not need indirect approaches. Our field research attempted to investigate directly whether local firms experience productivity gains as a result of foreign firms presence, and the channels through which the effects occur. This provides a more complete picture of the spillover effects and an important finding is that the simultaneous occurrence of both positive and negative effects in the same channel can be observed. Simultaneous

analysis of the three channels, moreover, reveals that the impact on productivity by channel is often not in the same direction. This phenomenon of simultaneous positive and negative effects in a specific channel (and between channels) within a given domestic firm is a novel and challenging finding that has not yet been recognised in theoretical and empirical research on FDI spillovers. Furthermore, the relative importance of labour mobility through either technological or pecuniary spillovers is difficult to investigate since it requires tracking workers employed or trained by foreign affiliates. We contribute to the literature by covering more fully technological versus pecuniary spillovers.[9]

In this article, we investigate the black box of FDI spillovers, exploring the effects and the channels through semi-structured on-site interviews with Ugandan and foreign firms.[10] The rapid growth of FDI into the manufacturing sector makes Uganda an exciting case to investigate.[11] Uganda created a favourable business-operating environment for FDI, for example by allowing full repatriation of profits and 100% foreign ownership.[12] Since such incentives are costly, the occurrence of spillover effects is crucial from a policy perspective. To the best of our knowledge, on-site interviews and observational qualitative analysis is thus far unexplored in a developing country context.

The available econometric studies provide some evidence for the importance of observing transmission channels, often in industrial countries. Hamida performed a panel regression derived from 2002 and 2005 innovation activity surveys on Swiss manufacturing firms and found that the identified channels are crucial in determining spillovers from FDI.[13] Balsvik, using Norwegian manufacturing firms, confirms that worker mobility is clearly a channel for spillover effects for the years 1999 to 2000 census data.[14] Martins reported relatively small potential spillovers from mobility of workers associated with labour flows from foreign affiliates using the 1986–2000 annual census in Portugal.[15] Görg and Strobl, based on the 1991–1997 firm-level survey, found evidence of productivity spillovers for Ghanaian owners who previously worked for foreign firms.[16]

A number of relevant case studies on large-scale FDI are available for Latin America and East Asia. Larrain et al., regarding Intel's investment in Costa Rica, and Javorcik et al., concerning Wal-Mart in Mexico, find substantial spillovers.[17] In contrast, Hanson, who examined three cases (General Motors and Ford in Brazil and Intel in Costa Rica), finds that strong positive FDI productivity spillovers are absent.[18] Similar findings are reported for the Malaysian electronics industry.[19] Although, generally, this kind of examination presents a more optimistic assessment, results are still not conclusive.

Only a handful of studies use semi-structured interviews and on-site observations in developing countries and emerging markets. Pavlínek and Žížalová for the Czech Republic's automotive industry, using on-site firm-level interviews, find that local firms were affected by both negative and positive spillovers.[20] Positive spillovers emerged through demonstration effects, whereas negative spillovers occurred in the form of increased competition and local employee poaching. Partial analysis of the channels by Amsden and Chu report positive spillovers through competition in the electronics sector (Taiwan in the 1960s and 1970s).[21] Importantly, the limited existing studies deal with only one of the channels by which spillovers are expected to emerge. In order to move beyond partial effects, a comprehensive approach seems necessary that simultaneously studies the three transmission channels.

The remainder of this article is structured as follows: Section 2 by way of background discusses FDI in Uganda. Section 3 describes the data collection process and discusses determinants, measurements and the data. Section 4 presents the detailed results. Section 5 concludes.

2. FDI in Uganda

By way of background, this section explores the features and trends of FDI mainly using quantitative and qualitative data obtained from the Uganda Investment Authority (UIA) and senior Ugandan officials interviewed, respectively. In the 1980s, Uganda started policies to facilitate FDI inflow in order to accelerate growth and development. The UIA was established by 'investment code 1991'[22] governing investment in Uganda that introduced incentive packages.[23]

Many of the foreign-owned firms in Uganda attribute their motivation to operate in the country to the UIA. As in Figure 1, after the establishment of the UIA, there was a gradual increase in FDI until 2004, followed by a significant expansion. FDI increased from a mere US$1 million in 1991 to US$0.2 billion in 2004 and then saw a remarkable rise to US$1.205 billion in 2012 – an all-time high, reflecting greatly improved investment opportunities. After a 9% decline in 2013, FDI reached US$1.147 billion in 2014. Furthermore, diversity in terms of the origin of the foreign firms investing in Uganda is another indication that the country generates private investment interest globally.[24] Both the adoption of friendly business instruments and the decline of business opportunities in other countries of the region assisted Uganda in attracting FDI.[25]

About half of the investment projects are in the manufacturing sector (especially in food products and beverages and metal and metal products, which accounted for 23% and 16%, respectively, in 2013). According to the expert interview with Dr Kamugasha, the Ugandan manufacturing sector is mainly engaged in import-substitution activities.[26] This suggests that the manufacturing sector is locally oriented and that FDI is mainly local market seeking.

The services sector accounts for half of FDI. In this sector, investment exhibited a steady reversal between local and fully foreign-owned investments. For instance, in 2009 (2013) the share of the foreign share was 44% (61%) and local investment accounted for 54% (33%). The services sector attracts more private foreign investors than Ugandans, perhaps due to market losing and/or crowding out effects.

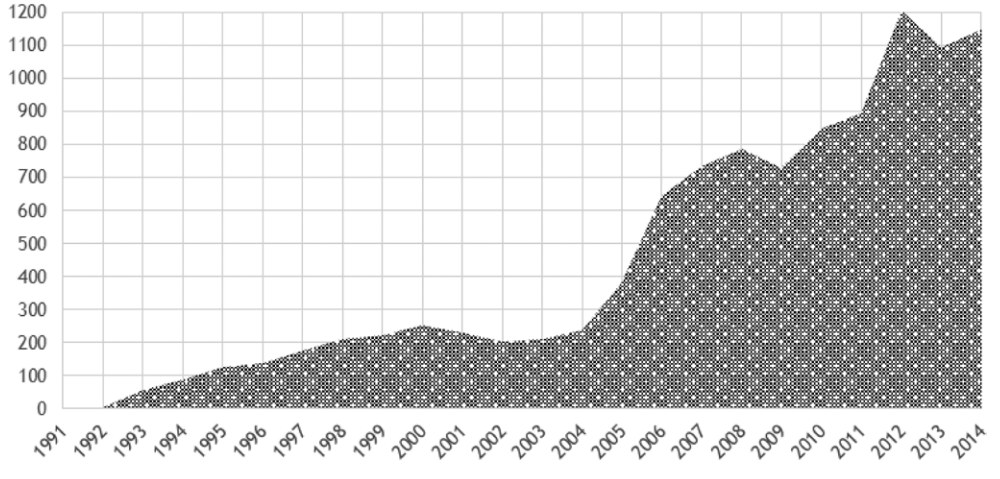

Figure 1. Trends of FDI inflow in millions US$ at current prices (1991–2014). *Source*: Author's compilation using various World Investment Reports by UNCTAD.

3. Methodology and data

This section first explains the procedure that was followed to select a set of firms operating in Kampala. Next, we discuss the problems encountered while trying to reach the selected firms, provide main characteristics of interviewed firms and the data collection, and the questions for the interviews and the related concepts and measurements.

Figure 2 shows the geographical location of FDI projects, indicating that about 80% of the fully foreign-owned firms, domestic firms and joint ventures investments are concentrated in the Central region, including Kampala. According to Mr. Ogwang, infrastructure, financial development and human capital largely drive this geographical concentration.[27] Within the Central region, the bulk of the investment is located in Kampala. Specifically, Kampala accounts for 70%, 84% and 65% of fully foreign-owned firms, joint ventures and domestic firms, respectively. Therefore, our research focuses on Kampala.

3.1. Data sample

We collected the list of firms operating in Kampala from Ugandan Bureau of Statistics (UBOS) and derived a random representative sample.[28] Based on a response rate of 50%, we selected 60 firms (about 20% of the population) to represent a random sample of the 306 firms operating in Kampala for which the required information was available.[29] Next, we searched various internet sources for additional firm-level information to supplement UBOS data. The aim was to obtain general information about the firms, including a description of their activities, their industry type and ownership status. We emailed the selected firms (mostly to the contact person listed in the UBOS database or the manager of the firm, inviting them to participate in the research). The research permit from the Uganda National Council for Science and Technology, a researcher's letter that described the main objective of the research and an overview of the structured interview questionnaire were attached to the email. The email communication was followed up with phone calls to arrange the interviews. A detailed description appears in Demena.[30]

In 87% of cases, a senior employee, generally the operations manager, managing director or general manager, was interviewed. The main criterion for the selection of the interviewee within the selected firms was that he/she had sufficient knowledge about the firm, its market(s) and competitors (85% were senior staff members who had been with the firm for at least 10 years, making it possible to also explore historically how the production process of

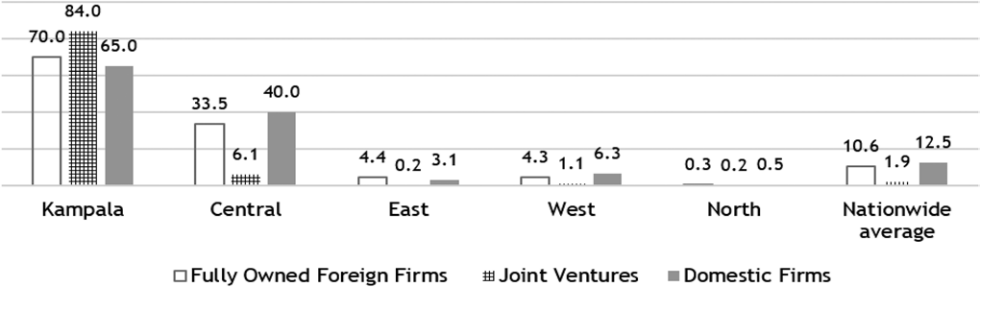

Figure 2. Composition of firm ownership by region in millions US$ at current prices (%) (1991–2013).
Source: Authors' calculation using data from the UIA.

Table 1. Interviewed firms by sectors and ownership.

Interviewed industry type	Domestic	Foreign	Total
Manufacture of textiles	1	0	1
Manufacture of chemicals and chemical products	2	2	4
Hotels and restaurants	3	1	4
Transport	1	1	2
Communications	2	0	2
Construction	1	3	4
Manufacture of non-metallic mineral products	0	1	1
Manufacture of food products and beverages	1	0	1
Manufacture of machinery and equipment	0	2	2
Manufacture of fabricated metal products	1	1	2
Wholesaler and retailer	0	4	4
Sale, maintenance and repair of motor vehicles	0	1	1
Other manufacturing	1	0	1
Other services	4	0	4
Total number of firms interviewed	17	16	33

Source: Authors' compilation based on on-site interviews, 2015.

existing products, the production of new products and the distribution technology were influenced by the presence of foreign firms). Importantly, the interviews offered a good opportunity to conduct on-site observations of the production processes and production technologies.

3.2. Interview and data

Our final sample consist of 33 (Table 1) successfully interviewed firms (55% response rate). We excluded 27 firms due to: unwillingness to cooperate (6), not available at their recorded physical address (16), not relevant (4) or not yet in operation (1).

We used semi-structured interviews to collect data, because this allowed us to gather in-depth information about the topic while guiding the discussions with the interviewee. It also elicited the opportunity to consider additional questions arising from the discussion and comments made during the interviews. In most cases, with the consent of the interviewees, the full interviews were audio-recorded. Six respondents did not agree to be recorded and notes were taken. After the first round of interviews (after transcription of the interviews), 52% of the firms were revisited or phoned for clarification or additional information. All interviews were conducted February–July 2015 inclusive, by the main researcher, in order to ensure consistency in data collection.

All recorded interviews were transcribed as soon as possible after the interviews. The interviews were coded by the researchers. A theory-driven data a priori coding strategy was used to identify FDI spillover transmission channels and their effects on local firms. These codes had been pre-identified during the systematic review stage of 74 primary studies.[31] Additionally a data-driven emergent coding strategy was applied because during the field research it became evident that some firms were simultaneously both positively and negatively affected and this had not previously been documented in the literature.

3.3. Data description: main characteristics of the interviewed firms

More than 80% of the foreign firms interviewed are medium- and large-sized enterprises while 59% of domestic firms are small-sized and 23% are medium-sized (Table 2). In terms

Table 2. Basic characteristics of interviewed firms and interviewees.

Variable	Domestic	Foreign
Average firm age	12	15
Median firm age	11	14
Small size (5–19 workers)	10	3
Medium size (20–99 workers)	4	8
Large size (100+ workers)	3	5
Median employment/workers	15	62
Formal training	35%	63%
Technology gap	Small: 41%; Large: 59%	–
Market orientation	4 firms also export	
Greenfield FDI	–	88%
FDI majority ownership	–	75%

Source: Authors' compilation based on on-site interviews, 2015.

of the numbers of employees, the median number of employees in the domestic (foreign) firms is 15 (62) workers.

The average age of the domestic (foreign) firms is 12 (15) years. With regard to the technological level of the domestic firms relative to the foreign firms, about 60% of the domestic firms fall into the large technological gap category. About 63% (35%) of the foreign (domestic) firms have an employee training policy. Formal training is fully provided in chemical and chemical products, transport, storage and communication, fabricated metal products, textiles and garments. Only 25% of the interviewed foreign and domestic firms in the construction, the wholesale and retail, and the hospitality sectors have a formal employee training policy. The interviews revealed that the main motivation for both domestic and foreign firms to provide formal employee training is skill development and specialisation.

3.3. Measuring spillovers, determinants and impact

For domestic firms, we first tried to establish its principal activities. Next, we explored whether there were any positive or negative spillover (in terms of product, process and/or distribution technology received from foreign presence in the sector). If so, we investigated how the technology from foreign firms was transferred to the local firms, in order to understand the nature and relevance of the transmission channels. In particular, we explored three channels: the imitation of foreign technology available in the market; recruiting workers trained by or working for foreign affiliates; and increased competition induced by foreign rivals. If no spillovers occurred, we investigated why. We also investigated whether the domestic firms experienced poaching of skilled local workers and/or market loss by the foreign rivals. In the interviews, we identified the firms' characteristics (and how these affect the occurrence of spillovers) as well as geographical proximity of foreign presence and its importance regarding spillover effects. With the foreign firms, the questionnaire was intended first to explore the principal activities of the establishment as well as its reasons for choosing to do business in Uganda. Second, we considered the reasons for its location. Third, we investigated how domestic employees were hired, whether they were offered training, and whether they (could) leave after having worked for or being trained by the foreign firms. The specific list of questions asked during the interviews are available in Demena.[32]

Since we also wanted to investigate how domestic firm-level heterogeneities can affect the nature and occurrence of expected spillovers, we explored five firm-related characteristics.

1. *Absorptive capacity of domestic firms* is widely recognised since Cohen and Levinthal.[33] Following Narula and Marin, the concept of absorptive capacity refers to 'the ability to internalise knowledge created by others and modifying it to fit their own specific applications, processes and routines'.[34] Domestic firms exploitation of potential spillovers from superior foreign technology requires training and learning-related investment.[35] Interviews with the domestic firms confirm the point that absorptive capacity is not only about imitation per se, but also requires the domestic firms to have the ability to understand and internalise external knowledge before potential spillover effects can materialise:

> We may not imitate 100% what they [foreign firms] are doing, but first we go and try to understand how specific technology works. Once we have understood how it works, then we do our own research to develop something or a similar process/product. We try to understand the background. Because once we understand something it is easier for us to internalize or change it, if it has a problem.[36]

   We seek to explore whether the presence of training programmes designed to increase the ability to incorporate superior foreign technology or modify it to fit local context affects FDI spillover gains. Thus, the hypothesis is that domestic firms with sufficient absorptive capacity levels are likely to experience more spillover benefits.
2. *A large technological gap between domestic and foreign firms* may indicate that local and foreign firms use different technologies, or manufacture different products although they are categorised as being in the same sector. The literature is inconclusive: spillover is more likely when the relative technological gap between foreign and domestic firms is large according to Wang and Blomström and Jordaan, or smaller as in Cohen and Levinthal and Demena and Murshed.[37] We investigate the domestic firm's self-image on how they perceive their own technological level vis-à-vis foreign firms in a given sector. Following this conflicting line of research, we hypothesise that small or moderate technological difference may assist domestic firms to identify cases where advanced foreign technology is relevant as opposed to a large technological difference which may suggest that domestic firms have nothing to learn from this technology, that their technological capability is too weak to use foreign technology, or that the products manufactured by foreign firms are very different from the products made by local firms.
3. *The capacity of domestic firms and their success in reaping the benefits from foreign firms presence*. We use experience (age) of the firm in years and the size of the firm measured by numbers of employees as an indirect indicator. Aitken and Harrison argue that small firms are more likely to suffer significantly from the presence of foreign firms.[38] Our hypothesis is that older and larger domestic firms can perform better because they are likely to have sufficient production space and scale to attract workers, and to imitate and compete with foreign firms.
4. *Export-orientation*. Greenaway et al. argue that exporting domestic firms are more likely to benefit from foreign affiliates through their capacity to imitate foreign technology and their strength to fiercely face and cope with foreign competition.[39] In contrast, the relevance of local-market-oriented foreign firms may decrease when domestic firms concentrate more on exports, and thus the potential for spillover effects from foreign affiliates in the local market may become less important. We asked the firms whether they are local-market-oriented or export-oriented or both. Note that the expert interviews

indicate that FDI in Uganda is mainly local-market-seeking, hence exporting firms may find little to benefit or learn from foreign presence, consistent with Lu et al.[40]

5. *Geographical proximity.* Firms tend to experience benefits when they are physically closer to foreign firms.[41] The main reason is that spillover transmission channels are reinforced first through neighbouring firms and only then spread to geographically more distant firms.[42] Hence, the potential for spillover transmission reduces with distance. To account this prediction, we collected information to indicate the presence of nearby foreign firms in the sector. We asked first whether respondents feel the presence of any foreign rivals located in their neighbourhood and, if so, estimate the distance between the two firms.

4. Findings and discussion

In this section, first we discuss the spillover effects and their transmission channels. Next, we explain the main factors behind these effects. Finally, we discuss implications for technological and pecuniary spillovers.

4.1. FDI spillover effects and transmission channels

A total of 71% (12) of the domestic firms indicate that their productivity is affected either negatively or positively by the operation of foreign firms. The breakdown of whether or not spillover effects emerged into the effect sign and the transmission channel reveals that 33% (18 cases) of the domestic firms report positive productivity effect. In nine cases (47%), increased competition due to the operation of the foreign firms was the most prominent positive effect, contrary to the negative evidence from China and limited or insignificant evidence from Sub-Saharan Africa (SSA).[43] According to one operations manager from a domestic firm, in order to cope with the constant competitive pressure, the company has to:

> identify methods, especially with the raw materials. We are forced at times to negotiate very aggressively with the suppliers of raw materials. The other way is that we try to come up with a better quality product that is different to the one that the competition is offering. So we are forced to go to the drawing board and think of methods or ways we can make a product much better than the competition is offering.[44]

In seven cases (13%), the interviewed domestic firms report that the entry and operation of foreign firms negatively affects their productivity. The most important effect is the restriction on the local market:

> The presence of foreign firms exerts permanent competitive pressure … they are making it hard for us to penetrate markets. They are beating us in quality and in price and we are getting a lower share of the market.[45]

Slightly more than half of the interviewed domestic firms (29 cases) reported that foreign firms had no effect on their productivity:

> We do our own business regardless of what others do. This is an ocean where everyone has to fish.[46]

> We do not feel the effect of the presence and operation of others. At Mansons we pride ourselves on our equipment, our unique knowledge base and industry experience.[47]

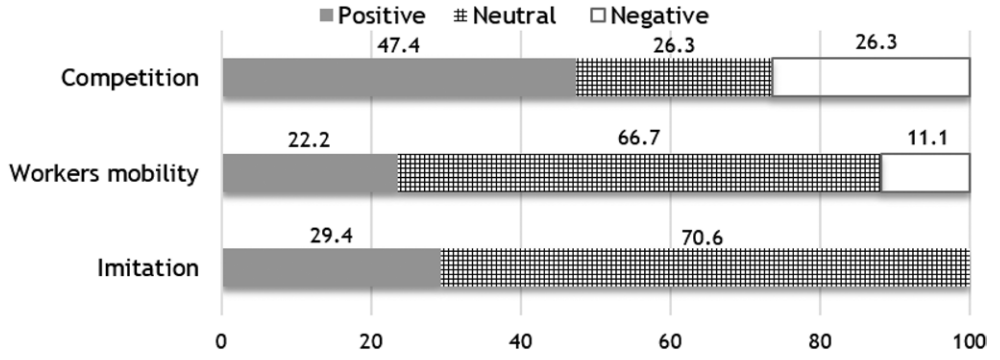

Figure 3. FDI spillover effects according to the sign and transmission channels (%). *Source:* Authors' compilation based on on-site interviews, 2015. *Note:* The chart is based on the 17, 18 and 19 responses on the imitation, labour mobility and competition channels, respectively. This is because one interviewed domestic firm benefited through both workers' skill acquisition and by the setting up of an own business after having worked for foreign affiliates. The other two firms believed they were affected with both market loss and by pressure to adopt or use existing resources efficiently.

Next, we explored how the spillover emerged. Figure 3 presents the transmission channels and the sign of the reported effects. The pre-eminent spillover channel is competition, as indicated by 14 respondents. With respect to this channel, 47% reported a positive impact and 26% a negative effect. The former illustrates that foreign competitors exert competitive pressure and domestic firms try to find new methods or products or improve their quality in order to maintain their market position. The effects mainly occurred in publishing and printing, chemical and chemical products, fabricated metal products and constructions with heterogeneous effects. Some interviewed domestic firms see competition as an incentive to adopt new technology:

> I was forced to buy the speed master machine in this area, a very fast machine that prints 14,000 pages per hour. The one in the market was printing 10,000 per hour or slower. So because of competition, I was the first to introduce this high tech machine.[48]

Increased competition was also found to force domestic firms to improve quality of their processes and products and to use existing resources and technology more efficiently:

> When we started, we had only five competitors in Uganda. [Now] there are about 200 competitors. The competition has taught us to really provide quality. It wakes us up as we do not have monopoly power. So there is no issue of good will anymore, we have to really work for quality.[49]

Table 3 summarises the diverse spillover transmission channels. Confirming Aitken and Harrison,[50] the competition channel also generates a 'market loss effect' or 'market reallocation effect': the presence of foreign affiliates reduced the market share for slightly more than one-quarter of the domestic firms. If this is a short-term effect, domestic firms try to adjust their production process in order to improve productivity, but if long-term, domestic firms leave the sector or reduce their market share unless they are able to adjust their production process. The interviews confirm that some domestic firms face negative competition effects as a result of permanent market share reallocation:

> Foreign counterparts have drained us. Before, our target market was clear, as not many companies were targeting the same niche, so we enjoyed the benefit of a certain market. I would not say monopoly but we were high. But, a number of companies come along doing the same business and targeting the same class. So [competition] has pushed us down by half, now the market is shared and so our sales are dropping.[51]

Table 3. Spillover effects from the entry and operation of foreign firms.

FDI spillovers effect	Transmission channel	Yes	%	No	%
Learning new processes and products	Imitation	5	29.4	12	70.6
Skill acquisition	Worker mobility	2	11.1		
Set up their own business		2	11.1		
Poaching/migration of worker		2	11.1	12	66.7
Market-losing: decrease domestic market share	Competition	5	26.3	5	26.3
Efficient use of existing resources or adopt new technologies		9	47.4		

Source: Authors' compilation based on the on-site interviews, 2015. *Note:* See Figure 3.

Learning about new products and processes (imitation channel) from foreign firms in the host market speeds up access to and utilisation of technologies by domestic firms. Consistent with Demena and Murshed,[52] almost 30% (5 cases) of the respondents learned about the presence and practicality of new technologies from foreign firms (Table 3 and Figure 3). Industries in the chemical and chemical products, communication services and construction industries enhanced their productivity through this channel. Domestic firms in such industries are constantly monitoring what their foreign counterparts are doing:

> because foreign companies come with heterogeneous products, we are forced to adapt or do the same. For example, the instant colour dispenser technology. Previously, if a customer wanted a specific paint product, we would have to go through a lot to have it ready for the customer, but now we learned and managed to get a machine [colour dispenser] to help us to do this in a short time.[53]

As Barrios and Strobl argued, the relevance of the imitation channel is expected to increase with the similarity in products produced by domestic and foreign firms.[54] The respondents report on introducing new products and process technologies in order to maintain their technological superiority and how they successfully imitated:

> Since we are producing the same product, domestic firms imitate our techniques and learn from us. They buy our products from the market. They check the quality and the raw materials of our product to adapt and incorporate them into their methods of production. This affects us, so we have to innovate again or bring better technology.[55]

We also observed that domestic firms might not be aware of the existence of a specific product or uncertain about a process unless they see it in the market. Once they are aware of the availability of a given product or process, they sometimes seek to access and adopt the technology and/or product that foreign counterparts had successfully introduced:

> We had a recent issue with one of our products. We decided to go to the market and see what foreign counterparts are doing, so we actually fuelled the car and toured around the city just to have an idea of how well the others are doing. It was about finishing cake products, we had an issue with our cakes. The quality was ok but the finishing was not appealing. So we just decided to do a survey to imitate how others are actually doing it.[56]

The worker mobility channel generates limited productivity effects, in particular in fabricated metal products, communications, constructions, and hotel and restaurants. Specifically, 11% of the respondents (in two firms) reported positive impacts for this channel. In support of Poole,[57] the interviewed domestic firms acquired experienced local workers that had worked for foreign affiliates but limited effect. In contrast to Liu et al.,[58] reporting substantial positive effect of FDI on labour mobility to establish local own business, we found

limited owners of domestic firms (11% or 2 firms) had previous experience in foreign firms in the host country. Moreover, two expert interviewees observed that the movement of workers is limited in Uganda, corroborating evidence provided by Demena and Murshed[59] from SSA countries.

Similar to the market-losing effect, the transfer of local workers from domestic firms to foreign competitors exerted a (small) negative effect, reflecting that foreign firms attract a limited number of experienced workers often by promising/offering better employment conditions. This effect was observed in two of the 18 cases (11%) of the domestic firms. As a result of losing the best personnel to their foreign counterparts, in the short-term domestic firms are forced to reduce production. In the long-term, domestic firms are, however, able to adjust production processes:

> They [foreign counterparts] have taken some of mine. Because, I trained my workers in England and Germany, and thus they took some of my workers. But, I have to adjust through training the other workers.[60]

Foreign counterparts have more advanced technology. Still, some domestic firms claim that exposure to the foreign firms' technology is highly restricted and difficult to access. One example is from the publishing and printing industry; a domestic firm experienced that access to most of the advanced technology of foreign firms is very restricted. A similar claim was made in two expert interviewees: the imitation effect is limited by access, making it difficult to learn about new products and process technologies from foreign competitors.

Overall, the interviews indicate that spillover effects mainly occur by way of the competition channel and that limited effects occur through the imitation and labour channels. Importantly, both negative and positive spillover effects occurred simultaneously. The next question is what determines the nature of these spillover effects.

4.2. Firm-level heterogeneities and FDI spillover effects

We organise the discussion into absorptive capacity, technological gap, size and firm experience, exports and geographical location (Table 4), in line with recent theoretical review by Crespo and Fontoura.[61]

Table 4. Driving factors of FDI spillover effects.

Factor	Yes	Yes and positive effect	%	No	No and absence or negative effect	%
Absorptive capacity	19	10	55.6	35	27	75.0
Technological gap	23	11	61.1	31	14	66.7
Firm experience	30	11	61.1	24	17	52.8
Firm size	28	11	61.1	26	19	52.8
Exporting	13	5	27.8	41	28	77.8
Geographical proximity	28	11	61.1	26	19	52.8

Source: Authors' compilation based on on-site interviews, 2015.
Note: See Figure 3. In total 54 responses were observed of which 18, 7 and 29 are positive, negative and neutral spillover effects, respectively. Technological gap represents a smaller gap between the two kinds of firms.

(a) Absorptive capacity

A total of 56% of the positive spillover effects from the operation of foreign firms is derived by domestic firms that undertake formal employee training programmes for skill upgrade and specialisation (a measure of absorptive capacity). About 75% of the firms that report no or negative spillover effect are domestic firms without formal training policy. About 60% of domestic firms with a formal training programme benefited through the competition channel. The interviews with the foreign firms show domestic firms' ability to understand and utilise external knowledge to compete with foreign competitors:

> Each market has its own unique challenge. The one big challenge in Uganda is the height of competition. This business environment is quite tough for us compared to when we first came into it. There was appetite to come and invest in a good market. Because, when we came into it, the players were very few. Now there are 10 times more players, so the marketability of our product is shrinking.[62]

(b) Technological gap

According to the interviews, positive spillovers mainly occur for a moderate/small technological gap between the domestic firms and their foreign counterparts: 61% of the domestic firms with a moderate or small technological gap report spillover benefits; 67% of the domestic firms report either no effect or a negative effect if the technological gap is large. Supporting Demena and Murshed,[63] these firms do not or cannot learn from foreign firms, as their technological capability is so weak that foreign technologies cannot be used.

(c) Firm experience and size

Domestic firms with above median experience (age) and size (number of employees) cover 61% of the positive spillover effects in our sample. About half of the below median domestic firms report no or negative effects. This is consistent with Aitken and Harrison,[64] who find that significant negative spillovers are concentrated in small firms which cannot compete effectively with foreign counterparts. According to the interviews, mature and larger firms are not only more apt to absorb external technology, but are also better able to counter competition from foreign firms:

> Right now, the competition has gone to almost 100% compared to when the company started. At the time, very few Ugandans were doing this kind of work … but as time moved on [domestic] firms become larger and became more experienced.[65]

(d) Exports

About 28% of the positive spillover benefits are associated with domestic exporters; 78% of the absence of or negative effect of spillovers is associated with domestic non-exporters. In line with Lu et al.,[66] a majority of the domestic firms reported that export-oriented foreign firms had no effect on their productivity, reflecting the expert interviews that foreign firms are local-market-seeking in Uganda.

(e) Geographical proximity

Domestic firms were asked to consider the presence and proximity of foreign firms from their own establishment. Overall, our interviews indicate that 61% of the positive spillovers

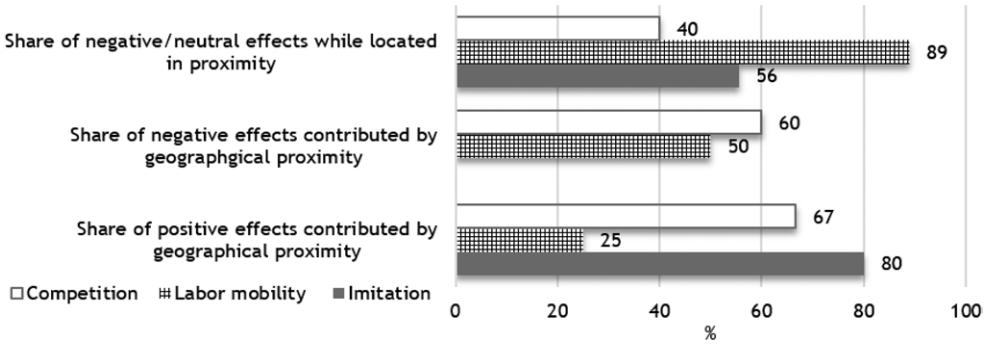

Figure 4. Transmission channels according to geographical proximity. *Source:* Authors' compilation based on the on-site interviews, 2015.

were experienced by domestic firms located within a distance of 5 km. In contrast, 53% of the absence of or negative effect of spillovers was experienced by those interviewed firms which do not have nearby foreign rivals.

Figure 4 summarises geographical proximity and the importance of the channels. About 80% of the domestic firms that learn through the imitation channel do so when they are located in close proximity to foreign firms, corroborating Lu et al. and Demena and Murshed that suggest local firms appeared to suffer geographically from more distant foreign firms via this channel.[67] Only 25% of the spillover gains from labour mobility was due to firms located near foreign rivals. We further explored the negative or neutral effects on firms located close to foreign rivals: for the labour mobility channel 89% of no or negative effect was experienced by domestic firms operating at a close distance to foreign firms. This reflects the expert observation that the Ugandan labour force is very static as the mobility is very weak.

Our results on geographical proximity contradict other studies for competition and labour channels.[68] The lowest share of no or negative spillovers (40%) occurs for the competition channel when foreign and domestic firms are in close proximity to each other. Worker mobility channel generates limited positive spillover effects (25%), and is more likely to show negative effects (50%). The highest share of no or negative spillovers (89%) is observed in the worker mobility channel for proximate foreign and domestic firms. Therefore, our fieldwork suggests that the competition effect is stronger for geographical proximity. Furthermore, the labour mobility channel is just as likely to generate negative effects as positive effects, so that the effects of this channel are not as clear-cut as often argued in the literature. Imitation effects are consistent with existing literature.

4.3. Implications for technological versus pecuniary spillovers

This section relates the outlined channels to the nature of technological and pecuniary spillovers. Our findings suggest that large spillover effects emerge through the competition effect. In the short-term, there is a business-losing effect in which the presence of foreign firms diverts business away from domestic firms. However, in the medium- to long-term, competition in the local market forces the domestic firms to improve their competitiveness through either the efficient use of existing resources or by adopting better technologies.

Local firms that lack competitiveness or are unable to adjust experience a negative competition effect. This initial market loss effect transforms into a long-term negative competition effect if foreign firms permanently capture markets. The gains and losses from the competition channel are pecuniary spillover effects. Although 26% of the interviewed firms experienced negative pecuniary spillover effects, 47% of the domestic firms benefitted from long-term pecuniary spillover effects. Increased competition in the local market appears to work as an incentive to local firms to use existing resources or new technologies more efficiently, creating pecuniary spillover gains. For foreign firms, this stronger competition, as theoretically shown by Wang and Blomström,[69] can be seen as exerting pressure to transfer technology that is more advanced in order to maintain market share, creating potential for pecuniary and technological spillovers. In such cases, increased competition in the local market propels the competition-determined spillovers. The increased level of competition also led foreign firms to protect their technological superiority in a more active way in line with Glass and Saggi.[70] The findings also indicate that about 75% of the domestic firms did not generate spillover benefits through the labour mobility and the imitation channels. The wage differentials between foreign and local firms play an important role in restricting the occurrence of technological spillovers. It is observed that, in developing countries like Uganda, foreign firms usually pay higher wages than domestic firms:

> I have not seen someone leave due to an interest to work for a different [local] company. This may explain why our employees are comfortable with the company, having so much job security and payment, ensuring people work here for long time.[71]

Similar arguments were put forward in the expert interviews:

> With technical people, the production crews, there is not much movement: for instance, if I work in production engineering in a coca cola company who can even pay me.[72]

In contrast to the positive effect of the labour mobility provided by Poole and Liu et al. and in support of Demena and Murshed, our interview approach shows that the existence of such wage gap makes it difficult for domestic firms to attract experienced local workers from foreign rivals as in most developing country settings.[73] This higher wage gap limits the workings of the worker mobility channel that otherwise would benefit local firms from the training and experience received in foreign affiliates confirming the theoretical assertion by Glass and Saggi.[74]

With regard to the imitation channel, increased competition in the local market restricts exposure to advanced foreign technology. Lower technological spillover effects emerge mainly because access to foreign technologies is likely to be protected. Das already stated that learning-from-watching by local firms may lead foreign affiliates to continue the transfer of more advanced technologies from the home country.[75] Because of the high level of local competition that emerges from the competition-determined spillovers, foreign firms are forced to use more advanced technology and at the same time to protect themselves from leakages. The latter impose costs on the workings of the imitation and worker mobility channels. Consequently, the effectiveness of the worker mobility and imitation channels would be deterred. However, according to our findings, limited short-term and long-term technological spillover effects emerge through imitation as opposed to worker mobility. The implication is that the FDI spillover effects on the interviewed domestic firms emerged mainly through long-term pecuniary spillover effects, while technological spillover effects are limited. Consequently, the occurrence, direction and extent of spillovers largely depends on the channels.

5. Conclusions

This paper qualitatively examined the channels of FDI spillovers using semi-structured interviews and observations in Uganda. The theoretical literature identifies three main channels. The empirical literature has not studied these channels yet and this field research fills this gap as it explores the transmission channels in a SSA by using firm-level qualitative data from interviews with the managers of foreign and domestic firms in Uganda. To our knowledge, this is the first time that such qualitative assessment has been done.

The structured interviews confirm a number of hypotheses commonly expressed in the literature. Our main result is that the spillover effects mainly depend on the channels by which they occur and that a more complete picture of the spillover effects is reached when the channels are considered simultaneously. Importantly, we observed the simultaneous occurrence of both positive and negative spillover effects in the domestic firms we interviewed. This phenomenon of simultaneous positive and negative effects in a specific channel is a novel and challenging finding that has not yet been recognised in theoretical and empirical research on FDI spillovers. Our results suggest that FDI spillover effects are mainly enhanced through the competition channel and that this may lead foreign firms to transfer advanced technology and also to protect their technological advantage in a more active way. Furthermore, spillover benefits through worker mobility and the imitation channels are less prevalent.

Our findings are in line with Wang and Blomström who argue that the higher the level of competition a foreign firm faces in the host market, the more advanced technology it has to transfer to maintain its competitive advantage, indicating a larger potential for spillover benefits.[76] In our sample, as a result of this kind of increased level of competition, local firms were unable to transform potential spillover effects into actual benefits, in particular through imitation and movement of labour effects. The entry and operation of foreign rivals increases local competition, which forms an incentive for local firms to be more productive and efficient. This increases the competitive capacity of the interviewed local firms, which in turn causes foreign firms to protect themselves from technological leakage. This is in line with Glass and Saggi, who stress that the higher the level of competition a foreign firm faces, the more actively it will protect its technological superiority.[77]

Our findings offer an empirical perspective on a number of contradictory hypotheses in the literature. We have shown that the occurrence of spillovers mainly depends on absorptive capacity, technological gap and geographical proximity. Domestic firms with a higher absorptive capacity appear to internalise spillovers more efficiently. This occurs mainly through the competition channel as such firms invest in the quality of their labour force in order to cope and fiercely compete with foreign rivals. Domestic firms with a small technological gap vis-à-vis foreign firms seem to have sufficient capacity to gain from FDI presence, against studies claiming a larger gap is relevant for local firms. Spillover benefits also appear to be internalised better through the imitation and competition channels when domestic and foreign firms are geographically close. Unlike the theoretical predictions of other studies, the worker mobility-determined spillover is not found to enhance productivity gains when the two types of firms are located in close proximity to each other, so that the effects of this channel are not as clear-cut as assumed in the literature.

While our research is country-specific, its results are relevant for other SSA countries. In Uganda, like in most SSA countries, foreign firms pay higher wages than domestic firms. A higher wage premium can restrict the potential for movement of labour limiting the transmission of foreign technologies to local firms. Another relevant issue is the nature of

market seeking behaviour of FDI in both Uganda and SSA. An increase in product competition induced by the presence of local market-oriented foreign rivals encourages local domestic firms to use existing resources and technology more efficiently or to adopt new technologies, improving the workings of the competition channel. Consequently, increased local competition forces foreign firms to protect themselves from leakage of their advanced technologies, restricting learning from watching (imitation effect).

Important for future theoretical analysis, empirical research and policy, are our results that the spillover effects mainly depend on the channels by which they occur and that positive and negative spillovers occur simultaneously even through the same channel. Future theoretical research could aim at models that explicitly deal with the three channels simultaneously. Exploratory research building on the present analysis may consider how spillover effects actually emerge. From a policy perspective, our analysis shows that attracting FDI is not sufficient for spillovers. Host countries could provide support to local firms, aimed at improving local capacity and identifying modern technologies, as one of our findings is that access to superior foreign technology is highly restricted. A policy agenda to facilitate foreign firms should not only determine job opportunities for local workers, but also specify the extent of their involvement across the entire production line, as this process appears to be an important ingredient of the policy package. However, there are various other sources of potential FDI-related effects that are not incorporated in our study. For instance, it could be important to investigate FDI-related effects through market access spillovers and inter-industry linkages.[78]

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Notes

1. Demena and Bergeijk, "A Meta-Analysis of FDI," 546.
2. Viner divides spillovers into pecuniary and technological. He stated that a pecuniary spillover results from changes in prices, while a technological spillover is derived from changes in the production processes that are not reflected in prices; Viner, *Cost Curves and Supply Curves*, 213. Scitovsky, who incorporates the notion of interdependence among firms, further elaborated these concepts of spillovers; Scitovsky, "Two Concepts of External Economies," 146.
3. Aitken and Harrison, "Do Domestic Firms Benefit," 606.
4. Liu et al., "Entrepreneurship and Spillovers from Multinationals," 96; Poole, "Knowledge Transfer from Multinational," 394.
5. Hamida, "Are There Regional Spillovers," 757.
6. Pack, "Econometrics versus Case Study Approach," 30.
7. Demena and Murshed, "Transmission Channels Matter," 711; Lu et al., "Identifying FDI Spillovers," 79.
8. Poole, "Knowledge Transfer from Multinational"; Liu et al., "Entrepreneurship and Spillovers from Multinationals"; Demena and Murshed, "Transmission Channels Matter". Poole exploits the matched establishment-worker database from Brazil and shows wage (pecuniary) spillovers as the presence of local workers formerly trained by foreign affiliates increasing the wage of workers in domestic firms. Similarly, Liu et al. suggest that local firms run by owners with foreign affiliate work experience perform better than owners without former work experience with foreign firms using the nationwide survey data for Chinese private firms. Unlike these two econometric analyses, Demena and Murshed construct job turnover by industry as a labour mobility channel proxy. Their panel of eight SSA countries finds only negligible significance for such spillovers.
9. The on-site interviews and observations largely concern with the process of FDI spillovers transmission channels, and do not investigate the size of the impact. Furthermore, as argued in Pack, our approach can suffer from the difficulties in demonstrating the validity of the observations and thus robustness of the results; Pack, "Econometrics versus Case Study Approach," 41. Generating larger samples is possible but only at cost of a significant (time) investment. Therefore, it might be necessary to call for more systematic evidence to confirm or disprove main results of this study. We thank the anonymous referee for pointing this out.
10. In addition, we used secondary quantitative data collected from the Uganda Investment Authority (UIA), document analysis and additional expert interviews carried out in Uganda in 2015.
11. Rasiah, "Ownership and Technology Intensities," 80; Demena, "Essays on Intra-Industry Spillovers," 125–6.
12. Uganda Investment Authority, *Brief Guide to Investing*, 2.
13. Hamida, "Are There Regional Spillovers," 754–67.
14. Balsvik, "Is Labour Mobility a Channel," 287–96.
15. Martins, "Inter-Firm Employee Mobility," 1–52.
16. Görg and Strobl, "Spillovers from Foreign Firms," 693–707.
17. Larrain et al., "Intel: a Case Study," 1–32; Javorcik et al., "Openness and Industrial Response," 1158–80.
18. Hanson, "Should Countries Promote FDI," 1–24.
19. Phillips and Henderson, "Global Production Networks," 38–56.
20. Pavlínek and Žížalová, "Linkages and Spillovers in Global," 1–33.

21. Amsden and Chu, *Beyond Late Development*.
22. Later revised as Laws of Uganda edition 2000.
23. For instance, tax holidays, import and export duty exemption, investment capital allowance, full repatriation of profits and 100% foreign ownership; Uganda Investment Authority, *Brief Guide to Investing*, 1–16.
24. In 2013, 48 countries invested in Uganda. This grew over time, with FDI coming from, on average, only 16 countries in the period 1991–1995, 22 countries in the period 1996–2000, 28 countries in the period 2001–2005 and 40 countries in the period 2006–2010; Demena, "Essays on Intra-Industry Spillovers," 157.
25. Rasiah, "Ownership and Technology Intensities," 80.
26. Author's personal interview with Director, Technology Development and Transfer, Uganda Industrial Research Institute, 28 May 2015.
27. Author's personal interview with Deputy Director, Investment Promotion Division, UIA, 3 July 2015.
28. UBOS is a central statistical information service in the country and all firms are required to register on its enterprise census. To identify a sub-group representing the full population of firms, a random sampling method was applied by using Microsoft Excel. The procedure was as follows: first, we applied the 'rand' function to generate random numerical values for all firms. Next, firms were listed according to their random values and we selected the first 60 firms.
29. More generally there are about 561 registered firms operating in Kampala; Demena, "Essays on Intra-Industry Spillovers," 131. Moreover, using data from the World Bank Enterprise Surveys, Demena and Murshed exploit 1203 firms operating in Uganda; Demena and Murshed, "Transmission Channels Matter," 709. Therefore, we believe that the set of 306 firms are enough to represent firms operating in Kampala (55%) as well as in all districts in Uganda (25%). A firm is selected for an interview based on geographic location (Kampala district) and contact details (telephone, e-mail or physical address).
30. Demena, "Essays on Intra-Industry Spillovers," 131–2.
31. Demena, "Publication Bias in FDI Spillovers," 1170–4.
32. Demena, "Essays on Intra-Industry Spillovers," 199–200.
33. Cohen and Levinthal, "Innovation and Learning," 569.
34. Narula and Marin, "FID Spillovers, Absorptive Capacity," 23.
35. Chung and Lee, "How Absorptive Capacity Is Formed," 691.
36. Author's personal interview with Operations Manager, Peacock Paints, 14 May 2015.
37. Wang and Blomström, "Foreign Investment and Technology Transfer," 153; Jordaan, "Intra- and Inter-Industry Externalities," 2840; Cohen and Levinthal, "Innovation and Learning," 23; Demena and Murshed, "Transmission Channels Matter," 716.
38. Aitken and Harrison, "Do Domestic Firms Benefit," 614–15.
39. Greenaway et al., "Do Domestic Firms Learn," 1027.
40. Lu et al., "Identifying FDI Spillovers," 88.
41. Demena, "Essays on Intra-Industry Spillovers," 111–13.
42. Hamida, "Are There Regional Spillovers," 764–5; Jordaan, "Determinants of FDI-Induced Externalities," 2211.
43. Lu et al., "Identifying FDI Spillovers," 87; Demena and Murshed, "Transmission Channels Matter," 715.
44. See note 36 above.
45. Author's personal interview with Director, Desire Beauty Products, 22 April 2015.
46. Author's personal interview with Managing Director, Hotel Raviraj International, 12 May 2015.
47. Author's personal interview with Director, Financial Controller, Mansons Uganda, 8 April 2015.
48. Author's personal interview with Managing Director, Intersoft Business Services, 9 April 2015.
49. Author's personal interview with Managing Director, Voice of Busoga, 29 April 2015.
50. See note 3 above.
51. Author's personal interview with Senior Accountant, Sokoni Africa, 21 May 2015.
52. Demena and Murshed, "Transmission Channels Matter," 715.
53. See note 36 above.

54. Barrios and Strobl, "Foreign Direct Investment and Productivity Spillovers," 472.
55. Author's personal interview with Country Manager, Basco Paints, 13 May 2015.
56. See note 51 above.
57. Poole, "Knowledge Transfer from Multinational," 399.
58. Liu et al., "Entrepreneurship and Spillovers from Multinationals," 99–100.
59. See note 52 above.
60. Author's personal interview with Managing Director, Peggy Garments, 14 April 2015.
61. Crespo and Fontoura, "Determinant Factors of FDI Spillovers," 416–21.
62. Author's personal interview with Operation Manager, Kobil Uganda, 30 April 2015.
63. Demena and Murshed, "Transmission Channels Matter," 716.
64. See note 38 above.
65. Author's personal interview with Director, Polad Uganda, 14 May 2015.
66. See note 40 above.
67. Lu et al., "Identifying FDI Spillovers," 86; Demena and Murshed, "Transmission Channels Matter," 719–20.
68. Lu et al., "Identifying FDI Spillovers," 86; Demena and Murshed, "Transmission Channels Matter," 719–20; Jordaan, "Determinants of FDI-Induced Externalities," 2108.
69. Wang and Blomström, "Foreign Investment and Technology Transfer," 147.
70. Glass and Saggi, "Multinational Firms and Technology Transfer," 504.
71. Author's personal interview with Executive Secretary, Cooper Motor Corporation, 8 April 2015.
72. See note 26 above.
73. See note 8 above.
74. Glass and Saggi, "Multinational Firms and Technology Transfer," 496.
75. Das, "Externalities, and Technology Transfer," 181.
76. See note 69 above.
77. See note 70 above.
78. Crespo and Fontoura, "Determinant Factors of FDI Spillovers," 411; Lu et al., "Identifying FDI Spillovers," 88; Havranek and Irsova, "Estimating Vertical Spillovers from FDI," 234–44.

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