Foreign Rivals are Coming to Town:
Responding to the Threat of Foreign Multinational Entry [*]
(Job Market Paper)

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Abstract

How do domestic firms respond to the *threat* of foreign competition? This paper quantifies the threat of competition from foreign multinational firms by exploring investment news that appear in over 35,000 newspapers, trade presses, magazines, newswires, and other forms of media in 200 countries. The analysis shows that, on average, domestic firms respond to foreign multinational threats by increasing productivity, R&D, labor training, patent applications, and advertising expense and changing product composition. However, the response exhibits substantial heterogeneity across industries and firms: industries with tougher competition are more likely to upgrade productivity; within each industry, the right tail of the domestic productivity distribution responds by increasing innovation while the left tail escapes competition threats by dropping threatened products. Moreover, the degree of response increases significantly with the size of the threat, the influence of the news, the amount of information embedded in the news on, for example, the credibility and the motive of the threat, and the number of news in downstream industries. The main findings are robust to placebo tests and IV analyses that explore detailed and unique characteristics—such as the publishing timing and location, the primary consumers, and the substance—of each news.

JEL Codes: F1, F2, L2, D2
Key Words: threat, foreign investment news, and domestic firm responses

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1   Introduction

How do domestic firms respond to the *threat* of foreign competition? An extensive body of research assesses the impact of increased competition from globalization on the performance of domestic firms, but relatively little analysis has investigated the response of domestic firms to the threat of foreign competition, mainly due to the difficulties of identifying the threat separately from actual competition. Observed changes (or the lack thereof) among domestic firms, as a result, are often attributed to the externalities or the competition effects of actual foreign competition, even though strategic, preemptive actions could lead to similar outcomes and represent a sharply different mechanism through which domestic firms respond to globalization.

In this paper, we examine domestic firm response to information of foreign competition threats. We quantify competition threats from foreign multinational firms by exploring investment news that appear in over 35,000 newspapers, trade presses, magazines, newswires, television and audio transcripts, and web and social media in 200 countries. We identify and collect foreign investment news in 2000-2007 by searching key words in Factiva, one of the largest global digital business archives in the world. For each piece of news, we record the publishing date of the news and the expected date of the actual investment to separate the anticipated threat of foreign competition from the arrival of actual competition. In addition, we document detailed investment characteristics—such as investment size, expected output and employment, investment motive, and entry form—and news characteristics—such as news content and news publisher information—by carefully reading through the text of each news and collecting related information.

For example, in a December 2005 issue of *Wall Street Journal*, Toyota Motor Corp. announced that "it received permission from authorities to build a car plant near St. Petersburg, Russia." The news further stated that the car maker "plans to invest $140 million in the plant, the construction of which will start in the fourth quarter of 2006 and finish in mid-2007" and "will start production at 20,000 Camry models a year and gradually raise output to 50,000 a year." In another example where the foreign threat was less certain, an October 2007 news article in *Shanghai Daily* announced that Continental AG plans to "invest US$216 million to build its first Chinese tire-making plant in Hefei, Anhui Province... The new facility, awaiting approval from the central government, will be able to produce four million passenger tires a year in the long term... Construction will start in the middle of next year and production is due to begin in early 2010."

These news enable us to quantify threats of foreign multinational entry revealed by news media and, further, identify a time window between the announcement and the expected occurrence of foreign investments (for example, December 2005-mid 2007 in the case of Toyota in St. Petersburg, Russia and October 2007-early 2010 in the case of Continental AG in Hefei, China). Exploring this unique information, we are able to examine how domestic firms in affected industries (e.g., automobiles and tires in the above two examples) behave when faced with the

threat of foreign competition, specifically, after the arrival of competition news and before the expected occurrence of competition.

We merge the constructed foreign investment news data with a large cross-country firm panel dataset drawn from Bureau van Dijk's Orbis and Chinese National Bureau of Statistics' Annual Census of Enterprises. The cross-country firm panel dataset contains rich time-series financial, operation, and ownership information for over 2 million public and private manufacturing companies, which enables us to assess domestic firms' reactions to anticipated and realized foreign multinational competition in a variety of dimensions.

Our analysis shows that domestic firms do respond significantly to the threat of foreign multinational competition. Domestic firms upgrade productivity when faced with the threat of foreign competition, especially threats with greater expected output and employment. The actual arrival of foreign investment, in contrast, is found to have weaker or no effect on productivity. In exploiting the underlying mechanisms of productivity response, we find that, on average, after the arrival of competition news domestic firms significantly increase R&D, staff training, patent applications, and advertising expense as well as change product composition.

However, the response to foreign multinational threats and its underlying mechanisms exhibit substantial heterogeneity across industries, firms, and countries. Domestic firms in industries with more fierce competition—the so-called "neck-to-neck" industries—respond more strongly to foreign multinational threats. Within each industry, firms at both the right and the left tails of the TFP distribution upgrade TFP in response to FDI news, but through sharply different channels. The most productive domestic firms improve TFP by increasing innovation, while the least productive domestic firms enhance their TFP by dropping threatened products. Incorporating a unique dataset from Orbis that reports top direct competitors of MNCs, we also investigate how the news of an MNC's FDI entry (e.g., Toyota's new investment in China) would affect the behavior of this MNCs' top global competitors (e.g., GM's existing subsidiary in China). Our analysis shows that top competitors, most of which are foreign multinationals themselves, do not adjust their TFP or innovation decisions, but instead increase advertising effort in response to FDI news. Across countries, domestic firms in developing countries are found more responsive to FDI news while news of developed-country FDI are more influential.

The response of domestic firms is also not limited to FDI news in the same industry. Anticipated competition in an industry can influence domestic firms in other industries via production linkages. Specifically, domestic firms increase innovation when there is FDI news in downstream industries. This suggests that anticipated entry by foreign multinational customers increases the expected payoff from innovating for domestic input producers and thereby raises domestic innovation in upstream industries.

Further, the extent of domestic productivity upgrading varies with the influence of news. To quantify the influence of each news, we collect the publication title and the news agency of each news piece, the location of news agencies and publications, and the word count of each news

and obtain the circulation volume of each publication title from data sources such as Ulrich, News Bank's Access World News, and Audit Bureau of Circulation. We find that domestic firms exhibit stronger TFP response to more influential news with a larger readership.

Given our goal to establish the role of information in firm behavior, we also explore the detailed content of each news to extract useful information contained in each news report and examine how domestic firms' reactions might vary with the specific information provided. We find that the substance of the news significantly affects domestic firms' behavior. First, we identify whether the news contains information on the credibility of threats by revealing any uncertainty or ambiguity (such as contingencies on government approval) about the foreign investments. Domestic firms are shown to respond only to credible foreign multinational threats whose investments are described to occur unambiguously, but not to those whose investments involve uncertainties and contingencies. Second, we document the motives of foreign investments (e.g., whether the new subsidiary of foreign MNCs seeks to serve primarily local or export markets) reported in the news. We find that news of local-market seeking FDI lead to significant domestic TFP upgrading whereas news of export-platform FDI and news that do not provide any target market information do not exert any effect on domestic firms' TFP.

In the analysis, we account for all time-variant city and country factors with the control of city-year and country-industry-year fixed effects and each city's industry-specific market growth. However, it is plausible that the reporting of FDI news might still be correlated with a city's unobservable persistent or contemporaneous productivity shocks (that are not already controlled for by the city-year dummies and city-industry sales growth).

We use various strategies to address the above concerns. First, we consider a placebo test by exploiting the specific timing of FDI news by assuming that each FDI news had been published slightly (6 months or one year) earlier. If FDI news indeed capture a local productivity or economic trend, the slight forward adjustment in the timing of news should lead to relatively small changes in the estimates. If, instead, the concern does not apply, FDI news, when assumed to be published before the actual publication date, should not result in any responses from domestic firms. Our placebo test result is consistent with the latter. We also perform an additional falsification test by investigating the effect of FDI news on other performance outcomes such as profit growth. If indeed FDI news reflect local industry-specific economic growth trends (for instance, FDI news are reported because of domestic demand boom), we should expect also a positive correlation between FDI news and other firm-level growth variables such as profit growth. This hypothesis is not supported in the data. These results offer us further reassurance that the estimated effect of FDI news is unlikely to have captured local economic growth trends.

In addition, we consider an instrumental variable (IV) approach, with two alternative instruments, to address the concerns described above. In the first IV approach, we instrument FDI news reported by domestic local news sources—which is likely endogenous—with FDI news reported by foreign local news sources. This approach is based on the considerations that news

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reporting by local publications (city- or town-level publications catering primarily to local readers) (i) is more likely to be driven by local news supply (e.g., inward or outward FDI activities by local companies) or local economic conditions than a foreign city's productivity shocks; (ii) should have little direct influence on the behavior of foreign readers. Our analysis confirms that foreign local news serve as a plausible IV and shows that the estimated effect of FDI news remains robust. In the second IV approach, we consider narrative articles published in weekend news as an IV for weekday news. Compared to weekday news, narrative weekend news are intended to have a lighter content; FDI news in this category are usually a relatively minor and subtle part of a long narrative article focusing on non-FDI-specific topics. The probability for these FDI news to be driven by local productivity shocks or to directly influence domestic firms is therefore very low. We find that the estimated effect of weekday FDI news is positive and robust to the IV.

Finally, we perform additional analysis to further examine the robustness of our results. For example, we investigate the potential concern of large FDI news bias and address the implications of this issue for our analysis. Specifically, we show that there are low correlations between the scale of FDI reported in the news and the amount of media attention. We also re-performed our analysis by separately considering small-scale FDI news and found their effects to be quantitatively similar. We also focused on countries with comprehensive news coverage—to account for the potential bias of large news publications—and countries with the best domestic-firm coverage—to mitigate the concern of large- and medium-firm bias—and found the results to remain robust.

Our paper is related to a broad empirical trade literature that examines domestic firms' responses to trade liberalization and foreign competition. A comprehensive review of this literature is beyond the scope of our paper; we focus instead on a few studies in the area. The pioneering work by Pavcnik (2002) uses plant-level panel data on Chilean manufacturers to show significant within-plant productivity improvements following Chilean trade liberalization. She also finds that reallocations of resources and output—from less to more efficient producers—constitute an important source of aggregate productivity gains. More recently, Lileeva and Trefler (2010) investigate the effect of U.S. tariff cuts on Canadian plants' export and innovation decisions and find lower-productivity Canadian plants that were induced to export by the tariff cuts tend to increase labor productivity and product innovation. Exploring the impact of MERCOSUR, Bustos (2011) shows that Argentinean firms in industries facing higher reductions in Brazil's tariffs increase technology investment faster. These analyses offer unique evidence on domestic firms' productivity upgrading in response to new export-market opportunities. Bloom, Draca and Van Reenen (2012) examine the impact of Chinese import competition on a rich set of European firms' technology behavior including patenting, IT, R&D, TFP and management practices and find that innovation increases among firms that are most affected by Chinese imports.

This paper is also related to an extensive empirical trade literature assessing the effects of

(actual) foreign multinational competition on domestic firm performance. In particular, many studies have shed significant light on potential productivity externalities generated by foreign multinational firms; see, for example, Aitken and Harrison (1999), Javorcik (2004), Keller and Yeaple (2009), Guadalupe et al. (2012), Fernandes and Paunov (2012), Aghion et al. (2012), and many others. While overwhelming evidence suggests positive productivity spillovers between industries with vertical production linkages, evidence on within-industry productivity spillovers has been ambiguous with the important exceptions of Keller and Yeaple (2009) and Aghion et al. (2012). Most analyses show that increased actual foreign multinational competition has led to relatively weak or little changes in the TFP of domestic firms in the same industry.

This finding is not surprising as foreign multinational competition can affect domestic firm TFP in a number of different ways. First, increased foreign multinational activity could generate positive productivity spillover via, for example, direct technology transfer and labor mobility (an externality effect). Second, increased competition from foreign multinationals implies increased competition for not only final product but also labor, capital, and technologies, which can consequently hurt domestic firms' innovation incentives and TFP (a competition effect). The third and the least stressed channel is that tougher competition from foreign multinationals could also motivate domestic firms to increase innovation and self-upgrade TFP with the aim to escape competition (a strategic effect), especially before the actual competition occurs. Given that it is difficult to disentangle these opposing forces when estimating the net TFP effect of actual foreign multinational competition, analyses often obtain ambiguous evidence.

Our paper complements the literature by investigating the effect of foreign competition threats. We distinguish between the strategic actions of domestic firms and the externality and the competition effects of actual foreign competition and offer one of the first evidence on how foreign competition threats could stimulate innovation and productivity upgrading. We achieve the goal by taking advantage of the unique setting of our data and exploiting domestic firm responses to foreign competition threats before the arrival of actual competition (thereby before the arrival of externality and competition effects). We show that the strategic, self response to competition threats represents an under-emphasized, but crucially important mechanism through which globalization affects domestic economies, accounting for, in our analysis, most of the domestic productivity growth associated with multinational competition. Our analysis also shows how anticipated foreign competition threats affect domestic firms' behavior in a rich set of dimensions to understand the mechanisms through which threats might stimulate productivity upgrading, and how the responses vary across industries, firms, and countries. Further, exploring unique detailed characteristics of our primary treatment variable (such as the timing and location, the primary consumers, and the content of each FDI news) enables us to employ various strategies to identify the treatment effect.

The rest of the paper is organized as follows. Section 2 discusses theoretical hypotheses emerging from existing theories. Section 3 describes the methodology and the process employed

in constructing the foreign investment news dataset and the information as well as the patterns embodied in the data. Section 4 discusses the supplementary cross-country firm-level financial, ownership, and operation data. Sections 5 and 6 report the baseline econometric evidence and the sensitivity analysis, respectively. Section 7 concludes.

2   Theoretical Hypotheses

An extensive number of theories have investigated how foreign competition could affect innovation and firm productivity. In this section, we briefly describe three strands of theories and explore how they each apply to the context of competition threats and represent a distinctively different mechanism through which anticipated foreign competition could influence firm productivity.

Innovation   First, many studies show that increased competition could induce more innovation and increase productivity by raising the incremental profits from innovating. Aghion et al. (2005), for example, show that more competition may foster innovation aimed at "escaping competition" for firms operating at similar technological levels, i.e., in the so-called "neck-to-neck" industries. In contrast, for technologically-laggard firms, the Schumpeterian effect of competition—where product market competition lowers post-innovation profit margins—could dominate and competition may dampen the innovation incentives.

In this paper, we examine the effect of competition threats rather than the effect of actual competition, but the above theoretical prediction similarly applies: threats of increased competition from foreign multinational firms could motivate "neck-to-neck" firms to increase innovation—even prior to the actual arrival of competition—by increasing the expected incremental profits from innovation. In fact, domestic firms have stronger incentives to act before—than after—the arrival of actual competition, as the costs of innovation will go up after actual competition occurs. However, for technologically-laggard firms, the threats of increased competition may discourage innovation due to the lower expected profit margin.

Product Composition   Increased foreign competition could also increase firm productivity by affecting firm product composition. Several studies—including, for example, Bernard, Redding and Schott (2010), Eckel and Neary (2010), Mayer, Melitz and Ottaviano (2014), and Nocke and Yeaple (forthcoming)—investigate how trade liberalization could affect the product composition of multi-product firms and show that increased competition can motivate firms to change their product mix by dropping their least competitive products and specializing at their most competitive products. Their analysis suggests that product switching contributes to a reallocation of resources within firms toward their most efficient use and represents an important channel of productivity gain. In a different setup, Bloom et al. (2013) develop a novel "trapped-factor" model of trade-induced innovation where firms can allocate a factor of production either

to produce old goods or innovate and produce new goods. Increased import competition reduces the profitability of old goods and consequently the opportunity cost of innovating and producing new goods, thereby increasing firms' incentives to innovate and introduce new goods.

This channel also applies in our context when there is threat of foreign multinational entry. In anticipation of future competition, domestic firms may strategically opt to drop their least competitive products or the products facing direct competition. In the meantime, they could innovate to introduce new products where there is no threat of competition. Such changes in product composition would also lead to an increase in the firm's overall productivity.

Vertical Production Linkages   Finally, increased competition could affect innovation and productivity through vertical production linkages. As shown in Goldberg et al. (2010a, b), increased imports of intermediate inputs could enhance innovation and firm productivity by enabling domestic firms to access better foreign technologies and higher-quality foreign intermediate inputs. Similarly, increased competition in final-good markets could raise the payoff from innovation for intermediate-input producers and motivate them to increase innovation and productivity.

This mechanism can become active before actual competition occurs. In anticipation of increased future competition in upstream and downstream industries, domestic firms may increase innovation in advance in order to better utilize foreign intermediate inputs and access final-good producers when actual entry occurs.

Our empirical analysis will examine the above three theoretical predictions and investigate how anticipated foreign multinational entry will affect domestic firms' productivity via three mechanisms: (i) innovation, (ii) product composition, and (iii) between-industry production linkages. We will also investigate—following the theoretical predictions—how the effects could vary across industries depending on each industry's competition structure, across firms depending on each firm's position in the productivity distribution, and across countries.

3   Quantifying Foreign Multinational Threats

A central challenge in assessing firm responses to the threats of foreign competition is the difficulties of identifying foreign competition threats separately from actual foreign competition. In this paper, we quantify the threats of foreign competition by exploring news of foreign multinational investments. Unlike other types of international competition such as exports and imports, the foreign investment activity of multinational firms has always received substantial media attention. Many newspapers, industry journals, and magazines closely track and report the latest news or rumors about multinationals' future investments. This offers us an opportunity to measure the anticipation of foreign multinational competition—through the news information

channel.[1] In this section, we describe the source and the process employed to construct a database of foreign investment news and the detailed information collected in the data.

3.1   Factiva

The primary source of our news information is Factiva, founded by Dow Jones and Reuters. Factiva is one of the largest global digital business aggregators and archives in the world. Factiva delivers the world's news and business information with access to more than 35,000 news sources, including newspapers, trade press, consumer magazines, newswires, press releases, television and audio transcripts, digital video and audio clips, web media, and social media, from 200 countries in 28 languages.[2] Top examples in each category include Wall Street Journal and the New York Times (newspapers); the Oil and Gas Journal and the Automotive News (trade presses); Dow Jones Newswire and AFP (newswires); PR Newswire and Business Wire (press releases); ABC News—Good Morning America and Deutsche Welle (TV and audio transcripts); WSJ Live (multimedia); Gazzetta di Parma Online News, L'Unione Sarda Online News, and Sina Corp (web media). Factiva's combination of global content, business search, and monitoring technologies offers users timely, reliable and relevant knowledge.

Two other sources, namely, LexisNexis Academic and ABI/Inform Complete Plus were also considered. LexisNexis Academic News, published by Reed Elsevier, also gives access to major newspapers from around the world as well as industry and market news sources in 16 languages. A comparison of Factiva and LexisNexis suggests that 84 percent of Factiva's news titles are unique and not covered in LexisNexis Academic News. Factiva has a more comprehensive coverage by including both major and local newspapers, industry journals, trade publications, and multimedia whereas LexisNexis Academic News focuses on major newspapers only. The advantage of LexisNexis Academic is its access to U.S. and international law documents, which are outside of our research interest. Similar to LexisNexis Academic News, ABI/Inform Complete Plus consists of primarily the largest publishers' publications in the U.S. and Europe. Given our goal of collecting news information from not only prime but also local channels, we adopt Factiva as the primary data source.

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[1]We recognize that FDI news is only one of the channels through which information about future multinational competition might dissipate across firms and countries. Information might also be transmitted through informal channels like business connections. However, compared to the informal channels, formal FDI news has several distinct advantages, namely, (i) a much broader audience coverage that includes people/firms without access to the informal channels; (ii) greater reliability and higher quality; and (iii) systematically available and quantifiable information. In contrast, information access through informal channels depends greatly on the extent of a person's/firm's informal connections and can be less reliable and accountable. More crucially, information transmitted through such channels is infeasible to quantify systematically. Further, we note that if informal channels constitute an important source of business information, our estimation results focusing on the role of formal news channels would likely be biased downwards.

[2]While Factiva is the largest business news archive in the world, its coverage varies across countries. In Section 6.4, we examine the robustness of our analysis by focusing on countries with the most comprehensive news coverage.

3.2 Methodology

The following specifications are employed in our data search process. We limit the search to the period of January 1, 2000-December 31, 2007.[3] The search includes all types of sources, all regions, and companies in manufacturing industries including Food, Beverages, Tobaccos, Automobiles, Chemicals, Clothing and textiles, Computers, Electronics, machinery, telecommunications, and other industrial and consumer products.

We search the string "invest" (as either a whole word or part of whole words such as "invested" and "investment") in the text (including headlines and lead paragraphs). This results in 146,663 investment-related news pieces from all over the world. We then screen the text, in particular, the text around the keywords to identify news about possible future investments. Investment news that contain "plan to", "agree to", "say they will", "sign an agreement", "expect", "consider", and other similar types of word are considered and kept as news of future investments.[4] To distinguish between domestic and foreign investment, we perform a background check on companies in the news as most news articles do not indicate the source country of investments. We identify the home country and the host country of each firm with the announced investment. This step leaves us 20,432 foreign investment news.

3.3 Investment and News Characteristics

We collect detailed investment and news characteristics by carefully reading through each piece of foreign investment news. The following list of information is included in the data.

Investment Information

1. *Multinational firm*: the firm that undertakes the foreign investment. We identify each firm's name, home country, primary industry, and ultimate owner (if the firm is a subsidiary of another firm). In most cases, only one firm engages in the investment. In cases where more than one firm is involved, each firm's information is recorded separately.

2. *Announcement date*: the date on which the investment was announced.

3. *Start year*: the expected production starting year.

4. *Investment country*: the country where the multinational firm will invest. There are 138 host countries in our final sample.

5. *Investment state/province*: the state or province where the multinational firm will invest.

6. *Investment city/town*: the city where the multinational firm will invest. The city information is reported in most investment news. There are 2,463 cities in the final sample. In cases in which only investment states and provinces are reported, we use the largest city to proxy for investment city/town.

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[3]The time frame is largely determined by the availability of firm-level financial data.

[4]We also recorded news of current FDI and used the information as an alternate measure of actual FDI activity in the analysis to examine the robustness of the results.

7. *Entry or expansion*: whether the investment is a new entry or an expansion of an existing investment.

8. *Investment industry*: the primary industry in which the subsidiary will operate. It is also the industry in which domestic firms will compete with the foreign multinational firm. Based on the description in the news, we identify the 4-digit US SIC code of the industry and later aggregate it to the 3-digit level to merge with the financial data. In a relatively few cases where industry information is not given, we search company information from other sources to identify the primary industry.

9. *Investment value and currency*: the amount of investment value and its currency. We convert all investment values to current U.S. dollars based on daily exchange rates.

10. *Expected employment, output, and revenue*: the expected employment, output, and revenue from the investment.

11. *Subsidiary name*: the name of the new subsidiary.

12. *Investment form*: whether the investment is greenfield, M&A, or joint venture.

13. *Investment contingency*: the contingency of the investment such as "*subject to government approval*".

14. *Investment motive*: the motive of the investment such as "*to meet the local demand*" and "*to use it as an export hub.*" We separately identify local-market seeking FDI news and export-platfom FDI news.

15. *Expected consumer market*: related to the investment motive, the targeted consumer market of the investment, namely, domestic or foreign market (and share of exports if available).

News Characteristics

1. *Publication title*: the name of the news source. Our final sample consists of 832 news sources from 67 countries.

2. *Publisher*: the publisher company of the news source.

3. *Publisher country*: the headquarter country of the news source.

4. *Publication location*: the location where the news was published.

5. *Word count*: the number of words in the news text.

6. *Type of news sources*: the type of news sources. Our final sample consists of four major types of news sources, including newspapers, journals, and magazines; news agency or news service; website; broadcast. The majority of news sources are the former two.

7. *Circulation*: the circulation volume of the publication. For newspapers, journals, and magazines, we collect circulation data to measure their influences. The circulation data are obtained from the following sources: Ulrich: Global Periodicals, News bank: Access World News, and Audit Bureau of Circulations.

8. *Online*: whether the publications have an online version.

9. *Frequency*: the annual frequency of publications.

10. *News agency reputation*: whether the news agency is an established national or international news agency.

3.4 Foreign Investment News: Stylized Facts

Our final sample consists of 20,432 foreign investment news. As shown in Figures 1-2, top host countries include China, India, Russia, the United States, and Thailand and top industries include transportation, electrical products, chemicals, computer, and food. Among multinationals that most frequently appear in FDI news are Siemens, Toyota, LG, Volkswagen, Nestle, Honda, GM, BASF, Hong Hai Precision, and Samsung, as seen in Figure 3.

[Figures 1-3 inserted here]

In the next subsections, we describe a number of stylized facts that emerge from the patterns of foreign investment news.

3.4.1 News Composition

We proceed by describing the composition of FDI news in several dimensions. First, we consider investment forms, including greenfield, mergers and acquisitions (M&As), and joint venture. We show in Table A.1 that greenfield FDI, M&As, and joint venture account for, respectively, 68, 7, and 14 percent of FDI news. The emphasis of news on greenfield FDI could be due to the fact that greenfield FDI usually takes much longer to realize after announcements than M&As and joint ventures. According to the SDC Platinum database which reports M&A announcements and rumors, the average time between M&A deal announcement or rumor and M&A deal completion is only 36 days, leaving very little preparation time for domestic firms.

Second, we examine the investment motive reported by the news. Based on the news description, we identify three main types of motive—local market access (FDI seeking to serve primarily local markets), export-platform (FDI seeking to serve primarily export markets), and comparative advantage (FDI seeking lower production costs)—for news with available information. As shown in Table A.1, the three investment motives constitute, respectively, 39, 59, and 8 percent of total FDI news.[5] The composition of investment motive is consistent with the geographic distribution of FDI news. We find that 56 percent of FDI reported in the news were expected to occur from OECD countries to non-OECD countries and about 30 percent of FDI were expected to occur between OECD countries.

Third, we consider the size distribution of investment and find large variations across investments. While the maximum investment value and the maximum expected output are over $100

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[5]Note that the three types of motive are not mutually exclusive in the data. Compared to information on expected markets which is reported by most news, information on cost motives is more limited. This motivates us to consider only the local-market-access and the export-platform motives in the later econometric analysis.

billion and 80,000, respectively, the minimum investment value is less than $1,000 and the minimum expected employment is 8. The average investment value and expected employment are $355 million and 1,508, respectively.[6] Across industries, lumber, printing and allied products, and chemicals have the lowest average expected employment, while leather, food, and electronic components have the highest average expected employment.

Finally, we separate FDI news described with certainty from those that reveal uncertainty or ambiguity about the foreign investment. We define uncertainty in two ways: investments with reported contingencies (government approval, broad-of-directors approval, and so on) and investments described with phrases such as "could invest", "would invest", "want to invest", "may invest", "expect to invest", "intend to invest", and "consider to invest". We consider threats of FDI involving uncertainty to be less credible than the others. As reported in Table A.1, we find that investments described with uncertainty account for over 10 percent of total FDI news.

3.4.2 News versus Actual FDI

Now we compare the data of FDI news with the data of actual FDI obtained from two different sources, namely, Orbis and UNCTAD.[7] As shown in Figure 4, we find a positive and significant correlation (around 0.4) between FDI news and actual FDI at the aggregate host-country level, based on either Orbis or UNCTAD. The correlation is, however, substantially lower (between 0.05 and 0.2) when we compare FDI news with actual FDI at the city, industry, or the city-industry pair level. This suggests that while the aggregate geographic distributions of FDI news correspond to those of actual FDI, there exist significant variations at disaggregated levels. FDI news in some countries, cities, and industries attract disproportionately high media attention. For example, China and India are two host countries that appear in FDI news more frequently than in actual FDI.[8] The different patterns of FDI news and actual FDI offer us an important source of variation for establishing their respective effects on domestic firms. The correlation between FDI news and actual FDI rises to 0.7 at the aggregate headquarter-country level, suggesting less variation in the headquarter-country dimension and that countries with more outward FDI news also tend to engage in more actual FDI overseas. Two exceptions are the U.S. and Japan, which attract considerably greater media attention than suggested by the levels of their actual FDI.

[Figures 4-5 inserted here]

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[6] In Section 6.4, we investigate the potential concern of large FDI news bias and address its implications for our analysis.

[7] In Section 4, we discuss the data sources for actual FDI in detail.

[8] The media attention bias towards China and India was present not just in FDI news but also in general news reporting. As a robustness check, we excluded China and India from the analysis and found the results remain similar.

In terms of bilateral country distribution, 56 percent of FDI news involve North-South FDI—occurring from OECD to non-OECD nations—while only 30 percent of actual FDI are North-South. In contrast, North-North FDI—FDI between OECD countries—accounts for only 30 percent of FDI news, but 53 percent of actual FDI. This suggests that North-South FDI tends to receive considerably greater attention in the media than FDI between developed nations.

Relating FDI news with country characteristics, we show in Figure 6 that countries with greater GDP and higher GDP and GDP growth rates tend to be reported more frequently by the news whereas no significant correlation is observed between FDI news count and countries' GDP per capita.

[Figure 6 inserted here]

4 Cross-country Firm Financial and Operation Data

We supplement the investment news dataset with a cross-country firm-level panel dataset drawn from Orbis and Chinese National Bureau of Statistics' Survey of Industrial Firms.

Orbis   Orbis, published by Bureau van Dijk, is a leading source of company information and business intelligence, containing comprehensive financial, operation, and ownership information for public and private companies in over 100 countries. Orbis combines information from around 100 sources and information providers. Primary sources include Tax Authorities, Ministry of Statistics, Provincial Bureau of Legal Entities, Securities and Investments Commissions, National Banks, Municipal Chambers of Commerce, and State Register of Accounts. Over 99 percent of the companies included in the database are private. The database reports for each company: (i) detailed 10-year financial information including 26 balance sheet and 25 income sheet items; (ii) industries and activities including primary and secondary industry codes in both local and international classifications; (iii) corporate structure including board members and management; and (iv) ownership information including shareholders and subsidiaries, direct and indirect ownership, ultimate owner, independence indicator, corporate group, and all companies with the same ultimate owner as the subject company.

Orbis provides several unique advantages that are central to our analysis. First, the financial and operation data in Orbis consist of a rich array of time-series information, enabling us to examine firm responses over time in a variety of dimensions such as total factor productivity, employment, unit labor cost, R&D, and product composition. Second, a notable strength of Orbis is its ownership information, which covers over 30 million shareholder/subsidiary links and is known for its scope and accuracy. The information is collected from a variety of sources including official registries, annual reports, research, and newswires. The data show full lists of direct and indirect subsidiaries and shareholders, a company's degree of independence, its ultimate owner, and other companies in the same corporate family. We explore the ownership

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information to identify actual multinational activity across countries and compare the effects of anticipated and realized foreign investment. Third, Orbis contains a cross-country panel dataset of patent applications and citations including information on the date and location, the inventor, and the outcome of patent applications as well as citations between patents. This information enables us to explore another interesting dimension of firm response as changes in domestic firms' patent applications could reflect either changes in innovation activities or strategic patenting decisions. Fourth, Orbis reports top direct competitors for a subset of firms, most of which are multinationals around the world. We exploit this information to assess how FDI news affect the behavior of top direct competitors differently than average domestic firms.

While we believe that Orbis is a very informative and useful data source for answering the question raised in our paper, we are aware of its limitations. Like most other datasets that rely on public registries and proprietary sources, Orbis does not cover the population of businesses across countries. An ideal alternative would be national census data that include the entire population of firms. However, such census data are either hard to obtain (usually subject to location and nationality restrictions and requirements) or non-existent in many developing countries due to high costs and institutional restrictions that prevent frequent collections of economic census for all the businesses in a country.

To assess the extent of coverage, in particular, with respect to small businesses, we compare the data against several benchmarks including, for example, the OECD Structural and Demographic Business Statistics (SDBS) and the U.S. Census. We find Orbis provides satisfactory coverage in most of the countries considered. For France, for example, the SDBS dataset reports that 84 and 91 percent of the enterprises have fewer than 10 and 20 employees, respectively, in 2007. Orbis reports 80 and 86 percent. The coverage for some countries seems highly satisfactory. For Norway and Sweden, SDBS reports close to 88 and 93 percent, respectively, of the enterprises have fewer than 20 employees, while Orbis shows 85 and 95 percent. For some other countries, Orbis tends to have a lower share of small firms. For Spain and Portugal, for example, the percentage of enterprises with fewer than 20 employees in SDBS is 91 and 89 percent, respectively. In Orbis, it is 80 and 77 percent. For the U.S., the SDBS reports close to 77 percent of the enterprises have fewer than 20 employees in 2006 (no data for 2007) and the U.S. Census Bureau reports 89 percent in 2008.[9] Orbis shows close to 89 percent for 2007. The SDBS data does not include data for developing countries, but the numbers in Orbis seem comparable for some of the countries. For Argentina, for example, the share of enterprises with fewer than 20 employees was close to 90 percent (with INDEC showing 82 percent for Buenos Aires). For Latvia, it was close to 78 percent in Orbis while Eurostat reports 85 percent. In Section 6.4, we further address the potential data coverage issue by re-performing our analysis for subsets of countries with the best data coverage.

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[9] http://www.census.gov/econ/smallbus.html

Compared to the coverage of domestic firms which might be biased towards large and medium firms in some countries, multinational firms are well represented in Orbis. A firm is considered domestically owned if it is a stand-alone domestic firm or its majority ultimate owner is based in the same country, and foreign owned if its majority ultimate owner is based in a different country. To examine the coverage of the MNC establishment data, we compared Orbis with UNCTAD's Multinational Corporation Database. For the U.S. and other major FDI source countries, the two databases report very similar numbers of multinational firms, while Orbis contains more multinational establishments.

Chinese Annual Census of Enterprises We also expand the data coverage in China— the top host country that accounts for over half of the FDI news—by supplementing Orbis with the Annual Census of Enterprises by the Chinese National Bureau of Statistics from 2001 to 2007. The Annual Census of Enterprises contains manufacturing firms with sales above 5 million RMB. The dataset reports comprehensive financial and operation information including sales, gross output value, asset, liability, cost, profit, number of employees, material cost, R&D expense, staff training cost, advertising expenditure, labor cost, new product value, and etc. It allows us to estimate TFP and examine several other firm response variables such as R&D expense, staff training cost, and advertising expenditure. The financial data are converted to U.S. dollars based on yearly exchange rates to be consistent with Orbis and deflated using the deflator from LEUVEN. The dataset covers both state-owned enterprises and private companies in 22 provinces, five autonomous regions, and four direct-controlled municipalities and reports detailed location information.

Our final sample consists of over 2 million manufacturing firms for the period of 2002-2007[10] and two main categories of information for each firm: (i) financial and operation information including revenue, value added, employment, labor cost, fixed asset, material cost, profit margin, R&D expenditure, staff training cost, and advertising expenditure (when available); (ii) product information including the 4-digit SIC codes of the primary and secondary products in which each firm operates.

We use firms' financial data in the 2002-2007 period to derive estimates of production function for each 3-digit SIC industry and obtain productivity estimates.[11] A key challenge in the measurement and identification of productivity relates to the endogeneity of the firm's optimal choice of inputs. Different estimation measures exhibit different advantages and limitations. As shown by Ackerberg, Caves, and Frazer (2006), the use of instruments based on lagged input decisions as the source of identification in structural estimation methods such as Olley and Pakes

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[10] The final sample size and the number of countries included varies with the dependent variables examined.

[11] Revenue, asset, and material cost are deflated in the data. We obtained industry-level revenue, asset, and material cost deflators from a variety of sources including the EU KLEMS, OECD STAN, LEUVEN (China), and Taiwan national statistics. For countries without industry-level deflators, we used national income and capital deflators.

(1996) and Levinsohn and Petrin (2003) may be associated with collinearity problems.

We considered a variety of productivity estimation methodologies, including Olley and Pakes (1996), Levinsohn and Petrin (2003), Ackerberg, Caves, and Frazer (2006), and Gandhi et al. (2012). Gandhi et al. (2012), one of the latest developments, use a transformation of the firm's first-order condition for flexible inputs that does not require finding instruments for the flexible inputs or subtracting them from output. The transformation enables a nonparametric regression of the flexible input revenue share against all observed inputs to non-parametrically identify the flexible input's production elasticity and the ex-post shocks.[12] We report our primary results based on productivity estimates obtained using Ghandi et al.'s (2012) technique, but confirm that the findings are qualitatively similar when other estimation methods such as Levinsohn and Petrin (2003) and labor productivity are used.[13]

To identify actual entry of foreign multinational firms, we explore the birth year of each foreign multinational establishment reported in Orbis. Identifying entry based on establishment dates offers a more accurate account of entry than counting foreign multinational subsidiaries newly appearing in the dataset because of data censoring and churning issues. According to the data, 21,930 new foreign multinational subsidiaries were established in 92 host countries and 149 manufacturing industries in 2000-2008.

Table A.2 reports the summary statistics and the sources of main variables.

5 Main Empirical Analysis

In this section, we present our main econometric results on how domestic firms respond to foreign multinational competition threats and actual competition, respectively.

5.1 Productivity Response: Baseline Results

We start with the following baseline empirical specification:

$$
\begin{aligned}
y_{i,city,k,t} = {} & \alpha + \beta_1 News_{city,k,t-1} + \beta_2 Actual\ entry_{city,k,t-1} + \gamma Z_{i,k,t-1} \\
& + \mu Growth_{city,k,t-1} + \lambda_{city,t} + \varphi_{country,k,t} + \varepsilon_{i,k,t}
\end{aligned}
\tag{1}
$$

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[12]We thank Amit Gandhi for kindly providing the program and refer the readers to the paper for more details about the technique.

[13]As in most empirical work that exploits productivity estimates, we do not observe firm-level physical output quantities and prices. This information is especially difficult to obtain for the large panel of countries considered in the paper. It is hence plausible that the productivity estimates are, to some extent, positively correlated with prices and markups. However, our prediction on the direction in which anticipated competition might affect prices and markups is opposite to the positive effect we show on productivity; competition threats should induce domestic firms to lower, instead of raise, prices and markups. Another potential concern is that the productivity measure might reflect product quality instead. To mitigate this concern, we re-performed our empirical analysis for relatively homogeneous goods and obtained largely similar findings.

where $y_{i,city,k,t}$ is the outcome of interest (e.g., log productivity growth) of firm i in a given city, industry k, and year t, $News_{city,k,t-1}$ is either a dummy or a count of foreign investment news in the city where firm i is located, industry k, and year $t-1$, $Actual\ entry_{city,k,t-1}$ is either a dummy or a count of actual entry or expansion by foreign multinational firms in the respective city, industry, and year $t-1$, $Z_{i,k,t-1}$ is a vector of firm characteristics in $t-1$ including size (employment), capital intensity, and age, and $Growth_{city,k,t-1}$ represents the average sales growth of domestic firms in a given city, industry and $t-1$. In addition, we include a vector of city-year dummies and a vector of country-industry-year dummies to control for all time-variant city factors such as quality of infrastructure, human capital, and government regulations and all time-variant country-industry characteristics such as market demand and trade policies. A city-industry-year cluster is also used to allow for correlations of residuals within each city and industry at a given year.[14]

The results for domestic firm TFP are summarized in Table 1. We find significant productivity upgrading by domestic firms in response to the threat of foreign multinational competition. If there was an investment news in year $t-1$, TFP would grow, on average, by 1 percent in year t. The number of investment news as well as the number of foreign MNCs that are involved in the news also play a significant role in firm TFP response.[15] Each additional foreign investment news and each additional MNC that is expected to invest in the host country are associated with 0.2- and 0.6-percent increases in TFP, respectively.[16] The effect of actual multinational entry, in contrast, is statistically insignificant.[17] This result is consistent with existing evidence and our hypothesis that the effect of actual multinational entry can be ambiguous due to the various opposing forces—including the externality, the competition, and the strategic effects—whereas anticipated multinational entry influences domestic firms primarily through the strategic channel.[18]

[Table 1 inserted here]

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[14]While our main analysis is performed at the city level, we also considered country-level analysis and found similar results.

[15]As some FDI entry is reported in more than one news, examining how the number of foreign MNCs reported in FDI news affects domestic firm response enables us to look at the impact of unique FDI news.

[16]We also examined domestic firms' TFP responses to greenfield FDI and M&A news, respectively, and found that greenfield FDI news exerts a significant effect while M&A has little impact. This is consistent with the fact that most M&A news, included in either our data or alternate sources such as Zephyr and SDC Platinum, have a very short time window between the rumor/announcement date and the actual deal date with an average of 36 days (according to the SDC Platinum database).

[17]The differences in the effects of FDI news and actual FDI are statistically significant. The above results remained robust when we included the news or the actual entry variable alone. As a robustness check, we also measured actual entry based on information from the same news sources. This, by measuring both anticipated FDI and actual FDI from news, also helps us address the concern that the FDI news variable captures only large FDI activities whereas the actual entry variable from Orbis includes FDI activities of all scales. We found that the effect of actual entry remains insignificant. In Section 6.4.1, we formally investigate the significance of the potential large FDI news bias and address the issue in detail.

[18]We also examined domestic productivity response using other alternate productivity estimates. We found that anticipated foreign multinational competition always exerts a significant and positive effect on domestic firm TFP while actual foreign multinational competition has a weaker or insignificant impact.

Next we account for the size of threats. Most investment news report the expected size of the future investment, including expected output, expected local labor employment, and investment value. We hence estimate the following equation:

$$
\begin{aligned}
y_{i,city,k,t} \;=\;& \alpha + \beta_1 News_{city,k,t-1} + \beta_2 News_{city,k,t-1} \times Threat\ size_{city,k,t-1} \qquad\qquad (2) \\
&+ \beta_3 Actual\ entry_{city,k,t-1} + \gamma Z_{i,k,t-1} + \mu Growth_{city,k,t-1} + \lambda_{city,t} + \varphi_{country,k,t} + \varepsilon_{i,k,t}
\end{aligned}
$$

where $Threat\ size_{city,k,t-1}$ is the average expected output, employment, or investment value of investments announced in the news.

As reported in Table 2, we find the response of domestic firms to increase significantly with the size of threats. Future multinational competition with greater expected output and employment motivates a steeper productivity upgrading by domestic firms. For example, a 100-percent increase in future competitors' anticipated local employment leads to 0.5-percent greater TFP improvement by domestic firms. We also find domestic firms respond most strongly to threats with larger expected employment, followed by threats with larger expected output. The value of investments does not have a direct impact.

[Table 2 inserted here]

We also explore the time path of productivity response in the window after the arrival of the FDI news and before the expected occurrence of FDI. The analysis shows that the TFP response is most pronounced when FDI is soon due to occur (i.e., as the expected investment date approaches). FDI news with a relatively long time window between the arrival of news and the expected arrival of competition tend to have little immediate effect on domestic firms.[19]

5.2 Innovation, Skill Upgrading, and Product Composition

In this sub-section, we explore the underlying mechanisms of productivity upgrading and investigate how domestic firms respond to the threat of foreign competition by adjusting innovation, labor skills, and product composition. We first utilize the rich information reported by Chinese National Bureau of Statistics' Survey of Industrial Firms to assess a variety of response variables including R&D decision, staff training expense (as a share of revenue), introduction and revenue share of new products, and advertising expense (as a share of revenue).

As shown in Table 3, we find that domestic firms raise R&D expenditure significantly after the arrival of news. In contrast, the actual entry of multinational firms does not affect domestic firms' R&D decision. A similar result is obtained for staff training expense. Domestic firms significantly increase staff training expense after the announcement of FDI news, suggesting increased efforts to upgrade labor skills. In addition to these responses, Chinese domestic firms are found more likely to introduce new products after the arrival of news. Another observation

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[19]This result is not reported and available upon request.

is the increase in advertising expenses. Chinese domestic firms are found to raise advertising efforts in response to the threat of foreign competition.

The adjustment in product composition is also seen in other countries based on the Orbis data.[20] In Table 4, we examine in greater detail how FDI news might motivate domestic firms to add and drop products and switch primary products. We find that the announcement of an FDI news in a domestic firm's primary industry increases the likelihood of this firm adding secondary products as well as switching its primary product. The actual entry of multinational firms is also found to exert a similar effect. Domestic firms also tend to adjust their product mix and switch their primary product after the actual occurrence of new FDI.

[Tables 3 and 4 inserted here]

Next, we employ a cross-country patent application and citation dataset provided by Orbis which reports information such as patent application date, location, inventor name, outcome, and citations. This information enables us to explore another interesting dimension of firm response as changes in domestic firms' patent applications could reflect either changes in innovation activities or strategic patenting decisions. As shown in Table 5, we find FDI news to exert a positive significant effect on domestic firms' patent applications. The increase in patent applications following an FDI news exceeds the effect of actual entry. This result has two possible interpretations. It suggests that domestic firms have either increased innovation activities or greater patenting incentives (to protect their technology and knowhow) when anticipating new competition by foreign multinationals.

[Table 5 inserted here]

These findings broadly support our first two theoretical hypotheses in Section 2, in particular, Aghion et al. (2005) and Bloom et al. (2013). The threats of foreign competition may motivate domestic firms to engage in innovation and skill upgrading, switch products facing direct competition, and introduce new products, all of which would help domestic firms escape the expected future competition from foreign multinationals.

5.3 Heterogeneous Firm Response

Next we examine potential heterogeneity in domestic firms' responses and how they might vary (i) across industries, (ii) within each industry, and (iii) across countries. First, we examine the prediction of Aghion et al. (2005) which suggests that firm responses to increased competition should increase with the degree to which an industry is "neck-to-neck." We construct three measures of "neck-to-neckness" for each country-industry pair: (i) the average productivity distance of domestic firms to the industry's top productivity level, i.e., $mean[(TFP_i - $

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[20]Here, the analysis compares product composition in 2005 v.s. 2007, the two years for which product composition data are available.

$\max TFP)/\max TFP]$ (following the methodology of Aghion et al., 2005); (ii) the standard deviation of domestic firm productivity; and (iii) the skewness of domestic firm productivity.[21]

As shown in Table 6, we find that firm TFP responses increase significantly with the extent to which an industry's competition is "neck-to-neck" as predicted by Aghion et al. (2005). Industries with a more-dispersed and more-right-skewed productivity distribution show less productivity upgrading—and even productivity downgrading—in response to foreign multinational threats.

Next we explore how domestic firm responses to the threats of multinational competition might vary within each industry—across the distribution of domestic firms—by interacting the news variables with domestic firms' lagged TFP as well as its square term and estimating the equation below:

$$
\begin{aligned}
y_{i,city,k,t} \;=\; & \alpha + \beta_1 News_{city,k,t-1} + \beta_2 News_{city,k,t-1} \times TFP_{i,city,k,t-1} + \beta_2' News_{city,k,t-1} \\
& \times TFP^2_{i,city,k,t-1} + \beta_2'' TFP_{i,city,k,t-1} + \beta_3 Actual\ entry_{city,k,t-1} + \gamma Z_{i,k,t-1} \quad (3) \\
& + \mu Growth_{city,k,t-1} + \lambda_{city,t} + \varphi_{country,k,t} + \varepsilon_{i,k,t}.
\end{aligned}
$$

The estimates reported in Table 7 suggest a non-monotonic, U-shape pattern: domestic firms at the right and left tails of the TFP distribution tend to upgrade TFP in response to the news while domestic firms with intermediate TFP levels show little reactions.

[Tables 6 and 7 inserted here]

The mechanisms underlying the TFP response are also sharply different depending on the levels of TFP. Our analysis in Table 8 shows that the relatively more productive domestic firms respond to foreign investment news by increasing R&D, which subsequently results in higher productivity. The less productive domestic firms, in contrast, are more likely to drop products in response to future multinational entry than their more competitive counterparts. Unlike Table 7, we do not have a U-shape relationship for innovation and product composition decisions.

These results, again, are consistent with our first two theoretical hypotheses discussed in Section 2, in particular, Aghion et al. (2005), Bernard, Redding and Schott (2010), Eckel and Neary (2010), Mayer, Melitz and Ottaviano (2014), and Nocke and Yeaple (forthcoming), and suggest that the mechanisms of productivity upgrading are sharply different across firms. The relatively more productive domestic firms—who are more likely to be close competitors of foreign MNCs—attempt to "escape" or reduce the adverse effect of competition threats by increasing innovation. The least productive domestic firms also attempt to escape competition, but by reallocating resources within firms and dropping their least competitive products.

[Table 8 inserted here]

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[21] Since we construct the "neck-to-neckness" measures at the country-industry pair level, we examine country-level (rather than city-level) FDI news in this specification.

Incorporating a unique dataset from Orbis that reports top direct competitors of MNCs with Chinese Annual Census of Enterprises, we also investigate how news of an MNC's new FDI activity (e.g., Toyota's new investment in China) might affect the behavior of the MNCs' top competitors (e.g., GM's existing subsidiary in China) and how the responses of the top competitors might differ from those of average domestic competitors in host countries. Our analysis shows that top competitors, most of which are foreign multinationals themselves, do not adjust their TFP or innovation decisions in response to FDI news.[22] This is not surprising since these firms are most likely already competing with one another in other locations; a new Toyota subsidiary in China is hence unlikely to influence GM's TFP and innovation decisions in China. Interestingly, top competitors do respond to the news by increasing local advertising expenses, suggesting that threats of new FDI competition motivate top multinational competitors to raise marketing efforts in the local market.

In examining how domestic firms' responses to FDI news might vary across FDI source and destination countries, specifically, between developed and developing nations, we find in Table 9 that domestic firms in developing countries respond significantly to FDI news by upgrading productivity while domestic firms in developed countries do not exhibit significant responses.[23]

[Table 9 inserted here]

5.4 Firm Responses in Upstream and Downstream Industries

While the focus of this paper is to examine the role of foreign competition threats on domestic firm responses in the same industry, we extend the analysis in this sub-section to investigate potential responses by domestic input suppliers and downstream customers: for example, how will intermediate input producers adjust their innovation decisions given news of FDI in downstream industries? As described Section 2, anticipation of future competition in upstream and downstream industries could also stimulate innovation and productivity upgrading.

To proceed, we exploit input-output relationships between each pair of industries to construct the weighted sum of FDI news in upstream and downstream industries, i.e., $\sum_{k'} IO_{k'k} News_{city,k',t-1}$ and $\sum_{k'} IO_{kk'} News_{city,k',t-1}$ where $IO_{k'k}$ is input-output linkage between industry k and k's measured by the share of industry k's inputs that come from industry k'. Similarly, we take into account the weighted sum of actual FDI entry in upstream and downstream industries. The input-output linkages are computed using the 2002 Benchmark Input-Output Accounts published by the U.S. Bureau of Economic Analysis.

The results are reported in Table 10. We find that while domestic firms' TFP is not significantly affected by upstream or downstream FDI news, domestic firms' innovation increases when there is FDI news in downstream industries. In addition, actual FDI activities in downstream

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[22]The results are suppressed here but available upon request.

[23]Across FDI source countries, we find that news of developed-country FDI have a stronger effect than news of developing-country FDI on domestic firms' TFP.

industries are found to be associated with higher TFP in upstream industries. These results are highly consistent with the third theoretical hypothesis in Section 2 concerning the role of vertical production linkages; the anticipation of new foreign multinational customers motivate domestic intermediate input producers to increase innovation, which in turn leads to a subsequent TFP increase after the actual entry of foreign multinational customers.

[Table 10 inserted here]

5.5 The Influence of News

Now we incorporate the characteristics of news and news publications into the analysis and investigate how domestic firms' responses might vary with the influence of the news. In the news dataset, we collected the word count, the publication title, and the news agency of each news. To differentiate the influence of each publication, we obtained additional information about each news source, including the circulation volume of the publication title and the national reputation of the news agency, from data sources such as Ulrich, News Bank's Access World News, and Audit Bureau of Circulation. We then compute, for each city, industry, and year, the average word count of news and the average circulation volume of publication titles reporting multinational entry news.

Specifically, we consider the following estimation equation:

$$
\begin{aligned}
y_{i,city,k,t} \;=\; & \alpha + \beta_1 News_{city,k,t-1} + \beta_2 News_{city,k,t-1} \times Influence_{city,k,t-1} \\
& + \beta_3 Actual\ entry_{city,k,t-1} + \gamma Z_{i,k,t-1} + \mu Growth_{city,k,t-1} + \lambda_{city,t} + \varphi_{country,k,t} + \varepsilon_{i,k,t}
\end{aligned} \tag{4}
$$

where $Influence_{city,k,t-1}$ represents the two measures of news influence discussed above. The results are reported in Table 11. We find that domestic firms exhibit stronger TFP response to more influential news, specifically news from publications with a larger circulation volume.

[Table 11 inserted here]

6 Establishing the Effect of Information

6.1 Exploring the Substance of News

Given that the goal of this paper is to examine the role of information in firm behavior, we next explore the content of each news to extract useful information contained in the news and examine how domestic firms' reactions might vary with the specific information provided. Exploiting the effect of news content helps us better establish the role of news/information as the specific substance reported—such as whether the news mentions investment motive or target market— and the tone of language used in each news tend to be driven by the information available to

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the news reporters and less likely—compared to the incidence of news reporting—to be driven by unobserved local productivity shocks.

We find that the substance of news significantly affects domestic firms' behavior. First, we identify whether the news reveal any uncertainty or ambiguity (such as contingencies on government approval) about the foreign investments by either explicitly mentioning the uncertainty and contingency or using ambiguous language such as "intend to", "consider", "may invest", "want to invest", "could invest", and etc. in describing a future FDI event. Threats reported with uncertainty are considered less credible than threats reported unambiguously. As shown in Table 12, domestic firms respond only to credible FDI threats—that is, FDI news where the investments are described to occur unambiguously—and little to less credible FDI threats— that is, FDI news where the descriptions reveal uncertainties or contingencies about the foreign investments.

Second, we examine whether the news report motives of foreign investments (e.g., whether the new subsidiary of foreign MNCs seeks to serve primarily local or export markets). News that provide such information are separated from the rest of the news and then divided into two groups: news of local-market seeking FDI and news of export-platform FDI. We find in Table 13 that the effect of FDI news varies sharply depending on whether the news describe the investment's target market and whether the target market is local or foreign. News of local-market seeking FDI lead to significant domestic TFP upgrading whereas news of export-platform FDI and news that do not provide target market information do not exert any effect on domestic firms' TFP.

[Tables 12 and 13 inserted here]

6.2   Falsification Tests

In the analysis so far, we accounted for all time-variant city and country factors with the control of city-year and country-industry-year fixed effects as well as each city's industry-specific sales growth as a proxy of potential demand and technology shocks. However, two plausible concerns could still arise with the identification of the effect of FDI news. First, it is possible that the estimated effect of FDI news reflects a city's productivity and overall economic growth trends (e.g., for example, FDI news in Bangalore could reflect the productivity boom in Bangalore's IT industry in the recent decade). Put differently, FDI going to cities that have been experiencing persistent productivity shocks in certain industries could attract greater media attention and have a greater probability of being reported. Second, the reporting of FDI news might be correlated with a city's unobservable contemporaneous shocks (that are not already controlled for by the city-year dummies and city-industry sales growth), such as the city's new industrial policy which might influence the news preferences of local news agencies. In this and the next sub-sections, we use two different strategies below to address these issues.

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First, we consider a placebo test by exploiting the specific timing of FDI news and assuming each FDI news had been published half a year or a year earlier. If FDI news indeed capture a local productivity and economic trend, the slight forward adjustment in the timing of news should lead to relatively small changes in the estimates. If, instead, the concern does not apply, FDI news, when assumed to have been published before the actual publication date, should not lead to any response by domestic firms. As shown in Table 14, we find no TFP responses in the falsification setting.

[Table 14 inserted here]

We also perform an additional falsification test by investigating the effect of FDI news on other performance outcomes such as revenue and profit growth. If indeed FDI news reflect local industry-specific economic growth trends (for instance, FDI news are reported because of domestic demand boom), we should expect as well a positive correlation between FDI news and other firm-level growth variables such as profit growth. This hypothesis is not supported in the data. We do not observe any significant relationship between anticipated competition and domestic firms' profit growth. The effect of FDI news is pronounced only in productivity, innovation, and the other strategic responses examined earlier. These results offer us further reassurance that the estimated effect of FDI news is unlikely to have captured local economic growth trends.

6.3 IV Analysis

Next we consider an Instrumental Variable (IV) approach where we use two alternative IVs to address the identification concerns including, in particular, the possibility that the reporting of FDI news is correlated with a city's unobservable contemporaneous productivity shocks in a given industry, such as, say, Shanghai's new auto industrial policy which might motivate Shanghai's local newspapers to report more local auto-related news.

In the first IV approach, we instrument FDI news reported by domestic local news sources with FDI news reported by foreign local news sources. This is based on the considerations that (i) the FDI reporting by local news publications (city- or town-level publications catering primarily local readers) tends to be driven by local news supply (e.g., inward or outward FDI activities by local companies) or local economic conditions instead of a foreign city's contemporaneous productivity shocks; (ii) a local city- or town-level news publication is not likely to reach foreign readers and has a direct influence on their behavior; and (iii) FDI news reported by local news sources from different countries might be correlated because of information flow. We dropped national and international news publications in this analysis as they do not satisfy the first two criteria.

Therefore, based on all these considerations, FDI news reported by local news sources in another country could serve as a plausible IV for FDI news reported by the host country's local

news sources, as confirmed in the first-stage results reported in column (1) of Table 15. In the second stage, we find that the instrumented local FDI news continue to exert a significant effect on domestic firms' responses.[24]

[Table 15 inserted here]

In the second IV approach, we consider narrative articles published in weekend news as an alternative IV. Compared to weekday news, narrative weekend news tend to cater to readers that have preferences for lighter business content; FDI news in this category are often a relatively minor and subtle part of a long narrative article focusing on non-FDI-specific topics. In contrast to FDI-specific news—which tend to devote its entire content to describing the FDI event and are usually published on weekdays to cater to targeted readers with strong business interests, the probability for FDI news embedded in weekend narrative articles to be driven by contemporaneous economic shocks or to reach and influence domestic firms is very low. We find in column (2) of Table 15 that weekend narrative FDI news is a good predictor of FDI news appearing in weekday news. Further, the estimated effect of the instrumented weekday FDI news is positive and significant.[25]

6.4 Additional Robustness Analysis

6.4.1 Large FDI News Bias

A plausible concern that could arise in our analysis is that news might have the tendency to report large investments or investments undertaken by large companies, which could then introduce an upward bias in our estimated effects of FDI news. We address the issue and its potential implications in several ways. First, we examine the correlations between the expected size of FDI (measured by investment value, output, or employment) and the frequency of being reported and find them to be generally lower than 0.2. The correlations of the expected size of FDI with the influence of the news publications (measured by circulation volume) are about 0.1, while the correlations with the content length of the news (measured by the word count) is about 0.05. These observations suggest that—among FDI events reported in the news—large FDI events do not systematically receive large media attention.

Second, we measured actual FDI entry also based on information from news sources. By measuring both anticipated and actual FDI from news, we address the concern that the FDI

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[24] The Hausman test that compared the OLS and the IV estimates rejected the null hypothesis that there is no endogeneity in the OLS results. We also notice that the IV estimate of FDI news is bigger in magnitude than the OLS estimate. One plausible explanation is that there exists a negative correlation between domestic local FDI news and unobserved productivity shocks; in other words, news in cities that are experiencing negative productivity shocks might pay more attention to inward FDI activities.

[25] Similarly, the Hausman test that compared the OLS and the IV estimates rejected the null hypothesis that there is no endogeneity in the OLS results. As in column (1), the IV estimate of weekday FDI news is bigger in magnitude than the OLS estimate, implying, again, that there could exist a negative correlation between weekday FDI news and unobserved productivity shocks.

news variable might capture only large FDI activities whereas the actual entry variable from Orbis includes FDI activities of all scales. We found that the findings remain similar.

Third, we re-performed our main analysis (such as Table 1) by separately focusing on FDI news with less-than-median expected investment value, output, or employment. We find that, on average, these relatively small-scale FDI news exert a quantitatively similar impact on domestic firm responses.

6.4.2 Data Coverage

Our analysis spans across a wide sample of countries; however, the degree of coverage, in terms of news publications and domestic firms, can vary significantly across countries. In this subsection, we examine the robustness of the results by restricting the analysis to countries with the best data coverage.

First, we acknowledge that Factiva, albeit being the most comprehensive news archive in the world, varies in its news coverage across countries. In many developed countries, Factiva covers both national and subnational local news publications (for example, our final sample of FDI news covers 181 publications in the U.S., 131 in the U.K., and 82 in Russia, while the complete coverage of Factiva—with or without FDI news—is much broader in all countries). However, in other—often less developed—countries, Factiva covers primarily national and major local news publications. To address this issue, we perform our main analysis for the top 10 countries with the largest number of news publications in Factiva and find that our main findings remain largely similar (Table 16). Second, we also address the varying coverage of the cross-country firm-level data by focusing on top 10 countries with the largest firm coverage (including primarily European countries, South Korea and China). As shown in Table 17, again we find that the main result is quantitatively similar.

[Tables 16 and 17 inserted here]

7 Conclusion

In this paper, we investigate domestic firm response to foreign competition threats using a unique constructed dataset of foreign investment news and exploring time lags between the arrival of foreign investment news and the expected arrival of actual investments. We investigate firm responses in both productivity and underlying mechanisms including innovation, skill upgrading, and product composition. Our results indicate that domestic firms respond significantly to the threat of foreign multinational competition by increasing productivity, R&D, labor training, patent applications, and advertising expense and adjusting product composition. The actual arrival of foreign investment, in contrast, is found to have weaker or no effect. The degree of response increases with the size of threats (measured by the expected output and employment),

the influence of news (measured by the circulation volume), and the amount of information on the level of certainty and the target market of future investments.

Our analysis also shows that response to FDI news exhibits substantial heterogeneity across industries, firms as well as countries. Domestic firms in industries with more fierce competition—the so-called "neck-to-neck" industries featuring a less-dispersed and left-skewed productivity distribution—respond more strongly to foreign multinational threats. Within each industry, domestic firms at the right and left tails of the TFP distribution respond significantly to the news by upgrading TFP while domestic firms with intermediate TFP levels show little reactions. Further, the mechanisms of TFP upgrading differ sharply across firms. The most productive domestic firms improve TFP by increasing innovation while the least productive domestic firms enhance their TFP by dropping threatened products. Top global competitors identified directly by investing multinationals, most of which are foreign multinationals themselves, do not adjust their TFP (or innovation) decisions, but instead increase local advertising effort in reaction to FDI news. Further, domestic firms in developing countries are found more responsive to FDI news while news of developed-country FDI are more influential. The influence of FDI news also extends across industries and cities. For example, domestic firms are shown to increase innovation after FDI news in downstream industries.

We employ two approaches to address potential correlations between FDI news reporting and persistent as well as contemporaneous local productivity shocks. First, we use various placebo tests by exploiting the exact timing of FDI news. For example, we assume that each FDI news had been published slightly earlier and find no domestic firm response to the placebo news. Second, we adopt an Instrumental Variable (IV) approach where we instrument FDI news reported by domestic local news sources with FDI news reported by foreign local news sources. This is motivated by the considerations that FDI reporting by local news publications (publications catering primarily local readers) tends to be driven by local news supply or local economic conditions instead of a foreign city's productivity shocks. We also use narrative weekend news as an alternative IV on the ground that narrative weekend news articles tend to cater to readers with preferences for lighter business content and FDI news embedded in these articles are less likely to be driven by productivity shocks and have direct influence on domestic firm behavior. Our analysis shows that the estimated effect of FDI news remains robust.

Our analysis contributes to the literature by offering new evidence on the effect of foreign competition threats and distinguishing between preemptive, strategic actions and the effects of actual foreign competition. Our findings show that the latter is not the only link that connects foreign competition with domestic firm performance: domestic responses could be initiated before the actual arrival of competition. This strategic, self response to competition threats represents a crucially important mechanism through which globalization affects domestic economies, accounting for, in our analysis, most of the domestic productivity growth associated with multinational competition.

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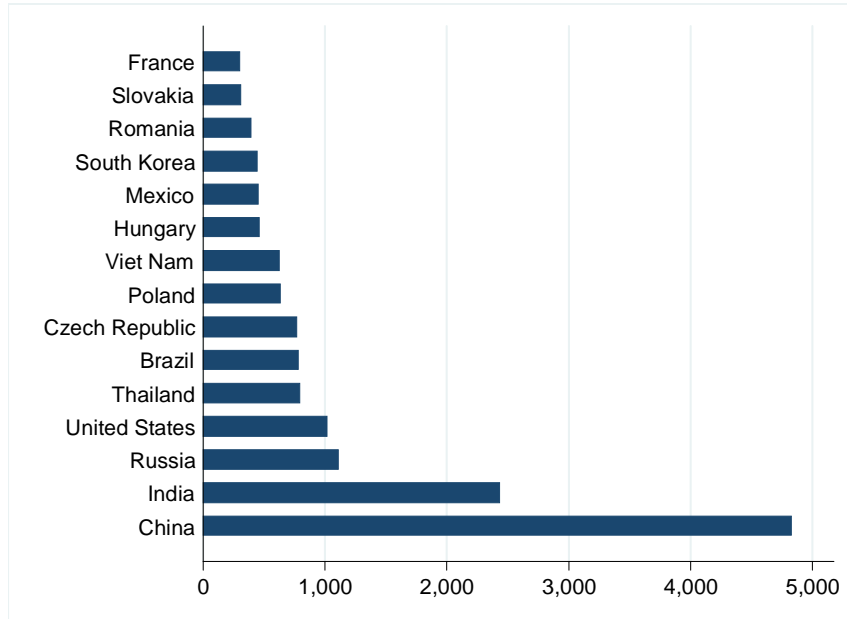
Figure 1: Top host countries by investment news count
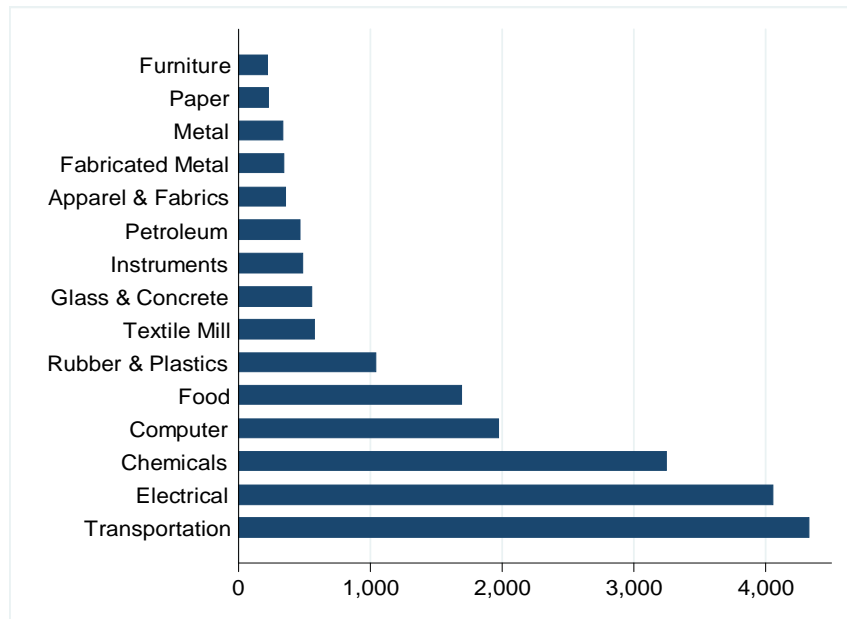
Figure 2: Top industries by investment news count
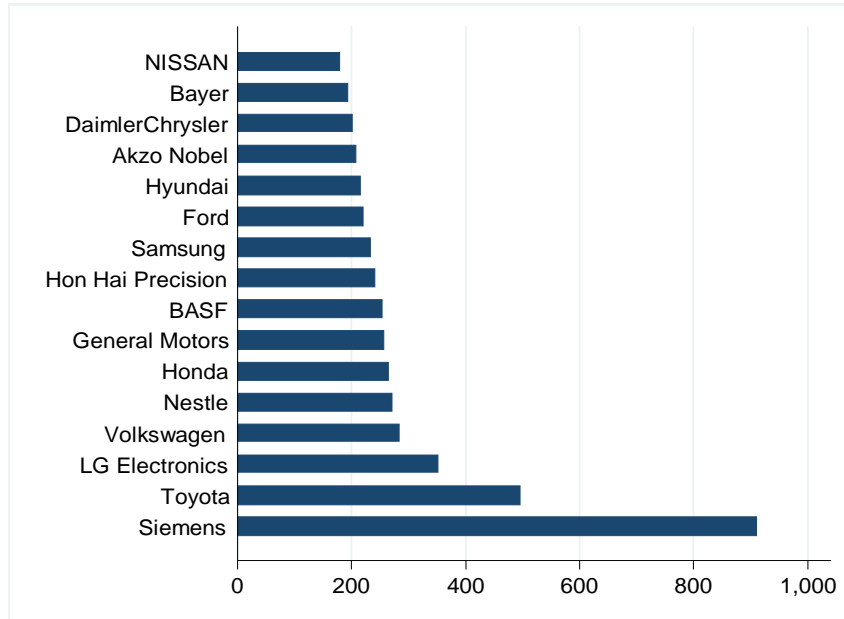
Figure 3: Top MNCs by investment news count
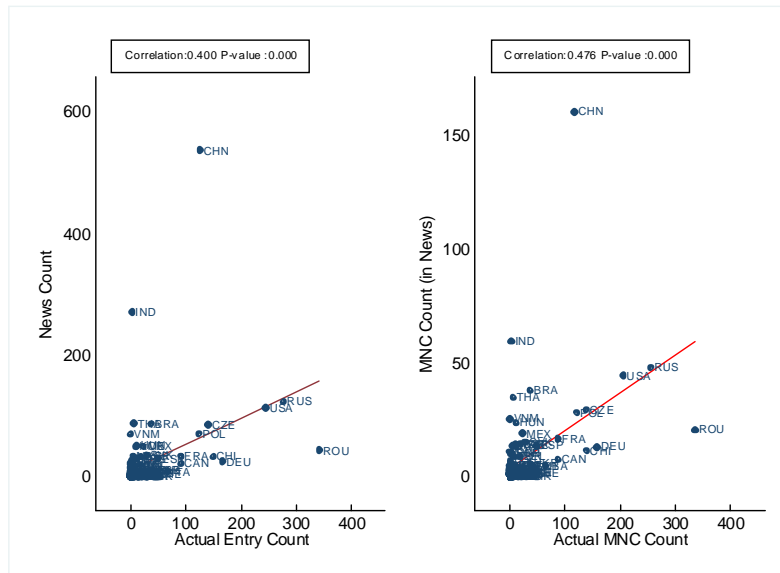
Figure 4: Correlations between FDI news and actual FDI across host countries
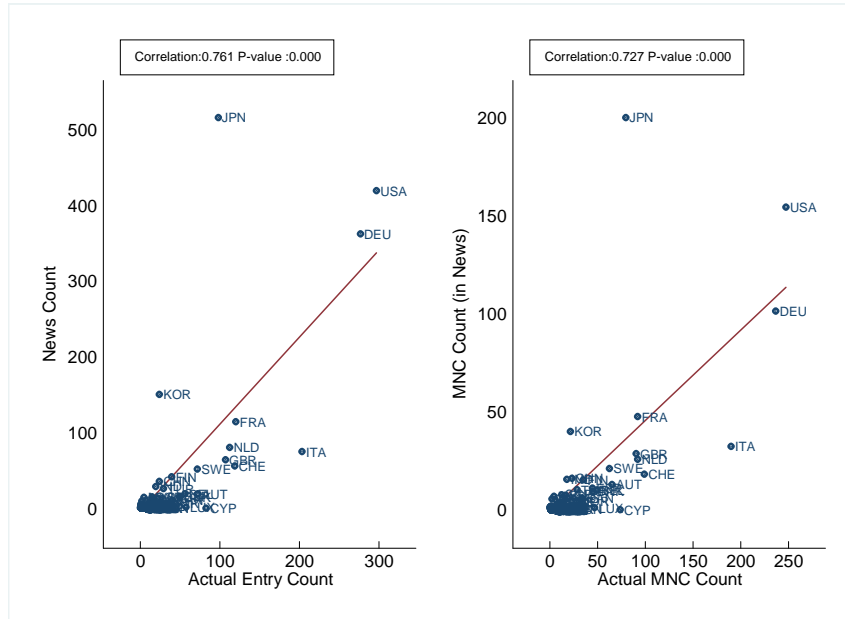
Figure 5: Correlations between FDI news and actual FDI across headquarter countries
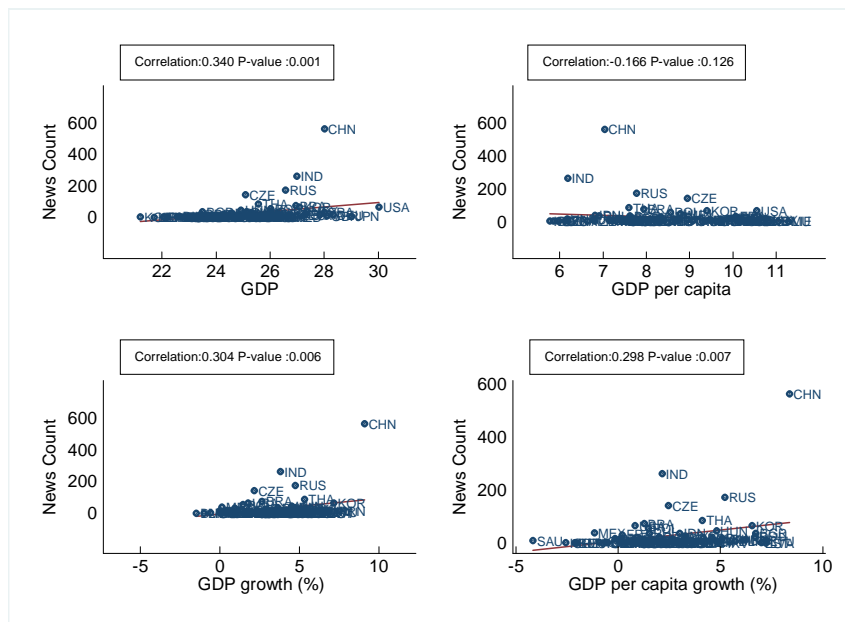
Figure 6: Correlations between FDI news and country characteristics

Table 1: The Threat of Multinational Entry v.s. Actual Entry: TFP

Dependent variable: Change in TFP	(1)	(2)	(3)
News dummy	0.010***		
	(0.003)		
Actual entry dummy	0.001		
	(0.003)		
News count		0.002**	
		(0.001)	
MNC count			0.006***
			(0.002)
Actual entry count		-0.000	-0.000
		(0.000)	(0.000)
Domestic ave. sales growth	-0.003***	-0.003***	-0.003***
	(0.000)	(0.000)	(0.000)
Size	0.001*	0.001*	0.001*
	(0.000)	(0.000)	(0.000)
Capital intensity	0.021***	0.021***	0.021***
	(0.000)	(0.000)	(0.000)
Age	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)
Country-industry-year FE	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes
City-industry-year cluster	Yes	Yes	Yes
Obs	1,470,663	1,470,663	1,470,663
R square	0.018	0.018	0.018

Notes: This table examines domestic firms' TFP responses to the threat of multinational entry and the occurrence of actual entry. The dependent variable is a domestic firm's change in log TFP. The variables "news dummy" and "news count" are, respectively, an indicator and a count of news on multinational entry in a given city, SIC 3-digit industry, and year. The variables "actual entry dummy" and "actual entry count" are, respectively, an indicator and a count of actual multinational entry in a given city, SIC 3-digit industry, and year. All variables on the right hand side are lagged by one year. All regressions include country-industry-year and city-year fixed effects. Standard errors are clustered at the city-industry-year level and reported in the parentheses. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table 2: The Size of Threat: TFP

Dependent variable: Change in TFP	(1)	(2)	(3)
News dummy	-0.018*	-0.020*	0.011
	(0.010)	(0.011)	(0.025)
x Expected output	0.002***		
	(0.001)		
x Expected local employment		0.005***	
		(0.002)	
x Investment value			0.001
			(0.001)
Actual entry dummy	0.000	0.001	0.001
	(0.003)	(0.003)	(0.003)
Domestic ave. sales growth	-0.003***	-0.003***	-0.003***
	(0.000)	(0.000)	(0.000)
Size	0.001*	0.001*	0.001*
	(0.000)	(0.000)	(0.000)
Capital intensity	0.021***	0.021***	0.021***
	(0.000)	(0.000)	(0.000)
Age	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)
Country-industry-year FE	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes
City-industry-year cluster	Yes	Yes	Yes
Obs	1,456,467	1,454,234	1,468,064
R square	0.018	0.018	0.018

Notes: This table examines domestic firms' TFP response to different sizes of threats of multinational entry. The dependent variable is a domestic firm's change in log TFP. The variable "news dummy" is an indicator of news on multinational entry in a given city, SIC 3-digit industry, and year. The "news dummy" is interacted, respectively, with the average expected output, employment, and investment value of announced multinational entry. The variable "actual entry dummy" is an indicator of actual multinational entry in a given city, SIC 3-digit industry, and year. All variables on the right hand side are lagged by one year. All regressions include country-industry-year and city-year fixed effects. Standard errors are clustered at the city-industry-year level and reported in the parentheses. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table 3: Innovation, Skill Upgrading, New Products, and Advertising (Chinese Data)

Dependent variable:	(1)	(2)	(3)	(4)	(5)
	RD	Staff training	New product	New product rev	Advertising
News dummy	0.016***	0.001*	0.008*	0.002**	0.0002*
	(0.005)	(0.000)	(0.005)	(0.001)	(0.0001)
Actual entry dummy	-0.001	-0.000	-0.006	-0.000	-0.0001
	(0.004)	(0.000)	(0.004)	(0.002)	(0.0001)
Domestic ave. sales growth	0.001**	-0.000	0.001**	-0.000	0.000
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Size	0.069***	0.000	0.049***	0.001***	0.001***
	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)
Capital intensity	0.038***	-0.000	0.027***	0.000*	0.000*
	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)
Age	0.001***	0.000	0.001***	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Country-industry-year FE	Yes	Yes	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes	Yes	Yes
City-industry-year cluster	Yes	Yes	Yes	Yes	Yes
Obs	673,244	405,467	700,528	620,690	405,676
R square	0.115	0.001	0.074	0.001	0.001

Notes: This table examines the effect of FDI news on domestic firms' innovation, skill upgrading, new product introduction, and advertising expense. The dependent variables are whether a domestic firm engages in research and development, staff training expenses (as a share of revenue), whether to introduce new products and their revenue share, and advertising expenses (as a share of revenue). The variable "news dummy" is a dummy of news on multinational entry in a given city, SIC 3-digit industry, and year. The variable "actual entry dummy" is a dummy of actual multinational entry in a given city, SIC 3-digit industry, and year. All variables on the right hand side are lagged by one year. All regressions include country-industry-year and city-year fixed effects. Standard errors are clustered at the city-industry-year level and reported in the parentheses. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table 4: FDI News and Product Composition

Dependent variable:	(1)	(2)	(3)
	Add product	Drop product	Switch primary product
News dummy	0.044***	0.003	0.054***
	(0.007)	(0.004)	(0.009)
Actual entry dummy	0.066***	-0.002**	0.068***
	(0.003)	(0.001)	(0.004)
Domestic ave. sales growth	0.005***	0.002***	0.008***
	(0.000)	(0.000)	(0.000)
Size	0.003***	0.008***	0.000***
	(0.000)	(0.000)	(0.000)
Age	-0.000***	0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
Country-industry-year FE	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes
City-industry-year cluster	Yes	Yes	Yes
Obs	4,000,169	4,000,169	4,000,169
R square	0.319	0.042	0.248

Notes: This table examines domestic firms' product mix adjustments in response to FDI news. The dependent variables are whether a domestic firm adds and drops products and switches its primary product. The variable "news dummy" is a dummy of news on multinational entry in a given city, SIC 3-digit industry, and year. The variable "actual entry dummy" is a dummy of actual multinational entry in a given city, SIC 3-digit industry, and year. All variables on the right hand side are lagged by one year. All regressions include country-industry-year and city-year fixed effects. Standard errors are clustered at the city-industry-year level and reported in the parentheses. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table 5: FDI News and Patenting Decisions

Dependent variable:	(1)	(2)
Change in patent applications		
News count	0.001**	
	(0.000)	
MNC count		0.002*
		(0.001)
Actual entry count	0.000**	0.000**
	(0.000)	(0.000)
Import growth	-0.001**	-0.001**
	(0.000)	(0.000)
Country-industry FE	Yes	Yes
Country-year FE	Yes	Yes
Industry-year FE	Yes	Yes
Country-industry-year cluster	Yes	Yes
Obs	118,451	118,451
R square	0.99	0.99

Notes: This table examines domestic firms' patenting decisions in response to FDI news. The dependent variables are a domestic firm's change in log patent applications. The variable "news count" is a count of news on multinational entry in a given city, SIC 3-digit industry, and year. The variable "actual entry count" is a count of actual multinational entry in a given city, SIC 3-digit industry, and year. All variables on the right hand side are lagged by one year. All regressions include country-industry, country-year, and industry-year fixed effects. Standard errors are clustered at the country-industry-year level and reported in the parentheses. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table 6: Heterogeneous Responses to FDI News across Industries

Dependent variable: Change in TFP	(1)	(2)	(3)
News dummy	0.108***	0.099***	0.041***
	(0.006)	(0.005)	(0.002)
* TFP ave. distance	-0.112***		
	(0.010)		
* TFP std. dev.		-0.088***	
		(0.007)	
* TFP skewness			-0.007***
			(0.002)
Actual entry dummy	0.008**	0.008**	0.007***
	(0.001)	(0.001)	(0.001)
Domestic ave. sales growth	0.001	-0.000	0.004***
	(0.001)	(0.001)	(0.001)
Domestic import growth	0.000	0.001	-0.001
	(0.001)	(0.001)	(0.001)
Size	0.005***	0.004***	0.006***
	(0.000)	(0.000)	(0.000)
Capital intensity	0.014***	0.014***	0.015***
	(0.000)	(0.000)	(0.000)
Age	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)
Country-industry FE	Yes	Yes	Yes
Country-year FE	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes
City-industry-year cluster	Yes	Yes	Yes
Obs	1,462,532	1,462,532	1,462,532
R square	0.007	0.008	0.007

Notes: This table reports domestic firms' heterogeneous TFP response to FDI news across industries. The dependent variables are a domestic firm's change in log TFP. The variable "news dummy" is a dummy of news on multinational entry in a given city, SIC 3-digit industry, and year. The variable "actual entry dummy" is a dummy of actual multinational entry in a given city, SIC 3-digit industry, and year. All variables on the right hand side are lagged by one year. All regressions include country-industry-year and city-year fixed effects. Standard errors are clustered at the city-industry-year level and reported in the parentheses. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table 7: Heterogeneous Responses to FDI News within Industries: TFP

Dependent variable: Change in TFP	(1)	(2)
News dummy	0.182***	0.303***
	(0.035)	(0.082)
* Lagged TFP	-0.060***	-0.172***
	(0.012)	(0.063)
* Lagged TFP square		0.023*
		(0.012)
Lagged TFP	-0.196***	-0.196***
	(0.002)	(0.002)
Actual entry dummy	0.006**	0.007**
	(0.003)	(0.003)
Domestic ave. sales growth	0.001*	0.001*
	(0.000)	(0.000)
Size	0.004***	0.004***
	(0.000)	(0.000)
Capital intensity	-0.033***	-0.033***
	(0.001)	(0.001)
Age	-0.001***	-0.001***
	(0.000)	(0.000)
Country-industry-year FE	Yes	Yes
City-year FE	Yes	Yes
City-industry-year cluster	Yes	Yes
Obs	1,457,828	1,457,828
R square	0.103	0.103

Notes: This table reports domestic firms' heterogeneous TFP response to FDI news within each industry. The dependent variables are a domestic firm's change in log TFP. The variable "news dummy" is a dummy of news on multinational entry in a given city, SIC 3-digit industry, and year. The variable "actual entry dummy" is a dummy of actual multinational entry in a given city, SIC 3-digit industry, and year. All variables on the right hand side are lagged by one year. All regressions include country-industry-year and city-year fixed effects. Standard errors are clustered at the city-industry-year level and reported in the parentheses. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table 8: Heterogeneous Responses to FDI News within Industries: Innovation and Product Composition

Dependent variable:	(1)	(2)
	RD	Drop product
News dummy	-0.134***	0.013**
	(0.025)	(0.006)
* Lagged TFP	0.052***	-0.003***
	(0.009)	(0.001)
Lagged TFP	0.052***	
	(0.002)	
Actual entry dummy	-0.001	0.005***
	(0.006)	(0.000)
Domestic ave. sales growth	0.004***	-0.002**
	(0.001)	(0.001)
Size	0.072***	0.008***
	(0.001)	(0.000)
Capital intensity	0.041***	
	(0.001)	
Age	0.001***	0.000***
	(0.000)	(0.000)
Country-industry-year FE	Yes	Yes
City-year FE	Yes	Yes
City-industry-year cluster	Yes	Yes
Obs	471,851	4,000,169
R square	0.123	0.043

Notes: This table reports domestic firms' heterogeneous innovation and product-composition response to FDI news within each industry. The dependent variables are, respectively, a domestic firm's decisions to engage in innovation and drop products. The variable "news dummy" is a dummy of news on multinational entry in a given city, SIC 3-digit industry, and year. The variable "actual entry dummy" is a dummy of actual multinational entry in a given city, SIC 3-digit industry, and year. All variables on the right hand side are lagged by one year. All regressions include country-industry-year and city-year fixed effects. Standard errors are clustered at the city-industry-year level and reported in the parentheses. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table 9: Heterogeneous Responses to FDI News across FDI Host Countries

| Dependent variable: | (1) | (2) |
Change in TFP	Developed	Developing
News count	-0.004	0.003***
	(0.003)	(0.001)
Actual entry count	0.001	-0.002
	(0.002)	(0.003)
Domestic ave. sales growth	-0.001***	-0.011***
	(0.000)	(0.001)
Size	0.002***	-0.001
	(0.000)	(0.001)
Capital intensity	0.021***	0.021***
	(0.000)	(0.000)
Age	-0.001***	-0.001***
	(0.000)	(0.000)
Country-industry-year FE	Yes	Yes
City-year FE	Yes	Yes
City-industry-year cluster	Yes	Yes
Obs	826,749	643,914
R square	0.028	0.013

Notes: This table reports heterogeneous responses to FDI news in developed v.s. developing FDI host countries. The variable "news dummy" is a dummy of news on multinational entry in a given city, SIC 3-digit industry, and year. The variable "actual entry dummy" is a dummy of actual multinational entry in a given city, SIC 3-digit industry, and year. All variables on the right hand side are lagged by one year. All regressions include country-industry-year and city-year fixed effects. Standard errors are clustered at the city-industry-year level and reported in the parentheses. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table 10: Domestic Firm Responses to FDI News in Downstream and Upstream Industries

Dependent variable:	(1)	(2)
	Change in TFP	RD decision
News count	0.002**	0.003**
	(0.002)	(0.001)
Downstream news count	-0.003	0.015**
	(0.007)	(0.008)
Upstream news count	-0.003	-0.022
	(0.016)	(0.012)
Actual entry count	-0.000	-0.001*
	(0.000)	(0.000)
Actual downstream entry count	0.010*	0.001
	(0.007)	(0.005)
Actual upstream entry count	-0.001	0.001
	(0.001)	(0.007)
Domestic ave. sales growth	-0.003***	0.001**
	(0.000)	(0.000)
Size	0.001*	0.069***
	(0.000)	(0.001)
Capital intensity	0.021***	0.038***
	(0.000)	(0.001)
Age	-0.001***	0.001***
	(0.000)	(0.000)
Country-industry-year FE	Yes	Yes
City-year FE	Yes	Yes
City-industry-year cluster	Yes	Yes
Obs	1,470,663	673,244
R square	0.018	0.115

Notes: This table reports domestic firms' TFP and innovation responses to FDI news in down-stream and upstream industries. The dependent variables are a domestic firm's change in log TFP and research and development decisions. The three "news count" variables are counts of news on multinational entry in the same industry, downstream industries, and upstream industries. The three "actual entry count" variables are counts of actual multinational entry in the same industry, downstream industries, and upstream industries. All variables on the right hand side are lagged by one year. All regressions include country-industry-year and city-year fixed effects. Standard errors are clustered at the city-industry-year level and reported in the parentheses. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table 11: The Influence of News

Dependent variable: Change in TFP	(1)	(2)
News dummy	0.015	-0.024**
	(0.024)	(0.012)
* Ave. word count	-0.001	
	(0.005)	
* Ave. circulation		0.003***
		(0.001)
Actual entry dummy	0.001	0.001
	(0.003)	(0.003)
Domestic ave. sales growth	-0.003***	-0.003***
	(0.000)	(0.000)
Size	0.001*	0.001*
	(0.000)	(0.000)
Capital intensity	0.021***	0.021***
	(0.000)	(0.000)
Age	-0.001***	-0.001***
	(0.000)	(0.000)
Country-industry-year FE	Yes	Yes
City-year FE	Yes	Yes
City-industry-year cluster	Yes	Yes
Obs	1,470,663	1,470,663
R square	0.018	0.018

Notes: This table examines domestic firms' TFP response to news with different degrees of influence. The dependent variables are a domestic firm's change in log TFP. The variable "news dummy" is a dummy of news on multinational entry in a given city, SIC 3-digit industry, and year. The news dummy is interacted with the average word count of news and the average circulation volume of publications, respectively. The variable "actual entry dummy" is a dummy of actual multinational entry in a given city, SIC 3-digit industry, and year. All variables on the right hand side are lagged by one year. All regressions include country-industry-year and city-year fixed effects. Standard errors are clustered at the city-industry-year level and reported in the parentheses. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table 12: The Effect of Information: Uncertainty

Dependent variable:	(1)	(2)	(3)	(4)
	Change in TFP		RD decision	
News (with certainty) dummy	0.010***		0.014***	
	(0.003)		(0.005)	
News (with uncertainty) dummy	0.000		0.001	
	(0.007)		(0.012)	
Actual entry dummy	0.001		-0.001	
	(0.003)		(0.004)	
News (with certainty) count		0.002**		0.003***
		(0.001)		(0.001)
News (with uncertainty) count		-0.001		0.004
		(0.003)		(0.007)
Actual entry count		-0.000		-0.001*
		(0.000)		(0.000)
Domestic ave. sales growth	-0.003***	-0.003***	0.001**	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
Size	0.001*	0.001*	0.069***	0.069***
	(0.000)	(0.000)	(0.001)	(0.001)
Capital intensity	0.021***	0.021***	0.038***	0.038***
	(0.000)	(0.000)	(0.001)	(0.001)
Age	-0.001***	-0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Country-industry-year FE	Yes	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes	Yes
City-industry-year cluster	Yes	Yes	Yes	Yes
Obs	1,457,828	1,457,828	673,244	673,244
R square	0.018	0.018	0.115	0.115

Notes: This table examines domestic firms' TFP response to the content of news, in particular, the uncertainty of FDI announced in the news. The dependent variables are a domestic firm's change in log TFP. The variables "news dummy" and "news count" are, respectively, an indicator and a count of news on multinational entry in a given city, SIC 3-digit industry, and year. The variables "actual entry dummy" and "actual entry count" are, respectively, an indicator and a count of actual multinational entry in a given city, SIC 3-digit industry, and year. All variables on the right hand side are lagged by one year. All regressions include country-industry-year and city-year fixed effects. Standard errors are clustered at the city-industry-year level and reported in the parentheses. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table 13: The Effect of Information: Target Market

Dependent variable:	(1) Change in TFP	(3) RD decision
News dummy	0.009***	0.019***
	(0.003)	(0.005)
* Local-market motive dummy	0.019**	-0.005
	(0.010)	(0.010)
* Export motive dummy	-0.012	-0.021**
	(0.013)	(0.009)
Actual entry dummy	0.001	-0.000
	(0.003)	(0.004)
Domestic ave. sales growth	-0.003***	-0.003***
	(0.000)	(0.000)
Size	0.001*	0.001*
	(0.000)	(0.000)
Capital intensity	0.021***	0.021***
	(0.000)	(0.000)
Age	-0.001***	-0.001***
	(0.000)	(0.000)
Country-industry-year FE	Yes	Yes
City-year FE	Yes	Yes
City-industry-year cluster	Yes	Yes
Obs	1,470,663	673,244
R square	0.018	0.115

Notes: This table examines domestic firms' TFP response to the content of news, in particular, the FDI's target market reported in the news. The dependent variables are a domestic firm's change in log TFP and research and development decision. The variable "news dummy" is a dummy of news on multinational entry in a given city, SIC 3-digit industry, and year. The variable "actual entry dummy" is a dummy of actual multinational entry in a given city, SIC 3-digit industry, and year. All variables on the right hand side are lagged by one year. All regressions include country-industry-year and city-year fixed effects. Standard errors are clustered at the city-industry-year level and reported in the parentheses. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table 14: Placebo Test: Timing of FDI News

Dependent variable: Change in TFP	(1)	(2)	(3)
Placebo news dummy	0.003		
	(0.004)		
Actual entry dummy	0.002		
	(0.003)		
Placebo News count		0.004	
		(0.005)	
Placebo MNC count			0.001
			(0.004)
Actual entry count		-0.000	-0.000
		(0.000)	(0.000)
Domestic ave. sales growth	-0.003***	-0.003***	-0.003***
	(0.000)	(0.000)	(0.000)
Size	0.001*	0.001*	0.001*
	(0.000)	(0.000)	(0.000)
Capital intensity	0.021***	0.021***	0.021***
	(0.000)	(0.000)	(0.000)
Age	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)
Country-industry-year FE	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes
City-industry-year cluster	Yes	Yes	Yes
Obs	1,470,663	1,470,663	1,470,663
R square	0.018	0.018	0.018

Notes: This tablet reports a falsification test where FDI news were assumed to occur half a year earlier than the actual date. The dependent variables are a domestic firm's change in log TFP. The variables "news dummy" and "news count" are, respectively, an indicator and a count of news on multinational entry in a given city, SIC 3-digit industry, and year. The variables "actual entry dummy" and "actual entry count" are, respectively, an indicator and a count of actual multinational entry in a given city, SIC 3-digit industry, and year. All variables on the right hand side are lagged by one year. All regressions include country-industry-year and city-year fixed effects. Standard errors are clustered at the city-industry-year level and reported in the parentheses. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table 15: IV Analysis

	First Stage	
	(1)	(2)
Dependent variable:	Domestic local news count	Weekday news count
Foreign local news count	0.220***	
	(0.000)	
Weekend narrative news count		0.011***
		(0.000)
Actual entry count	0.011***	0.001***
	(0.000)	(0.000)
Domestic ave. sales growth	0.00004	-6.44e-07
	(0.00003)	(3.32e-06)
Country-industry-year FE	Yes	Yes
City-year FE	Yes	Yes
Obs	889,821	889,821
R square	0.096	0.051
F stat	22706.3	10363.6

	Second Stage			
Dependent variable:	(1)		(2)	
Change in TFP	OLS	IV	OLS	IV
Domestic local news count	0.006**	0.019**		
	(0.002)	(0.009)		
Weekday news count			0.003***	0.222**
			(0.001)	(0.103)
Actual entry count	-0.002	-0.002	-0.002	-0.002
	(0.001)	(0.002)	(0.001)	(0.002)
Domestic ave. sales growth	-0.003***	-0.004***	-0.003***	-0.004***
	(0.000)	(0.000)	(0.000)	(0.000)
Size	0.001*	0.001***	0.001*	0.001
	(0.000)	(0.000)	(0.000)	(0.000)
Capital intensity	0.021***	0.021***	0.021***	0.022***
	(0.000)	(0.000)	(0.000)	(0.000)
Age	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Country-industry-year FE	Yes	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes	Yes
City-industry-year cluster	Yes	Yes	Yes	Yes
Obs	1,464,558	1,464,558	1,464,558	1,464,558
R square	0.018	0.018	0.018	0.018

Notes: This table reports the IV analysis where FDI news reported by domestic local sources are instrumented by those reported by foreign local sources and weekday FDI news are instrumented by weekend narrative FDI news. The dependent variables are a domestic firm's change in log TFP. The variable "news count" is a count of news on multinational entry in a given city, SIC 3-digit industry, and year. The variable "actual entry count" is a count of actual multinational entry in a given city, SIC 3-digit industry, and year. All variables on the right hand side are lagged by one year. All regressions include country-industry-year and city-year fixed effects. Standard errors are clustered at the city-industry-year level and reported in the parentheses. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table 16: Countries with the Most Publications

Dependent variable: Change in TFP	(1)	(2)	(3)
News dummy	0.008**		
	(0.003)		
Actual entry dummy	0.003		
	(0.003)		
News count		0.002**	
		(0.001)	
MNC count			0.004***
			(0.002)
Actual entry count		0.003	0.003
		(0.002)	(0.002)
Domestic ave. sales growth	-0.003***	-0.003***	-0.003***
	(0.000)	(0.000)	(0.000)
Size	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
Capital intensity	0.017***	0.017***	0.017***
	(0.001)	(0.001)	(0.001)
Age	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)
Country-industry-year FE	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes
City-industry-year cluster	Yes	Yes	Yes
Obs	551,159	551,159	551,159
R square	0.014	0.014	0.014

Notes: This table reports the analysis for the 10 countries with the most publications. The dependent variables are a domestic firm's change in log TFP. The variable "news count" is a count of news on multinational entry in a given city, SIC 3-digit industry, and year. The variable "actual entry count" is a count of actual multinational entry in a given city, SIC 3-digit industry, and year. All variables on the right hand side are lagged by one year. All regressions include country-industry-year and city-year fixed effects. Standard errors are clustered at the city-industry-year level and reported in the parentheses.***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table 17: Countries with the Largest Firm Coverage

Dependent variable: Change in TFP	(1)	(2)	(3)
News dummy	0.007**		
	(0.003)		
Actual entry dummy	0.003		
	(0.003)		
News count		0.002*	
		(0.001)	
MNC count			0.004***
			(0.002)
Actual entry count		0.003	0.002
		(0.002)	(0.002)
Domestic ave. sales growth	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)
Size	0.003***	0.003***	0.003***
	(0.000)	(0.000)	(0.000)
Capital intensity	0.017***	0.024***	0.024***
	(0.001)	(0.001)	(0.001)
Age	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)
Country-industry-year FE	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes
City-industry-year cluster	Yes	Yes	Yes
Obs	970,775	970,775	970,775
R square	0.013	0.013	0.013

Notes: This table reports the analysis for the 10 countries with the largest domestic firm coverage. The dependent variables are a domestic firm's change in log TFP. The variable "news count" is a count of news on multinational entry in a given city, SIC 3-digit industry, and year. The variable "actual entry count" is a count of actual multinational entry in a given city, SIC 3-digit industry, and year. All variables on the right hand side are lagged by one year. All regressions include country-industry-year and city-year fixed effects. Standard errors are clustered at the city-industry-year level and reported in the parentheses.***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Table A.1: The Composition of FDI News

Form	Share	Motive	Share
Greenfield	0.68	Local market access	0.39
Mergers and acquisitions	0.04	Export platform	0.59
Joint venture	0.14	Comparative advantage	0.08
Country	Share	Credibility	Share
North-North	0.31	FDI with certainty	0.89
North-South	0.56	FDI with uncertainty	0.11
South-North	0.02		
South-South	0.11		

Notes: This table reports the share of FDI news in each category.

Table A.2: Summary Statistics

Variables	Source	Mean	Std. dev.	Min	Max	Format
TFP	Orbis, Chinese census	2.37	1.16	-14.57	10.39	Log
Labor productivity	Orbis, Chinese census	3.54	1.70	-4.85	16.32	Log
RD	Orbis, Chinese census	0.12	0.32	0.00	1.00	Binary
Firm age	Orbis, Chinese census	15.45	15.95	1.00	199.00	Level
Firm size	Orbis, Chinese census	3.09	1.75	0.00	13.81	Log
Firm capital intensity	Orbis, Chinese census	2.08	1.49	-4.02	17.81	Log
New product	Chinese census	0.09	0.28	0.00	1.00	Binary
New product revenue	Chinese census	0.03	0.15	0.00	1.00	Ratio
Staff training	Chinese census	0.00	0.06	0.00	47.00	Ratio
Advertising	Chinese census	0.00	0.06	0.00	38.12	Ratio
Add product	Orbis	0.26	0.44	0.00	1.00	Binary
Drop product	Orbis	0.02	0.14	0.00	1.00	Binary
Switch primary product	Orbis	0.28	0.45	0.00	1.00	Binary
Patent applications	Orbis	0.65	1.31	0.00	9.32	Log
Actual MNC entry	Orbis	0.06	0.47	0.00	17.00	Level
News count	Factiva	0.03	0.54	0.00	36.00	Level
MNC count (in news)	Factiva	0.02	0.23	0.00	9.00	Level
Investment value	Factiva	0.15	1.80	0.00	23.29	Log
Expected employment	Factiva	0.01	0.27	0.00	10.82	Log
Expected output	Factiva	0.05	0.83	0.00	27.81	Log
Article word count	Factiva	0.05	0.49	0.00	7.32	Log
Circulation volume	Ulrich, News Bank, and etc.	0.04	0.69	0.00	15.45	Log

Notes: This table reports the sources and the summary statistics of main variables.