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Do the Biggest Aisles Serve a Brighter Future? Global Retail Chains and Their Implications for Romania

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Abstract

During the past two decades many countries have opened their retail sector to foreign direct investment (FDI), yet little is known about the implications of such liberalization for their economies. Using a unique dataset combining outlet-specific information on global retail chains with a panel of Romanian manufacturing firms, this study sheds some light on this question. The results from the difference-in-difference analysis suggest that the expansion of global retail chains leads to a significant increase in the total factor productivity (TFP) in the supplying manufacturing industries: their presence in a region raises the TFP by 3.8 to 4.7 percent, while doubling the number of chains leads to an increase of 3.3 to 3.7 percent. The decomposition of the aggregate productivity in the supplying industries suggests that the boost to performance is driven by both within-firm improvements and between-firm reallocation. Both changes are found to be associated with the expansion of foreign retailers. These conclusions are robust to a variety of specifications and supported by evidence from a firm-level survey. They suggest that the opening of the retail sector to FDI may stimulate productivity growth in manufacturing industries and thus provide another piece of evidence in favor of services liberalization.

JEL classifications: F23, F14, L81, D24

Keywords: global retail chains, productivity, services liberalization, foreign direct investment, backward linkages, reallocation, allocation efficiency

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1. Introduction

During the past two decades many countries, including some developing economies, have opened their retail sector to foreign direct investment (FDI). This liberalization has facilitated a rapid expansion of global retail chains. For instance, Wal-Mart, the world's largest retail chain and the largest company, had 2,913 outlets in 13 countries outside the United States in 2007, ten of which were in the developing world. In the same year, French retailer Carrefour, the second largest retailer in the world and the largest in Europe, operated 8,688 outlets in 28 foreign countries, including 20 developing countries.

The entry of global retail chains may transform the retail sector in the host economies and, more importantly, may affect the supplying industries. Global retail chains differ from indigenous retailers not only in terms of scale but also in terms of their access to global sourcing networks, advanced technologies and modern management strategies. Their entry often changes the landscape of the retail sector in the host country through increased concentration and modernization.[1] Moreover, their expansion may have implications for supplying industries in terms of lowering distribution costs, stimulating economies of scale, and increasing competition due to a greater ability of foreign retailers to source products from abroad. The competition effect may in turn encourage productivity improvements and innovation among suppliers. Some of these effects have been documented in a recent case study describing the effects of Wal-Mart's entry on detergent producers in Mexico (Javorcik, Keller and Tybout 2008).

Despite the growing importance of global retail chains and the potentially large implications of FDI inflows into the retail sector, little effort has been devoted to understanding how the entry of global retailers may affect the host economy.[2] This study takes a step towards filling the gap in the literature by examining how the opening of the Romanian retail sector to FDI affected manufacturing industries through backward linkages.

We motivate our analysis with the findings of a recent survey of manufacturing firms conducted by the World Bank in Romania. Its results indicate that the entry of foreign retail chains intensified competition in the upstream manufacturing industries and encouraged

[1] See Reardon and Berdegue (2002), Dries, Reardon and Swinnen (2004), and Mattoo and Payton (2007).

[2] The existing work on the retail sector and supermarket chains in the context of developing countries provides broader insight into the development of modern retailing. These studies, however, do not distinguish between foreign chains and domestic retailers and hence, do not clarify the potential impact of FDI inflows in the sector. Moreover, they focus only on the implications for agricultural producers. The literature focusing on the effects of expansion of indigenous retail chains in industrial countries is more advanced but examines mostly on the effects on other retailers and consumers. See the next section for a literature review.

innovation among its suppliers.[3] The results of the survey also suggest that the suppliers to global retailers exhibit superior productivity. Strikingly, no evidence of superior performance is observed one year before firms start doing business with global retailer

To investigate the implications of entry of global retail chains in a rigorous manner, we combine a unique dataset on Romanian outlets of foreign retail chains with a panel data on manufacturing firms operating in Romania during the period 1997-2005. Romania's opening to FDI is a relatively recent phenomenon, so our analysis covers both the period before and after the entry of foreign retailers. The size of the country allows us to take advantage of their uneven geographical expansion. In particular, our study takes a difference-in-difference approach, relying on the differences in the speed of the expansion of global retail chains across eight Romanian regions and the fact that only some industries within each region should be affected. Multiple indicators are used to measure the regional presence of foreign chains, including an indicator variable, the number of outlets, and their selling space.

We find that an expansion of global retail chains leads to a significant increase in the total factor productivity (TFP) in the supplying industries in the region where the expansion took place. The presence of global retail chains in a region boosts the TFP of firms in the supplying industries by 3.8 to 4.7 percent and doubling the number of chains leads to a 3.3 to 3.7 percent increase. These conclusions hold when we use alternative measures of performance: labor productivity and the TFP measure taking into account the simultaneity bias between unobserved productivity shocks and input choices (estimated following Ackerberg, Caves and Frazer 2006). Our findings are further confirmed in specifications in first, second and long differences.

We address potential endogeneity problems in several ways. We control for unobserved heterogeneity at the region-year level. We perform a strict exogeneity test, suggested by Wooldridge (2002, p. 285), and show that it does not reject our empirical strategy. To deal with the possible omitted variable bias, we demonstrate that controlling for regional wage levels and using the instrumental variable approach does not change the conclusions of our study.

Our results are robust to taking a more ambitious approach to geography and calculating

[3] About 60 percent of the respondents reported that entry of foreign retail chains into their city increased competition in the market, mainly through improving access to imports and stimulating emergence of new competitors. About 70 percent of firms *supplying* global retail chains reported increasing their market share, product diversity, frequency of product innovation and quality of packaging *after* they started doing business with global retailers. In contrast, only 13 percent of firms *not supplying* global retail chains reported an increase in their market share. The corresponding figures for increases in the product diversity, innovation and package were 31, 41 and 37 percent, respectively.

a measure of access to foreign retailers at the level of 42 counties. More specifically, we weight the number of foreign outlets in all counties in Romania (including the county in question) by the inverse of their distance to the county where the manufacturer in consideration operates. We find that access to foreign retailers is positively correlated with the performance of upstream industries. The magnitude of the effect is economically meaningful. A ten percent increase in the number of foreign chains in all counties is associated with a 2.4 to 2.6 percent increase in the productivity in the supplying industries.

Our next exercise focuses on identifying drivers of the aggregate productivity gains in the supplying industries. We decompose the aggregate productivity in the supplying industries and in the other industries into the average productivity and the covariance between a firm's share of industry output and its productivity. Increases in the average productivity represent improvement within individual firms, while increases of the covariance capture improvement due to reallocation of market shares towards more efficient producers. The results suggest that during the period under study the aggregate productivity increased faster in the supplying industries (where it rose by 16.4 percent) than in the other industries (where it increased by 5.3 percent). In the supplying industries, about half of the productivity increase was driven by changes in the average performance of firms and about half by the reallocation of market shares. In other industries, the contribution of the within-firm changes was much higher (82 percent).

In the final exercise, we link the aggregate productivity gains through both channels with the presence of global retail chains. We regress the aggregate productivity and its two components at the 3-digit-industry-county-year level on the access to foreign chains interacted with a dummy for the supplying industries. We control for industry-county fixed effects and county-year fixed effects. To make the results more representative of the national level we weight all observations by the number of firms observed in a county-industry group. We find a positive and statistically significant relationship between the interaction term and the aggregate productivity, the average productivity and the covariance. Thus our findings are consistent with the presence of global chains facilitating increases in aggregate productivity in the supplying industries through both within-firm changes and reallocation.

Our paper contributes to the empirical literature on the link between openness and firm performance. While there exists substantial empirical evidence on the effect of liberalizing trade in goods (see for instance Pavcnik 2002, Trefler 2004, Amiti and Konings 2007), much less is

known about the effects of services liberalization. The notable exceptions are Arnold et al. (2010 and 2011). These studies examine the implications of services liberalization using firm-level data from the Czech Republic and India, respectively, and find that services sector reform boosts the performance of downstream manufacturing firms. The former study concludes that allowing foreign entry into services industries is the key channel through which the effect takes place, while the latter study compares the effects of liberalizing banking, insurance, tele-communications and transport sectors.

This study differs from Arnold et al. (2010 and 2011) by considering the effect of services liberalization on *upstream* (rather than *downstream*) industries. Although the retail sector does not belong to backbone services, it acts as the critical intermediary between consumers and producers. Our approach is tailored to its character and is inspired by the literature on the spillovers of FDI through backward linkages.[4] Moreover, our unique dataset on foreign retailers allow us to exploit not only the inter-temporal but also the cross-regional variation in the variable of interest, which has not been used in the services liberalization literature. We also go beyond the existing studies by examining the relative contribution of within-firm changes and between firm reallocation to the aggregate productivity gains and linking them to developments in a services industry.

Although most countries have abolished the barriers to FDI in manufacturing, many governments are still reluctant to allow unrestricted foreign presence in services, concerned about its implications. Our results suggest that opening of the retail sector to FDI may stimulate productivity growth in upstream manufacturing, and thus they provide another piece of evidence in favor of services liberalization.

Our paper also adds to emerging literature on allocation efficiency. Recent research has suggested that there is considerable allocation inefficiency across firms in developing countries. This strand of literature finds that such misallocation has led to substantive aggregate productivity loss and that it helps explain a large portion of productivity gap between developing countries and more advanced economies (Banerjee and Duflo 2005, Restuccia and Rogerson 2008, Hsieh and Klenow 2009, and Bartelsman, Haltiwanger and Scarpetta 2009). Greater

[4] This literature documents positive productivity spillovers from FDI in *manufacturing* to indigenous firms in upstream industries (see Javorcik 2004, Blalock and Gertler 2008, and Javorcik and Spatareanu 2008 and 2009). See Görg and Greenaway (2004) for a review.

openness to trade has been shown to act as a stimulus intensifying domestic competition and facilitating productivity-enhancing reallocation across firms (Melitz 2003, Pavcnik 2002, Fernandes 2007, and Harrison et al. 2011). Our study finds that the entry of foreign retail chains can also act as a factor increasing allocation efficiency in upstream industries.

This study is structured as follows. Section 2 reviews the related literature on global retail chains. Section 3 discusses the channels through which presence of global chains may affect supplying industries and presents evidence from a recent World Bank enterprise survey. Section 4 describes the data, while section 5 briefly discusses the expansion of global retailers in Romania. The link between the expansion of global retailers and the productivity of the supplying sectors in Romania is examined in Section 6. Section 7 focuses on the drivers of the aggregate performance: within-firm changes and reallocation and investigates how they were affected by the expansion of foreign retailers. The last section presents conclusions.

2. Literature on Global Retail Chains

Two strands of the literature on global retail chains are relevant to this study. The first strand consists of case studies on the evolution of the retail sector in developing and transition countries. A series of studies describe the rise of modern retail formats, contrast them with traditional retailers and examine the implications of this phenomenon for agricultural producers. Dries, Reardon and Swinnen (2004) draw a detailed picture of the evolution of supermarkets in Central and Eastern European (CEE) countries and discuss their implications for the agricultural sector. Swinnen et al. (2006) document how FDI in the retail sector in some CEE countries facilitates productivity growth of local dairy farmers. Reardon and Berdegue (2002) and Reardon, Timmer, and Berdegue (2003), Minten, Randrianarison and Swinnen (2006), Mattoo and Payton (2007) provide similar analysis on the rise of supermarket in Latin America, Asia and Africa and their effects on the agricultural sector. The majority of these case studies, however, do not distinguish between foreign supermarket chains and domestic ones and thus do not advance our understanding of the effects of FDI. Their focus is also limited to suppliers of agricultural products.

Several recent case studies are devoted to the implications of FDI inflows into retail sector. Chavez (2002) describes the evolution of foreign retail chains and Mexican domestic retailers around the formation of NAFTA and the increasing competitive pressure caused by the

entry of foreign retailers. Javorcik, Keller, and Tybout (2008) document how the entry of Wal-Mart into Mexico facilitated the modernization of the retail sector and stimulated fundamental changes in the relationship between retailers and suppliers of soaps, detergents, and surfactants. They find that Wal-Mart's entry has driven high-cost suppliers out of business, benefited surviving producers by providing access to a larger market and prompted suppliers to introduce more innovations. In contrast, a case study by Durand (2007) concludes that FDI has played an important role in modernizing the retail sector in Mexico, but has dampened the performance of local retailers and retail wages by introducing higher competitive pressures. The large increase in imports initiated by Wal-Mart's entry has most likely negatively affected Mexican producers in the supplying sectors. These case studies suggest that there may be a strong relationship between the presence of global retail chains and the performance of supplying firms but the direction of such a relationship is still an open question.[5]

The second strand of the literature examines the effects of expansion of indigenous retail chains on various aspects of economic activity in the retail sector in industrial countries. A study by Foster, Haltiwanger and Krizan (2006) finds that establishments belonging to large retail chains are more productive than those of the single-unit establishments they are displacing. The authors argue such reallocation drives the productivity growth in the retail sector in the United States. Jia (2008) develops an empirical model to assess the impact of chain stores on the profitability and entry/exit decisions of discount retailers. She finds that Wal-Mart's expansion from the late 1980s to the late 1990s explains about 40-50 percent of the net change in the number of small discount retailers and a similar percentage for all other discount stores. A study by Basker (2005a) estimating the effect of Wal-Mart's expansion on retail employment at the US county level produces mixed results. Basker (2005b) finds that Wal-Mart's entry into US regions has been associated with lower retail prices of various consumer goods. The magnitude of the effects varies by product and econometric specification, but generally ranges from 1.5–3 percent in the short run to four times as much in the long run.[6]

[5] Related work by Head, Jing and Swenson (2009) examines the effects of the presence of multinational retailers in Chinese regions on regional exports.
[6] See the literature review by Basker (2007).

3. Implications of Global Retail Chains for the Supplying Industries in the Host Country

The entry of global retail chains may affect the performance of firms in the supplying industries of the host economy through several channels. First, it may increase competitive pressures on suppliers. As suggested by the evidence from the advanced countries, especially from the United States, large retail chains with a national reach tend to replace single-unit local retailers and capture increasing larger market shares (Foster, Haltiwanger and Krizan 2006). When foreign retail chains become more important, their bargaining power vis a vis suppliers strengthens. Moreover, thanks to their extensive international sourcing networks, global retail chains often have the option of importing products rather than purchasing them locally. This stronger position (relative to other retailers operating in the host country) allows global retail chains to require suppliers to lower prices and/or improve their products. This in turn forces suppliers to become more efficient.[7]

Second, entry of global retail chains possessing cutting-edge retail technologies and familiar with the best international practices may help lower distribution costs faced by suppliers. Instead of sending their products to a large number of small retailers, suppliers may deliver larger shipments to several retail outlets. Thanks to computerized inventory systems used by global retail chains, suppliers may be better informed about changes in demand and may be better able to tailor their products to the expectations of consumers.[8] Thanks to saving on employee time and the usage of capital (e.g. truck fleet) when arranging distribution and planning production, suppliers may produce more output with the same amount of labor and capital and thus achieve a higher productivity level.

Third, by allowing suppliers to reach a larger market through their regional, national and international presence, foreign retailers may stimulate economies of scale in the supplying industries.

Finally, by imposing higher quality standards, giving access to high sales volumes for favored suppliers and sharing useful point-of-sale information on demand patterns with

[7] Additionally, if the presence of global retail chains forces local retailers to lower their prices, they are likely to pass the price pressure onto their suppliers. Thus we would expect that entry of global retail chains will affect all producers in the supplying industries and not just firms directly supplying global retailers.

[8] Foster, Haltiwanger and Krizan (2006) discuss the impact of the information technology revolution on the retail trade sector. For example, adoption of systems that electronically link cash registers to scanners and credit card processing machines allows stores to increase services and sales without increasing personnel, change prices easily and track the success of their pricing strategies for individual items.

suppliers, foreign retailers can accelerate the reallocation process by which the most efficient supplying firms see their market shares increase at the expense of lesser performers.

In sum, by increasing competitive pressures on suppliers, cutting distribution costs and offering easier access to information and a larger market, global retail chains may stimulate productivity growth in the supplying industries through within-firm improvements and reallocation.

Anecdotal evidence supports the view that entry of global retail chains has profound implications for the supplying sectors in the host country. For instance, Mexican-owned detergent producers have reported introducing incremental improvements to their products in order to avoid drastic price cuts demanded by Wal-Mart (Javorcik et al. 2008). Wal-Mart has also been reported to provide its suppliers with full and free access to real-time data on how their products are selling. Suppliers can plan production runs earlier and offer better prices (Economist 2001). Tesco, among others, tracks every purchase through its Club card and can use this information to help its suppliers test and adapt innovations (The Boston Consulting Group 2007).

The results of a 2008 enterprise survey of manufacturing firms conducted in Romania by the World Bank paint a similar picture. Fifty-eight percent of enterprises indicate that entry of foreign retail chains into the respondent's city has increased the level of competition (see Figure 1a). The same percentage of respondents believe that competition from imports has increased because foreign retail chains sell a lot of imported products. Sixty-two percent indicate that entry of foreign retail chains has led to emergence of new competitors, and 42 percent indicate that it has eliminated some competitors. As the impact of foreign retail chains is likely to vary depending on the sector of operation of a Romanian respondent, Figure 1b presents responses of firms that are likely to be affected the most, namely firms manufacturing food and beverage products (sector denoted by the NACE code 15). The percentage of firms reporting an increase in the level of competition is the same as for all sectors, though respondents appear to be affected more by emergence of new competitors than by competition from imports. In all cases, the vast majority of respondents reports that the effects are felt within two years after entry of foreign retail chains.

The survey results also suggest that Romanian suppliers of foreign retail chains are strongly affected by the appearance of foreign retailers. Figure 2a lists the self-reported changes in a firm's market share and product characteristics that took place after the surveyed firm started

supplying one or more foreign retail chains. Figure 3a presents the reported impact of entry of foreign retail chains into the respondent's city on the companies that do not supply foreign retail chains. The difference between the patterns presented in the two figures is striking. While 71 percent of suppliers report an increase in their market share, 73 percent of non-suppliers report no change. Similarly, while 71-72 percent of suppliers report increasing the diversity of their products, an increase in the frequency of product innovation and an improvement in the quality of packaging, the corresponding figures for non-suppliers are only 31, 41 and 37 percent, respectively. When the sample of respondents is restricted to just firms manufacturing food and beverages (NACE 15), a similar pattern is observed (see Figures 2b and 3b).

Finally, when we combine the information on the surveyed firms with their balance sheet data from *Amadeus* database, we find that suppliers of global supermarkets exhibit superior performance relative to other firms in their industries. This is true when their performance is measured using labor productivity or TFP defined in two different ways. Depending on the performance measure used, the supplier premium ranges from 14 to 28 percent and is statistically significant in all cases. Interestingly, the supplier premium is not present in the year prior to the firm starting to supply a global retain chain. The patterns are very similar when we focus on all suppliers or just those active in food and beverage manufacturing (see Appendix I for details). Although we think of these estimates as capturing summary statistics, rather that pinning down a causal effect, we find them to be suggestive of productivity improvements taking place during the time firms supply global retail chains. We believe that they provide a good motivation for our core analysis.

4. Data

Our study examines the link between the expansion of global retail chains and developments in the supplying industries in the context of Romania. Focusing on Romania has three advantages. The first advantage is the availability of high quality and comprehensive firm-level data. We have time-varying information 513,554 companies operating in Romania during the period 1997-2005, of which 64,767 belong to manufacturing industries.[9] The second advantage is the timing of the entry of global retailer chains. They started entering Romania only in the late 1990s which means that our data cover both the pre- and the post-entry period. The

[9] The data set contains information on firms of all sizes, including those with one employee.

third advantage is that Romania is a large country with a population of 22 million and an area about 238,000 km^2. Thus, in our econometric analysis, we are able to rely not only on inter-temporal but also on cross-regional variation in the presence of foreign chains.

The main data source for our study is the commercial database *Amadeus* published by Bureau van Dijk. It contains information on about 9 million public and private companies in 38 European countries. *Amadeus* includes data on location, contact information, industry classification, standard financial statements.[10]

To identify global retail chains, we use information on company name, industry classification and ownership from *Amadeus*, which we cross check against the information on major international retail chains in the *World Retail Data and Statistics 2006/2007* and *European Marketing Data and Statistics* published by the Euromonitor International, Economist Intelligence Unit (EIU) Industry Briefing *Romania: Consumer Goods and Retail Background*, the *GAIN Report* by USDA Foreign Agriculture Service and *Dun & Bradstreet Business Report*. We identify 9 global retail chains operating in Romania. Their names and characteristics are listed in Table 1. *Amadeus* database provides aggregate figures on company operations in Romania. More detailed data on the presence of global retail chains in different Romanian regions were obtained by contacting each retail chain directly. We were successful at collecting information on the opening date of all stores, their location and selling space for 7 of the 9 chains operating in Romania. We did not manage to obtain data for Kaufland, which entered Romania during the last year of the sample (and because of using lags would not have been included in our analysis anyway), and Mega Image which is one of the smaller entrants.

A new version of the *Amadeus* database is released several times a year. Each release of the database captures firms operating in the last year included in the release and provides information on their operations for about ten years prior to the release. The database adequately captures new entrants who can be identified based on when they start reporting or based on their year of incorporation. When building the sample of manufacturing industries and the sample of retail firms, we start with the universe of Romanian firms, including one person companies, from the 2007 release of the database. To make sure that we adequately capture exiting firms, we use six earlier versions of the database released in 1998, 2001, 2002, 2003, 2004 and 2005. For

[10] The database also reports shareholder information including the country of origin but, unfortunately, this information is not time varying. Instead the ownership details pertain to "the latest available information".

instance, if a firm exited in 2004 and was dropped from the 2005 and 2007 release, we will capture it in our data set thanks to using the earlier releases. Thus our data set is an unbalanced panel which includes new entrants as well as exiting firms.

We focus on establishments that report the basic information including the value of total assets, turnover and employment, or 320,373 observations on 64,767 companies. We drop observations with negative values of total assets and interpolate missing values for output and input variables. The resulting sample consists of 299,236 observations on 55,673 firms, or 93 percent of the original sample. Next, we exclude observations with unusually large fluctuations in output and input variables (i.e., we drop the top and bottom one percent of the distribution of changes in each variable). We also drop observations for years prior to 1997.[11] We are left with 256,679 observations on 53,402 firms. We also exclude observations for which the firm's age (a covariate in our model) is missing.[12] This leaves us with 250,950 observations on 52,138 firms, which is the sample used to analyze the impact on labor productivity. When we focus on the TFP as the outcome of interest, we drop observations with unusual fluctuations in the TFP measures. We end up with 221,236 observations on 49,552 companies or 245,568 observations on 51,929 companies depending on the TFP measure used.[13]

We deflate output by the producer price index (PPI) for the 3-digit NACE sector, obtained from the *Statistical Yearbook of Romania*. We measure labor input as the number of employees, and capital as deflated tangible fixed assets. The capital deflator is a simple average of PPI from five NACE sectors.[14] We define material inputs as material costs deflated by the weighted average of PPI of the supplying sectors, with the weights defined based on the input-output matrix for year 2000 provided by the Statistical Institute of Romania. Wages are deflated by the consumer price index from the IMF's *International Financial Statistics* (IFS).

In one of our robustness checks, we also include the average real wage per worker at the regional level. To calculate the average real wage, we use data on wages and employment of all

[11] Information for the pre-1997 period is available only for a small number of firms. From our conversations with Bureau van Dijk, we understand that this is due to the coverage of the database being extended in the late 1990s. Thus to avoid a sample selection bias, we decided to focus on the period starting in 1997.

[12] Dropping a firm's age as a covariate and keeping these observations in the sample would not affect the conclusions of this paper.

[13] We are not concerned about state ownership because according to the Romanian Statistical Yearbook (2002), only 0.0038% of all enterprises in manufacturing, construction, trade and other services were majority state owned in 2002.

[14] These are: machinery and equipment; office, accounting, and computing machinery; electrical machinery and apparatus; motor vehicles, trailers, and semi-trailers; and other transport equipment.

companies operating in Romania during the period of 1997-2005 listed in *Amadeus* database, including all firms active in agriculture, industry, and services sectors. The data are then deflated by the consumer price index. In another specification, we also utilize information on the regional gross value added reported in the Eurostat database of regional statistics.

Finally, we also use information on imports and exports obtained from the UN's *COMTRADE* database. We concord 4-digit HS codes with the 4-digit NACE codes. We convert the data into Romanian lei using the average annual exchange rate from the IMF's IFS and deflate the figure by the GDP deflator from the IFS.

5. Expansion of Global Retail Chains in Romania

Compared to other Central and Eastern European countries, the retail sector in Romania was a late bloomer in terms of FDI inflows. The first entry of foreign retail chains into the Czech Republic, Hungary, and Poland took place in the early 1990s, and a broader expansion of these chains occurred around the mid-1990s. The first entry of global retail chains into Romania, however, did not take place until 1997 when the German chain Metro opened its first Metro Cash & Carry outlet in Bucharest. It took another two years before other large European retailers entered Romania. Only since year 2000, Romania has seen rapid expansion of foreign retailers, including Carrefour from France, REWE from Germany, and Cora from Belgium (see Table 1 and Table 2). From 1999 to 2001, the number of their outlets increased fivefold, from 5 to 27. From 2001 to 2005, the number again tripled and reached 86. The total selling space of global retail chains increased 10 times from 43,000 square meters in 1999 to 463,000 square meters in 2005.

Following the trend observed in other transition economies, foreign chains rapidly became dominant players in the Romanian retail sector, in which there were few significant domestic players.[15] In 1999, foreign chains employed around 1,400 workers, invested 44 million dollars in capital stock and generated 5.5 percent of total retail sales. In 2005, they had a total workforce of more than 18,900, a total capital stock of 844 million dollars and generated 3.27 billion dollars in sales, accounting for about 22.2 percent in total retail sales (see web Appendix I Figure W1).

The expansion of global retail chains in Romania was not uniform across regions. The

[15] EIU (2005).

area around the capital city Bucharest, especially its outskirts, was their initial target. The Western region, close to Hungary, also attracted a lot of entry in the initial period (see web Appendix I Table W1). In 2005, the regional distribution of outlets was still uneven. There were 16 and 19 outlets in Bucharest and West, respectively, but only 4 outlets in Northeast and 3 in Southwest (see Figure 4).

Global retail chains differ from other retailers operating in Romania. They are much larger in terms of employment, capital stock and sales and enjoy larger market shares. They are also more capital intensive, which is consistent with the anecdotal evidence suggesting that global retailers tend to be leaders in adopting advanced retail technologies, from large sales rooms and warehouses to computerized inventory tracking systems. They also have higher sales per worker, real wage per worker, and value added per worker. However, there does not appear to be any differences in terms of profitability measured by return on assets and return on sales. The larger size of global retailers (relative to domestic competitors) suggest that they may have greater bargaining power vis a vis suppliers while at the same time offering them access to a larger market and lower costs.[16]

To further investigate developments in the Romanian retail sector we follow Foster et al. (2006) and estimate the gross expansion and contraction rates of employment and output for 1997–2005. The expansion rate is measured as the weighted average of the growth rates of expanding firms, including the contribution of entering firms. The contraction rate is defined as the weighted average of the growth rates of contracting firms, including exiting firms. The results, presented in Table W2 in web Appendix II, document very high rates of job churning in the retail sector and significant excess reallocation. We find that during the nine year period studied, expanding establishments have yielded a gross rate of expansion of 158 percent for employment and 162 percent for output. At the same time, contracting establishments yielded a gross rate of contraction of 62 percent for employment and 64 percent for output.[17] The data further indicate that 62 percent of employment expansion in the sector was due to entry of new firms, while 23 percent of employment contraction was accounted for by exiting firms. For turnover expansion and contraction, the corresponding figures are 55 and 19 percent, respectively. Further, the appendix documents a sizeable (17 percent) increase in labor

[16] For details of this analysis see the earlier version of this study (Javorcik and Li 2008).
[17] For comparison, Foster et al. found gross expansion rates of 69.2% for employment and 71.5% for output and contraction rates of 54.6% for employment and 45.5% for output in the US retail sectors in 1987-97.

productivity in the retail sector and shows that entry of new firms and expansion of more productive firms at the expense of lesser performers was the main driver behind this development (see Table W3 in Appendix II).

Overall, the presence of global retail chains has brought significant changes to the landscape of the retail sector in Romania. In the next section, we explore the implications of their presence on the performance of the supplying industries, which is the main objective of this study.

6. Impact on the Total Factor Productivity in the Supplying Industries

6.1 Identifying Assumptions

In our analysis of the relationship between the presence of global retail chains and the performance of the supplying industries, we take advantage of regional variation in foreign chains' expansion. We rely on the Nomenclature of Territorial Units for Statistics (NUTS) which divides Romania into eight regions with an average territory of 29,800 km^2.[18] We focus on the changes in the performance of the supplying sectors following the entry of foreign chains into their region. Our identifying assumption is that the impact of global chains' entry should be felt most strongly within the region of entry.

We base our assumption on the following facts. First, while Romania is the third largest country in CEE with a territory of 238,000 km^2, its rail and road networks are among the least extensive in transition countries hindering development of national distribution systems (*World Development Indicators*). Second, the distribution system in Romania is underdeveloped as very few professional distributors are in operation. Foreign retailers find it difficult to find distributors with the required skills and capital base (EIU 2004, 2006). Third, one of the global retailers confirmed that the company does not use a centralized procurement system in Romania and that each outlet independently sources goods for sale. This suggests that individual stores are more likely to source locally than nationally. Fourth, producers located close to outlets of global retail

[18] The NUTS classification is a hierarchical system for dividing up the economic territory of the EU for the purpose of the collection, development and harmonization of EU regional statistics, socio-economic analyses of the regions, and framing of EU regional policies.

chains may be better informed about the type of products sold by the chains, their characteristics and pricing, and thus more likely to supply the chains.[19]

Our second identifying assumption is that entry of a global retail chain into the region should affect some manufacturing industries but not others. More specifically, we believe that industries supplying consumer products to supermarkets, as opposed to industries supplying industrial inputs, should be affected. As food and beverages are the most popular goods sold in all formats of supermarkets, we narrowly define supplying industries as food and beverage manufacturing and focus on the impact of global retail chains' expansion on these industries. We identify the relevant industries based on products listed on the web pages of retailers operating in Romania and match them with 3-digit industry codes in the NACE classification.[20] According to the Romanian input-output matrix for year 2000, 31 percent of all purchases of the retail and wholesale industries originated in the food sector.[21]

For the regional analysis to be meaningful, we would like to make sure that the affected industries are represented in all regions of the country. This is indeed the case. All industries are spread across all eight NUTS regions. In particular, manufacturing of fruit and vegetable products is represented in 37 of 42 counties in 1998 and 40 counties in 2004; manufacturing of dairy products existed in 41 counties; and the remaining four industries are spread across all 42 counties.

Ideally, we would like to base our analysis on plant- rather than firm-level data. Unfortunately, plant-level information is not available to us. In the case of firms that own plants in multiple regions, the presence of global retailers will be measured with error which is likely to bias our estimates toward zero, making it more difficult to find a statistically significant effect.

[19] Our identification strategy, based on geographical proximity, should work best for goods that are expensive to transport. We will examine this question in our robustness checks and show that this is indeed the case.

[20] Our list of the supplying industries includes: production, processing and preserving of meat and meat products; processing and preserving of fruit and vegetables; manufacture of dairy products; manufacture of grain mill products, starches and starch products; manufacture of other food products; manufacture of beverages. Hereafter, we refer to these industries as the food sector. For a description of developments in the Romanian food and beverage industries see annual industry briefings "Romania: Food, beverages and tobacco background" produced by the Economist Intelligence Unit.

[21] We are aware of the fact that some industries producing non-food consumer products may also be affected by entry of some (though not all) global retail chains. An earlier version of this study focused on industries manufacturing fast moving consumer goods (rather than just food) and produced qualitatively similar results. However, as we have no way of identifying non-food products sold by each chain, we choose to focus on manufactured food products. This means that our results will *underestimate* the overall effect of global retail chains on manufacturing. As in our regressions we examine how the presence of global retailers affects the performance of food industries (relative to the performance of all manufacturers), not taking into account the possibility that non-food manufacturers are also affected by global chains will *work against* us finding a statistically significant effect.

Thus our estimates should be thought of as a lower bound on the true effect.

6.2 Descriptive Analysis

As the first step in our analysis, we consider some descriptive statistics. We estimate the distributions of the logarithm of TFP for firms operating before and after the entry of global retail chains into their region. We do so separately for the food sector and for the remaining industries.[22] These distributions are plotted in Figure 5. We note that the distribution of productivity shifts to the right in the post-entry period in the case of the food supplying sector. The pattern for non-food industries is less clear.

The difference becomes more pronounced at the regional level. We calculate the average level of the logarithm of TFP for firms operating in a given region in a given time period. For both food and non-food sectors, we compare the distribution in the period before and after the entry of global retail chains. As shown in Figure 6, there is a clear shift of the distribution of productivity to the right in the post-entry period in the case of the food sector. The pattern for the non-food sector is not clear. While we cannot say anything about the direction of causality, these charts hint at a positive relationship between the productivity of the supplying industries and the presence of global retail chains.

As the pattern observed in Figure 5 and Figure 6 could be capturing effects of macroeconomic shocks or regional trends, we proceed to examine the relationship between the expansion of global retail chains and the TFP in the food sector using a regression analysis.

6.3 Empirical Strategy

In our empirical analysis, we use a difference-in-differences approach. Namely, we compare the TFP in the supplying industries before and after the entry of foreign chains into their region with the TFP of non-supplying industries in the same region during the same period. Our analysis is based on the following specification:

$$TFP_{it} = \gamma_1 Food_s \times global\_chain_{r,t-1} + \gamma_2 age_{it} + V_{s,t-1}\Gamma + \gamma_{rt} + \nu_i + \mu_{it} \quad (1)$$

where TFP_{it} denotes the logarithm of the total factor productivity of manufacturing firm i's operating in sector s at time t. Our baseline measures of TFP is a multilateral index calculated

[22] As explained in detail in the next section, TFP is measured relative to a hypothetical firm operating in the same sector in the first year of the sample 1997.

following Aw, Chen and Roberts (2001). We first express an individual firm's outputs and inputs (capital, labor and materials) as deviations from a hypothetical reference firm operating in the same sector at time *t* with average input costs shares, average logarithm of inputs and average logarithm of outputs. Then we chain-link all reference firms together over time within a sector. The index is an extension of the multilateral TFP index derived by Caves et al. (1982), which allows for consistent comparison of TFP in firm-level data with a panel structure (see Appendix II for a detailed formula). Thus the index is a measure of the proportional difference in TFP for firm *i* observed in year *t* relative to the hypothetical firm in the base year, 1997. The index is calculated separately for each of the 3-digit NACE manufacturing sectors. The advantage of this measure is that it allows for heterogeneity in production technology across producers. The disadvantage is that it does not take into account economies of scale and does not allow for measurement error.

As a robustness check, we also employ two alternative measures of firm performance. The first measure is the TFP estimated following Ackerberg, Caves and Frazer (2006) who build on the earlier work of Olley and Pakes (1996) and Levinsohn and Petrin (2003). This measure allows us to take into account the possibility that a firm's private knowledge of its productivity (unobserved by the econometrician) may affect the input decisions. It also provides a solution to multicollinearity issues from which the estimators proposed in these earlier papers may suffer. In contrast to the TFP index, the measure allows for measurement error, but does not allow production technology to differ between firms within the same industry.[23] The second measure employed is the labor productivity, defined as the value added per worker. All three measures lead to qualitatively the same conclusions. We choose the TFP index as our baseline measure as it allows for flexible and heterogeneous production technology within sectors.[24]

Similar to other studies assessing the impact of various aspects of globalization on firm productivity (Pavcnik 2002, Javorcik 2004, Amiti and Konigs 2007, just to name a few), we rely on a revenue based measure of productivity, as opposed to a measure based on physical quantities. Doing so may lead to confounding higher productivity with higher markups, as pointed out by Klette and Griliches (1996), Foster, Haltiwanger and Syverson (2008) and

[23] We are grateful to Carolina Villegas-Sanchez for sharing with us a STATA routine implementing the procedure proposed by Ackerberg et al. (2006).

[24] A comparison of the robustness of five widely used productivity measures (index numbers, data envelopment analysis, stochastic frontiers, GMM and semiparametric estimation) suggests that the approach we chose tends to produce very robust results across the different experiments (see van Biesebroeck 2007).

Katayama, Lu, and Tybout (2009).[25] While we acknowledge this limitation of our approach, we believe that it is less of a concern in the context of our study because global retail chains are likely to press suppliers to lower their markups. The existence of downward price pressures is supported the survey results in Figure 1 indicating an increase in competitive pressures due to entry of foreign retailers. It is also consistent with the case study evidence presented in Durand (2007) and Javorcik et al. (2008).

The explanatory variable of interest is the interaction term between the dummy for food supplying industries, denoted as $Food_s$, and a measure capturing the presence of global retail chains in the NUTS region, denoted as $global\_chain_{r,t-1}$. As explained above, we narrowly define the supplying industries as sectors manufacturing food and beverage products.

To take advantage of regional variation in their entry, we quantify the presence of global chains in seven different ways. Our first measure is a dummy taking on the value of 1 if at least one global retail chain is present in the region r at time t, and zero otherwise.[26] As our second measure, we use the number of global retail chain outlets in the region r at time t in a logarithmic form, adding one before taking a log. The third measure is the logarithm of the chains' total selling space in the region at time t (again one is added before taking a log).[27] The next two proxies are designed to measure the presence of foreign chains relative to the size of the food manufacturing sector. They are defined as the number of outlets or the total selling space divided by the total output of food manufacturers operating in a given region in a given time period. The final two measures express the presence of foreign chains relative to the economic size of the region. Thus the number of outlets or the total selling space are normalized by the gross value added of the region at time t. We lag all the measures by one period to take into account the time lag needed for the effect to manifest itself and to attenuate potential endogeneity problems.

We also control for other factors that may affect the performance of manufacturing firms. We use the number of years since establishment of a manufacturer to control for learning-by-doing effects. The variable is denoted as age_{it} and enters in a logarithmic form. We control for the effects of trade liberalization by including sector-level imports and exports.[28] Both variables

[25] Though Mairesse and Jaumandreu (2005) find that estimating the revenue function (using a nominal output measure) or the production function proper (using a real output measure) makes very little difference for the results in their sample.
[26] If the entry took place in the last quarter of the year, we consider it effective as of the following year.
[27] In this case one corresponds to a one square meter of selling space.
[28] Although normalizing imports or exports by domestic production may be prefereable, the differences between the

are lagged one period and take a logarithmic form. The level of competition in the industry is another potential factor influencing firm productivity, and we use the Herfindahl index to take it into account. Summary statistics for all variables are listed in Table 3.

To take into account the uneven economic development across Romanian regions, we control for time-varying regional factors by including a set of region-year fixed effects. We also include firm fixed effects to take into account unobservable firm characteristics, such as managerial ability. These fixed effects will also allow us control for time-invariant sector characteristics, for instance, the level of development in the pre-transition period and extent of privatization during the early reform period.

Finally, we correct the standard errors to take into account the fact that the measures of global retail chains' presence are at the region-year level while the dependent variable is at the firm-year level. Failure to correct for such data structure may lead to a downward bias in the estimated errors. We perform the correction by clustering standard errors at the region-year level.

6.4 Baseline Results

In our baseline results, reported in Table 4, the firm performance is measured using the multilateral TFP index. We present the estimates for each of the seven measures of global chain presence separately and report results of specifications without time-variant sector-specific controls together with the full model. Note that we do not need to include the variable $global\_chain_{r,t-1}$ by itself in the model because productivity changes coinciding with the chain's entry and affecting all manufacturing sectors equally are captured by region-year fixed effects.

We find that expansion of global retail chain leads to a significant increase in the total factor productivity of the food sector. This effect is statistically significant at the one percent level across all specifications. The presence of foreign chains increases the TFP of firms in the food sector located in the region by 3.8 to 4.7 percent (based on the results from column 1 and 2). The results from column 3 and 4 indicate that doubling the number of chains will lead to a 3.3 to 3.7 percent increase in firm productivity among food suppliers. If we take as a benchmark the average regional growth rate of the number of foreign chains' outlets (50 percent), the model predicts that the TFP of food suppliers increases by 1.65 to 1.85 percent per year in a region where foreign chains expand at the average speed. The results in column 5 and 6 suggest that

classifications in which the two types of data are available means that the ratios could be misleading.

doubling the selling space increases the TFP of food supplying sectors by about 0.4 to 0.5 percent. As illustrated in the remaining four columns, the results are robust to normalizing the measures of chain presence by either the value of output in the region's food sector or the region's gross value added.

The productivity effects in Table 4 are comparable in magnitude to those found by other studies examining the effects of openness to FDI on firm performance. For instance, using Lithuanian data, Javorcik (2004) finds that doubling the foreign presence in downstream manufacturing sectors is associated with a 3.8 percent rise in the TFP of domestic firms in the supplying industries. Arnold et al. (2011) show that a one-standard-deviation increase in foreign presence in services industries is associated with a 7.7 percent increase in the productivity of manufacturing firms relying on services inputs.

As for the control variables, the coefficient on firm age is positive and significant across all specifications, which is consistent with learning-by-doing effects. The Herfindahl index bears a negative and statistically significant coefficient. It suggests that higher concentration is correlated with a lower productivity, which is in line with the belief that more competition encourages better performance. Imports are negatively correlated with firm productivity and exports do not appear to matter. The results on imports differ from the conclusions of Pavcnik (2002) for Chile and Fernandes (2006) for Colombia, but are in line with the findings of Arnold et al. (2011) for the Czech Republic.

6.5 Alternative Measures of Performance

We employ an alternative measure of the TFP, suggested by Ackerberg et al. (2006), which corrects for the simultaneity bias between productivity shocks and input choices. This alternative TFP measure is highly correlated with the TFP index used in the baseline results (correlation of 0.72). As before, we find that the entry of global retail chain leads to a significant increase in the TFP of the food supplying sectors (see the top panel of Table 5). The estimated coefficients are statistically significant at the one percent level in all specifications. Doubling the number of foreign chains' outlets in the region increases the TFP of the food sector in the region by 5.5 to 6 percent.

Next, we focus on labor productivity as the outcome variable (see the lower panel of Table 5). As labor productivity is strongly affected by the capital intensity of the production

process, we control for the log of the firm's capital-labor ratio. Using this alternative measure of firm performance reinforces our earlier findings. We find a positive link between the expansion of foreign retail chains and the performance of food producers in the region. The estimated coefficients are significant at the one percent level in all specifications. As expected, we also find that capital intensity is positively correlated with labor productivity.

As all three measures of firm performance lead to the same conclusions, in what follows we only report the results for the TFP index. However, using the alternative measures would not change the conclusions of the study. To save space, we will also restrict our attention to the first three measures of foreign chain presence.

6.6 Robustness Checks

We subject our results to a series robustness checks. First, we consider a possible outlier problem. Bucharest as the capital of Romania has disproportionate concentration of economic activity and wealth. It produces about twenty percent of the country's GDP while only accounting for ten percent of the total population. To check whether our results are affected by the special case of Bucharest, we exclude firms operating in Bucharest and perform the baseline analysis. All coefficients on the presence of global chains remain positive and significant at the one percent level. The magnitudes are very similar to those found in Table 4. Thus these estimates (reported in the top panel of Table W4 in web Appendix II) indicate that our findings are not driven by the observations from Bucharest.

Second, if our identification strategy based on the regional variation is reasonable, we would expect to observe that goods that are more expensive to transport should be more affected by the entry of global retail chains into the region because they are more dependent on the regional retail infrastructure than other products. To check whether this is true we use the data on the product-specific transport costs from Javorcik and Narciso (2008).[29] Each of 28 4-digit NACE sectors producing food is classified as facing high transport costs if its costs are above the median value found for all food industries. We augment our baseline specification by adding an

[29] The figures are derived from the difference between the value of Finnish imports from Germany recorded including the cost of insurance and freight (c.i.f. basis) and the value of German exports to Finland recorded in Germany net of the cost of insurance and freight (f.o.b. basis). Finland was chosen by Javorcik and Narciso (2008) as the importing country because it was ranked by Transparency International as the least corrupt country in the world, which suggests that Finnish import data are unlikely to be contaminated by tariff evasion. Annual figures are available in 6-digit HS classification for 1992-2005. We compute the average value for each HS code and then concord the HS classification with 4-digit NACE codes.

interaction terms between the dummy for high transport cost food industries and the presence of local chains. If food industries facing high transport costs are affected more by the entry of global retailers than the food sector in general, then this additional interaction term will be positive and statistically significant. This is indeed the case in all specifications: the interaction term is statistically significant at the one percent level. The interaction term between *Food* and the presence of foreign chains in the region also remains positive and statistically significant at the one percent level in all models. We conclude that these results (reported in the middle panel of Table W4) give credibility to our identification strategy and confirm our findings on the link between the activities of foreign retail chains and the firm performance in the supplying industries.

Third, to make sure that our results are not driven by mismeasurement of capital stock driven by differences in valuation of capital between old and new firms, we check whether young food producers (defined as firms in the first three years of their operation) are affected differently. Another justification for this exercise comes from the observation made by Foster, Haltiwanger and Syverson (2008) that young producer tend to charge lower prices than incumbents and thus their productivity advantage may be understated. This does not appear to be the case. The additional interaction term is statistically significant only in two of six specifications, and the variable of interest is not affected by this modification. See the bottom panel of Table W4.

Fourth, Katayama et al. (2009) argue that the problems with using revenue based TFP measures are reduced in a differenced specification, we check whether our results are robust to differencing. In the specification in first and second differences, we drop firm age but still include region-year fixed effects. We also cluster standard errors at the region-year level. We present the results in Table 6. The interaction term between *Food* and each of the three measures of the regional presence of global chains remains positive and statistically significant in all specifications. The magnitude of the impact is smaller than in the baseline specification when the presence of foreign chains is measured as a dummy or in terms of their selling space. When we use the number of outlets to proxy for foreign chains' regional presence, the magnitudes are similar to the baseline results. In summary, our conclusions remain robust.

We also conduct a simple cross-sectional regression on the overall changes in TFP between 1997 and 2005. The measures of regional presence of global retail chains and sector-

specific variables are lagged by one period and span 1996 to 2004. Correspondingly, we only include region fixed effects and cluster the standard errors at the region level. The results are presented in the bottom panel of Table 6. The overall changes in the TFP of the food supplying sectors during the period are shown to be positively correlated with changes in the regional presence of global chains. The estimated coefficients are statistically significant at the one percent level in all specification.

Finally, we examine whether our results are not subject to autocorrelation problem when using dummy for the presence of foreign chains. Bertrand et al. (2004) show that estimations with a difference-in-difference method using panel data are likely to be subject to serial correlation problems and the standard errors could be severely underestimated. To check for this potential estimation bias, we take their advice and ignore the time-series information when computing standard errors.[30] As evident from Table W5 in the web Appendix II, in both specifications the variable of interest remains positive and significant at the one percent level though its magnitude becomes smaller. Given these findings, we feel reasonably confident that our baseline results are not subject to the autocorrelation problem.

6.7 Potential Endogeneity Problem and Omitted Variable Bias

To address a potential endogeneity problem, we check whether there is evidence of an impact *before* the actual entry of global chains takes place in the region. As economic conditions vary across regions, global retail chains may choose to operate in regions where food suppliers are highly productive in the first place. If such reverse causality exists, food suppliers in regions that attract global chains should exhibit higher TFP before the entry of global chains. We are not very concerned about this possibility because our specification controls for region-year fixed effects. Nevertheless, to capture firm performance in the pre-entry period, we define a new variable which takes the value of one in the year *prior* to the entry of global chains into the region, and zero otherwise. We include an interaction term between *Food* and this new dummy in our estimation. We report the results in Table 7. The new interaction term does not appear to

[30] We perform the test in three steps. First, we regress the logarithm of TFP on control variables (other than the variable of interest) and fixed effects and keep the residuals for food supplying sectors. Second, we divide the residuals into two groups: residuals from the years before foreign chains' entry and residuals from post-entry period and calculate a within-firm average for each period. Finally, we regress the two-period panel of mean residuals on the dummy denoting the presence of global retail chains. We also repeat the procedure for a one-period lag of the of the foreign chains' presence.

matter, while the interactive term between *Food* and global chain presence remains positive and statistically significant. We find that the magnitudes of the coefficients on these two variables are significantly different from each other. These findings suggest that global retail chains are not attracted to regions with more productive food producers and thus give us confidence that reverse causality is unlikely to be a serious problem in our analysis.

To further investigate the possibility that our results are driven by reverse causality we conduct a strict exogeneity test. As suggested by Wooldridge (2002, p.285), we estimate a specification with a contemporaneous interaction between *Food* and global chain presence as well as its lead and lag. We find a positive and significant effect of the lagged term in all six specifications (see Table 8). The contemporaneous effect is positive in all models, but it does not reach the conventional significance levels. More importantly, we find that the lead term bears a negative coefficient and is not significant in any of the models. These findings indicate that our analysis does not suffer from the reverse causality problem.

As for omitted variables, one may be concerned that an increase in the regional income stimulates regional demand for food industries more than that for other industries and that a higher demand encourages food production and at the same time attracts global retail chains to the region. To examine our results against this alternative explanation, we compute the average real wage in the region and use it as a proxy for the regional income level. We add an interaction term between *Food* and the log of the average wage in the region to our model. The results, reported in web Appendix II Table W6, show that our findings are robust to this modification. The additional interaction term does not appear to be statistically significant in any of the models and bears a negative sign. This pattern suggests that the relationship between regional income level and productivity does not exhibit systematic differences across food and non-food sectors (note that the effect of regional wages on all industries is captured by region-year fixed effects). Our variable of interest, the interaction term between *Food* and the global chain presence, remains positive and statistically significant in all of the specifications. It suggests that the regional expansion of global retail chains facilitates productivity growth of food industries located in the same region.

In a final robustness check, we employ the instrumental variable approach to take care of the possible bias resulting from other omitted variables. We instrument for the interaction between *Food* and the global chain presence using the information on activities of global chains

in other Central and Eastern European countries in the belief that the expansion of global retail chains in Romania may be part of their business strategy for the entire CEE. To build our instrument set, we also use the share of a given sector in the total regional manufacturing sales in 1996 (year prior to the first year of our sample) in order to capture the initial conditions of each sector in a region. The interaction of these two components creates sector-region-year specific instrumental variables that are consistent with the dimensions of the variable of interest. The detailed description of our IV strategy and the results can be found in web Appendix III. In most cases, the instruments bear statistically significant coefficients, and the Shea's partial R^2 indicates that they are good predictors of global chain presence in the region. The Sargan test does not cast doubt on the validity of the instruments.

The estimation results are consistent with our main conclusions. They indicate that the regional expansion of foreign retail chains leads to a significant increase in the TFP of the supplying industries. The interaction between the *Food* dummy and the presence of global retailers is positive and statistically significant across all models. The magnitude is, however, only about half of that found in the baseline results.

In sum, the above robustness checks make us confident that our conclusions are not driven by reverse causality or omitted variables.

6.8 A More Ambitious Approach to Geography

Our analysis thus far has been conducted at the level of eight NUTS regions implicitly assuming that the presence of global retail chains affects only food producers in the same region. In this section, we relax this assumption and take a more ambitious approach to geography. We work with information on the presence of foreign chains in 42 counties, and for each county we construct a measure capturing proximity to all foreign retailers. We do so by weighting the number of foreign chains' outlets in all counties by the inverse of their distance to the county where the manufacturer in consideration operates:

$$\text{access to chains}_{ct} = \ln\left(\sum_{k=1}^{42} \text{no. of outlets}_{kt} / \text{distance}_{ck}\right) \quad (2)$$

In the above formula, *c* stands for the county of interest. Note that *k* does not exclude *c*, meaning that the chain presence in country *c* is also taken into account. An analogous measure is constructed using the county-level information on the selling space of foreign chains. The distance between two counties is measured by the great circle distance between their capital

cities. Following Amiti and Javorcik (2008), the within-county distance is calculated as a radius of a circle assuming each county has a circular shape:

$$\text{distance}_{cc} = \sqrt{area_c / \pi} \qquad (3)$$

where $area_c$ stands for the land area of county c. We estimate the following equation

$$TFP_{it} = \beta_1 Food_s \times (access\ \text{to chains})_{c,t-1} + \beta_2 age_{it} + V_{s,t-1}\Theta + \alpha_{ct} + \alpha_i + \varepsilon_{it} \quad (4)$$

and cluster standard errors at the county-year level.

The results, presented in Table 9, corroborate our earlier conclusions. The estimates listed in columns (1) and (2) of the top panel demonstrate a positive and statistically significant (at the one percent level) relationship between the access to outlets of foreign chains and the productivity of food manufacturers. The magnitude of the effect is economically meaningful. A ten percent increase in the number of foreign chains in all counties would lead to a 2.4 to 2.6 percent increase in the productivity of food manufacturers in the county in question. A positive and statistically significant link between access to foreign retailers and the performance of food producers is also found in columns (4) and (5) where the measure of access is based on the outlets' selling space. In columns (3) and (6), we additionally include a time trend for the food sector to allow for the possibility that the food sector follow a different productivity trajectory than non-food industries. The results are robust to this modification, though, not surprisingly, the magnitude of the estimated effect declines.[31]

In order to derive policy implications it useful to know whether our conclusions hold up if we restrict the sample to just domestic firms. Although the *Amadeus* database provides detailed information on shareholders of each firm, this information pertains to the end of the sample period. As we are unable to easily identify when a firm became foreign, we drop from the sample firms whose foreign owners hold more than 10 percent of equity which is the standard cutoff for defining FDI.[32] The results, presented in the second panel of Table 9, are very similar to those found for the full sample. The magnitudes of the estimated coefficients are slightly larger and the significance level increases in the last column.

In the third panel of the table, we return to the baseline specification for the full sample

[31] In tables not reported to save space, we find that the results, based on county-specific measures of access to foreign chains, are robust to excluding Bucharest which is a potential outlier. As before, we also find that the estimated effects are larger for food subsectors with a high transport cost. In contrast to the earlier findings, the results indicate that younger firm tends to be affected more by the access to foreign retailers.

[32] This means that our sample may still include firms which at some point were foreign and later became domestic.

and use the alternative measure of productivity, TFP estimated following Ackerberg et al. (2006). In the bottom panel, we repeat the exercise considering labor productivity as the outcome of interest. In each panel, the estimated coefficients are positive and statistically significant at the one percent level in five of six specifications. The exception is the specification with the time trend for food industries where the access measure is based on the number of outlets.

In Table 10, we demonstrate that our results are robust to specifications in first, second and long differences. In all regressions, we find a positive relationship between the access to global retailers and the productivity of food manufacturers. The estimates are significant at the one percent level.

7. Drivers of Aggregate Performance

To better understand the implications of foreign chain presence, we next describe developments in aggregate (weighted) productivity in the food sector and in other industries. We decompose them into changes in the unweighted average productivity and reallocation effects. Then we examine how the two subcomponents of aggregate productivity are affected by the entry of global retailers.

Following Olley and Pakes (1996) and Pavcnik (2002), we compile the aggregate industry productivity measure W_t which is the average of the firms' individual productivities (measured using the log of TFP index) weighted by each firm's share in the total industry output (s_{it}). Then we decompose the aggregate productivity into the unweighted aggregate productivity measure (i.e., the average productivity taken over all firms) and the covariance between a firm's share of the industry output and its productivity. A positive covariance indicates that more output is produced by the more efficient producers.

$$W_t = \sum_i s_{it} TFP_{it} = \overline{TFP_t} + \sum_i (s_{it} - \overline{s_t})(TFP_{it} - \overline{TFP_t}) \quad (5)$$

Changes in the first term (unweighted average productivity) capture within-plant productivity improvements. They are also affected by the productivity of entering and exiting firms. Changes in the second term (covariance) capture the effects of reallocation of market shares and resources across firms of different productivity levels.

The results of this exercise are presented in Table 11. Following Pavcnik (2002), we report the values as growth rates relative to 1998, the first year when an effective entry of foreign

chains occurred.[33] Our calculations show that during the period under study the aggregate weighted productivity increased faster in food industries (where it rose by 16.4 percent) than in other sectors (where it increased by 5.3 percent). In food industries, about a half of the productivity increase (8.3 percentage points) was driven by changes in the average performance of firms and about a half (8.1 percentage points) by the reallocation of market shares. In non-food industries, the contribution of the within-firm changes was much higher. It accounted for 82 percent of the aggregate productivity growth, while reallocation accounted for only 18 percent.

Given the significant contribution of reallocation to the productivity growth in food industries, it is natural to ask whether this phenomenon was related to entry of global retailers. To examine this question, we follow the approach of Harrison et al. (2011) and regress aggregate productivity and each of its components on the access to foreign chains. More specifically, we calculate the aggregate weighted productivity, unweighted average productivity and the covariance at the 3-digit NACE-county-year level. Then we estimate the following model:

$$Y_{sct} = \delta_1 Food_s \times (access\ \text{to chains})_{c,t-1} + V_{s,t-1}\Phi + \alpha_{sc} + \alpha_{ct} + \upsilon_{it} \quad (6)$$

where Y_{sct} is each of the three measures relevant to industry *s* operating in county c at time *t.* The other variables are defined as before. The specification includes 3-digit NACE sector-county fixed effects and county-year fixed effects. We weight all observations using the maximum number of firms observed in each county-industry group during the period under study, which ensures that industries and counties with large firm populations receive a higher weight in the analysis and makes the results more representative of the national level.

Our estimation results suggest that the presence of global chains facilitated increases in aggregate productivity in food industries through both within-firm changes and reallocation. We find a positive relationship between the access to global retailers and the aggregated weighted productivity, unweighted average productivity and covariance. This is true with and without industry controls and when the access to foreign chains is measured based on the number of outlets as well as their selling space. The estimated coefficients are statistically significant in all but one case (see Table 12).

All of these findings are in line with survey evidence presented in Appendix I which indicates that entry of foreign retailers has led to increased competitive pressures and that more

[33] Recall that if entry takes place in the last quarter of the year, we consider it to be effective as of the following year. The first entry by a foreign retail chain took place in October of 1997, when Metro set up its first establishment in Bucharest. According to our rule, the entry is effective as of 1998.

productive producers able to do business with foreign chains were more likely to expand their market share. They are also in line with the findings of the recent theoretical and empirical literature suggesting that increases in the level of competition lead to reallocation of resources (Melitz 2003, Pavcnik 2002, Harrison et al. 2011).

8. Conclusions

Although the implications of liberalizing trade in goods for firm productivity have been widely examined, the implications of services liberalization are much less well understood. This paper seeks to enhance the understanding of services liberalization by using Romanian firm-level data to examine the link between the entry of global retail chains and developments in the supplying sectors.

The econometric results lead us to the following conclusions. The expansion of global retail chains leads to a significant increase in the total factor productivity in the supplying industries. The chains' presence in a region increases TFP of firms in the supplying industries by 3.8 to 4.7 percent and doubling the number of chains leads to a 3.3 to 3.7 percent increase.

The results further suggest that during the period under study the aggregate weighted productivity increased faster in the supplying industries (where it rose by 16.4 percent) than in other sectors (where it increased by 5.3 percent). In the former industries, the productivity increase was driven in equal parts by changes in the average performance of firms and the reallocation of market shares. In the latter industries, the contribution of the within-firm changes was much higher (82 percent). The findings are consistent with the entry of foreign retail chains driving both within-firm improvements and reallocation of market shares within the food sector.

All these results indicate that opening of the retail sector to FDI may stimulate productivity growth in upstream manufacturing in the context of transition and developing economies. It also suggests that countries prohibiting FDI inflows into the retail sector may be foregoing an opportunity to provide a competitive stimulus to the upstream industries.

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Appendix I Supplier Premium

Table A1 Supplier Premium

	ln(TFP index)	ln (TFP Ackerberg et al.)	ln(Labor productivity)
All suppliers			
Supplier	0.128***	0.182***	0.249***
	(0.024)	(0.046)	(0.040)
Year before supplying	-0.006	-0.074	0.085
	(0.048)	(0.110)	(0.095)
ln(capital/labor)			0.429***
			(0.017)
R-squared	2595	2641	2654
No. of obs.	0.160	0.344	0.466
F-test of Supplier = Year before supplying	6.76	4.98	2.68
p-value	0.009	0.026	0.101
Suppliers operating in food and beverage manufacturing			
Supplier	0.125***	0.165***	0.355***
	(0.026)	(0.056)	(0.051)
Year before supplying	-0.015	-0.089	0.084
	(0.049)	(0.113)	(0.099)
ln(capital/labor)			0.414***
			(0.018)
R-squared	2389	2432	2444
No. of obs.	0.144	0.346	0.454
F-test of Supplier = Year before supplying	6.84	4.40	6.36
p-value	0.009	0.036	0.012

All models control for the exporter status, foreign ownership and state ownership and include 2-digit industry, region and year fixed effects.
Robust standard errors are reported in parentheses. * significant at 10%, ** at 5%, *** at 1%

In the regressions presented above, we combine data on firm performance (compiled based on the information from *Amadeus* database and described in Sections 4 and 6.3) with the time-varying information on whether or not a particular firm included in the World Bank enterprise survey supplies global retail chains. The sample includes 315 firms of which 51 supply at least one global retail chain and 24 suppliers operate in the food and beverage sector. We use three measures of firm performance: a TFP index, a TFP measure estimated following Ackerberg et al. (2006) and labor productivity (value added per worker). We regress each measure of firm performance on an indicator variable taking the value of one if firm *i* supplies at time *t* a global retail chain operating in Romania and zero otherwise. We control for the firm's industry affiliation (2-digit NACE), its exporting status, foreign ownership and state ownership at time *t*. The information on the last three variables comes from the survey. We also include region and year fixed effects.

The results suggest that suppliers outperform other firms in terms of the TFP and labor productivity. The coefficient on the supplier dummy is positive and statistically significant in all three

specifications. Depending on the performance measure used, the supplier premium ranges from 14 to 28 percent.

The supplier premium is not present in the year prior to the firm starting to supply a global retain chain. An additional indicator variable equal to one in the year preceding supplying a global retail chain (and zero otherwise) is not statistically significant in any of the specifications. Moreover, its coefficient is significantly different from the coefficient on the supplier dummy in two of three specifications.

In the lower panel of the table, we narrow our focus to 24 suppliers operating in food and beverage manufacturing by dropping from the sample 27 suppliers belonging to other industries. This change does not affect the estimated results. In all specifications, we find a positive and statistically significant supplier premium of a magnitude very similar to that found earlier. In all cases, we are able to reject the hypothesis that this premium was present one year prior to doing business with foreign retailers.

Appendix II Calculation of TFP index

Following Aw, Chen and Roberts (2001), we calculate the index according to

$$\ln TFP_{it} = (\ln Y_{it} - \overline{\ln Y_t}) + \sum_{\tau=2}^{t}(\overline{\ln Y_\tau} - \overline{\ln Y_{\tau-1}})$$

$$-[\sum_{j=1}^{m}\frac{1}{2}(S_{jit} + \overline{S}_{jt})(\ln X_{jit} - \overline{\ln X_{jt}}) + \sum_{\tau=2}^{t}\sum_{j=1}^{m}\frac{1}{2}(\overline{S_{j\tau}} + \overline{S_{j\tau-1}})(\overline{\ln X_{j\tau}} - \overline{\ln X_{j\tau-1}})]$$

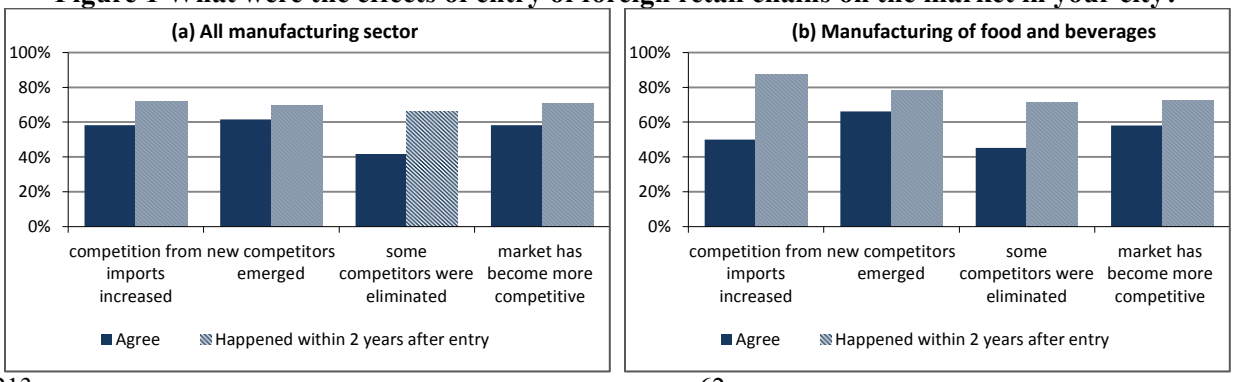
i denotes firm, *t* denotes year, *j* denotes types of inputs. *Y* denotes output, which is measured in real terms. Inputs (*X*) include labor (number of employees), materials (real value of material costs), and capital stock. *S* denotes input shares, that is, the ratio of wage bill (or material costs) to output. The capital share is obtained from the assumption of constant returns to scale.

This index is an extension of the multilateral TFP index derived by Caves et al. (1982). It allows for consistent comparison of TFP in firm-level data with a panel structure. The first term in the definition of the index expresses firm output in year *t* as a deviation from the mean output in that year, thus capturing information on the cross-sectional distribution of output. The second term sums the change in the mean output across all years and captures the shift of the output distribution over time by chain-linking the movement in the output reference point. The remaining terms repeat the exercise for each input *j*. The inputs are summed using a combination of the input revenue share for the firm (S_{jit}) and the average revenue share in each year $\overline{S_{jt}}$ as weights. Thus the index is a measure of the proportional difference in TFP for firm *i* observed in year *t* relative to a hypothetical reference firm with average input costs shares, average logarithm of inputs and average logarithm of outputs operating in the same sector in the base year, 1997.

The index is calculated separately for each of the 3-digit NACE manufacturing sectors.

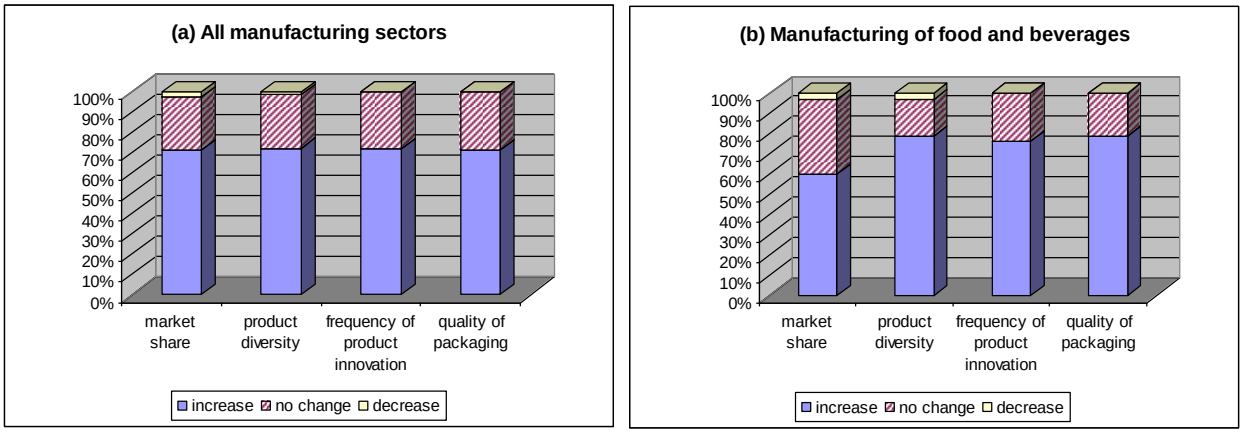
Figures 1-3 Survey Evidence

Figure 1 What were the effects of entry of foreign retail chains on the market in your city?



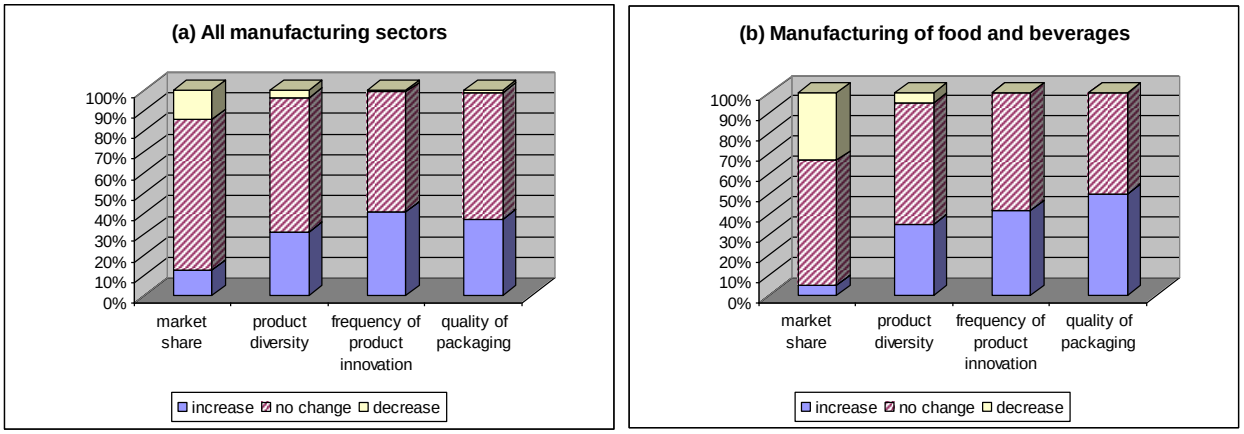
213 responses 62 responses

Figure 2 What happened after your company began to supply a foreign retail chain?



66-70 responses 33-35 responses

Figure 3 Was you company affected by the entry of foreign retail chains into your city? Respondents not supplying foreign retailers



97-111 responses 19-21 responses

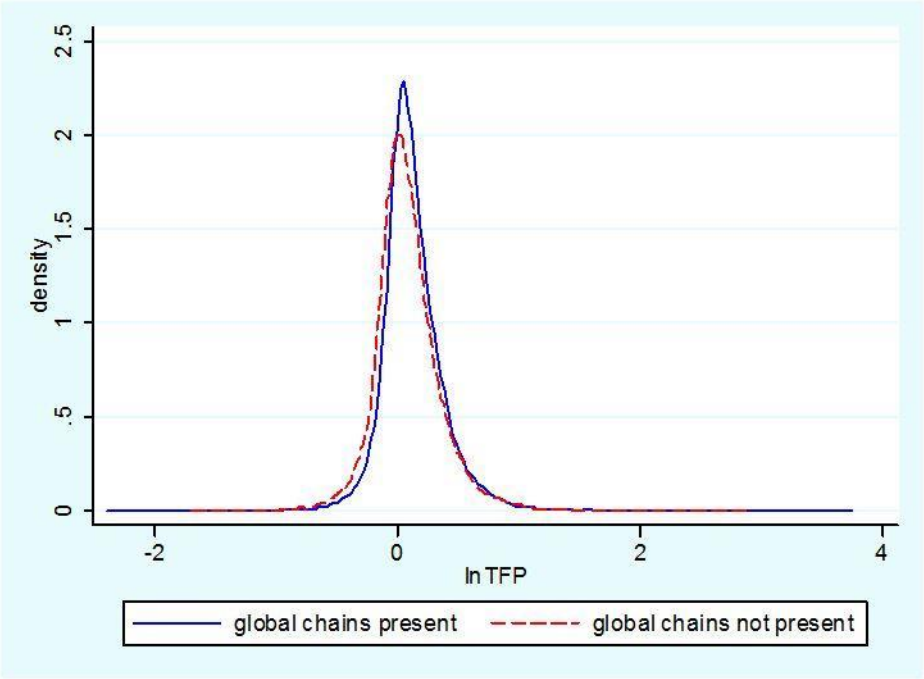
Figure 4 Regional Distribution of Global Retail Chains in Romania

1997

2005

Figure 5 Logarithm of Total Factor Productivity of Manufacturing Firms Pre- vs. Post-entry of Global Chains, Firm-Level Data

Food Sector



Other Industries

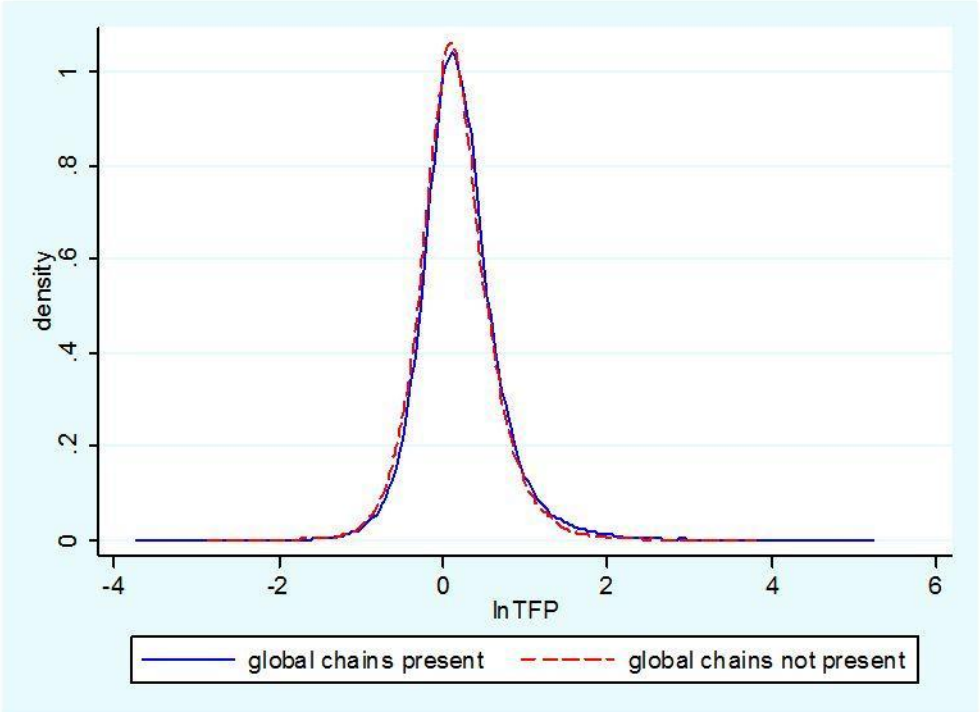
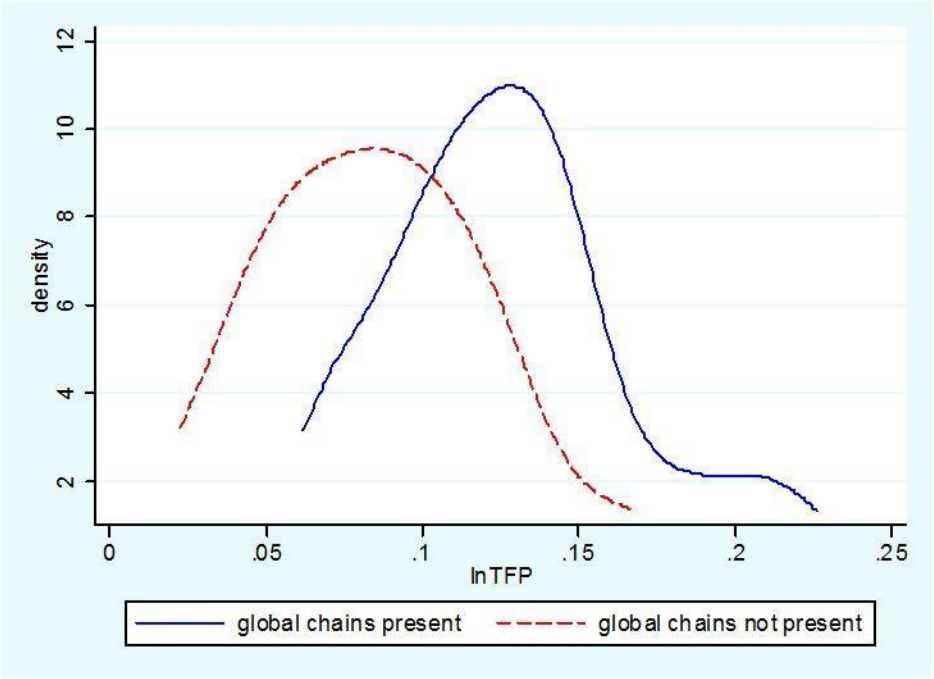


Figure 6 Logarithm of Total Factor Productivity of Manufacturing Firms Pre- vs. Post-entry of Global Chains, Regional Average

Food Sector



Other Industries

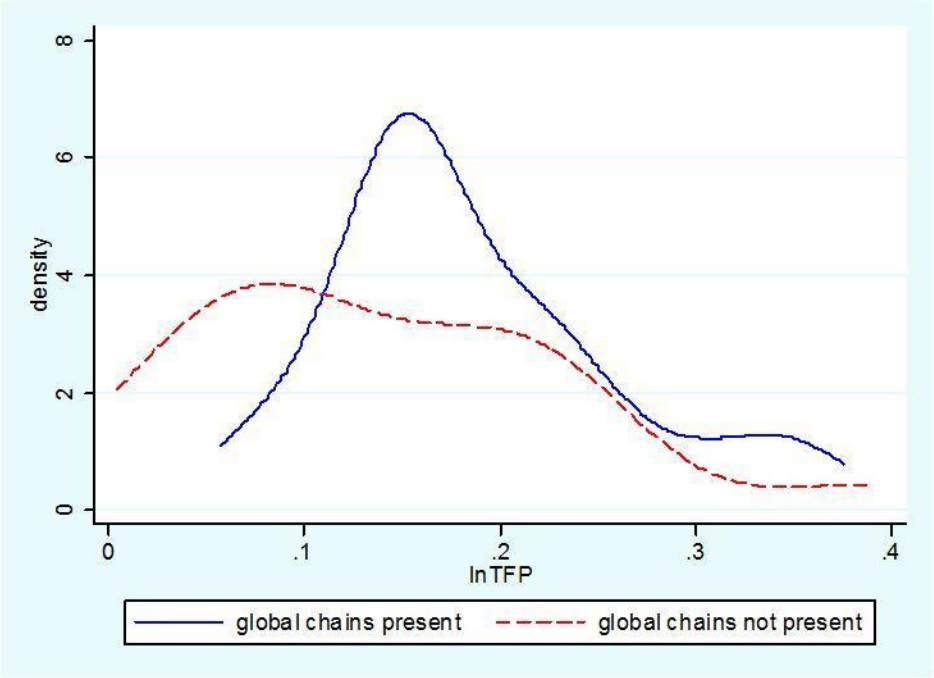


Table 1 Information on Global Retail Chains in Romania

Romanian subsidiary	parent	country of origin	year of entry	2005 employment	2005 capital stock (mn USD)	2005 sales (mn USD)
METRO CASH & CARRY ROMANIA	Metro	Germany	1997	6,197	257	1,544
SELGROS CASH & CARRY	Rewe	Germany	2001	3,933	172	533
HIPROMA SA	Carrefour	France	2001	2,695	176	462
ROMANIA HYPERMARCHE SA	Louis Delhaize	Belgium	2003	1,765	14	206
BILLA ROMANIA	REWE	Germany	1999	1,613	35	292
REWE (ROMANIA)	REWE	Germany	2001	877	8	108
MEGA IMAGE SA*	Delhaize	Belgium	2000	947	14	63
PROFI ROM FOOD	Louis Delhaize	Belgium	2000	401	10	45
KAUFLAND ROMANIA SCS*	Kaufland	Germany	2005	500	149	18

*outlet-specific information is not available

Table 2 Evolution of Global Retail Chains in Romania

year	number of global chains	number of outlets*	selling space (m^2)*	employment	sales (mn USD)	share in total sales of retail sector	share in total sales of retail & wholesale sectors
1997	1	1	13,000	864	126	3.20%	1.30%
1998	1	3	39,000	1,431	198	4.60%	1.70%
1999	2	5	43,000	1,455	207	5.50%	1.80%
2000	4	13	90,686	2,961	306	7.40%	2.30%
2001	7	27	174,024	5,169	585	11.60%	3.60%
2002	7	42	254,317	8,239	959	15.10%	4.60%
2003	8	55	318,013	11,167	1,574	17.70%	5.40%
2004	8	68	390,220	14,243	2,632	20.20%	6.10%
2005	9	86	463,996	18,928	3,271	22.20%	6.90%

*This column pertains to 7 retail chains for which outlet-specific information is available (see Table 2 for a list)

Table 3 Summary Statistics

Firm-specific

Variable	Food Sector			Non-Food Sector		
	No. of Obs.	Mean	Std. Dev.	No. of Obs.	Mean	Std. Dev.
TFP index	49498	0.116	0.279	171297	0.188	0.491
TFP (Ackerberg et al.)	56772	0.356	0.857	188796	1.025	0.977
value added/labor (th lei 2000)	58252	7.9	29.2	192698	13.2	39.9
capital stock/labor (th lei 2000)	58252	10.8	76.7	192698	10.4	74.1
output (th lei 2000)	58252	1041.3	7388.7	192698	1529.8	20328.3
wage costs (th lei 2000)	57234	85.2	604.5	188869	267.8	2442.5
material costs (th lei 2000)	58252	739.6	5090.6	192698	897.9	13812.3
capital stock (th lei 2000)	58252	354.5	3531.0	192698	694.7	13469.9
employment	58252	23.3	155.4	192698	56.8	343.1
age	58252	7.7	3.4	192698	7.3	3.6

NACE sector-specific

Variable	Food Sector			Non-Food Sector		
	No. of Obs.	Mean	Std. Dev.	No. of Obs.	Mean	Std. Dev.
Herfindahl Index	54	0.031	0.017	808	0.165	0.179
imports (th lei 2000)	54	169032.3	174615.6	793	628703.0	1006053.0
exports (th lei 2000)	54	48700.4	55999.3	793	565333.2	1466706.0

NUTS region-specific

Variable	No. of Obs.	Mean	Std. Dev.
wage/L (th lei 2000)	72	4.6	1.0
foreign chains present (dummy)	72	0.7	0.5
no. of foreign chain outlets	72	3.8	4.3
selling space of foreign chain outlets (sq. meters)	72	22273	24194
no. of foreign chain outlets / regional food output (per mn lei 2000)	72	0.0052	0.0056
selling space of foreign chains/ regional food output (sq. meters per mn lei 2000)	72	21.07	19.07
no. of foreign chain outlets / regional gross value added (per mn lei 2000)	64	0.0004	0.0003
selling space of foreign chains / regional gross value added (sq. m per mn lei 2000)	64	1.74	1.74

County-specific

Variable	No. of Obs.	Mean	Std. Dev.
access to chains (measure based on the no. of outlets)	328	0.122	0.128
access to chains (measure based on the selling space)	328	762.7	752.9

Table 4 Presence of Global Retailers and Performance of Food Producers
Fixed effects, TFP index

	chains present		ln(no. of outlets)		ln(selling space)		Normalized by the output of food sector in the region				Normalized by gross value added of the region			
							ln(no. of outlets)		ln(selling space)		ln(no. of outlets)		ln(selling space)	
Food $_s$	0.047***	0.038***	0.037***	0.033***	0.005***	0.004***	0.044***	0.040***	0.005***	0.004***	0.039***	0.035***	0.005***	0.004***
**(global_chain)* $_{r,t-1}$	(0.010)	(0.010)	(0.005)	(0.005)	(0.001)	(0.001)	(0.007)	(0.006)	(0.001)	(0.001)	(0.006)	(0.006)	(0.001)	(0.001)
age $_{it}$	0.118***	0.117***	0.119***	0.118***	0.118***	0.117***	0.119***	0.118***	0.118***	0.117***	0.119***	0.118***	0.118***	0.117***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
ln(imports) $_{s,t-1}$		-0.029***		-0.020***		-0.027***		-0.021***		-0.027***		-0.020***		-0.027***
		(0.005)		(0.005)		(0.005)		(0.005)		(0.005)		(0.005)		(0.005)
ln(exports) $_{s,t-1}$		-0.004		-0.004		-0.004		-0.004		-0.004		-0.004		-0.004
		(0.004)		(0.004)		(0.004)		(0.004)		(0.004)		(0.004)		(0.004)
Herfindahl Index $_{st}$		-0.190***		-0.210***		-0.196***		-0.208***		-0.195***		-0.211***		-0.195***
		(0.040)		(0.039)		(0.040)		(0.040)		(0.040)		(0.039)		(0.040)
R-squared	0.019	0.02	0.02	0.021	0.019	0.02	0.02	0.021	0.019	0.02	0.02	0.021	0.019	0.02
No. of obs.	221236	220002	221236	220002	221236	220002	221236	220002	221236	220002	221236	220002	221236	220002
No. of firms	49552	49390	49552	49390	49552	49390	49552	49390	49552	49390	49552	49390	49552	49390

All models include firm fixed effects and region-year fixed effects. Standard errors, clustered at the region-year level, are reported in parentheses.
* significant at 10%, ** at 5%, *** at 1%

Table 5 Presence of Global Retailers and Performance of Food Producers
Fixed effects, TFP estimated following Ackerberg, Caves and Frazer (2006) and Labor Productivity

	chains present		ln(no. of outlets)		ln(selling space)		Normalized by the output of food sector in the region				Normalized by gross value added of the region			
							ln(no. of outlets)		ln(selling space)		ln(no. of outlets)		ln(selling space)	
ln(TFP ACF)														
$Food_s$	0.089***	0.076***	0.060***	0.055***	0.010***	0.008***	0.076***	0.071***	0.010***	0.009***	0.065***	0.060***	0.010***	0.008***
$*(global\_chain)_{r,t-1}$	(0.028)	(0.026)	(0.014)	(0.013)	(0.003)	(0.003)	(0.017)	(0.016)	(0.003)	(0.003)	(0.016)	(0.015)	(0.003)	(0.003)
Industry controls	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
R-squared	0.02	0.022	0.021	0.022	0.021	0.022	0.021	0.022	0.021	0.022	0.021	0.022	0.021	0.022
No. of obs.	245568	244197	245568	244197	245568	244197	245568	244197	245568	244197	245568	244197	245568	244197
No. of firms	51929	51764	51929	51764	51929	51764	51929	51764	51929	51764	51929	51764	51929	51764
ln(Labor productivity)														
$Food_s$	0.081***	0.066***	0.055***	0.049***	0.009***	0.007***	0.070***	0.062***	0.009***	0.008***	0.061***	0.053***	0.009***	0.007***
$*(global\_chain)_{r,t-1}$	(0.025)	(0.024)	(0.013)	(0.012)	(0.002)	(0.002)	(0.016)	(0.015)	(0.003)	(0.002)	(0.015)	(0.014)	(0.003)	(0.002)
$ln(capital/labor)_{it}$	0.327***	0.328***	0.327***	0.328***	0.327***	0.328***	0.327***	0.328***	0.327***	0.328***	0.327***	0.328***	0.327***	0.328***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Industry controls	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
R-squared	0.108	0.109	0.108	0.109	0.108	0.109	0.108	0.109	0.108	0.109	0.108	0.109	0.108	0.109
No. of obs.	250950	249557	250950	249557	250950	249557	250950	249557	250950	249557	250950	249557	250950	249557
No. of firms	52081	51916	52081	51916	52081	51916	52081	51916	52081	51916	52081	51916	52081	51916

All models include a firm's age, firm fixed effects and region-year fixed effects. Industry-level controls include: $\ln(imports)_{t-1}$, $\ln(exports)_{t-1}$ and Herfindahl $index_t$.
Standard errors, clustered at the region-year level, are reported in parentheses.
* significant at 10%, ** at 5%, *** at 1%

Table 6 Presence of Global Retailers and Performance of Food Producers, Specifications in Differences, TFP index

	chains present		ln(no. of outlets)		ln(selling space)	
First differences						
$Food_s * \Delta(global\_chain)_{r,t-1}$	0.021**	0.022***	0.034***	0.036***	0.003***	0.003***
	(0.008)	(0.008)	(0.008)	(0.007)	(0.001)	(0.001)
Industry controls	no	yes	no	yes	no	yes
R-squared	0.014	0.014	0.014	0.015	0.014	0.014
No. of obs.	164668	163623	164668	163623	164668	163623
Second differences						
$Food_s * \Delta(global\_chain)_{r,t-1}$	0.026*	0.028**	0.031***	0.035***	0.003**	0.004**
	(0.014)	(0.014)	(0.007)	(0.008)	(0.001)	(0.001)
Industry controls	no	yes	no	yes	no	yes
R-squared	0.014	0.014	0.014	0.015	0.014	0.014
No. of obs.	130181	129356	130181	129356	130181	129356
Long differences						
$Food_s * \Delta(global\_chain)_{r,t-1}$	0.172***	0.164***	0.074***	0.066***	0.016***	0.015***
	(0.012)	(0.015)	(0.008)	(0.007)	(0.001)	(0.001)
Industry controls	no	yes	no	yes	no	yes
R-squared	0.021	0.022	0.019	0.021	0.021	0.022
No. of obs.	11418	11346	11418	11346	11418	11346

Industry-level controls include: $\Delta\ln(\text{imports})_{t-1}$, $\Delta\ln(\text{exports})_{t-1}$ and $\Delta\text{Herfindahl index}_t$.
All models in first and second differences include region-year fixed effects. Standard errors, clustered at the region-year level, are reported in parentheses.
Models in long difference include region fixed effects. The standard errors are clustered at the region level.
* significant at 10%, ** at 5%, *** at 1%

Table 7 Pre-entry Impact
Fixed effects, TFP index

	chains present		ln(no. of outlets)		ln(selling space)	
Food $_s$(global_chain) $_{r,t-1}$*	0.045***	0.035***	0.036***	0.032***	0.005***	0.004***
	(0.012)	(0.011)	(0.006)	(0.006)	(0.001)	(0.001)
Food $_s$(1_year_before) $_{r,t}$*	-0.008	-0.010	-0.005	-0.007	-0.005	-0.007
	(0.015)	(0.015)	(0.014)	(0.014)	(0.015)	(0.015)
Industry controls	no	yes	no	yes	no	yes
F test on Food(global_chain) = Food *(1_year_before)*	14.90	10.62	n.a.	n.a.	n.a.	n.a.
p-value of F test	0.000	0.002	n.a.	n.a.	n.a.	n.a.
R-squared	0.019	0.02	0.02	0.021	0.019	0.02
No. of obs.	221236	220002	221236	220002	221236	220002

All models include a firm's age, firm fixed effects and region-year fixed effects. Industry-level controls include: $\ln(\text{imports})_{t-1}$, $\ln(\text{exports})_{t-1}$ and Herfindahl index $_t$.
Standard errors, clustered at the region-year level, are reported in parentheses.
* significant at 10%, ** at 5%, *** at 1%
n.a. stands for non applicable

Table 8 Strict Exogeneity Test
Fixed effects, TFP index

	chains present		ln(no. of outlets)		ln(selling space)	
Lag	0.023**	0.021**	0.020*	0.018*	0.003**	0.002**
Food $_s$(global_chain) **$_{r,t-1}$***	(0.010)	(0.009)	(0.010)	(0.010)	(0.001)	(0.001)
Contemporaneous	0.018	0.017	0.013	0.014	0.002	0.002
Food $_s$(global_chain) **$_{r,t}$***	(0.016)	(0.015)	(0.013)	(0.013)	(0.002)	(0.002)
Lead	-0.003	-0.006	-0.009	-0.01	-0.001	-0.001
Food $_s$(global_chain) **$_{r,t+1}$***	(0.020)	(0.020)	(0.012)	(0.012)	(0.002)	(0.002)
Industry controls	no	yes	no	yes	no	yes
R-squared	0.020	0.021	0.02	0.021	0.02	0.021
No. of obs.	190620	189569	190620	189569	190620	189569

All models include a firm's age, firm fixed effects and region-year fixed effects. Industry-level controls include: $\ln(\text{imports})_{t-1}$, $\ln(\text{exports})_{t-1}$ and Herfindahl index $_t$.
Standard errors, clustered at the region-year level, are reported in parentheses.
* significant at 10%, ** at 5%, *** at 1%

Table 9 Analysis at the Country Level. Various Productivity Measures

	Measure based on the number of outlets			Measure based on the selling space		
TFP index						
Food $_s$ (access to chains) $_{c,t-1}$*	0.261***	0.237***	0.080*	0.011***	0.010***	0.004*
	(0.027)	(0.031)	(0.046)	(0.001)	(0.001)	(0.002)
Industry controls	no	yes	yes	no	yes	yes
Time trend for food sector	no	no	yes	no	no	yes
R-squared	0.023	0.023	0.023	0.022	0.023	0.024
No. of obs.	221236	220002	220002	221236	220002	220002
TFP index, Excluding foreign firms						
Food $_s$ (access to chains) $_{c,t-1}$*	0.274***	0.246***	0.087*	0.011***	0.010***	0.005***
	(0.026)	(0.030)	(0.046)	(0.001)	(0.001)	(0.002)
Industry controls	no	yes	yes	no	yes	yes
Time trend for food sector	no	no	yes	no	no	yes
R-squared	0.021	0.022	0.023	0.021	0.022	0.023
No. of obs.	177938	176866	176866	177938	176866	176866
Ackerberg, Caves and Frazer TFP						
Food $_s$ (access to chains) $_{c,t-1}$*	0.382***	0.343***	-0.065	0.022***	0.021***	0.021***
	(0.076)	(0.081)	(0.145)	(0.003)	(0.003)	(0.005)
Industry controls	no	yes	yes	no	yes	yes
Time trend for food sector	no	no	yes	no	no	yes
R-squared	0.023	0.024	0.025	0.024	0.025	0.025
No. of obs.	245568	244197	244197	245568	244197	244197
Labor productivity						
Food $_s$ (access to chains) $_{c,t-1}$*	0.380***	0.333***	0.011	0.021***	0.019***	0.019***
	(0.063)	(0.067)	(0.117)	(0.002)	(0.003)	(0.005)
Industry controls	no	yes	yes	no	yes	yes
Time trend for food sector	no	no	yes	no	no	yes
R-squared	0.11	0.111	0.111	0.111	0.112	0.112
No. of obs.	250950	249557	249557	250950	249557	249557

All models include a firm's age, firm fixed effects and county-year fixed effects. Industry-level controls include: $\ln(\text{imports})_{t-1}$, $\ln(\text{exports})_{t-1}$ and Herfindahl index_t. Standard errors, clustered at the county-year level, are reported in parentheses. * significant at 10%, ** at 5%, *** at 1%

Table 10 Analysis at the Country Level. Specifications in Differences. TFP index

	Measure based on the number of outlets		Measure based on the selling space	
First differences				
$Food_s * \Delta(access\ to\ chains)_{c,t-1}$	0.342***	0.359***	0.008***	0.009***
	(0.047)	(0.048)	(0.001)	(0.001)
Industry controls	no	yes	no	yes
R-squared	0.017	0.017	0.016	0.017
No. of obs.	164668	163623	164668	163623
Second differences				
$Food_s * \Delta(access\ to\ chains)_{c,t-1}$	0.249***	0.280***	0.011***	0.012***
	(0.033)	(0.039)	(0.002)	(0.002)
Industry controls	no	yes	no	yes
R-squared	0.017	0.018	0.018	0.018
No. of obs.	130181	129356	130181	129356
Long differences				
$Food_s * \Delta(access\ to\ chains)_{c,t-1}$	0.484***	0.432***	0.023***	0.022***
	(0.058)	(0.051)	(0.001)	(0.002)
Industry controls	no	yes	no	yes
R-squared	0.025	0.027	0.027	0.028
No. of obs.	11418	11346	11418	11346

Industry-level controls include: $\Delta\ln(imports)_{t-1}$, $\Delta\ln(exports)_{t-1}$ and $\Delta Herfindahl\ index_t$.
All models in first and second differences include county-year fixed effects. Standard errors, clustered at the country-year level, are reported in parentheses. Models in long difference include county fixed effects. The standard errors, reported in parentheses, are clustered at the county level.
* significant at 10%, ** at 5%, *** at 1%

Table 11 Decomposition of Aggregate Productivity

Year	Aggregate weighted productivity	Unweighted average productivity	Covariance
Food sector			
1998	0.000	0.000	0.000
1999	0.072	0.036	0.036
2000	0.074	0.025	0.048
2001	0.085	0.032	0.054
2002	0.102	0.090	0.012
2003	0.112	0.105	0.007
2004	0.101	0.087	0.014
2005	0.164	0.083	0.081
Other industries			
1998	0.000	0.000	0.000
1999	0.014	0.001	0.013
2000	0.036	0.015	0.021
2001	0.040	0.049	-0.008
2002	0.056	0.053	0.003
2003	0.053	0.068	-0.015
2004	0.061	0.049	0.011
2005	0.053	0.044	0.010

Note: the reported figures are relative to 1998

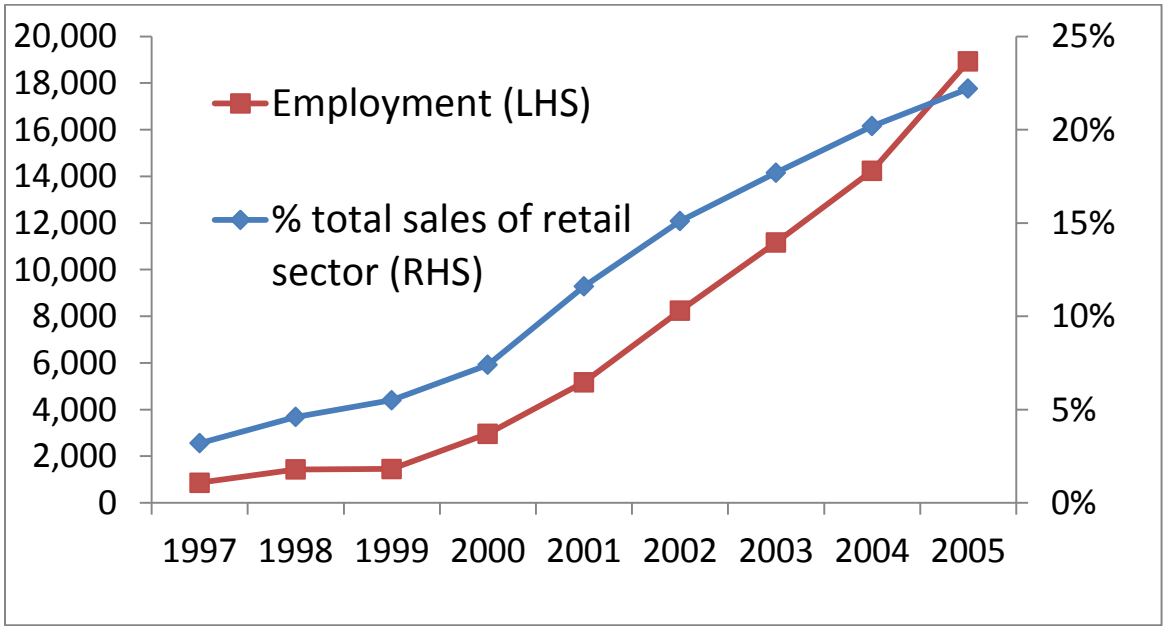
Table 12 Components of Aggregate Productivity and Presence of Global Retailers

	Aggregate weighted productivity		Unweighted average productivity		Covariance	
Food $_s$ (access to chains) $_{c,t-1}$*	0.250***	0.131***	0.141***	0.058**	0.109***	0.073**
(measure based on the no. of outlets)	(0.040)	(0.043)	(0.026)	(0.027)	(0.024)	(0.033)
Industry controls	no	yes	no	yes	no	yes
R-squared	0.058	0.059	0.094	0.105	0.083	0.092
No. of obs.	311512	274050	311512	274050	311512	274050
Food $_s$ (access to chains) $_{c,t-1}$*	0.010***	0.004**	0.007***	0.001	0.004***	0.003**
(measure based on the selling space)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)
Industry controls	no	yes	no	yes	no	yes
R-squared	0.058	0.058	0.094	0.105	0.083	0.092
No. of obs.	311512	274050	311512	274050	311512	274050

Dependent variables are defined at the industry-county-year level. All models are estimated as weighted regressions where weights capture the maximum number of firms operating in the industry-county cell during the sample period. Standard errors are reported in parentheses. * significant at 10%, ** at 5%, *** at 1%

WEB APPENDICES [NOT FOR PUBLICATION]
Web Appendix I Developments in the Romanian Retail Sector

Figure W1 Expansion of Global Retail Chains in Romania



Source: Authors' calculations based on the *Amadeus* database.

Table W1 Regional Expansion of Global Retail Chains in Romania

NUTS region	year of first entry	number of outlets 2001	number of outlets 2005	selling space (m^2) 2001	selling space (m^2) 2005
Bucharest-Ilfov	1997	7	16	43,400	115,900
West	1998	8	19	22,266	62,495
Central	1998	3	13	23,958	69,560
Southeast	1999	2	10	15,000	58,500
South	2000	1	7	2,000	33,286
Northwest	2000	2	14	26,000	62,855
Northeast	2001	2	4	26,000	36,000
Southwest	2001	2	3	15,400	25,400

This table pertains to 7 retail chains for which outlet-specific information is available (see Table 2 for a list)

Table W2 Developments in Romanian Retail Sector in 1997-2005

	Employment	Output
Gross reallocation rates (%):		
expansion rate	158.3	162.2
contraction rate	61.6	63.5
net flows	96.7	98.6
excess reallocation	123.2	127.0
Shares of reallocation (%):		
expansion due to entry	62	55
contraction due to exit	23	19

Table W3 Productivity Changes in Romanian Retail Sector in 1997-2005

Productivity growth (%)	17.27
Share of productivity growth (%):	
within share	-39
between share	84
cross share	-73
net entry share	129
entrants' share	135
exiters' share	-7

Table W3 presents decomposition of productivity changes in the Romanian retail sector following the methodology of Foster et al. (2006):

$$\Delta LP_t = \sum_{f \in C} s_{ft-1} \Delta LP_{ft} + \sum_{f \in C} (LP_{ft-1} - \overline{LP_{t-1}}) \Delta s_{ft} + \sum_{f \in C} \Delta LP_{ft} \Delta s_{ft} + \sum_{f \in N} s_{ft} (LP_{ft} - \overline{LP_{t-1}}) - \sum_{f \in X} s_{ft-1} (LP_{ft-1} - \overline{LP_{t-1}})$$

where LP_{ft} stands for the labor productivity (value added per worker) of retail firm f operating at time t and s_{ft} denotes the share of firm f's employment in industry employment at time t. C denotes continuing firms, N new entrants and X exiters. The first term in the decomposition captures a within firm component based on firm-level changes weighted by initial employment shares in the industry. The second term represents a between-firm component reflecting changing shares, weighted by the deviation of initial firm productivity from the initial industry index. The third term represents a cross term indicating whether

firms with large positive productivity changes are more likely to have decreased employment and vice versa. The last two terms represent the contribution of entering and exiting firms, respectively.

Foster et al. (2006) suggest that if new business methods (including capital deepening) that lead to productivity improvements can only be adopted by new firms, then the net entry term should dominate. This appears to the case in Romania, where the appearance of new entrants is the key driver of productivity growth in the retail sector. Productivity growth is further boosted by the positive between-firm component suggesting expansion of more productive entities at the expense of lesser performers. Similarly to Foster et al., we find a negative cross term which is consistent with the view that downsizing has been productivity enhancing for continuing establishments. Finally, the negative within-firm effect may be capturing firms being driven up the average cost curve as a result of losing their market share to new entrants.

Web Appendix II Additional Tables

Table W4 Presence of Global Retailers and Performance of Food Producers, Robustness Checks
Fixed effects, TFP index

	chains present		ln(no. of outlets)		ln(selling space)	
Excluding Bucharest						
$Food_s*(global\_chain)_{r,t-1}$	0.044***	0.036***	0.037***	0.034***	0.005***	0.004***
	(0.010)	(0.009)	(0.006)	(0.005)	(0.001)	(0.001)
Industry controls	no	yes	no	yes	no	yes
R-squared	0.02	0.021	0.021	0.022	0.02	0.021
No. of obs.	186892	185845	186892	185845	186892	185845
High vs. low transport costs						
$Food_s*(global\_chain)_{r,t-1}$	0.035***	0.028***	0.030***	0.028***	0.004***	0.003***
	(0.010)	(0.009)	(0.005)	(0.005)	(0.001)	(0.001)
$High\ cost_s*Food_s*(global\_chain)_{r,t-1}$	0.028***	0.025***	0.016***	0.013***	0.003***	0.003***
	(0.007)	(0.008)	(0.004)	(0.004)	(0.001)	(0.001)
Industry controls	no	yes	no	yes	no	yes
R-squared	0.019	0.02	0.02	0.021	0.02	0.02
No. of obs.	221236	220002	221236	220002	221236	220002
Young vs. old firms						
$Food_s*(global\_chain)_{r,t-1}$	0.047***	0.038***	0.037***	0.033***	0.005***	0.004***
	(0.010)	(0.010)	(0.005)	(0.005)	(0.001)	(0.001)
$Young*Food_s*(global\_chain)_{r,t-1}$	0.001	0.007	0.015***	0.016***	0.000	0.001
	(0.007)	(0.007)	(0.004)	(0.004)	(0.001)	(0.001)
Industry controls	no	yes	no	yes	no	yes
R-squared	0.019	0.02	0.02	0.021	0.019	0.02
No. of obs.	221236	220002	221236	220002	221236	220002

All models include a firm's age, firm fixed effects and region-year fixed effects. Industry-level controls include: $\ln(imports)_{t-1}$, $\ln(exports)_{t-1}$ and Herfindahl $index_t$. Standard errors, clustered at the region-year level, are reported in parentheses.* significant at 10%, ** at 5%, *** at 1%

Table W5 Robustness Check on Autocorrelation
TFP index

First Stage Estimation

ln(firm age) $_{it}$	0.117***	0.117***
	(0.004)	(0.004)
ln(imports) $_{s,t-1}$	-0.038***	-0.038***
	(0.003)	(0.003)
ln(exports) $_{s,t-1}$	-0.004**	-0.004**
	(0.002)	(0.002)
Herfindahl Index $_{st}$	-0.152***	-0.152***
	(0.032)	(0.032)
R-squared	0.02	0.02
No. of obs.	220002	220002

Second Stage Estimation, only food produers

(global_chain) $_{r,t}$	0.028***	
	(0.002)	
(global_chain) $_{r,t-1}$		0.024***
		(0.002)
R-squared	0.012	0.009
No. of obs.	14775	14588

First stage estimation includes firm fixed effects and region-year fixed effects.
Standard errors are reported in parentheses.
* significant at 10%, ** at 5%, *** at 1%

Table W6 Controlling for Regional Wage
Fixed effects, TFP index

	chain present		ln(no. of outlets)		ln(selling space)	
$FOOD*(global\_chain)_{r,t-1}$	0.046***	0.036***	0.037***	0.034***	0.005***	0.004***
	(0.010)	(0.009)	(0.005)	(0.005)	(0.001)	(0.001)
$FOOD_s*(wage\_per\_L)_{r,t-1}$	-0.027	-0.033	-0.065	-0.065	-0.029	-0.033
	(0.053)	(0.050)	(0.052)	(0.051)	(0.052)	(0.050)
$ln(firm\ age)_{it}$	0.117***	0.117***	0.119***	0.118***	0.118***	0.117***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
$ln(imports)_{s,t-1}$		-0.029***		-0.019***		-0.027***
		(0.005)		(0.005)		(0.005)
$ln(exports)_{s,t-1}$		-0.003		-0.003		-0.003
		(0.004)		(0.004)		(0.004)
$Herfindahl\ Index_{st}$		-0.193***		-0.222***		-0.200***
		(0.041)		(0.040)		(0.041)
R-squared	0.019	0.02	0.02	0.021	0.019	0.02
No. of obs.	221236	220002	221236	220002	221236	220002

All models include firm fixed effects and region-year fixed effects.
Standard errors, clustered at the region-year level, are reported in parentheses.
* significant at 10%, ** at 5%, *** at 1%

Web Appendix III Instrumental variable approach

To attenuate potential concerns about the omitted variable bias, we also employ the instrumental variable approach. We instrument for the interaction between *Food* and global chain presence by taking into account the following factors. First, the expansion of global retail chains in Romania may be part of their business strategy for the whole Central and Eastern Europe. For instance, Dries et al. (2004) find that global retail chains tend to adopt "anchor" strategy in CEE by establishing their business first in relatively advanced countries, including the Czech Republic, Hungary and Poland, which the authors classify as "first wave countries", and then moving into nearby economies. Alternatively, the chains may face capacity limits when considering expanding into the CEE and thus may choose to enter only a subset of countries. Finally, the initial development in supplying industries may affect foreign retailers' entry decision into specific region. Based on all these factors, we use the following four instruments:

$$sale\_share_{sr} * \ln(global\_chain\_in\_1stWave\_\&\_Romania)_{t-1}$$
$$sale\_share_{sr} * \ln(global\_chain\_in\_1stWave\_only)_{t-1}$$
$$sale\_share_{sr} * \ln(global\_chain\_in\_2ndWave\_\&\_Romania)_{t-1}$$
$$sale\_share_{sr} * \ln(global\_chain\_in\_2ndWave\_only)_{t-1}$$

The first part of each instrument, $sale\_share_{sr}$, denotes the sector share in the total regional manufacturing sales in 1996, which is prior to the first year of our sample. It captures the initial condition (importance) of each sector in the region. The second part of each instrument captures annual sales by global retail chains in two groups of CEE countries (the first wave countries and the rest) by two types of global retail chains: those operating in Romania and those not doing so. Thus *global_chain_1stWave_&_Romania* is defined as the annual sales in the first wave countries by chains having outlets in Romania, and *global_chain_1stWave_only* is defined as the annual sales in the first wave countries by chains without outlets in Romania. Similarly, *global_chain_2ndWave_&_Romania* captures the annual sales in the second wave countries by chains having outlets in Romania. Note that the chains' sales in Romania are excluded. We identify global retain chains based on sources described in section 4 and obtain the information on their sales in other CEE countries from Amadeus database. The figures enter in the log form and are lagged one period. The interaction of these two components creates sector-region-year specific instrumental variables that are consistent with the dimensions of our potentially endogenous variables.

Table W7 IV Approach
Fixed effects, TFP index

First Stage Estimation

	chains present		ln(no. of outlets)		ln(selling space)	
$sale\_share_{sr}$*	-0.522***	-1.049***	-4.251***	-5.402***	-8.409***	-14.04***
$ln(global\_chain\_in\_1stWave\_\&\_Romania)_t$	(0.066)	(0.063)	(0.113)	(0.105)	(0.654)	(0.622)
$sale\_share_{sr}$*	6.696***	8.520***	7.146***	11.118***	65.222***	84.732***
$ln(global\_chain\_1stWave\_only)_t$	(0.197)	(0.190)	(0.338)	(0.314)	(1.953)	(1.861)
$sale\_share_{sr}$*	0.005	-0.066***	-0.163***	-0.316***	-0.223**	-0.979***
$ln(global\_chain\_in\_2ndWave\_\&\_Romania)_t$	(0.011)	(0.011)	(0.019)	(0.018)	(0.112)	(0.106)
$sale\_share_{sr}$*	-4.949***	-7.145***	6.610***	1.808***	-37.04***	-60.55***
$ln(global\_chain\_2ndWave\_only)_t$	(0.174)	(0.168)	(0.298)	(0.277)	(1.721)	(1.644)
$ln(firm\ age)_{it}$	-0.018***	-0.012***	-0.069***	-0.056***	-0.220***	-0.154***
	(0.003)	(0.002)	(0.004)	(0.004)	(0.025)	(0.024)
$ln(imports)_{s,t-1}$		-0.209***		-0.465***		-2.243***
		(0.002)		(0.003)		(0.016)
$ln(exports)_{s,t-1}$		-0.013***		-0.005***		-0.121***
		(0.001)		(0.002)		(0.011)
$Herfindahl\ Index_{st}$		0.669***		1.112***		6.792***
		(0.020)		(0.033)		(0.196)
R-squared	0.324	0.388	0.348	0.451	0.328	0.403
No. of obs.	211538	210229	211538	210229	211538	210229
Shea's Partial R-squared	0.102	0.077	0.153	0.117	0.111	0.083
p-value of F test	0.00	0.00	0.00	0.00	0.00	0.00
p-value of underidentification test	0.00	0.00	0.00	0.00	0.00	0.00

Second Stage Estimation

$Food_s$*$(global\_chain)_{r,t-1}$	0.024**	0.024*	0.012**	0.011*	0.002**	0.002*
	(0.011)	(0.013)	(0.005)	(0.006)	(0.001)	(0.001)
age_{it}	0.117***	0.117***	0.117***	0.117***	0.117***	0.117***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
$ln(imports)_{s,t-1}$		-0.032***		-0.032***		-0.032***
		(0.004)		(0.004)		(0.004)
$ln(exports)_{s,t-1}$		-0.004**		-0.004**		-0.004**
		(0.002)		(0.002)		(0.002)
$Herfindahl\ Index_{st}$		-0.175***		-0.171***		-0.176***
		(0.034)		(0.034)		(0.034)
R-squared	0.019	0.02	0.019	0.02	0.019	0.02
No. of obs.	211538	210229	211538	210229	211538	210229
p-value of Sargan test	0.734	0.308	0.916	0.272	0.818	0.327

All models include firm fixed effects and region-year fixed effects. Robust standard errors are reported in parentheses.
* significant at 10%, ** at 5%, *** at 1%

The Shea's partial R^2 indicates that our instruments are reasonable predictors of the potentially

endogenous variable. Almost all instruments bear statistically significant coefficients. The estimates hint at the presence of capacity constraints. When the operations of chains active in Romania are considered, the results suggest a negative correlation between the extent of their presence in Romania and their sales in the first wave CEE countries. The same is true for their sales in the second wave CEE countries. At the same time, the estimates suggest that expansion of retail chains in Romania is positively correlated with the general trends in the first wave CEE countries (as reflected by the positive coefficient on the sales of chains not present in Romania in the first wave countries). The Sargan test does not cast doubt on the validity of the instruments.

The results from the instrumental variable approach are consistent with our baseline results. They suggest that the regional expansion of global retail chains leads to a significant increase in the TFP of the supplying industries. The interactive term between *Food* and presence of global chains remains positive and statistically significant across all models. The magnitude is, however, only about half of that found in the baseline results.