**Authors’ responses to the Editor’s Comments**

First of all, we would like to thank the editor, Professor Mallick, for the helpful comments and have acknowledged that in the footnote on the first page of the paper.

**Editor’s Comments**

You did not take my previous comments seriously. Your tables contain coefficients which are too large. You should re-estimate with variables in logs as you have done in Tables A5-A6. Otherwise those 4-digit coefficients are meaningless to report. Your abstract and highlights are still poorly written and remain technical. You do not say why you are finding those results. The journal no longer publishes pure statistical correlations. Unless you identify what is the problem that you have solved through your research and how there is a correlation between the two variables of interest, I am afraid I cannot take this paper forward. We no longer publish pure statistical correlations, whatever be the methodology. You may take a look at the following recent paper for insights in the general economics literature in order to connect to the wider debate on innovation and vertical/horizontal FDI at industry-level:

Bournakis, I., Christopoulos, D. and Mallick, S. (2018), Knowledge Spillovers and Output Per Worker: An Industry-Level Analysis for OECD Countries. Economic Inquiry, 56 (2): 1028–1046. doi:10.1111/ecin.12458

Please note that the journal is a general-interest journal; you need to make it as clear as possible in explaining the mechanism or channel for your main finding both in the abstract and in highlights, which is very important for a paper to have impact. General readers do not know what these models are, unless you express the idea clearly in an intuitive sense and via introducing interaction terms relative to a benchmark model. People only spend one or two minutes to read an abstract; if they do not see the novelty within that time, they tend to ignore a paper. Please make sure you highlight the big ideas in a clear and succinct manner that is informative, novel, logical and engaging, which I consider as one of the ways to improve citations of all the papers we publish.

The journal is interested in findings that will attract citation by future authors. Please highlight what is new in your research that will attract authors to read and cite your work. A reader will not be interested only in what you found, but why you found it and how it helps solve a problem. Building on existing knowledge is key for scientific advancement. You need to make a reader to stay up-to-date with the latest development on this topic and then say the incremental contribution that your paper makes. Please get it professionally proof-read before you resubmit the next version. Please say clearly the main contribution in relation to the literature, as a reader needs to know in what way your paper adds to the existing knowledge. In other words, what was the problem in the literature that your paper solves. In your highlights, you have to say what you have found and how significant they are, rather than saying what all the paper is doing.

Please take this as your final opportunity in coming up with an error-free version. Please refine the exposition of your paper as the journal's focus is on an economic argument which is very important for a paper to have impact and increase citation when published. Each highlight should be telling a big idea or finding as a short sentence within 85 characters (including spaces). Please think carefully about the key messages that you want people to note as big takeaways from your paper (you can have up to 150 words in your abstract). Your abstract and highlights should be written in a logical sequence. Please take a close read to make sure there is no other error, as it takes editorial time and delays the review process.

Do not resubmit in a hurry. Please take your time and improve clarity and exposition throughout your paper with more focus on practical implications/economic story rather than pure technical results which the journal limits publishing. If you are prepared to undertake the additional work required to improve exposition and clarity, I would be pleased to reconsider my decision.

**Authors’ Responses:**

1. The OLS and Tobit coefficients estimates reported are now of acceptable size. The KK model links FDI stocks to GDP flow variables (sums, differences, squares, and interaction terms). We checked the previous literature and found that it used different dollar unit values (e.g., Awakuse et al. (2012), Blonigen and Piger (2014), Carr et al. (2001), Davies (2008), and Mariel et al. (2009) have all used levels and different units within each of their regressions of stock on flow values). We now followed that approach and report new coefficients that seem all of very reasonable size. We changed Table 3 to reflect the new units used. All results for methods other than OLS and Tobit remain unchanged, except for estimates of the constant terms and the pseudo likelihood values, which we adjusted as necessary. This approach avoids purging zero values or choosing a transformation of the data to eliminate zero values in order to be able to take logs (e.g., Blonigen and Davies, 2004), such as adding a small positive value to all observations or taking an inverse hyperbolic transformation. Also it makes our results directly comparable to most of those in the previous KK literature.
2. We added new highlights to read as follows:

* Knowledge transfer is not a main driver for foreign direct investment within Asia.
* GDP, distance, common language and bilateral investment treaties matter most.
* A basic gravity model outperforms various versions of the knowledge-capital model.
* Results are robust to different estimation methods for zeros and corner solutions.
* Future research on foreign direct investment should be guided by the gravity model.

1. We added a new abstract:

“This study analyses the role of knowledge transfers via bilateral foreign direct investment (FDI) among pairs of 31 Asian economies from 2001 to 2012. The article makes three different contributions to the literature on the motivations for FDI: (1) it is the first study that applies the knowledge-capital model to FDI among Asian economies, using a comprehensive data set; (2) it conducts model selection tests for choosing the best fitting empirical model specification and most appropriate estimation method; and (3) it models both, the decision whether to engage in FDI or not and the decision on the amount of FDI. The main ﬁndings are: (1) while FDI is driven partially by seeking low-cost unskilled labour, overall the knowledge-capital model is not supported by the data; and (2) a gravity model explains FDI among Asian countries better than the knowledge-capital model and therefore is a more suitable vehicle for future research.”

1. We added a new paragraph to the introductions and rewrote/shortened other parts of the introduction in order to make the subject matter more accessible and less technical, focusing on the economic arguments:

“A leading theoretical model explaining FDI is the so-called knowledge-capital (KK) model of Markusen (2002), where knowledge is transferred along capital internationally via FDI.[[1]](#footnote-1) It is able to explain FDI between countries of similar or different market size as measured by GDP when relative skilled- and unskilled-labour endowments are either similar or quite different. For example, a firm may have headquarters in one country and a single production plant in another country, or it may have plants in both countries, even when labour endowments are similar and the goods produced are the same. The KK model involves complex economies of scale at the firm and plant levels in order to provide a theoretical explanation for FDI under these different circumstances. Firms motivated by market-seeking FDI may try to take advantage of a large domestic market in the FDI host country due to economies of scale at the plant level, try to avoid transport costs, and/or take advantage of low foreign investment barriers. This is referred to as horizontal FDI, where every plant produces the same product regardless of its location. On the other hand, the KK model is also able to explain FDI when FDI is driven instead mainly by relative differences in skilled and unskilled labour across countries. Firms located in relatively skilled-labour abundant countries use FDI to establish plants abroad in order to source out parts of the production process, that involves unskilled labour, to countries where unskilled labour is relatively abundant and low cost. This type of FDI is referred to as vertical FDI, because firms fragment the production process of a specific product into vertical stages.”

“The KK model is a general-equilibrium model that endogenizes the FDI decisions of multinational enterprises (MNEs) and integrates vertical and horizontal FDI, allowing both to exist simultaneously in equilibrium. It is assumed that knowledge capital is internationally mobile and can be used simultaneously at low cost as a joint input into a firm’s multiple production facilities across different countries (Markusen, 1984). It is assumed that labour is not mobile across countries. The KK model explains the dominant type of FDI, i.e., vertical, horizontal, or no FDI, based on characteristics of pairs of source and host countries of FDI. The KK model makes it necessary to separate inflows and outflows of FDI, instead of using net FDI flows only. Skill endowments of the source country relative to the host country play a crucial role, as do relative and total market size of both and the cost of trade and investment among them.”

“We contribute to the literature on the motivations behind FDI in three ways:

(1) Ours is the first study that applies the KK model to intra-Asian FDI. Even though a large empirical literature explores FDI in Asia, only a few studies examine intra-Asian FDI (e.g., Petri, 2012). However, they do not employ the KK model. Petri (2012) shows that FDI patterns within Asia differ systematically from the general FDI patterns observed elsewhere, with intra-Asian FDI dominated by technology upgrading in host countries. This motivates us to explore whether the KK model can provide an explanation for intra-Asian FDI based on knowledge-capital transfers.

(2) We bring together and compare results for different empirical specifications for the KK model and in addition consider an alternative model, the gravity model. We apply model selection tests in order to establish the best fitting empirical specification. The KK models that we consider include those of CMM (2001), Braconier, Norbäck and Urban (2005), Davies (2008), and Bergstrand and Egger (2013). As Table A1 in the Appendix shows, empirical support for the KK model is rather mixed and it is therefore a matter of controversy what the motivations for FDI are. Furthermore, we also consider an empirical specification based on the multi-country general-equilibrium gravity-type model of FDI with costly international trade and investment, developed by Anderson, Larch and Yotov (2019), as an alternative approach to the KK model in order to see whether it provides a more convincing empirical specification. As to the estimation methods, we explore various alternatives, including ordinary least squares (OLS), Tobit, Poisson pseudo-maximum-likelihood (PPML), lognormal hurdle, and exponential-type II Tobit, and conduct statistical testing to choose the most appropriate model specification and estimator for our FDI data.

(3) A novel feature of our analysis is that, as part of the lognormal hurdle model, we separate for the KK model and the gravity model the participation decision, which is FDI or no FDI, from the FDI amount decision for bilateral FDI between all possible in-sample country pairs.[[2]](#footnote-2) The majority of observed values of bilateral FDI in our sample are zeros. In contrast, empirical applications of the KK model generally ignore the no-FDI outcome choice and, instead, focus only on the two types of non-zero FDI, horizontal and vertical.”

1. We rewrote the technical parts of Section 5 in order to explain the econometric methods in a more accessible way for the non-specialist and in the process we took out several equations. We also made throughout Section 6 a number of changes to focus more on the economics of the results and less on the statistical technicalities.
2. We changed various parts of the conclusion to make it less technical and to focus more on the findings and less on the econometric techniques. We include here all of the conclusion for completeness:

“The knowledge-capital (KK) model has been widely used in the empirical FDI literature in the last two decades in order to identify what the motives are behind FDI. The majority of studies focus on a group of developed countries, such as the OECD, or on inward and outward FDI for a single economy. An unanswered question in the existing literature is whether the KK model is a suitable vehicle to explain FDI among Asian economies or whether a gravity-type model is preferable. The KK model postulates that investment related to transfers of knowledge and know-how may play an important role for FDI. The KK model includes specific difference, interaction and squared variables that distinguish it from other theories of FDI. We compare various empirical KK model specifications to a gravity model in line with Anderson et al. (2019) and use model specification tests to choose the best fitting model and estimation methods. A novel feature of our study is that, due to the prevalence of zero values in our FDI data, we model the decision to participate in FDI as being separate from the decision on the amount of FDI.

KK model-specific variables are the bilateral sum of GDP and its squared difference, the difference in skilled-labour endowments, and its squared interaction with trade cost to the host country. To some extent, our KK model-specific empirical findings signal that low-cost-labour seeking (vertical) FDI is the dominant type of FDI between Asian economies. However, the empirical results reveal that coefficients either have signs opposite to what is predicted by the KK theory or are not statistically significant when country and time fixed effects are included in the fitted models.

We explore the robustness of our results, but our conclusions remain unchanged. A variety of alternative empirical KK model specifications suggested in the literature do not lend empirical support to the KK model for intra-Asian FDI either. On the other hand, a number of factors are found to have a significant impact on the volume of FDI between Asian countries. However, these are typical variables used in the FDI literature based on gravity model specifications. Therefore, we also fitted a gravity model.

A basic gravity model (Anderson et al., 2019) seems to provide a satisfactory empirical explanation of FDI among Asian countries. The variables relevant for FDI are GDP in the source country, GDP in the host country for the participation decision, distance between source and host country, a common spoken language for the FDI amount decision, and a common colonial relationship for the participation decision. Existence of a bilateral investment treaty also has a positive impact on FDI decisions.

Overall, our results suggest that future research on intra-Asian FDI should consider alternative models to the KK model, such as the gravity model of Anderson et al. (2019). Our results also highlight the importance of checking the robustness of results to the inclusion of fixed effects and alternative estimation methods that deal specifically with corner solution outcomes reflected in large numbers of zeros in the FDI data, which may bias results if purged.

Our results have several implications for economic policies related to trade and investment among Asian countries. While we do not find much empirical support for the KK model, which focuses on the transfer of knowledge and capital, it nevertheless reveals that relative unskilled-labour cost advantages are an important channel that drives FDI within Asia. This is in line with recent movements of foreign investors from China to other low-wage Asian countries due to rising labour costs in China (Donaubauer and Dreger, 2018). Furthermore, the empirically preferred model for FDI, the gravity model of Anderson et al. (2019), points to additional crucial drivers of intra-Asian FDI that are relevant for policy: bilateral investment treaties and distance. Distance has a negative effect on FDI. It serves in our model as a proxy for trade costs. Therefore, policies that reduce trade costs, such as China’s belt and road initiative, will enhance FDI significantly.“

1. A native English language professional carefully proofread the whole paper. We made numerous small changes throughout the paper in order to improve/polish the English and correct any mistakes.

1. FDI is one way to transfer knowledge to other countries. Another route for the international diffusion of knowledge is through imports. See Bournakis et al. (2018) on knowledge spillovers through FDI and trade at the industry level for OECD countries. [↑](#footnote-ref-1)
2. The KK model not only predicts the volume of FDI but also whether there is no FDI, in which case there is only domestic investment. [↑](#footnote-ref-2)