Retail Globalization and Household Welfare: Evidence from Mexico*

David Atkin†, Benjamin Faber‡ and Marco Gonzalez-Navarro§

January 2015

PRELIMINARY AND INCOMPLETE

Abstract

The arrival of global retail chains in developing countries is causing a radical transformation in the way that households source their consumption. This paper draws on a new and unique collection of Mexican microdata to estimate the effect of foreign supermarket entry on household welfare and its underlying channels. The richness of the data allows us to estimate a general expression for the welfare gains from retail FDI, and to decompose the total effect into several distinct components. To base our estimates on plausibly exogenous variation in foreign retail entry we propose an event study design that exploits data on the universe of foreign store locations and opening dates in combination with high frequency data on barcode-level store prices, consumption quantities, and household incomes in those same locations over the period 2002-2014. We find that foreign retail entry causes large and significant welfare gains for the average household that are mainly driven by a reduction in the cost of living. A substantial share of this price index effect is due to pro-competitive effects on consumer prices charged by domestic stores. We find little evidence of significant changes in average municipality level incomes, wages or employment. We do, however, find evidence of store exit and adverse effects on domestic store profits and the incomes of traditional retail sector workers. Finally, we present evidence that the gains from retail FDI are on average positive for all income groups but strongly regressive, and quantify the opposing forces that underlie this finding.

Keywords: Supermarket revolution; foreign direct investment; gains from trade
JEL Classification: F15; F23; F63; O24

*Zakia Akanda, Fatima Aqeel, Christopher Balette, Sakshi Kumar, Shruti Maken, Ramsha Mugal and Fern Ramoutar provided excellent research assistance. We are grateful to Rafael Posse and Javier Romero at INEGI, and to José Antonio Murillo at Banco de México for providing us access to the non-public access microdata of the Mexican CPI. Etienne Gagnon at the Fed Board in Washington D.C. kindly shared his data on the public access part of the Mexican CPI. Natalia Volkow at INEGI was pivotal in gaining access to the confidential microdata of the Mexican retail census. We thank Mauricio Varela for sharing his Mexican retail store data. We are also grateful to the Mexico City office of a large international market research company for supporting an academic collaboration and granting us access to their uncensored barcode-level consumption microdata, and to Enrique Seira Bejarano and Paul Gertler who were instrumental in making that happen. Finally, we thank Costas Arkolakis, Jessie Handbury, Dan Keniston, Steve Redding, Andrés Rodríguez-Clare and seminar participants at Berkeley, BREAD, Chicago Booth, IGC/SCID, LSE, Minnesota, NBER ITI and DEV, Northwestern, NYU, Princeton, Rottman, Simon Fraser, Stanford, UBC, UEA, UCLA and the World Bank for helpful comments. This research has been supported by funding from OWSP.

†Department of Economics, UCLA and NBER.
‡Department of Economics, UC Berkeley and NBER.
§CIRHR, Economics, and UTSC Management, University of Toronto.

1 Introduction

A radical transformation is occurring in the way households in developing countries source their consumption. A key driver of this so called 'supermarket revolution' has been the arrival of global retail chains in developing countries (Reardon et al., 2003; Humphrey, 2007).[1] Perhaps unsurprisingly in this context, retail globalization has led to heated policy debates. Those against foreign retailers point to the large share of employment in the traditional retail sector, while those in favor emphasize potential benefits from lower consumer prices.

Importantly, these debates have also led to stark differences in the policy approaches to retail FDI across countries. While some countries such as Argentina, Brazil, Mexico and most of Eastern Europe chose to fully liberalize retail FDI at the beginning of the 1990s, several developing countries including India continue to severely restrict foreign retail entry and others such as Indonesia, Malaysia and Thailand re-imposed regulatory barriers on foreign retailers after initially allowing entry (Dufey et al., 2008; Wrigley and Lowe, 2010).[2] These policy differences matter because retail is a key sector of the economy in terms of both employment and consumption: Retail on average accounts for 15-20 percent of total employment, 10-15 percent of total GDP, and more than 50 percent of total household expenditure in developing countries.[3]

Despite the rapid globalization of retail in the developing world and widespread policy interest, the existing literatures in trade and development have so far paid relatively little attention to this facet of international integration. This paper brings to bear a new and uniquely rich collection of microdata to assess the consequences of retail FDI in the context of Mexico, a country whose retail landscape underwent a dramatic transformation as foreign retailers came to dominate its market over the last 20 years. Our analysis coincides with the major wave of foreign store expansion in Mexico, providing an ideal empirical setting to study the process of retail globalization. The number of foreign supermarkets close to quadrupled from 365 stores at the end of 2001 to 1335 stores at the end of our estimation period in March 2014.

This paper aims to contribute to our understanding of three central questions: 1) What is the effect of retail FDI on average household welfare in the municipality of entry?; 2) What are the channels underlying this effect?; and 3) To what extent do the gains from retail FDI differ across the pre-existing distribution of household incomes?

In answering these questions, the paper also makes two methodological contributions to the literature that focuses on quantifying the gains from trade and multinational production. The

[1] In 2012, the 250 largest retailers reported 4.3 trillion USD in revenues, of which 25 percent were due to foreign affiliate sales. This represents an increase of more than 400 percent relative to foreign affiliate sales of these firms in the year 2000, and a doubling of the foreign sales share in total revenues. Over the same period, the share of the world stock of inward retail FDI accounted for by developing countries also more than doubled to 25 percent (UNCTAD, 2014).

[2] For example, it took India's Congress Party several years and many failed attempts to finally approve foreign entry into multi-brand retail in 2012. This process was accompanied by street protests, and several Indian states, such as Delhi, subsequently voted to block foreign entry. Most recently, the BJP government has announced its intention to move back to an outright nationwide ban of foreign retailers.

[3] These figures are based on reporting developing countries in post-2000 ILO data (employment), UN National Accounts statistics (GDP), and household consumption surveys (retail expenditures).

first is that rather than imposing structure ex ante to limit the data requirements to a set of readily available cross-country moments, we instead exploit newly available and uniquely rich microdata that allow us to estimate a very general expression for the welfare gains from retail FDI. In particular, microdata on barcode level consumer prices, consumption quantities, worker level incomes and store-level profits allow us to capture all major components of household welfare without shutting down any potential channels, such as the gains from variety or pro-competitive effects on consumer prices in domestic stores, ex ante. The second contribution is that rather than relying on cross-sectional moments that may or may not capture the causal effects of integration, we propose an event study design to ensure that the moments we feed into the welfare expression are causally identified.

At the center of the analysis lies the construction of an extremely rich collection of microdata. We combine data on all foreign supermarket locations and opening dates over the period 1999-2014, with household, product and store level microdata from multiple sources: monthly store-level consumer prices at the barcode-equivalent level (e.g. a 330ml can of Coca-Cola) from the confidential microdata of the Mexican CPI; daily household-by-store level data on consumption quantities and prices at the barcode-equivalent level from the the Mexican operation of a large international market research company; store-level revenues, costs and profits for the universe of urban retail establishments from the confidential microdata of the Mexican retail census; quarterly worker-level incomes, occupations and employment from Mexico's urban income and employment surveys (ENEU/ENOE); and household-level incomes and employment propensities matched to consumption and shopping patterns from Mexico's household income and expenditure surveys (ENIGH).

The analysis proceeds in four steps. In Step 1, we write down a general expression for the effect of retail FDI on household welfare. We decompose the total effect into three distinct effects on household cost of living (the price index) and three effects on household nominal incomes. We express the total cost of living effect as the sum of a direct price index effect and two pro-competitive price index effects. The direct price index effect captures the implicit changes in consumer prices due to foreign stores offering new varieties, pre-existing varieties at cheaper prices, as well as different store amenities. The pro-competitive effects comprise an intensive margin, the effect of foreign entry on consumer prices in continuing domestic stores, and an extensive margin, the implicit price index changes due to domestic store exit. We express the total effect on nominal incomes as the sum of a retail labor income effect (both from employment in traditional retail and modern retail), a retail business income effect (for domestic store owners) and indirect income effects on household incomes in other sectors of the local economy.

In Steps 2 and 3 we estimate the empirical moments required to quantify the six effects that underlie the total household gains from retail FDI. We tackle the pro-competitive effect among continuing domestic stores first. The first empirical challenge in identifying this effect is that the composition of goods and stores within consumer product groups changes over time. This implies that changes in unit values reported in household consumption surveys yield imperfect measures

of local consumer price changes. We address this challenge by exploiting nationally representative store price surveys at the barcode-equivalent product by store level that are administered by Mexico's statistical agency INEGI to calculate the CPI. These data allow us to construct monthly time series of prices for individual products sold in a particular retail outlet in a particular municipality over the period 2002-2014.

The second empirical challenge is non-random entry of foreign retailers across municipalities and over time. To ensure that we are identifying the causal effect on consumer prices in domestic stores, we propose an event study design. The store-opening data suggest that, over our period of study, foreign retailers operated under the objective of establishing a store presence across all of urban Mexico. If so, the precise timing of opening within these locations will be determined by the speed of obtaining zoning permits and the completion of construction, and so the month of opening will be uncorrelated with location specific changes in prices or incomes that may confound estimates of the price and income effects of foreign retail before and after entry. We test this identifying assumption by estimating a full set of 48 monthly treatment effects starting one year prior to the opening event and continuing for three years after opening. By looking for evidence of pre-trends in these monthly treatment effects we are able to transparently and non-parametrically test for the validity of this identifying assumption.

While our data allow us to observe the price changes of continuing store-by-product varieties in order to estimate the intensive margin pro-competitive effect, the consumer price changes that result from either the arrival of new store-by-product varieties in foreign stores (the direct price index effect) or the exit of domestic stores (the extensive margin of the pro-competitive effect) are inherently unobservable because neither first period prices of new varieties nor second period prices of exiting varieties can be recorded. To quantify the cost of living implications of these changes in the available set of consumer choices, we require functional form assumptions about consumer demand in order to estimate a virtual price, the price at which demand would be zero.

To this end, we use two different approaches. The first approach is an exact estimation of the cost of living effect under a multi-tier CES preference structure. As shown by Anderson et al. (1992), these preferences generate the same demands as would be obtained from aggregating many consumers who make discrete choices over which store to shop in. This approach has the appeal of being widely used in the trade literature that evaluates the gains from new imported products starting with Feenstra (1994), in part because it yields a very parsimonious expression for the welfare gain from new products (or stores in our case). This expression requires information on the ex post household expenditure shares on foreign stores across households and product groups in combination with estimates of the elasticity of substitution across local outlets. To obtain these estimates, we exploit the uncensored microdata of the Mexican operation of a large international market research company which contain prices and household consumption quantities at the barcode-equivalent level matched to individual retailer identities.

A second benefit of the CES structure is that it allows us to relate our results to the recent quantitative literature on the gains from trade: We show that under CES preferences, the expres-

sion for the direct price index effect of foreign entry is identical to the well known import share sufficient statistic for the gains from trade of Arkolakis et al. (2012) and extended to the case of horizontal FDI by Ramondo and Rodriguez-Clare (2013). Because our welfare expression includes additional terms, this allows us to provide empirical evidence on a number of commonly made assumptions in the trade literature. For example, we empirically estimate the size and nature of the pro-competitive effects of foreign entry, separately estimate price index and nominal income effects, and document to what extent the average effect of multinational production on household welfare differs across the income distribution.

While the assumption of CES preferences has its virtues, it also imposes a particular structure on household demands. As an alternative approach, we exploit the richness of the barcode-level store price data in order to estimate a first order approximation of the direct price index effect of foreign store entry that is solely based on observable price changes due to foreign entry. The advantage of this alternative approach is that it yields a a Paasche price index that approximates the consumer gains that arise from foreign store entry without imposing functional form assumptions on consumer preferences. The disadvantage is that it can only quantify the direct gains from foreign store entry that arise due to the price differences between foreign and domestic stores for pre-existing products. That is, while being transparent and general, this approach abstracts from the consumer gains that arise from both a new store variety, and from unobserved differences in either product variety or shopping amenities between foreign and domestic stores. In contrast, the exact estimation under CES allows us to capture the complete set of unobserved consumer price changes due to foreign entry. The combination of these two approaches provides an additional benefit. The difference between the direct price index effect under CES and the first order approach provides an approximate estimate of the proportion of the welfare gains that come from the additional variety provided by foreign stores and the amenity differences between foreign and domestic stores.

To estimate the effects on nominal household incomes, we construct a quarterly time series of individual incomes, wages, occupation, and employment status that allows us to track individual workers over time in a given municipality. The identification issues are very similar to those we address in the price regressions. Accordingly, we follow a similar event study approach and examine how incomes, wages and employment status change in quarters before and after the month of entry of a foreign retailer. Similar to the consumer price regressions, this quarterly event study design allows us to test for pre-existing differences in the growth rates of local household economic outcomes without imposing parametric structure. To capture the effects of foreign retail entry on household income derived from domestic store profits, as well as to capture the effects on store exit, we complement these data with profit and store count data from the Mexican retail census.

In Step 4, we combine the estimates from Steps 2 and 3 to quantify the welfare expression from Step 1. The analysis provides several new findings. We find that foreign supermarket entry causes large and significant welfare gains for the average household that are in the order of 8 percent of

initial household income. The majority of this effect is driven by a significant reduction in the cost of living. Interestingly, slightly more than 20 percent of the price index effect appears to be driven by pro-competitive effects on consumer prices charged by pre-existing domestic stores. In particular, foreign supermarket entry leads to a permanent reduction in domestic store prices of 4 percent. The remaining 80 percent is driven by the direct price index effect that is due to foreign supermarkets offering cheaper quality-adjusted prices, new varieties and different shopping amenities to consumers. This finding is consistent with raw moments in the data that we present as motivating evidence: foreign retailers charge on average 12 percent lower prices for the identical barcode within the same month and municipality, offer five times the barcode variety compared to modern domestic stores, and constitute on average more than one third of total household retail spending after foreign entry. The estimation results using our first order approximation of the direct price index effect suggest that about one third of this direct effect is driven by observed ex-post store price differences alone, while the remaining two thirds derive from the substantial differences in product variety and store amenities. Turning to nominal incomes, we find no evidence of an effect on average municipality-level household incomes or employment rates. We do, however, find evidence of store exit and adverse effects on domestic store profits and the wage incomes of workers in the traditional retail sector. Finally, we exploit the full richness of the data to quantify the distribution of the gains from retail FDI. We find that while all household income groups on average experience significant gains from retail FDI, this effect is about twice as large for the richest income group compared to the poorest, and quantify the interplay of opposing forces that underlie this finding.

The paper is related to the recent literature that estimates the gains from international integration for developing countries and the distribution of those gains (Porto, 2006 ; Goldberg and Pavcnik, 2007; Topalova, 2010; Atkin, 2013; Donaldson, 2012; Faber, 2014; Fajgelbaum and Khandelwahl, 2014). Relative to the existing literature on trade and development, we focus on the consequences of retail globalization, a channel of integration that has received relatively little attention. Methodologically, this paper differs in its careful empirical evaluation of all major components of household welfare and, in particular, the cost of living implications of the policy in question. Rather than relying on state level price deflators as in Topalova (2010) or earlier work by Deaton and Tarozzi (2000), or on household consumption surveys in combination with simulated price changes at the level of aggregate product groups as in Porto (2006) and earlier work by Deaton (1989), or relying on cross-country trade flows as in Caron et al. (2012) and Fajgelbaum and Khandelwal (2014), this paper draws on price and consumption data at the level of individual households, barcode-equivalent products, and stores to provide the first empirical estimate of the effect of foreign retail entry on household price indexes.

The paper closely relates to a small body of work that explores the economic consequences of foreign supermarkets in developing and emerging countries (Neven and Reardon, 2004; Iacovone et al., 2014; Javorcik and Li, 2013).[4] Relative to these papers that have focused on the spill-over

[4]Varela (2013) uses Walmart's entry decisions into local markets in Mexico to estimate a structural model of disec-

effects on domestic suppliers in both agriculture and manufacturing, this paper instead focuses on the consequences for consumers, workers and business owners located in the municipality where the foreign store entry occurs. To the best of our knowledge, this is the first paper to provide empirical evidence on these first order effects of retail globalization. [5]

In so far as we are estimating the welfare effects of new foreign retail choices, the work is also related to the trade literature that estimates the gains from new product variety (Feenstra, 1994; Broda and Weinstein, 2006; Feenstra and Weinstein, 2013; Handbury and Weinstein, 2011). In addition to studying foreign retailer entry at the level of a municipality as opposed to extensive margin changes in country level import flows, the richness of the collected data allows us to directly trace foreign production shares across the consumption baskets of individual households at the level of disaggregated product groups. To the best of our knowledge, this is the first time that an empirical analysis exploits information on import shares in consumption directly (in our setting expenditure shares on foreign-owned stores) at the household-by-product level in order to quantify the gains from integration.

Finally, since Walmart de México is by far the biggest foreign retailer in Mexico (and in fact is more dominant in Mexico than it has ever been in the United States), the paper relates to an extensive literature on the effects of Walmart in the United States. Basker (2005) analyzes effects on retail employment. Jia (2008) focuses on entry and exit decisions between Walmart and competing retailers. Hausman and Leibtag (2007) estimate the consumer benefits of Walmart entry. And Holmes (2011) infers economies of store density for Walmart from the centrifugal but dense expansion of Walmart. This paper offers two main innovations relative to the existing literature. First, developing countries offer a very different pre-existing retail environment to study the effect of modern big box store entry. That is, rather than analyzing the effect of modern store entry in the context of an already modernized retail sector, this paper sheds light on the effect of exposing a largely traditional retail environment to what is arguably the world's technological frontier in retailing. Second, to the best of our knowledge this paper is the first to provide a comprehensive measurement of the total welfare effect of retail formats such as Walmart for local households. Somewhat surprisingly, the estimation of the effect of retail modernization on both nominal incomes and household cost of living in a unified empirical framework has not been attempted in the existing literature to date.

The remainder of the paper is structured as follows. Section 2 describes the background and policy context of retail globalization in Mexico and provides motivating evidence. Section 3 presents the theoretical framework. Section 4 describes the data sets used to estimate each component of the welfare expression. Sections 5 and 6 present the empirical strategy and estimation results. Section 7 draws on these estimation results in combination with estimates of household demand parameters to quantify the average household welfare gain from retail FDI, its underlying

onomies of scale in outlet expansion.

[5] We note that this paper's focus is on quantifying the effects of foreign retail entry on local household welfare within the municipality of entry, and is silent on potentially interesting national level effects such as changes in manufacturing productivity that are absorbed by time fixed effects in our empirical setting.

channels, and the distribution of the gains from retail FDI. Section 8 concludes.

2 Background and Motivating Evidence on Retail Globalization in Mexico

2.1 Background

Foreign investments in retail and other sectors were originally governed by the 1973 Foreign Investment Law which required FDI to be approved on a case by case basis, and generally required a minimum 51% Mexican ownership. Over the 1980's restrictions were relaxed allowing FDI in most sectors up to 49% without explicit authorization, and allowing specific sectors to have up to full foreign ownership. The major final step in Mexico's opening to FDI was brought about by NAFTA which allowed full foreign ownership in all (including retail) but a few reserved sectors such as energy. Of particular importance was the fact that NAFTA guaranteed full freedom to repatriate profits and a third-party dispute resolution mechanism.

The first significant foreign investment in retail we are aware of is the purchase of 49% of Casa Ley (a regional retailer in Northern Mexico) by Safeway of the U.S. in 1981 under pre-NAFTA regulations. However, the truly transformative event has proven to be Walmart's decision to enter the Mexican market in the early 1990's around the time of NAFTA's negotiation. Walmart initially arrived under a joint venture partnership with Mexican retailer Cifra, a successful local retailer focused on the Mexico City region with around 100 supermarket units. By 1997 Cifra was bought out by Walmart, and in 2000 the name of the company was changed to Walmart de México (WALMEX). In the ensuing years, Walmart de México became the largest retail chain and the largest employer in the country with 210,000 employees in January 2014.

The entry of global retail chains and their modern store formats into Mexico created a setting in which the domestic retail market, which was dominated by street markets, traditional store formats and independent shop owners, was exposed to what is arguably the world technological frontier in retailing. Major operational and technological differences included the introduction of distribution centers, modern logistics such as cold-chain logistics for fresh products, and sourcing from global supply chains (Biles, 2008).

The expansion of Walmart and other foreign supermarket chains, such as Casa Ley-Safeway, Costco, HEB, Smart and Waldos, proceeded relatively slowly during the second half of the 1990s, serving predominantly metropolitan and relatively high income neighborhoods in the major cities. As depicted in Figure 1, the number of foreign supermarkets in Mexico expanded from 204 stores at the end of 1995 to 365 stores at the end of 2001. In both periods, the presence of foreign stores was strongly concentrated in a handful of central locations in the major metropolitan centers of Mexico. Between 2002 and 2014, the estimation period of our empirical analysis, foreign retailers expanded close to fourfold from 365 supermarkets to 1335 at the beginning of 2014. As is apparent in Figure 1, this period saw the expansion of foreign supermarkets way beyond the large

metropolitan city centers, towards establishing presence among the wide range of second and third tier urban areas as small as 15,000 inhabitants.

2.2 Motivating Evidence

Once they have opened, how do these foreign-owned supermarkets differ from the domestic stores they compete with? In this subsection, we exploit the microdata of the Mexican subsidiary of a large international market research company and the administrative records of the Mexican National Retail Association (ANTAD) to document a set of stylized facts about the differences between foreign-owned and domestic retailers in periods after foreign entry.

Table 1 shows that foreign-owned retailers differ substantially along several key dimensions. Column 1 shows that, on average, foreign stores charge approximately 12 percent lower prices for identical barcode products compared to domestic retailers in the same municipality during the same month. Interestingly, the sign of this difference is reversed when we replace barcode-by-month fixed effects by product group-by-month fixed effects (column 2). Thus, foreign stores appear to offer higher quality varieties (where quality is proxied by price) and/or larger pack sizes within a product group whilst charging lower prices for varieties of equal quality and pack size.

These large differences in prices and product variety are combined with a substantially larger set of available varieties. When compared to modern domestic retail chains in column 3, a foreign-owned supermarket offers approximately five times as many barcode products during a given survey year in the same municipality compared to a domestic supermarket chain store.[6] This difference in consumer choice is also apparent when comparing the floor space records using the ANTAD data. Column 4 of Table 1 shows that the average foreign-owned store is approximately six times the size of a domestic retailer that is also a member of ANTAD.

Finally, in addition to differences in consumer prices and product variety there are a number of differences in the shopping amenities offered by foreign-owned supermarkets compared to the domestic retailers. Two key dimensions of shopping amenity are the store environment and the store location. In terms of positive amenities, foreign-owned supermarkets are typically cleaner, offer greater security, and display and organize their products better. In addition, store branding and the perceived consumer benefit from shopping at a modern foreign retail outlet relative to a Mexican store brand could be significant. In terms of negative amenities, foreign-owned stores tend to be located farther outside the town center due to both their larger size and their later entry into the market.

[6]Notice that columns 3 and 4 are based on the comparison to modern domestic retail chains and exclude the traditional independent domestic retail segment. These comparisons likely provide lower bounds of the differences in product variety between foreign stores and the domestic retail environment including the traditional sector.

3 Theoretical Framework

In this section we derive a general expression for assessing the impact of foreign supermarket entry on local household welfare. We allow foreign supermarket entry to affect welfare through a variety of channels that affect both the cost of living (i.e. the price index) as well as household nominal incomes. We distinguish between three separate channels on the cost of living side: (1) a direct price index effect whereby the entry of foreign stores lowers the household cost of living by offering new varieties, pre-existing varieties at potentially cheaper prices, as well as different levels of shopping quality, (2) an intensive margin pro-competitive effect whereby foreign supermarkets affect consumer prices charged by continuing domestic retailers due to greater competition in the local retail market, and (3) the extensive margin of the pro-competitive effect on domestic retail prices whereby foreign entry affects the available local variety due to the potential exit of domestic stores. On the nominal income side, we also distinguish between three separate channels: (4) an income effect for workers in both the traditional and modern domestic retail sector due to wage and employment changes that result from foreign entry, (5) a retail business income effect for domestic store owners due to increased competition with foreign retailers, and (6) additional general equilibrium effects on non-retail household income.

3.1 A General Estimation Framework

Consumers purchase goods from a set of "items" indexed by a product b by store s pair. Each product is sold by potentially many stores. These stores may belong to either the modern retail sector i_m (e.g. supermarkets or big box stores) or to the traditional retail sector i_t (e.g. market stalls or mom-and-pop stores) with the two retail sectors indexed by $i \in \{i_m, i_t\}$, respectively. For notational convenience, we distinguish prices at foreign retailers in the modern sector (indexed by f with product-store prices stacked in a vector $\mathbf{P}_f$) from domestic retailers (indexed by d with product-store prices stacked in a vector $\mathbf{P}_d$), with the latter category including both modern and traditional retailers.

A household h's nominal expenditure on all goods and services, $e(\mathbf{P_d}, \mathbf{P_f}, u_h)$, is equal to household nominal income:

$$e(\mathbf{P}_d, \mathbf{P}_f, u_h) = y_h = \sum_{i \in \{i_m, i_t\}} w_i l_{ih} + \sum_{i \in \{i_m, i_t\}} \pi_{ih}(\mathbf{P}_{ih}; \mathbf{w}) + x_h. \quad (1)$$

where nominal income y_h is the sum of three terms: wage earnings w_i from household labor l_{ih} (with $\sum l_{ih} \leq n_h$ where n_h is household labor supply) across both retail sectors; profits π_{ih} from domestic modern or traditional retail enterprises owned by the household that depend on the vector of output prices $\mathbf{P}_{ih}$ and the vector of input prices $\mathbf{w}$ including potentially household labor; and income from other sources x_h.

In order to calculate the welfare effects we consider the compensating variation[7], the change in

[7] This approach follows earlier work by Hausman (1981) and Hausman and Leonard (2002).

exogenous income required to maintain utility when foreign retail arrives between period 1 and period 0, with periods denoted by superscripts:

$$CV = \underbrace{\left[e(\mathbf{P}_d^{1*}, \mathbf{P}_f^1, u_h^0) - e(\mathbf{P}_d^0, \mathbf{P}_f^{0*}, u_h^0)\right]}_{\text{Cost of living effect } (CLE)} - \underbrace{\left[\sum_i w_i^1 l_{ih}^1 - \sum_i w_i^0 l_{ih}^0 + \sum_i \pi_{ih}^1(\mathbf{P}_{ih}^1; \mathbf{w}^1) - \sum_i \pi_{ih}^0(\mathbf{P}_{ih}^0; \mathbf{w}^0) + x_h^1 - x_h^0\right]}_{\text{Income effect } (IE)}. \tag{2}$$

Or in proportional terms (relative to period 0 expenditure):

$$\frac{CV}{e(\mathbf{P}_d^0, \mathbf{P}_f^{0*}, u_h^0)} = \underbrace{\left[\frac{e(\mathbf{P}_d^{1*}, \mathbf{P}_f^1, u_h^0)}{e(\mathbf{P}_d^0, \mathbf{P}_f^{0*}, u_h^0)} - 1\right]}_{\text{Cost of living effect } (CLE)} - \underbrace{\left[\frac{\sum_i w_i^1 l_{ih}^1 + \sum_i \pi_{ih}^1(\mathbf{P}_{ih}^1; \mathbf{w}^1) + x_h^1}{\sum_i w_i^0 l_{ih}^0 + \sum_i \pi_{ih}^0(\mathbf{P}_{ih}^0; \mathbf{w}^0) + x_h^0} - 1\right]}_{\text{Income effect } (IE)}. \tag{3}$$

The first term is the cost of living effect, whereby foreign retail entry may lower the prices consumers pay. Of course foreign retailers' prices are not observed prior to their entry and so the foreign retail prices in period 0 are replaced with virtual prices $\mathbf{P}_f^{0*}$, the foreign prices that would ensure that exactly zero quantity was consumed given the price vector of other goods. These virtual prices can be estimated with additional assumptions on consumer preferences. Similarly, prices are not always observed for domestic items that exit between periods 0 and 1 and these unobserved prices are also replaced with virtual prices; the vector $\mathbf{P}_d^{1*}$ contains actual prices for the observed domestic items in period 1 (continuously available items and new items) and virtual prices for item exits, while the vector $\mathbf{P}_d^0$ contains actual prices for domestic items in period 0.[8] The second term is the income effect, whereby foreign retail entry may change wages, particularly in the retail sector, and may alter profits for firms competing with foreign retailers.

In the following sections we consider the various sub-components of the cost of living and income effects as well as the moments in the data that we will use to identify them.

3.2 Estimating the Cost of Living Effect

The cost of living effect can be divided into two quite distinct sub-components: a direct effect due to new items sold at foreign retailers (either previously available varieties of a product sold by foreign retailers at different shopping-quality-adjusted prices, or new varieties of products); and a pro-competitive effect due to domestic retailers exiting or changing prices as a result of the entry of foreign retailers. To see these distinct terms, note that

$$CLE = \underbrace{\left[e(\mathbf{P}_d^{1*}, \mathbf{P}_f^1, u_h^0) - e(\mathbf{P}_d^{1*}, \mathbf{P}_f^{1*}, u_h^0)\right]}_{\text{(1) Direct effect } (DE)} + \underbrace{\left[e(\mathbf{P}_d^{1*}, \mathbf{P}_f^{1*}, u_h^0) - e(\mathbf{P}_d^0, \mathbf{P}_f^{0*}, u_h^0)\right]}_{\text{Pro-competitive effect } (PE)}. \tag{4}$$

[8] It is straightforward to also allow for domestic product entry through virtual prices $\mathbf{P}_d^{0*}$. Empirically we find no evidence of such entry in response to foreign retail arrivals and so abstract from this possibility in the theoretical exposition.

where using the virtual price notation defined above, $\mathbf{P}_f^{1*}$ are the prices required to set demand for foreign products equal to zero given domestic prices in period 1. The first expression which we label the direct effect is the cost difference between obtaining u_h^0 at period 1 prices with and without the presence of foreign retail. These are the gains from foreign retail arrival holding fixed competitors prices. The second expression which we label the pro-competitive effect is the cost difference between obtaining u_h^0 at period 1 domestic prices and at period 0 domestic prices accounting for domestic product exit through the use of virtual prices (in the absence of foreign retail in either period). These are the gains from foreign retail working through changes in domestic competitors on the intensive and extensive margins.

The pro-competitive effect can itself be divided into two terms by separating the price effects on continuing domestic items with a price vector $\mathbf{P}_{dc}$, from domestic item exiters with prices $\mathbf{P}_{dx}$:

$$PE = \underbrace{\left[e(\mathbf{P}_{dc}^1, \mathbf{P}_{dx}^{1*}, \mathbf{P}_f^{1*}, u_h^0) - e(\mathbf{P}_{dc}^0, \mathbf{P}_{dx}^{0*}, \mathbf{P}_f^{0*}, u_h^0)\right]}_{\text{(2) Pro-competitive intensive margin } (PEI)} + \underbrace{\left[e(\mathbf{P}_{dc}^0, \mathbf{P}_{dx}^{0*}, \mathbf{P}_f^{0*}, u_h^0) - e(\mathbf{P}_{dc}^0, \mathbf{P}_{dx}^0, \mathbf{P}_f^{0*}, u_h^0)\right]}_{\text{(3) Pro-competitive exit margin } (PEX)} \quad (5)$$

Estimating both the direct effect and the pro-competitive effect requires us to place additional structure on demand. Most obviously, since virtual prices are not observed they must be estimated which requires a demand function for the good or at least an approximation to one. Below we propose two estimation approaches.

First Order Approach Using Observed Store Price Differences In the first approach, we exploit the extremely detailed price data before and after the arrival of foreign retail in order to estimate a first order approximation of the cost of living effect of foreign entry that is solely based on observed product-level price changes. This approach abstracts from any unobserved retailer differences in terms of shopping variety or amenities, and provides a first order Paasche approximation of the pro-competitive effect (PE) and the direct price index effect (DE) using observed price changes and ex post consumption weights.

For the pro-competitive effect, we start by taking a first-order Taylor expansion of the expenditure function around period 1 prices and apply Shepherd's lemma. Focusing on price changes in the set of domestic stores continuously selling product b across both periods (for which we can observe price changes) we obtain:

$$PE \approx \sum_b \sum_{s \in S_b^{dc}} \left[q_{bsh}^1 (p_{bs}^1 - p_{bs}^0)\right], \quad (6)$$

where q_{bsh}^t is the quantity consumed of product b in store s by household h in period t and S_b^{dc} is the set of domestic stores continuously selling product b across both periods. Rewriting the PE in proportional terms:

$$\frac{PE}{e(\mathbf{P}_d^{1*}, \mathbf{P}_f^{1*}, u_h^0)} \approx \sum_b \sum_{s \in S_b^{dc}} \left[\phi_{bsh}^1 \left(\frac{p_{bs}^1 - p_{bs}^0}{p_{bs}^1}\right)\right], \quad (7)$$

where ϕ^1_{bsh} is the household expenditure share spent on the item in period 1. To a first order approximation, the pro-competitive effect is simply a Paasche price index of the price changes of pre-existing store-by-product varieties that occurred due to the entry of foreign retail.

For the direct price index effect, we again take a first-order Taylor expansion of the expenditure function around period 1 prices but now focus on the remaining term, the sales at foreign stores in period 1. We calculate the first-order welfare loss if these stores had the exact same number of varieties and amenities, but instead charged the pre-entry prices charged by domestic stores for those products:

$$\frac{DE}{e(\mathbf{P}_d^{1*}, \mathbf{P}_f^1, u_h^0)} \approx \sum_b \sum_{s \in S_b^f} \left[\phi^1_{bsh} \left(\frac{p^1_{bf} - p^0_{bd}}{p^1_{bf}} \right) \right]. \tag{8}$$

where S_b^f is the set of foreign stores present in period 1. Hence, the direct effect corresponds to a Paasche price index of the product-level price differences between foreign stores in period 1, p^1_{bf}, and domestic stores in period 0, p^0_{bd} (instead of evaluating the virtual price changes at foreign stores that would set their demand equal to zero in period 1 that provides the exact welfare gain).

The benefits of this approach are clear. It yields a transparent first order approximation of the consumer gains that arise from foreign store entry purely based on moments we can obtain from the price microdata without the need to impose particular functional form assumptions on consumer preferences. The disadvantages are equally clear: we miss any direct gains that arise due to differences in the number and type of product varieties on sale in foreign stores or the amenities provided by foreign stores, differences that are potentially substantial and that we highlighted in Section 2. We also miss any gains from the additional store-variety that new foreign-retail outlets provide since we do not evaluate the price changes that would set the demand for foreign stores equal to zero. We now turn to our second approach that allows us to evaluate those additional unobserved consumer price changes.

Exact Estimation under CES demand Our second approach provides an exact and complete estimate of the cost of living effect under a multi-tier CES demand structure that is common in the trade literature. This approach has several advantages. As first shown by Feenstra (1994), the CES structure produces an intuitive and straightforward expression for the cost of living change due to the introduction of new varieties. Unlike the first order approach above, we can capture differences in variety or amenities across domestic and foreign stores. The assumption of CES preferences also allows us to relate the estimation results to the recent quantitative literature on the gains from trade: Under CES, the expression for the direct price index effect in our expression for the total welfare effect due to foreign retail entry is identical to the well known sufficient statistic of Arkolakis et al. (2012), extended to horizontal multinational production by Ramondo and Rodriguez-Clare (2013). Finally, as shown by Anderson et al. (1992), the demands generated by CES will be identical to the demands generated by aggregating many consumers who make discrete choices over which store to shop in.

We propose a three tier demand system: in the upper tier there are Cobb-Douglas preferences over product groups $g \in G$ (e.g. Beverages), in the middle tier there are CES preferences over local retailers selling that product group $s \in S$ (e.g. Walmex, a foreign retailer; Soriana, a domestic retailer in modern retail; or a mom-and-pop store in the traditional retail sector), and in the final tier there are preferences over the products within the product groups $b \in B_g$ (e.g. a product such as a 330 ml Coca Cola can) that we can leave unspecified for now:

$$U = \prod_{g \in G} [Q_{gh}]^{\alpha_{gh}} \tag{9}$$

$$Q_{gh} = \left(\sum_{s \in S_g} \beta_{gsh} q_{gsh}^{\frac{\eta_{gh}-1}{\eta_{gh}}} \right)^{\frac{\eta_{gh}}{\eta_{gh}-1}} \tag{10}$$

where α_{gh}, β_{gsh} and are (potentially household-specific) preference parameters that are fixed over periods. Q_{gh} and q_{gsh} are consumption aggregates with associated price indexes P_{gh} and r_{gsh} respectively. Under this demand system, consumers choose separately for each broad product group how much they are going to buy in each store. Consumers then choose the particular products purchased within each store. This seems like a reasonable assumption given that certain stores specialize in certain product groups and, at least within a month, consumers visit multiple stores. While the demand system is homothetic, we capture potential heterogeneity across the income distribution by allowing for the preference parameters and elasticities to differ across households in different income groups.[9]

Building on Feenstra (1994), the following expression provides the exact proportional cost of living effect:

$$\frac{CLE}{e(\mathbf{P}_d^{0*}, \mathbf{P}_f^{0*}, u_h^0)} = \frac{e(\mathbf{P}_d^{1*}, \mathbf{P}_f^{1}, u_h^0)}{e(\mathbf{P}_d^{0*}, \mathbf{P}_f^{0*}, u_h^0)} - 1 = \prod_{g \in G} \left\{ \left(\frac{\sum_{s \in S_g^{dc}} \phi_{gsh}^1}{\sum_{s \in S_g^{dc}} \phi_{gsh}^0} \right)^{\frac{1}{\eta_{gh}-1}} \prod_{s \in S_g^{dc}} \left(\frac{r_{gsh}^1}{r_{gsh}^0} \right)^{\omega_{gsh}} \right\}^{\alpha_{gh}} - 1. \tag{11}$$

where S_g^{dc} denotes the set of continuing domestic retailers within product group g, $\phi_{gsh}^t = r_{gsh}^t q_{gsh}^t / \sum_{s \in S_g} r_{gsh}^t q_{gsh}^t$ is the expenditure share for a particular retailer of product group g, and the ω_{gsh}'s are ideal log-change weights

$$\omega_{gsh} = \left(\frac{\tilde{\phi}_{gsh}^1 - \tilde{\phi}_{gsh}^0}{\ln \tilde{\phi}_{gsh}^1 - \ln \tilde{\phi}_{gsh}^0} \right) / \sum_{s^{dc} \in S_g^{dc}} \left(\frac{\tilde{\phi}_{gsh}^1 - \tilde{\phi}_{gsh}^0}{\ln \tilde{\phi}_{gsh}^1 - \ln \tilde{\phi}_{gsh}^0} \right)$$

which in turn contain expenditure shares of different retailers within product groups where the shares consider only expenditure at continuing retailers $\tilde{\phi}_{gsh}^t = r_{gsh}^t q_{gsh}^t / \sum_{s \in S_g^{dc}} r_{gsh}^t q_{gsh}^t$. The price terms r_{gsh}^t are themselves price indexes of product-specific prices p_{gsb}^t within stores which, in prin-

[9] Notice that while convenient for estimation, this somewhat ad hoc treatment of non-homotheticity is unlikely to significantly bias our results in our empirical setting. Unless foreign retail entry causes large effects on either average household incomes, or the distribution of incomes—which we do not find to be the case empirically—income effects would only play a minor role in evaluating the causal effect of retail FDI on household price indexes.

ciple, could also account for new product varieties using the same methodology.

As above, the cost of living effect can be broken up into the direct effect and the pro-competitive effect as follows:

$$\frac{CLE}{e(\mathbf{P}_d^{0*}, \mathbf{P}_f^{0*}, u_h^0)} = \underbrace{\left[\prod_{g\in G}\left\{\left(\frac{\sum_{s\in S_g^{dc}}\phi_{gsh}^1}{\sum_{s\in S_g^{dc}}\phi_{gsh}^0}\right)^{\frac{1}{\eta_{gh}-1}}\prod_{s\in S_g^{dc}}\left(\frac{r_{gsh}^1}{r_{gsh}^0}\right)^{\omega_{gsh}}\right\}^{\alpha_{gh}} - \prod_{g\in G}\left\{\left(\frac{1}{\sum_{s\in S_g^{dc}}\phi_{gsh}^0}\right)^{\frac{1}{\eta_{gh}-1}}\prod_{s\in S_g^{dc}}\left(\frac{r_{gsh}^1}{r_{gsh}^0}\right)^{\omega_{gsh}}\right\}^{\alpha_{gh}}\right]}_{\text{(1) Direct effect } (DE)}$$
$$+ \underbrace{\left[\prod_{g\in G}\left\{\left(\frac{1}{\sum_{s\in S_g^{dc}}\phi_{gsh}^0}\right)^{\frac{1}{\eta_{gh}-1}}\prod_{s\in S_g^{dc}}\left(\frac{r_{gsh}^1}{r_{gsh}^0}\right)^{\omega_{gsh}}\right\}^{\alpha_{gh}} - 1\right]}_{\text{Pro-competitive effect } (PE)}. \quad (12)$$

Once more we can further break up the pro-competitive effect into extensive and intensive margins:

$$\frac{PE}{e(\mathbf{P}_d^{0*}, \mathbf{P}_f^{0*}, u_h^0)} = \underbrace{\left[\prod_{g\in G}\left\{\left(\frac{1}{\sum_{s\in S_g^{dc}}\phi_{gsh}^0}\right)^{\frac{1}{\eta_{gh}-1}}\prod_{s\in S_g^{dc}}\left(\frac{r_{gsh}^1}{r_{gsh}^0}\right)^{\omega_{gsh}}\right\}^{\alpha_{gh}} - \prod_{g\in G}\left\{\prod_{s\in S_g^{dc}}\left(\frac{r_{gsh}^1}{r_{gsh}^0}\right)^{\omega_{gsh}}\right\}^{\alpha_{gh}}\right]}_{\text{(3) Pro-competitive exit margin } (PEX)}$$
$$+ \underbrace{\left[\prod_{g\in G}\left\{\prod_{s\in S_g^{dc}}\left(\frac{r_{gsh}^1}{r_{gsh}^0}\right)^{\omega_{gsh}}\right\}^{\alpha_{gh}} - 1\right]}_{\text{(2) Pro-competitive intensive margin } (PEI)}. \quad (13)$$

This decomposition can be written more compactly if we consider the log change in expenditure holding fixed utility at the base period:

$$\ln\frac{e(\mathbf{P}_d^{1*}, \mathbf{P}_f^{1}, u_h^0)}{e(\mathbf{P}_d^{0*}, \mathbf{P}_f^{0*}, u_h^0)} = \underbrace{\sum_{g\in G}\alpha_{gh}\frac{1}{\eta_{gh}-1}\ln\sum_{s\in S_g^{dc}}\phi_{gsh}^1}_{(1)\,DE} - \underbrace{\sum_{g\in G}\alpha_{gh}\frac{1}{\eta_{gh}-1}\ln\sum_{s\in S_g^{dc}}\phi_{gsh}^0}_{(3)\,PEX} + \underbrace{\sum_{g\in G}\alpha_{gh}\sum_{s\in S_g^{dc}}\omega_{gsh}(\ln r_{gsh}^1 - \ln r_{gsh}^0)}_{(2)\,PEI}. \quad (14)$$

In the simple case where there are no pro-competitive effects (such as when firms are monopolistically competitive as in Krugman 1980):

$$\frac{CLE}{e(\mathbf{P}_d^{0*}, \mathbf{P}_f^{0*}, u_h^0)} = \prod_{g\in G}\left\{\left(\sum_{s\in S_g^{dc}}\phi_{gsh}^1\right)^{\frac{1}{\eta_{gh}-1}}\right\}^{\alpha_{gh}} - 1 \quad (15)$$

which is precisely the welfare gain from trade highlighted in recent work by Arkolakis at al. (2012) and Ramondo and Rodríguez-Clare (2013), but here in a multi-sectoral environment.

As described in detail in Section 4, the richness of the Mexican data we have compiled allows

us to calculate each of these components of the cost of living effect. In particular, we first draw on detailed price and quantity data and the precise timing of foreign retail openings to calculate causal changes in the price index of domestic stores (the r^1_{gsh}/r^0_{gsh} ratio) and market shares due to foreign retail entry. We then use barcode-by-store level consumption surveys to provide an estimate of the elasticity of substitution between store types (η_{gh}). Finally, we combine these two estimates with expenditure shares of different store types and product groups to perform the quantification.

3.3 Estimating the Income Effect

The income effect in equation 2 can also be separated into distinct sub-components. Taking a second order Taylor approximation on the income effect in period 1 we obtain the following:

$$\frac{IE}{e(\mathbf{P}^{0*}_d, \mathbf{P}^{0*}_f, u^0_h)} \approx \underbrace{-\sum_i \left[\theta^{w0}_{ih}\left(\frac{w^1_i - w^0_i}{w^0_i} + \frac{l^1_{ih} - l^0_{ih}}{l^0_{ih}} + \frac{w^1_i - w^0_i}{w^0_i}\frac{l^1_{ih} - l^0_{ih}}{l^0_{ih}}\right)\right]}_{\text{(4) Wage effects}} \tag{16}$$

$$\underbrace{-\sum_i \left[\theta^{\pi 0}_{ih}\left(\frac{\pi_{ih}(\mathbf{P}^1_{ih}; \mathbf{w}) - \pi_{ih}(\mathbf{P^0}_{ih}; \mathbf{w}^0)}{\pi_{ih}(\mathbf{P^0}_{ih}; \mathbf{w}^0)}\right)\right]}_{\text{(5) Household business effects}} - \underbrace{\left[\theta^{o0}_h \frac{x^1_h - x^0_h}{x^0_h}\right]}_{\text{(6) Other income effects}}$$

where θ^w_{ih} is the share of wages from industry i in household total income, θ^π_{ih} is the share of total income derived from selling product b in a household retail enterprise in sector i and θ^{o0}_h is the share of other income in household total income.

Foreign retail entry may change wages generally, or specifically in certain industries such a formal retail or informal retail (the $\theta^{w0}_{ih}\frac{w^1_i - w^0_i}{w^0_i}$ term). There may also be changes along the employment margin with workers reducing their labor supply to certain industries, for example informal retail that competes with foreign retail, and increasing their labor supply to other industries or moving into unemployment (the $\theta^{\pi 0}_{ih}\frac{l^1_{ih} - l^0_{ih}}{l^0_{ih}}$ term).

Households may also own businesses, for example traditional retail stores, and these may be hurt by foreign retail entry (the household business effects term). Finally, income from other sources may respond to foreign retail entry through general equilibrium wage effects or because households are producing goods that are sold through the retail sector.

The household business effect can be further broken down into effects due to output and input price competition. For simplicity we assume that retail profits are an additive function of profits from each good sold in that store type,

$$\pi_{ih}(\mathbf{P}_{ih}; \mathbf{w}) = \sum_b \pi_{bih}(p_{bih}; w_i, \tilde{p}_b),$$

with product-by-product profits a function of wages in that sector w_i, and a common wholesale price for that good $\tilde{p}_b$. Taking a second order Taylor approximation and applying Hoteling's

lemma on the profits in period 1 we obtain two effects:

$$\underbrace{\sum_i \left[\theta_{ih}^{\pi 0}\left(\frac{\pi_{ih}(\mathbf{P}_{ih}^1;\mathbf{w}) - \pi_{ih}(\mathbf{P^0}_{ih};\mathbf{w}^0)}{\pi_{ih}(\mathbf{P^0}_{ih};\mathbf{w}^0}\right)\right]}_{\text{(5) Household business effects}} \approx \underbrace{\sum_i \sum_b \left[\theta_{bih}^{\pi 0}\left((\frac{p_{bih}^1 - p_{bih}^0}{p_{bih}^0}) + \frac{1}{2}\mu_{bibih}(\frac{p_{bih}^1 - p_{bih}^0}{p_{bih}^0})^2\right)\right]}_{\text{(5a) Household business effects (output price competition)}} \quad (17)$$

$$\underbrace{-\sum_i \left[\omega_{ih}^0(\frac{w_i^1 - w_i^0}{w_i^0}) + \frac{1}{2}\omega_{ih}^0\xi_{iih}(\frac{w_i^1 - w_i^0}{w_i^0})^2 + \sum_b\left(\omega_{bih}^0(\frac{\tilde{p}_b^1 - \tilde{p}_b^0}{\tilde{p}_b^0}) + \frac{1}{2}\omega_{bih}^0\varrho_{bibih}(\frac{\tilde{p}_b^1 - \tilde{p}_b^0}{\tilde{p}_b^0})^2 + \omega_{ih}^0\chi_{biih}(\frac{\tilde{p}_b^1 - \tilde{p}_b^0}{\tilde{p}_b^0})(\frac{w_i^1 - w_i^0}{w_i^0})\right)\right]}_{\text{(5b) Household business effects (input price competition)}}$$

where $\theta_{bih}^{\pi 0}$ is the share of income from selling product b in total income; $\mu_{bibih} = \frac{\partial q_{bih}^S}{\partial p_{bih}}\frac{p_{bih}}{q_{bih}^S}$ is the elasticity of supply; ω_{ih} is the share of wage costs in total income; ω_{bih} is the share of wholesale costs for good b in total income; and $\xi_{iih} = \frac{\partial \tilde{l}_{bih}}{\partial w_i}\frac{w_i}{\tilde{l}_{bih}}$, $\varrho_{bibih} = \frac{\partial \tilde{q}_{bih}^S}{\partial \tilde{p}_b}\frac{\tilde{p}_b}{\tilde{q}_{bih}^S}$ and $\chi_{biih} = \frac{\partial \tilde{l}_{bih}}{\partial \tilde{p}_b}\frac{\tilde{p}_b}{\tilde{l}_{bih}}$ are the various input elasticities. In terms of output price competition, household business profits may decline through lowering the prices the firm receives (the $\theta_{bih}^{\pi 0}(\frac{p_{bih}^1 - p_{bih}^0}{p_{bih}^0})$ term). Households may also substitute into other businesses in order to avoid competition with foreign retailers (the $\theta_{bih}^{\pi 0}\frac{1}{2}\mu_{bibih}(\frac{p_{bih}^1 - p_{bih}^0}{p_{bih}^0})^2$ term). In terms of input price competition, household businesses may suffer from higher wages in retail if foreign entry bids up salaries, as well as potentially gain from lower wholesale prices if foreign entry lowers producer price.

In our empirical work we will explore these terms allowing the effects of foreign entry to differ across industry and hence across households depending on the household's initial labor allocation and businesses. In order to do so, we draw on data from ENEU and ENOE, the Mexican employment surveys, which allow us to observe a quarterly time series of household income before and after foreign retail entry as well as, for example, whether households are working in various forms of retail or own a retail business.

In summary, our theoretical framework allows us to express the total household gains from retail FDI as a function of causal effects on retail prices, consumption quantities and household nominal incomes in combination with household demand parameters. The next section describes the data sources we draw on to obtain these estimates. We then proceed in three steps. In step 1, we present the empirical strategy to estimate the causal effects of foreign entry on retail prices, consumption quantities and household incomes. In step 2, we estimate the necessary demand parameters needed for the quantification. Finally, in step 3, we combine the estimates obtained in the two previous steps with data on both household expenditure shares and income sources to quantify the gains from retail FDI across the income distribution.

4 Data

This section provides an overview of the main data sets that we use to estimate the welfare expression.

Monthly Mexican CPI Microdata

Monthly price data at the barcode-equivalent product and store level are used to estimate the intensive margin pro-competitive effect: the effect of foreign entry on consumer prices among continuing domestic stores. These data consist of retail price quotes that are administered by Mexico's national statistics agency INEGI every month to compute the Mexican CPI.[10] Because the main objective of the CPI is to compute price inflation for identical product items in identical retail outlets over time, these data are ideally suited to estimate price effects among the pre-existing domestic retail environment faced by consumers that are unconfounded by unobserved changes in product quality or changes in the composition of stores over time.

The data collection effort for the Mexican CPI is substantial. Every month INEGI enumerators obtain price quotes for over 85,000 items covering 315 product categories in 46 metropolitan areas covering 141 urban municipalities.[11] These individual price quotes are made publicly available on a monthly basis in the country's official government gazette (Diario Oficial de la Federación).[12] Obviously the CPI includes many product groups which do not refer to physical goods sold by retailers, such as housing, education, health or public transport. We exclude all non-retail product groups from the main analysis of the effect of foreign entry on consumer prices in pre-existing retail establishments, but also use the non-retail price quotes for a set of placebo falsification tests. When comparing prices over time, we also exclude product groups whose price quotes are not based on barcode-equivalent information. CPI prices of fast changing product groups, such as clothing, or unprocessed product groups, such as fruit and vegetables or fresh meat, are based on store samples that do not credibly control for changes in product characteristics over time. The time series of prices for barcode-equivalent items (i.e. fresh whole milk Alpura brand 1 liter carton) that we use to estimate the pro-competitive effects of foreign retail entry comprise more than one third of all reported price quotes in the Mexican CPI microdata, and account for more than 40% of average household retail expenditure. Price quotes are inclusive of any promotions (sales) as well as value added tax.

In addition to the public access data of the Mexican CPI, we also obtain access to the confidential data columns.[13] These allow us to observe the municipality in which the price quote was taken, as well as store format type and retailer names. The latter information allow us to explore the heterogeneity of the effect of foreign entry on consumer prices across different types of domestic competitors. The final estimation sample of the event study described in the following section consists of roughly 3.3 million store price observations over the period 2002-2014 comprising 120 product groups with barcode-equivalent products across 76 urban municipalities.

These price data have a number of additional advantages for our purposes. First, the sampling of prices being collected is designed to be representative of Mexican household consumption and

[10] In July 2011 this operation was passed from Mexico's Central Bank to INEGI.

[11] For comparison, the U.S. CPI collects prices on 80,000 items in 211 product categories.

[12] We thank Etienne Gagnon for access to the data he assembled directly from the Gazette.

[13] We thank Rafael Posse and Javier Romero at INEGI as well as José Antonio Murillo at Banco de México for providing access to these data when visiting Mexico City.

covers not only supermarkets, convenience, and department stores but also street vendors, traditional markets, and specialized stores. A second important advantage is that within a product group, the selection of barcode-equivalent products and store types is designed to capture the consumption patterns obtained in the urban segment of the ENIGH household consumption surveys discussed below (Salas, 2006).

ANTAD Store Opening Dates and Locations

We obtain data on store locations and dates of opening from Mexico's national association of retail businesses ANTAD (Asociación Nacional de Tiendas de Autoservicio y Departamentales). All major retailers in Mexico are part of ANTAD. The association represents more than 34,000 retail units with close to 25 million square meters of retail space. ANTAD collects an unusually detailed data set with information from all its members about the location and date of opening for every unit in the country. The store openings at the municipality level by retailer over the 2002-2014 period are the source of the independent variable of interest in the empirical analysis—the first entry of a foreign-owned supermarket in a municipality.[14]

Microdata from the Mexican Operation of a Large International Market Research Company

The estimation of the effects of changes in product variety on household cost of living requires data on the ex post retail market shares of foreign supermarkets across product groups and households along the income distribution, as well as estimates of the elasticity of substitution of household consumption across local stores as a function of price differences. The data we exploit for this purpose are the microdata of a large international market research company, which was made available to us through an academic collaboration with their Mexico City office. Their Mexican consumption microdata data are available for the years 2011-2014. These data are similar to the home scanner data that market research companies collect on US consumers. The Mexican operation of the firm collects information from roughly 6,000 urban households distributed across 151 Mexican municipalities. Households are visited biweekly to obtain consumption diary information on all products purchased by the household. As with the CPI data, these data are at the barcode-equivalent level with enumerators carefully noting the brand, variety and pack size. The household sample is updated annually to be representative of all cities over 50,000. Importantly, we obtain access to the uncensored records including retailer identities that can be linked to every transaction in a household's consumption basket. These data are ideally suited to observe retailer market shares embodied in household consumption baskets, as well as for the estimation of household elasticities of substitution that capture the extent to which households source their

[14] We thank Mauricio Varela for access to his data on Walmart store openings during years in which Walmart was not a member of ANTAD (2002-2007). We also extended the foreign store openings database for the period after 2007 using monthly or annual reports from firms and in some cases newspaper coverage and phone calls to track down opening dates for foreign-owned supermarkets with missing information on opening dates that were present at the beginning of 2014.

consumption from different local stores as a function of price differences. These microdata provide us with roughly 24 million transaction-level observations over the period between January 2011 and June 2014.

Mexican Retail Census Microdata

For the purpose of estimating the effect of foreign entry on retail business profits and domestic store exit we use the confidential version of the Economic Census microdata for the years 2003 and 2008 (Censos Económicos 2004 and 2009) from INEGI. The Economic Census records establishment level information for the universe of urban retail establishments in the country, including the universe of urban retail establishments. The restricted access version of the data we use allows us to observe store level revenues and costs in addition to distinguishing between foreign and domestic establishments as well as modern and traditional store formats. The final dataset comprises 608 urban municipalities reporting outcomes for 1.3 million retail establishments in 2003 and 1.5 retail establishments in 2008.[15]

Quarterly Data on Household Incomes, Income Sources and Employment

To estimate the effect of foreign entry on nominal household incomes and employment, we require high frequency data to exploit the same event study design for incomes as we use for consumer prices. To this end, we make use of the National Employment and Occupation Surveys (ENOE) from INEGI. The ENOE has a similar design to the U.S. Current Population Survey in that it is a quarterly survey with a rotating panel of sampled households in which a given household is followed over 5 quarters. The survey tracks occupation and income in a manner equivalent to the ENIGH data set described below and has the advantage of being representative at the state level and for 32 large cities. Every quarter more than 100,000 individual residences are surveyed. The ENOE replaced the national urban employment survey ENEU (1987-2004) which we use for the pre-2005 years. The final estimation sample comprises roughly 5 million observations across 273 urban municipalities.

Household Data on Consumption and Income Shares

In the final quantification exercise in section 7, we make use of Mexican household microdata that allow us to observe both the incomes and income sources of each household as well as its expenditure shares across all retail and non-retail product groups. We obtain these data from the Mexican National Income and Expenditure Surveys (ENIGH), which are administered biannually by INEGI. These data provide us with the distribution of incomes, income sources, and consumption habits that we require to quantify the welfare effect for different income groups in Section 7.

[15] Throughout the analysis, we define our urban estimation sample across datasets as urban classified municipalities that report at least one store presence in the ANTAD dataset over the years 2002-2014. The official urban classification in Mexico are all municipalities with more than 2500 inhabitants.

Unlike earlier rounds, the ENIGH microdata starting from 2006 also provide us with rich information on the store formats that each individual transaction takes place at. The final estimation sample for the welfare quantification contains 12,293 households residing in 240 urban municipalities between 2006-2012 that had not experienced foreign retail entry at the time of the ENIGH survey.

5 Estimating the Effects of Foreign Retail Entry

This section draws on the microdata described in the previous section to empirically estimate the effect of foreign retail entry on local consumer prices, retail market shares, store exit, as well as household labor and business incomes and employment across Mexican municipalities over the period 2002-2014. As well as being of interest in their own right, these empirical estimates enter into the welfare expressions derived in the theoretical framework, and hence form the basis of the quantification of the household gains from retail FDI in Section 7.

5.1 Effect on Consumer Prices

5.1.1 Effect on Consumer Prices in Domestic Retail Outlets

Empirical Strategy To estimate the effect of foreign supermarket entry on consumer prices in pre-existing domestic retail outlets in expression 6, we combine information on the universe of foreign store locations and opening dates with monthly panel data on local barcode level prices from the confidential microdata of the Mexican CPI over the period 2002-2014. The obvious identification concern is that store openings are correlated with pre-existing price trends. There are several basic scenarios. First, it could be the case that foreign retailers target municipalities with higher pre-existing price growth or time their opening in a way that is correlated with positive local retail price shocks. Both of these scenarios would lead to an upward biased estimate of the treatment effect of foreign entry on domestic store prices. Alternatively, foreign stores could target faster growing municipalities whose retail environments are also becoming more competitive, so that store prices could be on a pre-existing downward trajectory for reasons other than foreign entry. Finally, rather than targeting a particular subset of municipalities at particular points in time, foreign retailers expand rapidly over the sample period with the long term aim of establishing store presence in most urban municipalities. In this final scenario, we would expect a limited potential for biased estimates as neither the selection of municipalities nor the timing of opening would likely be correlated with differential pre-existing price growth, at least among urban municipalities that form part or our CPI microdata sample.

To further explore these scenarios, we exploit the richness of the CPI microdata to estimate the following baseline event study specification:

$$\ln p_{gsbmt} = \sum_{\tau=-12}^{36} \beta_\tau \, I\left(MonthsSinceEntry_{mt} = \tau\right) + \delta_{gsbm} + \eta_t + \epsilon_{gsbmt}\,, \tag{18}$$

where $\ln p_{gsbmt}$ is the log price of a barcode-product b in product-group g, individual store s, in municipality m and month t. $I\left(MonthsSinceEntry_{mt} = \tau\right)$ is an indicator function, and $MonthsSinceEntry_{mt}$ counts the months since foreign entry for each municipality m at a given point in time t (with negative values counting months before entry, positive values counting the months after entry, so that $MonthsSinceEntry_{mt} = 0$ in the month that a foreign store enters a municipality for the first time).[16] Since expression 6 concerns the intensive margin pro competitive effect, we restrict attention to prices at domestic stores before and after the first foreign store opening. The parameter β_τ captures the effect of foreign store entry for each of τ months before and after the opening event. δ_{gsbm} is a barcode-by-store fixed effect, and η_t is a month fixed effect.[17]

By estimating the treatment effect in the 12 months leading up to the opening event as well as the 36 months after, this approach allows us to test for the presence and slope of potential trends or leads in the run-up to the foreign store opening event in a transparent way, and without imposing parametric structure. The absence of pre-existing trends or leads would suggest that the two troubling scenarios outlined above are not an issue, while if there are trends or leads, the event study design allows us to sign and quantify potential bias.

To estimate the event study on a fully balanced sample of municipalities both before and after the store opening, we exclude municipalities where the first foreign store opened in the first 12 months of our data set (July 2002-June 2003), and municipalities where the first foreign store opened in the last 36 months our data set (April 2011-March 2014) or later. There is a clear tradeoff between a longer event study and a smaller, less representative, sample. Our choice of window was guided by the fact that we lose only six percent of our store price observations through this restriction (although, along with including additional fixed-effects and controls, we will also show results with an extended window).

Estimation Results Panel A of Figure 2 presents the event study graph. Prices are flat (and not significantly different from zero) in the lead up to the store entry event, start falling as soon as entry occurs, and level off approximately 2 years after entry at a negative and significant 3 percentage points. As evidenced by the treatment effect estimated for post 36 months (labeled ">36" in the figure), this pro-competitive effect appears to be permanent. Note that since the CPI sampling weights reflect the consumption basket of a representative household, these point estimates indicate that foreign retail entry significantly lowers the price index when using a first order Laspeyres approximation.

In addition to the baseline event study specification in 18, we present two additional event studies that serve as robustness checks. First, in case our results are driven by more granular

[16] We also define the indicator variable $I\left(MonthsSinceEntry_{mt} = 36\right)$, that picks up the last treatment effect, to take the value 1 for all $MonthsSinceEntry_{mt} \geq 36$.

[17] Note, we do not include barcode-by-month fixed effects for two reasons. First, the product descriptions which we use to define barcodes in the CPI microdata are recorded consistently within stores over time, but not necessarily across stores or municipalities. Second, even with harmonized barcode-level product descriptions across stores and regions, because the store price data doesn't sample an exhaustive list of products, or the same products in every location, including such fixed effects would absorb much of the variation in the data set.

trends not captured by the month fixed effects, we replace the 141 month fixed effects with 33,516 store type-by-product group-by-month fixed effects, 705 region-by-month fixed effects and 705 municipality size-by-month fixed effects (Panel B of Figure 2).[18] Second, to address remaining concerns that longer-run pre-existing trends may not be detected in our fully balanced event study with 12 pre-months, we also extend the event study to cover 24 months before the opening event (Panel B of Figure 2). The coefficient patterns across the three panels are remarkably similar. Table 2 presents the coefficients in table form (in quarterly rather than monthly bins for compactness).

The absence of pre-existing differential trends in price growth and the subsequent leveling off two years after entry provides no evidence in support of the hypothesis that, during our sample period, foreign retailers targeted urban municipalities based on pre-existing price trends or entered in response to changing economic conditions pre-entry. Instead, the results appear to be consistent with a scenario in which foreign retailers rapidly expanded their store networks to establish presence in a wide range of urban locations subject to a longer term planning horizon (and hence variation in opening times is driven by local planning approvals and building delays). The finding that the coefficients fall gradually in the first two years after opening rather than immediately is interesting. It suggests that local consumers adjust their shopping behavior gradually, as recently found to be the case for US retailers (Einav et al., 20152015).

The remaining endogeneity concern is that foreign retailers anticipate breaks in local economic trends. For example, foreign retailers may anticipate local road or other infrastructure investments and target entry to coincide with these investments. We should be clear what would constitute a concern in this context: The local infrastructure investment must be placed at random, in the sense that it is uncorrelated with pre or post trends in prices; it must induce a trend break in prices that lasts only two years since prices return to trend after that; and it must be both anticipated by the foreign retailer, yet the foreign retailer must always precisely preempt its arrival since we see no drop in prices pre-entry. Taken individually, each of these three conditions appear unlikely, particularly the last one given the stochastic nature of delays in both opening a new store and in infrastructure investments. And of course, even if all three conditions are satisfied, it would not be obvious why foreign retailers explicitly target places with anticipated negative price shocks.

Nevertheless, we present two additional robustness checks that serve to address these concerns directly. First, we add direct controls for time-varying municipality log annual local government expenditure from the Mexican statistical institute INEGI. As presented in Table 2, the event study coefficients are virtually unchanged after controlling for contemporary changes in local public expenditure, providing some reassurance against this concern. Second, we also estimate the baseline event study specification in 18 on the non-retail CPI microdata. This serves two purposes. If we do not expect non-retail prices to respond, it serves as a placebo falsification test as we

[18]Store types refer to modern store formats (supermarkets and big box stores) and traditional retail outlets (mom and pop stores, street markets, etc.). Mexican regions are defined by five contiguous geographical zones following the electoral regions of the Instituto Federal Electoral (http://www.ife.org.mx/documentos/DERFE/Cartografia/Circunscripciones_Electorales.html). Similarly, we assign each municipality in our sample to one of five population quintiles that we define over pre-existing populations in the year 2000 to compute the size-by-month fixed effects.

might expect any omitted variables that change retail price trends to have similar effects on non-retail prices. If we think they may respond to foreign retail openings through indirect channels, the size of the response is needed for the quantification exercise. The non-retail CPI microdata includes price time series for consumer expenditures on, for example, the same local hair cut, taxi ride, public transport fares, domestic cleaning services, apartment rents, private education fees or medical procedures. As shown in Table 2, when considering these non-retail prices, the point estimates of the event study specifications are essentially a time series of precisely estimated zeroes. Once again this provides some reassurance in favor of the validity of the event study design presented in Figure 2.

Heterogeneity After reporting the event study on the average retail price effect of foreign store entry, we also explore the heterogeneous effects of foreign entry on domestic retail prices across broad product categories as well as domestic store formats. This analysis is possible since the confidential version of the Mexican CPI microdata allows us to observe store formats and retailer names in addition to product groups. We estimate the following specification:

$$\ln p_{gsbmt} = \sum_{gs} \beta_{gs} \left(ForeignEntry_{mt} \times Product_{gs} \right) + \delta_{gsbm} + \eta_{gst} + \theta_{rt} + \phi_{pt} + \epsilon_{gsbmt} \,, \tag{19}$$

where $ForeignEntry_{mt}$ is an indicator that takes the value of 1 if there is a foreign store in the municipality m in period t and $Product_{gs}$ is an indicator variable that takes the value of 1 if the retail price quote belongs to a product in product g and store type s, and δ_{gsbm} are barcode-by-store fixed effects. As before, to control for time-varying product-group by store-type specific shocks to price growth as well as price changes that may affect regions or municipality types differently in a given period, we also include product-group by store-type by month fixed effects (η_{gst}), region-by-month fixed effects (θ_{rt}) and municipality size-by-month fixed effects(ϕ_{pt}). The β_{gs} estimates capture the differential effect of foreign entry on domestic retail prices across product-group by store-type categories relative to a reference category. This specification on the heterogeneous effects of foreign entry is subject to similar identification concerns as discussed for the simple pre versus post mean comparison of the average effect above. We follow a similar strategy and rely on the lack of pre trends in the event study reported above. We also exclude all price observations during a 24 month adjustment period immediately after the foreign opening event. We choose to exclude the first 24 months after store opening because the price coefficients in the event study level off by that time so our single coefficient here will capture the long-run price adjustment.

Table 3 reports the results of the treatment interactions with respect to domestic supermarkets as opposed to traditional stores, and with respect to food items as opposed to other consumer categories. The results suggest that foreign supermarket entry affects the prices of domestic stores similarly across both food and non-food products. In contrast, the pro-competitive effect is stronger for modern domestic store formats relative to traditional store formats.

5.1.2 Ex-Post Price Gaps between Foreign and Domestic Stores for Identical Barcode Products

Empirical Strategy As discussed in Section 3, empirical estimates of the average ex-post price differences charged by foreign retailers relative to domestic retailers can be used to estimate a simple and transparent empirical approximation for the direct price index effect of foreign retail entry (in combination with the price changes in domestic stores calculated in the previous subsection). To estimate these ex-post price differences in the same municipality and month and for identical barcode items in expression 7, we use the microdata of the international market research company over the period 2011-2014 to estimate the following specification:

$$\ln p_{gsbmt} = \beta DomesticStore_s + \delta_{gbmt} + \epsilon_{gsbmt}\,, \tag{20}$$

where $DomesticStore_s$ is a dummy that takes the value of 1 if the retailer is not a foreign-owned store and δ_{gbmt} is a barcode-by-municipality-by-month fixed effect. This specification estimates the average price gap between foreign stores and domestic stores for identical barcode items observed in the same location and during the same month. Alternatively, as in the previous subsection, we also estimate the ex-post price gaps after further breaking up the domestic retail environment into modern and traditional stores as well as food as opposed to non-food product groups within each of these retailer categories.

Estimation Results Table 4 presents the estimation results. As reported in Section 2, foreign stores charge approximately 12 percent lower prices for identical barcode items compared to domestic stores in the same location during the same month. In terms of heterogeneity, the price advantage of foreign stores is most pronounced compared to traditional domestic retailers (a 17 percent price difference), but the difference remains both economically and statistically significant when comparing foreign stores to modern domestic supermarkets (a 4 percent price difference). In terms of heterogeneity across product groups, the price differences are most pronounced for food relative to non-food product groups.

5.2 Effect on Consumption Quantities

5.2.1 Effect on Foreign Retail Market Shares

Empirical Strategy To calculate the direct price index effect in expression 14, we require estimates of the effect of foreign supermarket entry on the retail expenditure shares of foreign stores (broken down by product group and by household income group). To obtain these estimates we turn to the uncensored microdata of the international market research company and estimate the following specification:

$$\sum_{s \in S^f_{gmt}} \phi_{ghmt} = \beta_{gh} + \gamma_{mt} + \epsilon_{ghmt} \tag{21}$$

where $\sum_{s \in S^f_{gmt}} \phi_{ghmt}$ are local retail market shares of all foreign retailers $s \in S^f_{gmt}$, and γ_{mt} are municipality-by-quarter fixed effects. We allow for the expenditure share estimates β_{gh} to differ across product-group g and household-type h, where household type is one of seven income-groups as described in Section 4. As above, we focus on the time period 24 months after initial foreign entry which we interpret as the long run (recall the price effects leveled off around that point). Accordingly, we restrict our sample to municipalities and time periods where foreign retailer had been open for 24 or more months. Thus, this specification estimates the mean long-run foreign retailer shares across 7 household income groups and 13 product groups.[19]

The choice to estimate average ex post foreign retailer shares after 24 months raises the potential concern that foreign entry could be correlated with other changes in the municipality that also affect foreign retail market shares. For example, income growth or changes in local transport infrastructure may differentially affect retail expenditures on foreign and domestic stores. To limit potential bias, as a robustness exercise we also restrict the estimation of 21 to municipalities where foreign retail first arrived between 2 and three years ago. The identifying assumption is that up to three years after the foreign entry event, the predominant factor that affects foreign retail shares is the fact that a foreign store opened in the municipality, rather than other time varying factors, such as income growth, that could affect the relative expenditure shares on domestic and foreign outlets independently of a foreign store opening.

Estimation Results Figure 3 presents the estimation results using the microdata of the international market research company. These data allow us to trace each retailer's expenditure shares by product group across individual household consumption baskets. The average ex-post quarterly share of total household retail expenditure on foreign stores is more than 30 percent. Given that the median number of foreign stores across urban Mexican municipalities is one single store, these results provide prima facie evidence of a substantial and significant direct price index effect of retail FDI in a developing country context.

Importantly, the estimated ex post expenditure shares on foreign stores significantly differ across the distribution of household incomes. Figure 3 suggest that the poorest income group spend approximately 40 percent less of their retail expenditure in foreign supermarkets compared to the richest income group. The lower panel of the figure then breaks up the observed average ex post expenditure shares on foreign stores across product groups, rather than household income groups. The insight that arises is that non-food product groups appear to have slightly higher foreign expenditure shares compared to food products. However, this difference is not very pronounced. These findings are confirmed in size and significance in the robustness exercise reported in the Online Appendix where we restrict the estimation sample to municipalities where foreign retail first arrived between 2 and 3 years ago.

[19] See discussion in data section.

5.2.2 Effect on Domestic Store Exit

To estimate the effect of foreign store entry on domestic store exit in expression 14, we use the retail census microdata that provide us with store counts across urban municipalities in 2003 and 2008. As these are the same data that we use to estimate the effects on store profits, we discuss and report these specifications as part of the following subsection.

5.3 Effect on Nominal Labor and Business Incomes and Employment

Empirical Strategy To calculate the income effect in expression 16 of Section 3, we require estimates of the causal impact of foreign retail entry on nominal incomes and employment in the location where retail entry occurred. We start by analyzing the effect on average nominal labor incomes by running the following event study specification using the microdata of the Mexican urban income and employment surveys (ENEU/ENOE):

$$\ln Income_{jmt} = \sum_{\tau=-10}^{20} \beta_\tau \, I\left(QuartersSinceEntry_{mt} = \tau\right) + \gamma X_{jmt} + \delta_m + \eta_t + \epsilon_{jmt}, \tag{22}$$

where subscripts j, m and t index individuals, municipalities and quarters respectively. X_{jmt} are person controls including a gender dummy, dummies for completed degrees (below primary, primary, secondary, higher) and third order polynomials for age and years of schooling. Alternatively, we replace log monthly incomes with an employment indicator that takes the value of one if the person is employed.

Hence, we regress quarterly individual income or employment outcomes on foreign store opening events in addition to person controls, municipality fixed-effects and quarter fixed-effects.

As discussed for the price regressions above, the event study design allows us to transparently and non-parametrically explore pre-existing trends in the run up to the store opening event. Again, there are several potential scenarios. Foreign retailers could target urban municipalities with higher pre-existing income growth rates, or decide on the timing of the opening in a way that is correlated with positive local economic shocks. Conversely, it could be the case that foreign retailers target urban municipalities with higher income levels that in turn could be characterized by lower income growth rates. Finally, it could be that, as found to be the case in the price regressions, foreign retailers expanded rapidly during the estimation period with a longer-term planning horizon to establish store presence in a wide range of urban municipalities, so that store openings are uncorrelated with local shocks or pre-existing trends in incomes or employment (at least for our urban estimation sample).

To empirically explore these possibilities, we proceed to implement the event study in the same way as described above for the price regressions. As above, we balance the estimation sample between one year before and three years after the store entry event. This restriction excludes approximately ten percent percent of our income and employment observations. The majority (6 percent) of these excluded observations are in urban municipalities that had not yet received a

foreign store at the end of our sample in March 2014.[20]

In addition to these baseline specifications, we follow the same methodology outlined in the previous section and estimate a number of additional robustness checks. As in the consumer price event study, we replace the quarter fixed effects with region-by-quarter as well as municipality size-by-quarter fixed effects, and we estimate specifications with both a one year pre-period as well as an extended event study with two years in the run up to the foreign retail entry event.

Before turning to the results on differential income effects, we note that our empirical methodology is only able to estimate income gains or losses within the location where the foreign store opened. Any changes in national income due to foreign store entry are absorbed in the fixed effects. Undoubtedly such effects may be important. The owners, headquarter employees and shareholders of large domestic supermarket chains are likely to experience profit declines, and employees at foreign firms' Mexican headquarters could experience gains. Such income effects are likely to be concentrated in Mexico City and other major cities where the headquarters are located and are excluded from our analysis. Accordingly, this paper provides estimates of the local welfare effects of foreign retail entry rather than the complete national welfare effects.

For our quantification we require estimates of the nominal income effects broken down by occupation. Any differences across occupations will lead to heterogeneous welfare impacts on households depending on their pre existing occupation breakdown. Therefore, to estimate to what extent household incomes are affected differently depending on the primary source of income (indexed by i below), we also run specifications that allow for heterogeneity.

Since individuals may work in several occupations or become unemployed over time, and we only follow individuals over 5 consecutive quarters, if we want to assess the impact on workers in different occupations prior to foreign entry we are necessarily restricted to shorter-run responses. In order to obtain longer run responses that match our price results, we therefore evaluate aggregate changes in incomes and employment across different occupations without including worker fixed effects. As with the price regressions, we remove observations from the first two years after foreign store entry to explore long run adjustments. We regress log income or employment on a foreign entry dummy that takes the value 1 when there is a foreign store in the municipality interacted with an occupation dummy that takes the value of 1 if a worker is employed in that occupation:

$$\ln(Income)_{jimt} = \sum_i \beta_i \left(ForeignEntry_{mt} \times Occupation_i\right) + \gamma X_{jimt} + \delta_{mt} + \eta_{im} + \theta_{it} + \epsilon_{jimt}\,, \tag{23}$$

where subscripts j, i, m and t index individuals, occupations, municipalities and quarters respectively. We focus on different retail occupations, where i includes categories for retail workers in modern store formats, retail workers in traditional store formats, retail business owners and workers in other sectors. δ_{mt} is a municipality-by-quarter fixed effect, η_{im} is an occupation-by-municipality fixed effect, and θ_{it} is an occupation-by-quarter fixed effect. The coefficients β_i cap-

[20] Note that we do not include individual worker fixed effects as the ENEU data is a rotating panel where individuals are followed for a maximum of 5 quarters. For completeness, the Online Appendix also reports results after including worker fixed effects.

ture the differential effect of foreign store entry on the incomes of retail workers in modern store formats, traditional store formats as well as agricultural workers and manufacturing workers (conditional on flexible trends at the municipality-quarter level and initial earnings differences across occupation groups within the municipality and the quarter). Alternatively, we estimate specification 23 with employment dummies on the left hand side to capture the differential effect on employment propensities.

Finally, to estimate the effect of foreign retail entry on the business incomes among domestic store owners as well as domestic store exit, we complement the urban employment and income surveys with the confidential microdata of the Mexican retail census that we have access to for the years 2003 and 2008.

[Work in progress.]

Estimation Results Figures 4 and 5 and Table 5 present the estimation results on the income and employment effects of foreign supermarket entry. The estimation results on the average effects in Figures 4 and 5 suggest no significant effects on average municipality level log monthly incomes or employment propensities. For completeness, the Online Appendix reports the regression table and additional results that confirm the findings depicted in the Figures.

Table 5 presents the results that explore heterogeneity across retail workers in modern store formats, traditional formats, as well as labor income effects on agricultural and manufacturing workers. In contrast to the average income regressions, we find a negative and significant effect on the incomes of traditional retail workers. This point estimate is robust to including income group-by-quarter fixed effects as well as state-by-income-group specific time trends, implying that this effect is not driven by pre-existing differential trends that are specific to particular income groups. The point estimate corresponds to a reduction in the monthly incomes of traditional sector retail workers of approximately 5.5 percent as a result of foreign retail entry. It is important to keep in mind that the ENEU allows us to estimate the effect on retail worker earnings conditional on employment in that sector during any given quarter. What the ENEU do not allow us to quantify is the extensive margin effect of workers or store owners that lose their job or business as a consequence of foreign retail entry because of the very short 5 quarter panel structure.

The final four columns of the table aim to shed light on such extensive margin effects using the ENEU employment data. We find insignificant estimates of the effect of retail entry on the employment propensities across the four occupational groups relative to average changes in employment in the municipality.

Finally, Table 6 presents the estimation results on the effect of foreign entry on domestic store profits and store exit from the Mexican retail census microdata. [Work in progress]

6 Estimating Demand Parameters

We now turn to the estimation of the preference parameters using the market research company's records on individual household shopping patterns across multiple stores. These data allow us to estimate our key elasticity, the degree to which households substitute across local outlets as a function of retailer price differences.

In the estimation procedure we will draw on the elasticity of household shopping responses with respect to variation in store-specific prices across locations to identify these parameters. These cross-location estimates form our baseline specification as we believe that these provide more reasonable estimates of the long run elasticity relevant for estimating the gains from new foreign retail store openings.

6.1 Estimation of the CES Elasticity Parameter

In the CES case, note that the logged share equation can be written as

$$\ln \phi_{gshmt} = (1 - \eta_{gh}) \ln r_{gshmt} - (1 - \eta_{gh}) \ln c_{ghmt} + \eta_{gh} \ln \beta_{gshmt} \tag{24}$$

where $c_{ghmt} = (\sum_{s \in S_{gmt}} (\beta_{gsh})^{\eta_{gh}} (r_{gshmt})^{1-\eta_{gh}})^{\frac{1}{1-\eta_{gh}}}$ is the CES price index, g indexes product groups, s indexes stores, h indexes household income groups, m indexes location, and t indexes time. If we had measures of r_{gshmt}, the price index for product group g within store s for income group h, we could simply run the following regression:

$$\ln \phi_{gshmt} = b_{gh} \ln r_{gshmt} + \delta_{ghmt} + \gamma_{st} + u_{gshmt} \tag{25}$$

where u_{gshmt} is measurement error on log budget shares that needs to be uncorrelated with prices, δ_{ghmt} are product-group-by-income-group-by-municipality-by-time fixed effects, γ_{st} is a store-time fixed effect that absorbs unobserved taste differences across stores and time which we discuss in more detail in the next paragraph. Finally, $1 - b_{gh}$ is the parameter of interest: the elasticity parameter η_{gh} that governs the degree of substitutability between local retail outlets as a function of store price differences. When we carry out the estimation, we restrict this parameter to be identical across households and product groups as our baseline estimation approach. We later relax this assumption, and allow the parameter to potentially differ across income groups as well as product categories.[21]

We allow the store-specific taste shifters to vary across time through the inclusion of store-by-time fixed effects. Essentially we are comparing store market shares across locations with different relative price indexes across stores (where prices indexes across stores are all demeaned by product group, income group, municipality and time through the δ_{ghmt} fixed effects). Exploiting the

[21] Notice that despite the richness of these microdata, the variation starts to become thin once we allow for heterogeneity along the h or g dimension. To see this more clearly, notice that there are on average 40 households observed in a given quarter in a given municipality.

cross section in this manner provides estimates of long run elasticities since if price differences are persistent over time, when we look across municipalities we see consumers that have had time to adjust their shopping patterns in response to these price differences across stores.

Turning to our measures of the store price index, r_{gshmt}, recall we left the third tier of the demand system unspecified in Section 3. In principle we could use any demand system to calculate the price index. For simplicity and transparency, we use a Stone-price index, $\ln r_{gshmt} = \sum_{b \in B_{gshmt}} \phi_{gsbhmt} \ln p_{gsbhmt}$, or a budget share weighted sum of log prices. As barcodes differ across stores, and some stores may sell higher-quality varieties, we ensure that we are only comparing identical products to extract price differences by recovering $\ln r_{gshmt}$ from regressing budget-share-weighted log prices at the barcode level (where budget shares are income group-specific) on store-by-product-group-by-income-group-by-municipality-by-time fixed effects. The coefficient on the fixed effects provides an estimate of the store price index for a product and income group relative to other stores in that municipality and time period.

Given the nature of the consumption microdata, we collapse the price data to averages at the (retailer identity)-(barcode)-(income-group)-(quarter)-(municipality) level in order to estimate the specifications above.[22]

We address the standard simultaneity concern that arises when estimating demand. For example, suppose that the taste parameters β are not constant across locations within a store-time period as implicitly assumed when we include only a γ_{st} fixed effect. Deviations in taste shifters would then enter the error term and potentially be correlated with $\Delta \ln p^i_{gsh}$ due to supply side considerations. To deal with this concern we follow Hausman (1996) and instrument price indexes with price indexes in stores of the same retailer in nearby municipalities. The assumption here is that deviations in the taste shifters across locations are idiosyncratic, a similar assumption required for the identification through heteroskedasticity approach in Feenstra (1994), Broda and Weinstein (2006) and Feenstra and Weinstein (2013), and so these deviations do not confound prices in nearby locations which serve as valid instruments in the presence of common supply side price determinants.

6.2 Estimation Results

Table 7 presents the estimation results for the average household elasticity of substitution under CES. We estimate this parameter by exploiting variation in relative store prices across municipalities (taking store-by-quarter fixed effects in addition to the δ_{ghmt} fixed effects). The IV point estimate reported in Table 7 that we use for the welfare quantification is $\eta = 3.82$.

[22] The retailer identity is one of the retailers we can identify from the microdata with all traditional stores (for which the research company does not brand-identify a retailer) grouped together. The market research company data divide consumers into six income groups.

7 Quantifying the Welfare Effect of Foreign Retail

This section calculates the expressions derived in the theoretical framework of Section 3, using both the causal effects estimated in Section 5 and the demand parameters from Section 6, to quantify the welfare effects of foreign retail entry across Mexican households. The first subsection explains how we map our various estimates into the theoretical welfare expressions, while the second subsection reports the results of the quantification both for the average household and for the full distribution of households.

7.1 Calculating the Welfare Effect of Foreign Retail Entry

This subsection explains how we use the causal estimates of the price, quantity, and income effects reported in Section 5 in combination with the demand parameter estimates of the previous section to quantify the gains from retail FDI across households. At the center of this exercise lies household microdata from the Mexican income and expenditure surveys (ENIGH), which provide us with household specific budget shares at the product group-by-store type level in addition to household income shares across different occupations and business income sources. These data allow us to separately quantify the welfare effects of foreign entry for every household in the dataset and hence for us to obtain the full distribution of welfare effects across households.

To be consistent with the empirical estimates of the previous sections, we restrict attention to ENIGH households surveyed over the period 2006-2012 (four cross-sections covering incomes and expenditure for the third quarters of 2006, 2008, 2010 and 2012) who reside in urban municipalities without foreign stores at the time of the survey. Unlike earlier ENIGH surveys, these four rounds break down the location of expenditure by product group into detailed store categories that allow us to code the expenditure as occurring in modern or traditional stores. The ex ante household income shares as well as ex ante household expenditure shares provide us with the remaining parameters needed to perform the full quantification outlined in Section 3.

To quantify the cost of living effect, ideally we would separately estimate the causal price changes and budget share changes for every barcode product in every domestic store. Given the available store price microdata that we use in the event study methodology presented in Section 5, estimating such a large number of causal price effects is not feasible. Instead, we make a simplifying assumption that still allows for substantial heterogeneity. We assume that causal price changes within a product-group-by-store-type are the same, where the two store types are domestic continuing modern, M, stores and domestic continuing traditional, T, stores and product groups refer to food and beverages and non-food consumption: $\frac{p^1_{gsb}}{p^0_{gsb}} \equiv p_{gj} \ \ \forall s \in S^{dcj}_g$.

where j takes two values, M or T. Note that we allow these price changes to differ by broad product groups as well as store types, so for example food prices could fall more than the prices of non-food products, and relatively more so in domestic modern than traditional stores as suggested by the empirical estimates in Table 3.

With this assumption in hand, and the estimates of the causal effects on price changes and

ex post foreign retail shares reported in Section 5, we have almost all we need to carry out the quantification exercise presented in Section 3. The only remaining inputs are empirical estimates of post-foreign-entry market shares of continuing domestic varieties that enter into the ideal log change weights. In the CES case, these can be easily calculated since the estimated elasticities of substitution allow us to calculate ex post budget shares for continuing stores as a function of initial expenditure shares in the ENIGH surveys and the estimated prices effects:

$$\tilde{\phi}^1_{gsh} = \tilde{\phi}^0_{gsh}\left(\frac{(p_{gj})^{1-\eta_{gh}}}{(p_{gM})^{1-\eta_{gh}}\sum_{s\in S^{dcM}_g}\tilde{\phi}^0_{gsh} + (p_{gT})^{1-\eta_{gh}}\sum_{s\in S^{dcT}_g}\tilde{\phi}^0_{gsh}}\right)$$

where j takes the value M if $s \in S^{dcM}$ and the value T if $s \in S^{dcT}$. Note that $\sum_{s\in S^{dcM}_g}\tilde{\phi}^0_{gsh}$ is the expenditure share of continuing domestic store purchases of product group g spent in modern retail.

7.2 Quantification Results

7.2.1 Average Household Gains from Foreign Retail Entry

In this subsection, we present the quantification results and explore several counterfactuals that shed light on the interplay of forces that underlie the distribution of the welfare effects that we find.

We first present the results of the quantification under the exact (CES) approach. The ENIGH data combined with our empirical moments allow us to calculate welfare gains separately for each household in the sample based on their expenditure shares and income sources. Column 1 of Table 8 presents the mean of the total welfare gain across all households as well as the various sub components of the total welfare effect in columns 2-7. Foreign store entry leads to large and significant welfare gains for the average household in the municipality where the store opened. These gains are of the order of 8 percent of initial household welfare.

Given that the counterfactual analysis is based on international integration (foreign entry) in just one sector of the economy, these welfare effects are large relative to existing estimates of the gains from trade (Arkolakis et al.,2012). Two important insights arise from our analysis in this respect. First, retail is an important non-tradable sector that would frequently be omitted when quantifying the gains from international integration. In particular, while not a majority of households source nominal incomes from retail employment, all households are affected by retail sector shocks through changes in local cost of living. Second, the richness of the newly available micro-data that our analysis brings to bear allows us to evaluate the consequences of foreign supermarket entry on all major components of household welfare without shutting down potential channels, such as pro-competitive effects, ex ante.

The majority of the total welfare gain is driven by a significant reduction in the cost of living rather than income effects. While the adverse effects on the household incomes of traditional retail workers and local store owners are economically significant (estimated negative 5-6 percent

changes), these effects are muted when analyzing the municipality as a whole. In contrast, retail constitutes a large share of household expenditures for all households which drives large cost of living effects.

Focusing on the cost of living effect, about 20 percent of this effect comes from pro-competitive effects on the intensive margin, i.e. reductions in prices at domestic stores induced by the entry of foreign retailers. The remaining 80 percent of the cost of living effect is due to the direct price index effect of foreign entry, a finding already foreshadowed in the raw data by both the significantly lower prices charged by foreign stores and their large ex-post retail market shares reported in Section 5.

Turning to the first order approach in columns 8-14 of Table 8 we see that the Paasche approximation of the direct price index effect that is purely based on observable price changes can account for one third of the exactly estimated direct price index effect under CES (2.07 percent as opposed to 6.17 percent). This effect does not capture three potentially important welfare gains due to foreign store entry: gains from greater product variety or higher quality product varieties, potentially higher shopping amenity at foreign stores, and gains from the addition of an additional store variety. Hence, in an approximate sense, these additional sources of welfare gains account for around two thirds of the total welfare gain. Given the large differences in product variety and quality at these foreign stores and differences in amenity that we highlighted in Section 2, the share accounted for by these channels seems plausible (a discussion we will return to when assessing the distribution of the welfare gains). The pro-competitive price effect is also slightly smaller under the direct approach, which can be explained by the fact that we use a Paasche first-order approximation which will tend to underestimate the pro-competitive effects as it uses ex post weights on domestic stores.

7.2.2 The Distribution of the Gains from Foreign Retail Entry

Since we have estimates of the welfare gains for every household in the ENIGH sample, we can plot these estimated gains against initial household income to explore the distribution of the gains from foreign retail entry. Figure 6 presents non-parametric plots of the exact approach quantification, and Figure 7 breaks up this total welfare effect into the various components. We find that while all income groups benefit substantially from foreign retail entry, richer households gain more than poorer households. The regressiveness of the gains from retail FDI is sizable. The total welfare gain for the poorest household group is about 5 percent, doubling to 10 percent for the richest households.

Where do these regressive gains come from? Figures 8 present a number of counterfactual exercises that allow us to analyze the interplay of forces underlying these results. Each of these graphs sets one component of the quantification equal to the mean of that component across all households in the sample and compares the resulting counterfactual distribution of the welfare gains from foreign entry to the one we actually observe. We explore the role of several salient differences in household shopping and income patterns across the household income distribu-

tion: expenditure shares on foreign retailers relative to domestic ones ex post, on retail relative to non-retail consumption, on food relative to non-food product groups within retail, and labor and business income shares from retail relative to other income sources.

On one hand, post foreign entry the richest households spend over 50 percent of their total retail expenditure at foreign stores compared to merely 10 percent for the poorest households. These patterns suggest that household evaluations of store product variety and shopping amenities systematically differ across the income distribution, as captured by β_{gsh} in expression 9. As shown in Figure 8, this moment in the data clearly works in favor of richer households experiencing much larger reductions in cost of living due to foreign entry: In the absence of differences in foreign shares across households, the gains would actually become progressive.

On the other hand, richer households spend a significantly smaller share of their total expenditure on retail consumption compared to poorer households. As shown in Figure 8, this moment in the data works in the opposite direction. In absence of differences in retail expenditure shares, the gains from retail globalization would be vastly more regressive than we estimate.

The two remaining sources of heterogeneity have much more moderate impacts on the distribution of gains across households. As shown in Figure 8, the fact that poorer households spend more of their retail expenditure on food consumption contributes positively but only slightly to the regressiveness of the welfare gains. The reason for this is that both the pro-competitive effect on domestic retail prices in Table 3 as well as the direct price index effect in Figure 3 are relatively evenly distributed across food and non-food product groups.. Finally, differences in retail income shares across the income distribution do not appear to contribute significantly to the estimated regressiveness. While there are clear distributional patterns in the sectors that households obtain their income from (e.g. poorer households derive a larger proportion of their income from working in the traditional retail sector or being self-employed in the retail sector), these differences have little effect on the total welfare gains from foreign retail entry since the majority of households derive no income from the retail sector.

8 Conclusion

The arrival of foreign retailers in developing countries is causing a radical transformation in the way that households source their consumption. This paper sets out to evaluate the welfare consequences of retail globalization in a developing country context. To do so, we bring to bear newly available and uniquely rich microdata that allow us to estimate a general expression of the welfare effect of retail FDI. Empirically, we exploit the combination of foreign supermarket locations and opening dates with high frequency data on local economic outcomes to ensure that the moments we feed into the welfare expression are causally identified.

The paper presents several new findings. We find that foreign supermarket entry causes large and significant welfare gains for the average household. The majority of this effect is driven by a significant reduction in the local cost of living. Interestingly, a significant fraction of this price in-

dex effect appears to be driven by pro-competitive effects on consumer prices charged in domestic stores. This effect arises in addition to the direct price index effect that is due to foreign supermarkets offering cheaper quality-adjusted prices, new varieties and different shopping amenities to local consumers. Turning to nominal incomes, we find no evidence of an effect on average municipality level household incomes or employment rates. We do, however, find evidence of store exit and adverse effects on domestic store profits and the wage incomes of workers in the traditional retail sector. Finally, we exploit the richness of the household microdata to quantify the distribution of the gains from retail FDI. We find that while all household income groups on average experience significant gains from retail FDI, this effect is about twice as large for the richest income group compared to the poorest, and quantify the interplay of opposing forces that underlie this finding.

Our analysis provides a number of insights that relate to ongoing debates about developing country policies on retail FDI. Most importantly, our findings suggest that these debates may focus too little on potential real income gains for the vast majority of consumers due to improvements in local purchasing power. Instead they commonly focus on potentially adverse effects for an important, but nevertheless select, subgroup of households working in the traditional retail sector. The empirical evidence suggests that while the potential for adverse effects on the nominal income side is borne out in the data, these effects appear to be trumped by significant reductions in local cost of living inflation that on average give rise to net welfare gains across all household income groups.

References

Anderson, S. P., De Palma, A., & Thisse, J. F. (1992). *Discrete choice theory of product differentiation*. MIT press.

Arkolakis, C., Costinot, A., & Rodríguez-Clare, A. (2012). New trade models, same old gains? *American Economic Review*, *102*(1), 94–130.

Atkin, D. (2013). Trade, tastes and nutrition in India. *American Economic Review*, *103*(5), 1629–1663.

Basker, E. (2005). Job creation or destruction? Labor market effects of Wal-Mart expansion. *Review of Economics and Statistics*, *87*(1), 174–183.

Biles, J. J. (2008). Wal-Mart and the supermarket revolution in Mexico. *Geographische Rundschau International Edition*, *4*(2), 44–49.

Broda, C., & Weinstein, D. E. (2006). Globalization and the gains from variety. *Quarterly Journal of Economics*, *121*(2), 541–585.

Caron, J., Fally, T., & Markusen, J. R. (2012). Skill premium and trade puzzles: A solution linking production and preferences. *NBER Working Paper 18131*.

Deaton, A. (1989). Rice prices and income distribution in Thailand: A non-parametric analysis. *The Economic Journal*, *99*(395), 1–37.

Donaldson, D. (2012). Railroads of the raj: Estimating the impact of transportation infrastructure. *American Economic Review, forthcoming*.

Dufey, A., Grieg-Gran, M., & Ward, H. (2008). *Responsible enterprise, foreign direct investment and investment promotion: Key issues in attracting investment for sustainable development*. International Institute for Environment and Development.

Einav, L., Levin, J., & Klenow, P. (2015). The importance of customer relationships for u.s. retailer size and growth. *ASSA 2015 Unpublished Conference Manuscript*.

Faber, B. (2014). Trade liberalization, the price of quality, and inequality: Evidence from Mexican store prices. *UC-Berkeley Working Paper*.

Fajgelbaum, P. D., & Khandelwal, A. K. (2014). Measuring the unequal gains from trade. *Working Paper*.

Feenstra, R. C. (1994). New product varieties and the measurement of international prices. *American Economic Review*, *84*(1), 155–57.

Feenstra, R. C., & Weinstein, D. E. (2013). Globalization, markups and U.S. welfare. *NBER Working Paper 15749*.

Goldberg, P., & Pavcnik, N. (2007). Distributional effects of globalization in developing countries. *Journal of Economic Literature*, *45*, 39–82.

Handbury, J., & Weinstein, D. E. (2011). Goods prices and availability in cities. *NBER Working Paper 17067*.

Hausman, J., & Leibtag, E. (2007). Consumer benefits from increased competition in shopping outlets: Measuring the effect of Wal-Mart. *Journal of Applied Econometrics*, *22*(7), 1157–1177.

Hausman, J. A. (1981). Exact consumer's surplus and deadweight loss. *American Economic Review*, *71*(4), 662–676.

Hausman, J. A. (1996). Valuation of new goods under perfect and imperfect competition. In *The economics of new goods* (pp. 207–248). University of Chicago Press.

Holmes, T. J. (2011). The diffusion of Wal-Mart and economies of density. *Econometrica*, *79*(1), 253–302.

Humphrey, J. (2007). The supermarket revolution in developing countries: Tidal wave or tough competitive struggle? *Journal of Economic Geography*, *7*(4), 433–450.

Iacovone, L., Javorcik, B. S., Keller, W., & Tybout, J. R. (2014). Supplier responses to Wal-Mart's invasion of Mexico. *Journal of International Economics forthcoming*.

Instituto Nacional de Estadística y Geografía - INEGI. (2004). *Metodología de los censos económicos*.

Instituto Nacional de Estadística y Geografía - INEGI. (2009). *Metodología de los censos económicos*.

Javorcik, B. S., & Li, Y. (2013). Do the biggest aisles serve a brighter future? Global retail chains and their implications for Romania. *Journal of International Economics*, *90*(2), 348–363.

Jia, P. (2008). What happens when Wal-Mart comes to town: An empirical analysis of the discount retailing industry. *Econometrica*, *76*(6), 1263–1316.

Krugman, P. (1980). Scale economies, product differentiation, and the pattern of trade. *American Economic Review*, *70*(5), 950–59.

Neven, D., & Reardon, T. (2004). The rise of Kenyan supermarkets and the evolution of their horticulture product procurement systems. *Development Policy Review*, *22*(6), 669–699.

Porto, G. (2006). Using survey data to assess the distributional effects of trade policy. *Journal of International Economics*, *70*(1), 140–160.

Ramondo, N., & Rodríguez-Clare, A. (2013). Trade, multinational production, and the gains from openness. *Journal of Political Economy*, *121*(2), 273–322.

Reardon, T., Timmer, C. P., Barrett, C. B., & Berdegué, J. (2003). The rise of supermarkets in Africa, Asia, and Latin America. *American Journal of Agricultural Economics*, *85*(5), 1140–1146.

Topalova, P. (2010). Factor immobility and regional impacts of trade liberalization: Evidence on poverty from India. *American Economic Journal: Applied Economics*, *2*(4), 1–41.

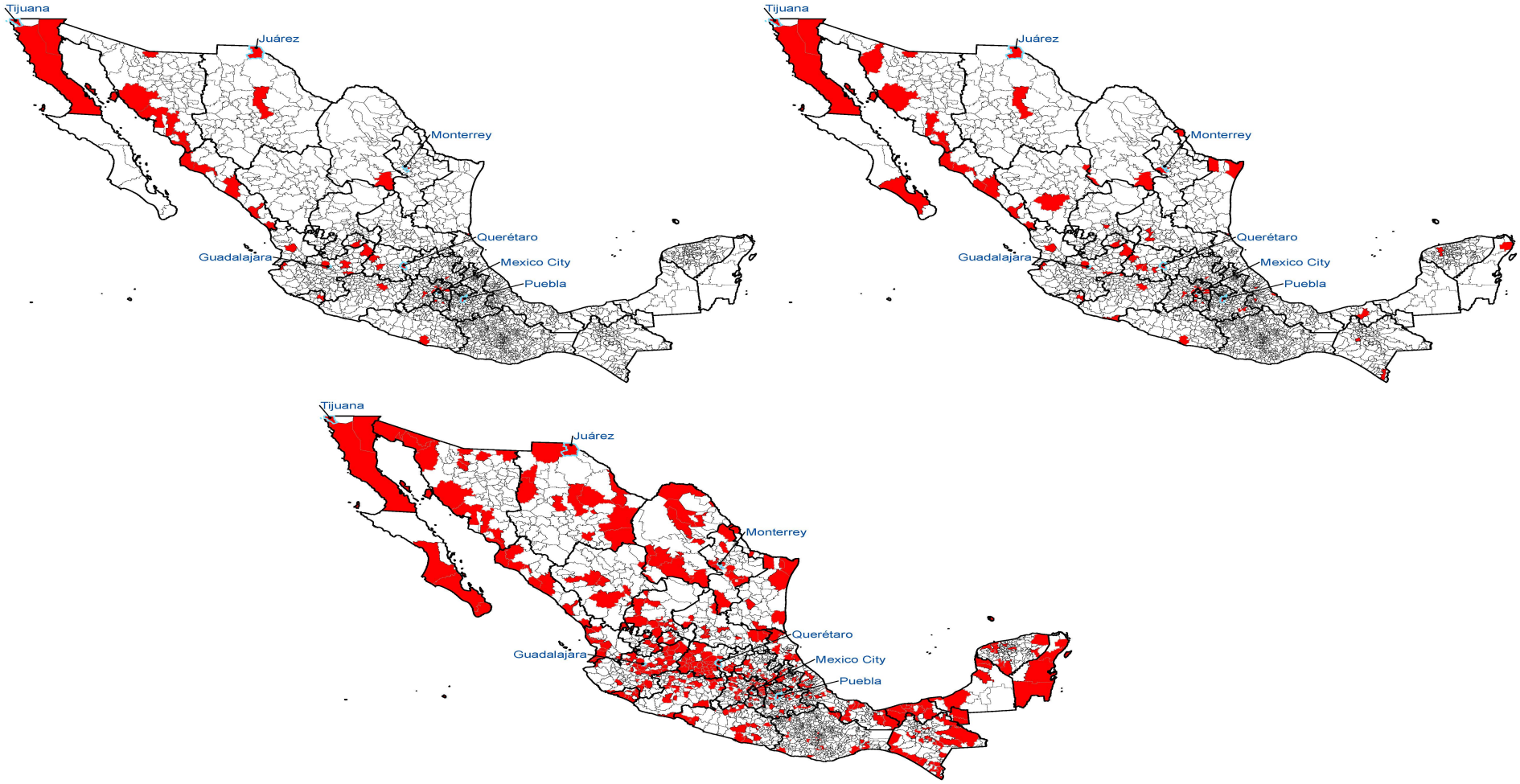
United Nations Conference on Trade and Development. (2014). *World economic report 2014*.

Varela, M. (2013). The costs of growth: Estimating entry costs during rollouts. *University of Arizona Working Paper*.

Wrigley, N., & Lowe, M. (2010). The globalization of trade in retail services. *Organisation for Economic Co-operation and Development*.

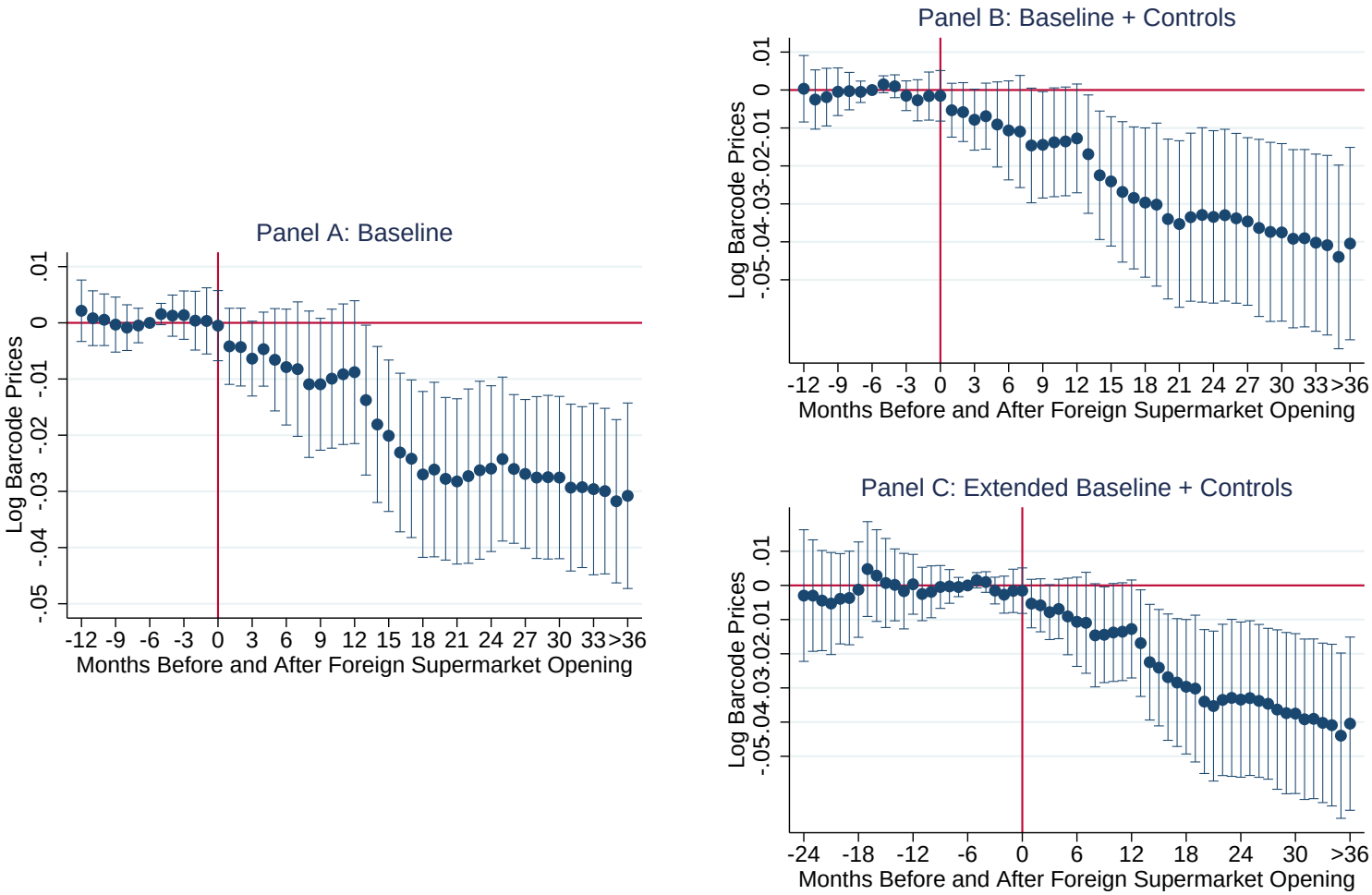
9 Figures and Tables

Figure 1: Retail Globalization in Mexico - Left to Right: Foreign Store Presence at the End of 1995, 2001, and 2013



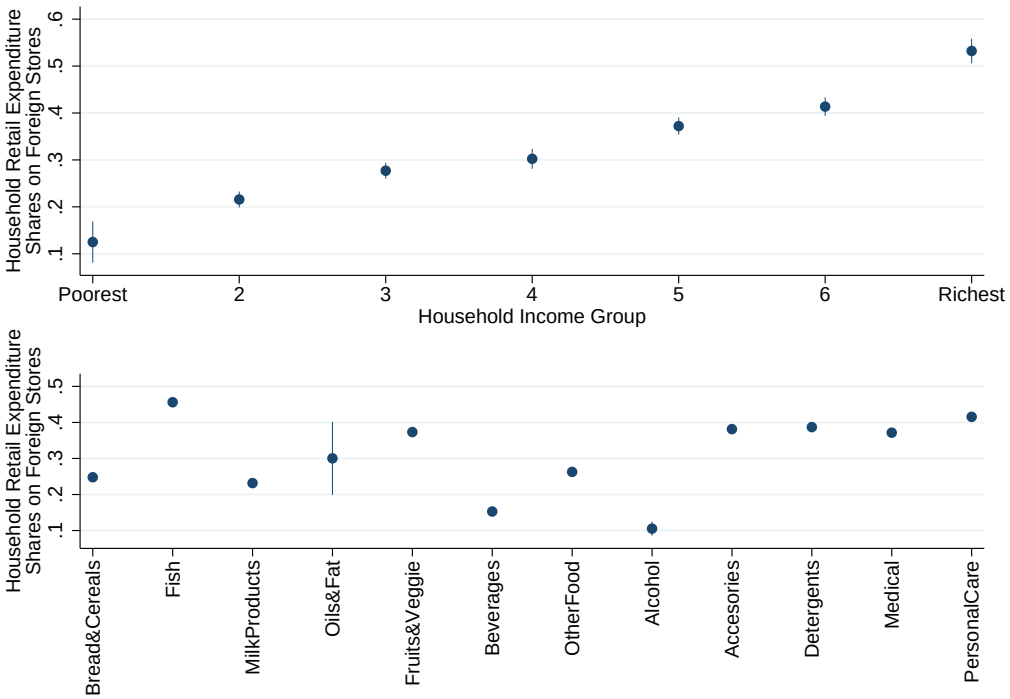
Notes: Municipalities in red indicate foreign store presence at the end of 1995 (upper left, 204 stores), 2001 (upper right, 365 stores), and 2013 (lower, 1335 stores). The data source are annual publications of the Mexican National Association of Supermarkets (ANTAD).

Figure 2: Effect on the Prices of Domestic Retailers: Monthly Event Study



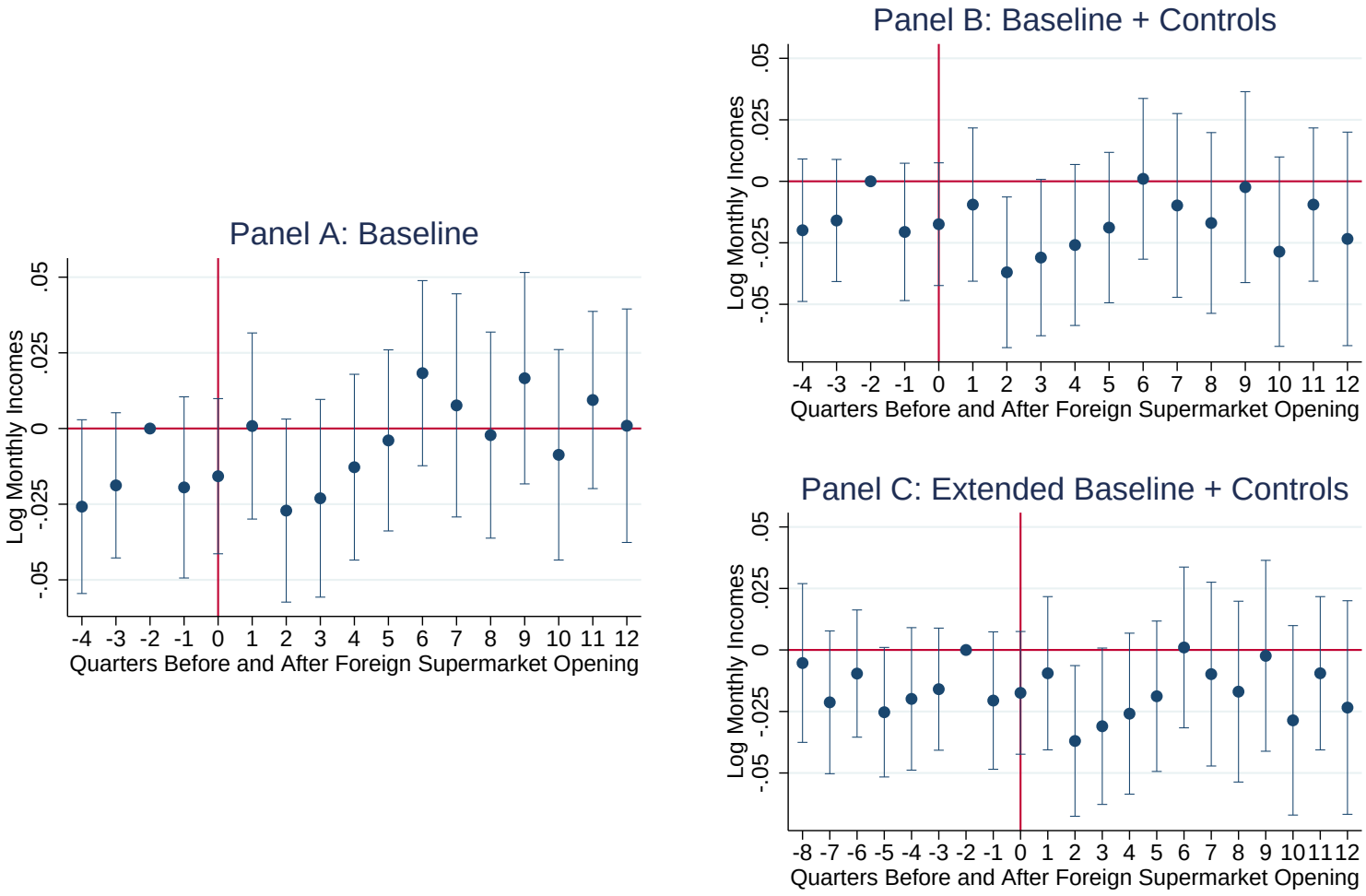
Notes: Point estimates are based on monthly price time series of unique barcode-by-store combinations over the period 2002-2014. The dots correspond to coefficient estimates from a regression of log prices on the indicated monthly treatment effects in addition to barcode-by-store fixed effects and month fixed effects in the baseline specification. The reference category in all graphs are barcode prices 6 months before foreign entry. Controls indicates the inclusion of additional store type-by-product group-by-month as well as region-by-month and municipality size-by-month fixed effects. The graphs depict 95% confidence intervals based on standard errors that are clustered at the municipality level.

Figure 3: Effect on Foreign Retail Market Shares



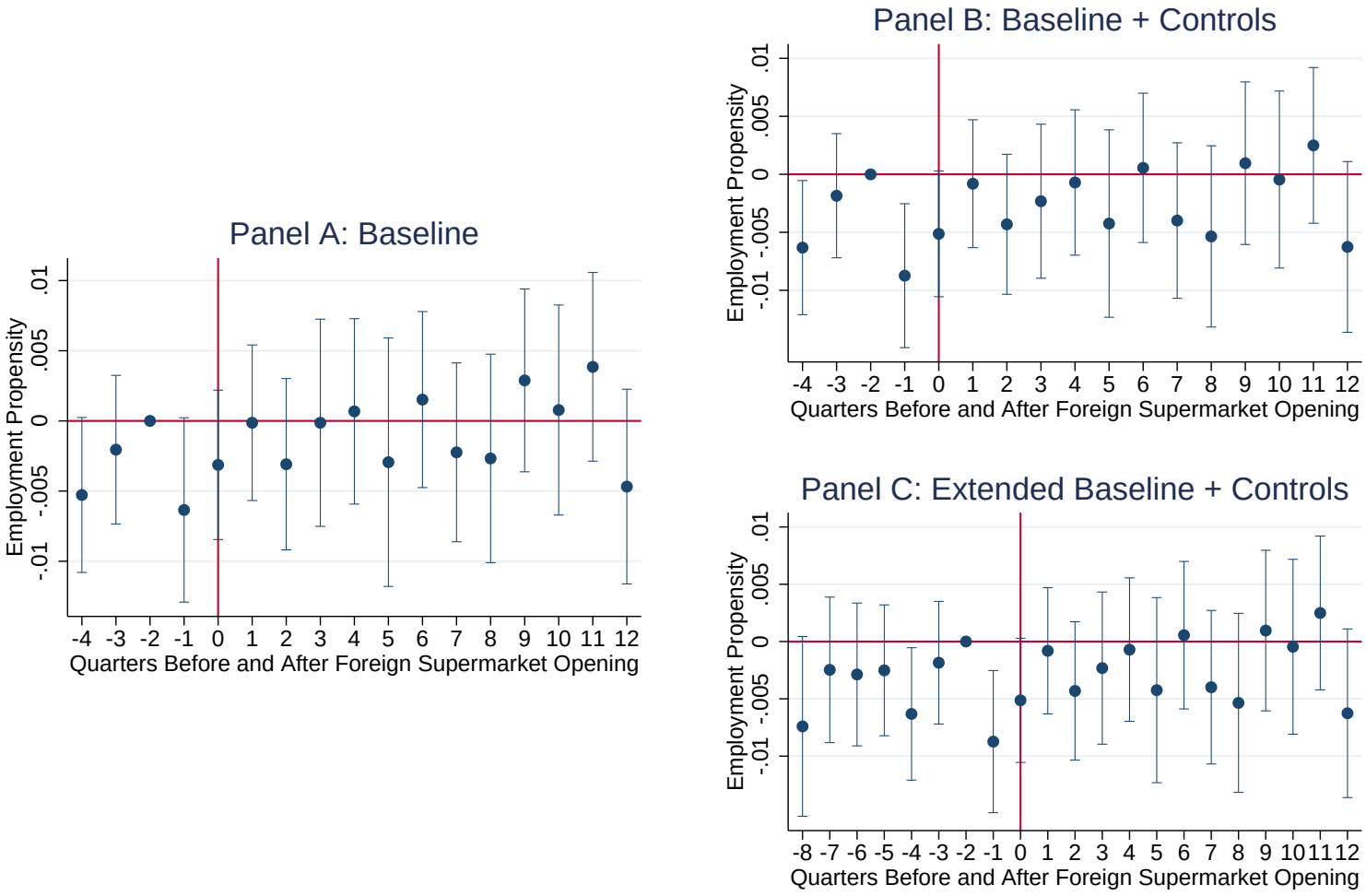
Notes: The graphs depict quarterly household retail expenditure shares on foreign stores among municipalities that have experienced foreign store entry more than two years ago. The point estimates are based on regressions of household expenditure shares on the indicated income group or product group dummy variables in addition to municipality-by-quarter fixed effects. The data source for this graph are the microdata of the Mexican operation of a large international market research company for the years 2011-14. Both graphs depict 95% confidence intervals based on standard errors that are clustered at the municipality level.

Figure 4: Effect on Average Municipality Monthly Incomes



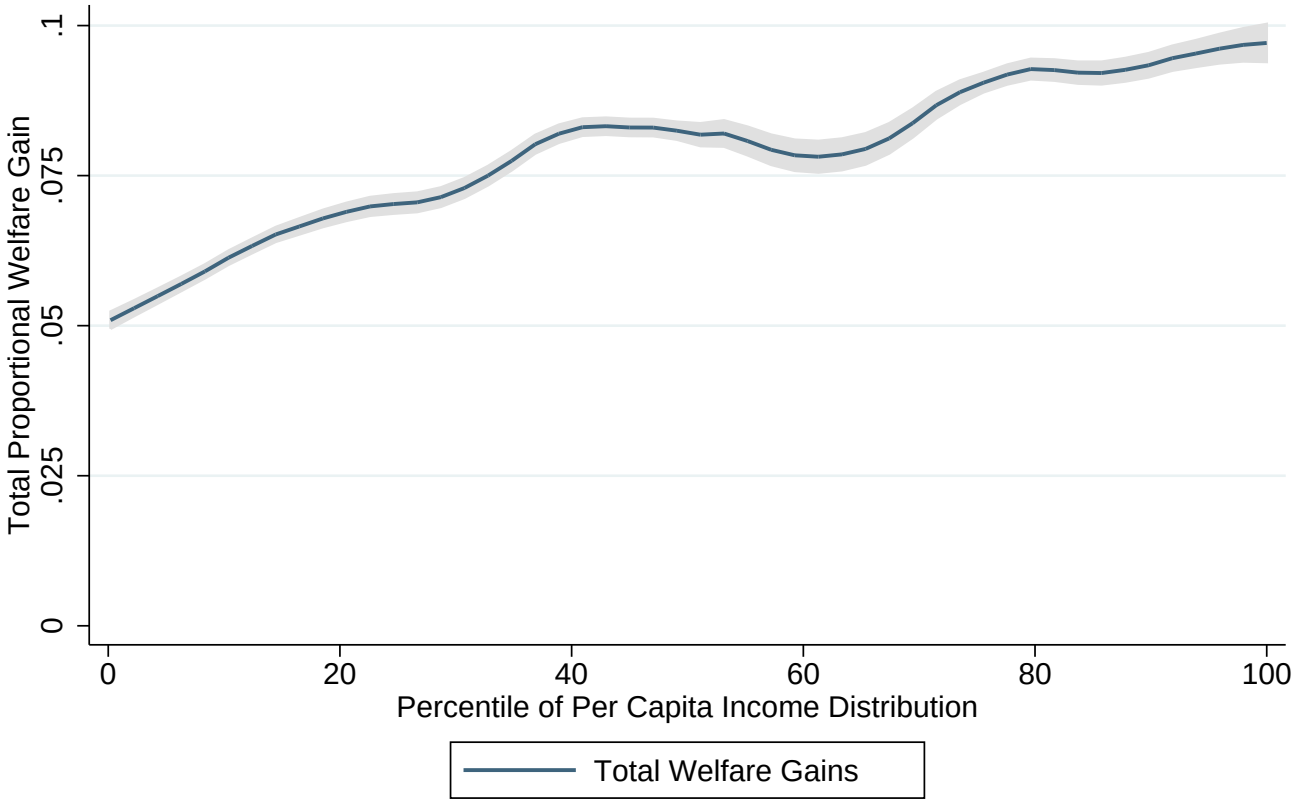
Notes: Point estimates are based on the quarterly microdata of the Mexican urban income and employment surveys over the period 2002-2012. The dots correspond to coefficient estimates from a regression of log monthly incomes on the indicated quarterly treatment effects in addition to municipality fixed effects, quarter fixed effects, as well as person controls for sex, education and age. The reference category are incomes 2 quarters before foreign entry. The graphs depict 95% confidence intervals based on standard errors that are clustered at the municipality level.

Figure 5: Effect on Average Municipality Employment



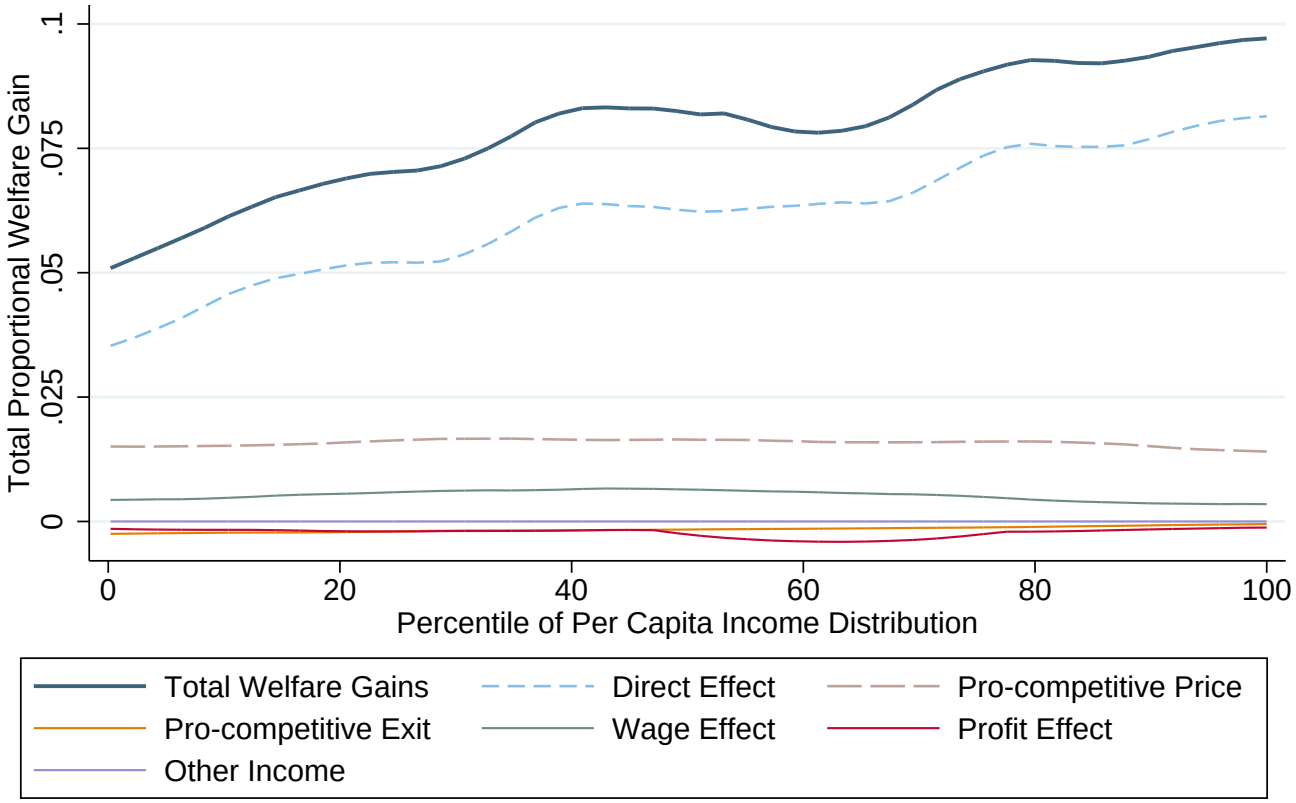
Notes: Point estimates are based on the quarterly microdata of the Mexican urban income and employment surveys over the period 2002-2012. The dots correspond to coefficient estimates from a regression of individual employment indicators on the indicated quarterly treatment effects in addition to municipality fixed effects, quarter fixed effects, as well as person controls for sex, education and age. The reference category are employment propensities 2 quarters before foreign entry. The graphs depict 95% confidence intervals based on standard errors that are clustered at the municipality level.

Figure 6: Gains from Foreign Retail Entry across the Household Income Distribution



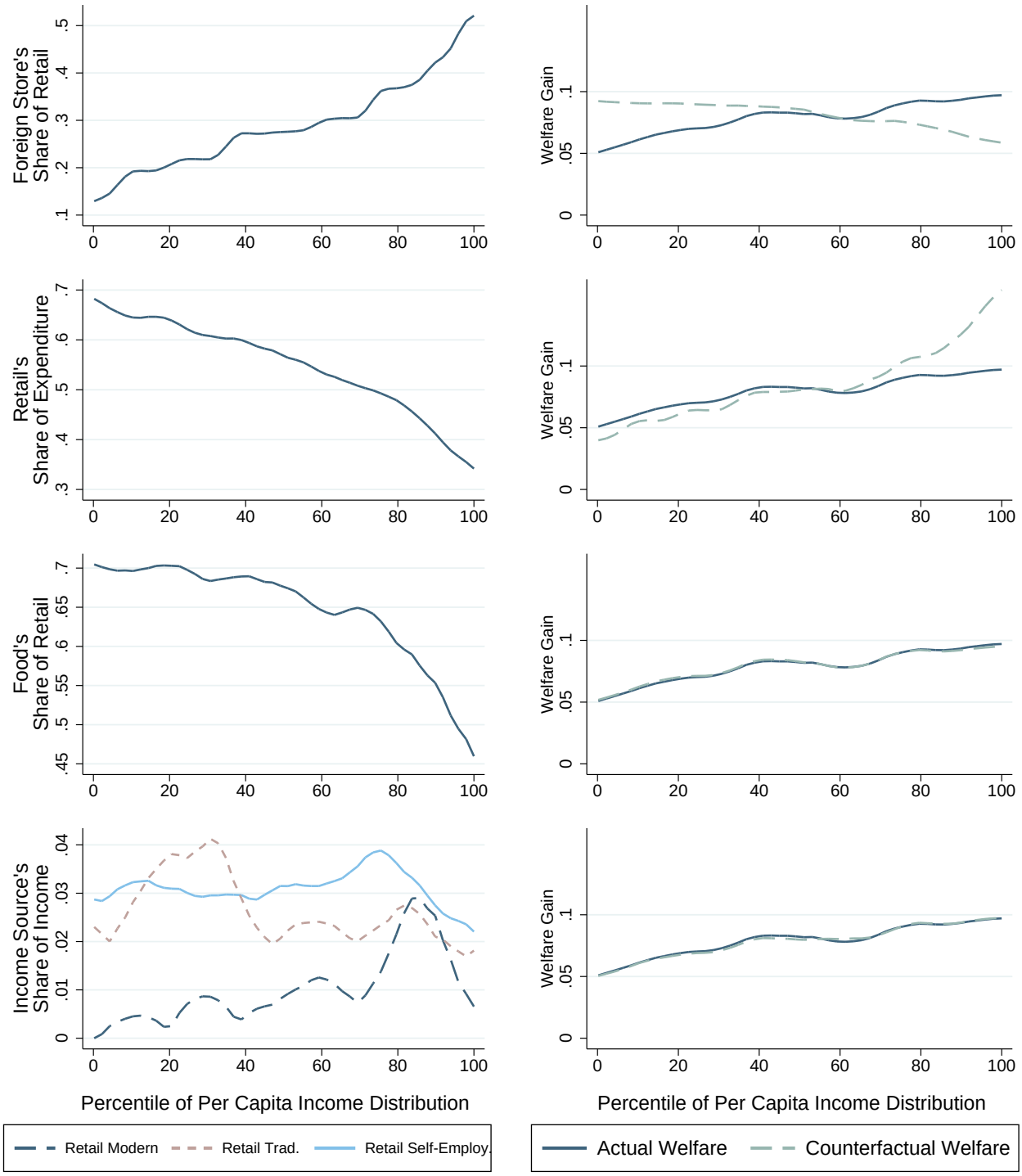
Notes: The graph is based on 12,293 households residing in 240 urban municipalities between 2006-2012 that had not experienced foreign retail entry at the time of the ENIGH survey.

Figure 7: Gains from Foreign Retail Entry across the Household Income Distribution



Notes: The graph is based on 12,293 households residing in 240 urban municipalities between 2006-2012 that had not experienced foreign retail entry at the time of the ENIGH survey.

Figure 8: Counterfactual Distributions of the Gains



Notes: The graphs are based on 12,293 households residing in 240 urban municipalities between 2006-2012 that had not experienced foreign retail entry at the time of the ENIGH survey.

Tables

Table 1: How Do Foreign Owned Stores Differ Ex Post?

Dependent Variable:	(1) Log Price	(2) Log Price	(3) Log Number of Barcodes	(4) Log Floor Space
Foreign Store Dummy	-0.118***	0.249***	1.612***	1.911***
	(0.00913)	(0.0160)	(0.0671)	(0.0416)
Municipality-By-Year FX	✓	✓	✓	✓
Municipality-By-Product-By-Month FX	✓	✓	×	×
Municipality-By-Barcode-By-Month FX	✓	×	×	×
Observations	18,659,777	18,659,777	10,393	11,113
R-squared	0.923	0.368	0.139	0.302
Number of Municipalities	151	151	151	499

Notes: Columns 1-3 are based the microdata of the Mexican operation of a large international market research company for the years 2011-14. Column 4 is based on the administrative records of the Mexican National Retail Association (ANTAD) over the period 2002-2007. Estimation samples in Columns 3 and 4 report mean differences among modern store formats (supermarkets) of domestic and foreign retailers. Regressions are weighted by household weights and expenditure weights across products. Standard errors are clustered at the municipality level and reported in parenthesis below the point estimates. * 10%, ** 5%, *** 1% significance levels.

Table 2: Effect on the Prices of Domestic Retailers

Dependent Variable:	(1) Log Price	(2) Log Price	(3) Log Price	(4) Log Price (Non-Retail)	(5) Log Price (Non-Retail)
Foreign Entry - Four Quarters Before	0.000227	-0.00215	-0.00341	0.00407	0.00989
	(0.00228)	(0.00367)	(0.00336)	(0.00336)	(0.00633)
Foreign Entry - Three Quarters Before	-0.00148	-0.00115	-0.00204	0.00842**	0.00975**
	(0.00224)	(0.00219)	(0.00201)	(0.00408)	(0.00488)
Foreign Entry - Two Quarters Before	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)
Foreign Entry - One Quarter Before	-0.000252	-0.00267	-0.00256	-0.00105	0.00224
	(0.00197)	(0.00195)	(0.00193)	(0.00370)	(0.00490)
Foreign Entry - One Quarter After	-0.00395	-0.00505	-0.00499	0.00742	0.00999
	(0.00290)	(0.00310)	(0.00311)	(0.00508)	(0.00848)
Foreign Entry - Two Quarters After	-0.00681**	-0.00867**	-0.00875**	0.00985*	0.00891
	(0.00311)	(0.00404)	(0.00407)	(0.00534)	(0.00615)
Foreign Entry - Three Quarters After	-0.00997*	-0.0128*	-0.0132*	0.00276	0.00168
	(0.00568)	(0.00698)	(0.00703)	(0.00453)	(0.00337)
Foreign Entry - Four Quarters After	-0.0109*	-0.0147**	-0.0152**	-0.000175	0.00118
	(0.00592)	(0.00691)	(0.00695)	(0.00593)	(0.00673)
Foreign Entry - Five Quarters After	-0.0145**	-0.0181**	-0.0190**	0.00752	0.00749
	(0.00627)	(0.00746)	(0.00735)	(0.00632)	(0.00897)
Foreign Entry - Six Quarters After	-0.0233***	-0.0272***	-0.0283***	0.00659	0.00283
	(0.00657)	(0.00867)	(0.00843)	(0.00694)	(0.00823)
Foreign Entry - Seven Quarters After	-0.0278***	-0.0319***	-0.0330***	-0.00156	-0.00635
	(0.00714)	(0.0101)	(0.00986)	(0.00722)	(0.00746)
Foreign Entry - Eight Quarters After	-0.0281***	-0.0346***	-0.0353***	-0.00119	-0.00402
	(0.00745)	(0.0109)	(0.0107)	(0.00909)	(0.0106)
Foreign Entry - Nine Quarters After	-0.0263***	-0.0341***	-0.0341***	0.0106	0.00693
	(0.00692)	(0.0112)	(0.0110)	(0.00999)	(0.0124)
Foreign Entry - Ten Quarters After	-0.0282***	-0.0368***	-0.0362***	0.0147	0.00580
	(0.00696)	(0.0114)	(0.0111)	(0.0107)	(0.0113)
Foreign Entry - Eleven Quarters After	-0.0296***	-0.0392***	-0.0385***	0.0102	-0.000894
	(0.00710)	(0.0116)	(0.0113)	(0.0112)	(0.0110)
Foreign Entry - Twelve Quarters After	-0.0313***	-0.0424***	-0.0414***	0.0115	0.00201
	(0.00734)	(0.0118)	(0.0114)	(0.0131)	(0.0134)
P-Value (Post 3 Years = 12 Quarters After)	0.9394	0.7399	0.5437	0.0075	0.0533
Month FX	✓	✓	✓	✓	✓
Barcode-By-Store FX	✓	✓	✓	✓	✓
Product Group-By-Store Type-By-Month FX	×	✓	✓	×	✓
Region-By-Month FX	×	✓	✓	×	✓
Municipality Size-By-Month FX	×	✓	✓	×	✓
Control for Local Government Expenditure	×	×	✓	×	✓
Observations	3,228,544	2,850,238	2,560,558	1,581,115	1,321,733
R-squared	0.996	0.996	0.996	0.997	0.997
Barcode-By-Store Cells	149,273	124,466	114,207	42,715	34,877
Store Type-By-Product-By-Month Cells	33,516	33,516	32,790	8,186	8,186
Region-By-Month Cells	705	705	690	705	705
Municipality Size-By-Month Cells	705	705	690	705	705
Municipality Clusters	76	76	65	90	76

Notes: The dependent variable is log barcode prices. Regressions are based on the monthly price time series of unique barcode-by-store combinations over the period 2002-2014 in 120 product groups and 76 municipalities. Foreign Entry indicates the first presence of a foreign supermarket in the municipality. The final columns show results on non-retail CPI price quotes including transportation, housing, education, health and other services. The equivalent to "barcode-by-store" fixed effects in that estimation are individual item codes followed each month (such as the same hair cut or the same taxi ride). Standard errors are clustered at the municipality level and reported in parenthesis below the point estimates. * 10%, ** 5%, *** 1% significance levels.

Table 3: Effect on the Prices of Domestic Retailers - Heterogeneity

Dependent Variable:	(1) Log Price	(2) Log Price	(3) Log Price	(4) Log Price
Average Effect	-0.0373***			
	(0.0119)			
Effect on Food & Beverage Products		-0.0395***		
		(0.0137)		
Effect on Non-Food Products		-0.0362**		
		(0.0154)		
Effect on Traditional Retail Outlets			-0.0235	
			(0.0198)	
Effect on Modern Retail Outlets			-0.0526***	
			(0.0169)	
Effect on Food Products in Traditional Outlets				-0.00425
				(0.0162)
Effect on Non-Food Products in Traditional Outlets				-0.0287
				(0.0231)
Effect on Food Products in Modern Outlets				-0.0559***
				(0.0169)
Effect on Non-Food Products in Modern Outlets				-0.0497*
				(0.0255)
Barcode-By-Store FX	✓	✓	✓	✓
Product-By-Store Type-By-Month FX	✓	✓	✓	✓
Region-By-Month FX	✓	✓	✓	✓
Municipality Size-By-Month FX	✓	✓	✓	✓
Observations	2,790,780	2,790,780	2,790,780	2,790,780
R-squared	0.996	0.996	0.996	0.996
Number of Barcode-By-Store Cells	123,937	123,937	123,937	123,937
Number of Product-By-Store Type-By-Month Cells	33,516	33,516	33,516	33,516
Number of Region-By-Month Cells	705	705	705	705
Number of Municipality Size-By-Month Cells	705	705	705	705
Number of Municipality Clusters	76	76	76	76

Notes: The dependent variable is log barcode prices. Regressions are based on monthly price observations over the period 2002-2014 in 120 product groups and 76 municipalities. Foreign Entry indicates the presence of a foreign supermarket in a municipality. Estimations are based on regressions after excluding an adjustment period of 24 months. Standard errors are clustered at the municipality level and reported in parenthesis below the point estimates. * 10%, ** 5%, *** 1% significance levels.

Table 4: Ex-Post Price Differences for Identical Barcodes

Dependent Variable:	(1) Log Price	(2) Log Price	(3) Log Price	(4) Log Price
Domestic Outlets	0.118***			
	(0.00913)			
Food & Beverage Products in Domestic Outlets		0.124***		
		(0.00979)		
Non-Food Products in Domestic Outlets		0.0744***		
		(0.00765)		
Traditional Domestic Outlets			0.173***	
			(0.00874)	
Modern Domestic Outlets			0.0397***	
			(0.0113)	
Food & Beverage Products in Traditional Domestic Outlets				0.174***
				(0.00942)
Non-Food Products in Traditional Domestic Outlets				0.170***
				(0.0108)
Food & Beverage Products in Modern Domestic Outlets				0.0431***
				(0.0124)
Non-Food Products in Modern Domestic Outlets				0.0189***
				(0.00713)
Municipality-By-Barcode-By-Month FX	✓	✓	✓	✓
Observations	18,659,777	18,659,777	18,659,777	18,659,777
R-squared	0.923	0.923	0.923	0.923
Number of Municipalities	151	151	151	151

Notes: The dependent variable is log barcode prices. Regressions are based on the microdata of the Mexican operation of a large international market research company for the years 2011-14. The reference category in all columns are barcode prices in foreign owned retailers. Regressions are weighed by household weights and expenditure weights across products. Standard errors are clustered at the municipality level and reported in parenthesis below the point estimates. * 10%, ** 5%, *** 1% significance levels.

Table 5: Effect on Incomes - Heterogeneity

Dependent Variable:	(1) Log (Monthly Income)	(2) Log (Monthly Income)	(3) Log (Monthly Income)	(4) Employed	(5) Employed	(6) Employed
Effect on Modern Retail Workers	0.00204	-0.0326	-0.0261	0.0411***	-0.00303	0.00129
	(0.0193)	(0.0205)	(0.0213)	(0.00413)	(0.00486)	(0.00421)
Effect on Traditional Retail Workers	-0.0360*	-0.0557**	-0.0575**	0.0332***	-0.00326	-0.000574
	(0.0203)	(0.0219)	(0.0246)	(0.00392)	(0.00535)	(0.00519)
Effect on Manufacturing Workers	0.0226	0.0257	0.0262	0.0282***	-0.00106	0.00361
	(0.0272)	(0.0316)	(0.0302)	(0.00482)	(0.00535)	(0.00425)
Effect on Agricultural Workers	-0.00566	-0.00618	0.0118	0.0208***	-0.00400	-0.000401
	(0.0174)	(0.0187)	(0.0187)	(0.00365)	(0.00449)	(0.00381)
Person Controls	✓	✓	✓	✓	✓	✓
Municipality-by-Quarter FX	✓	✓	✓	✓	✓	✓
Municipality-by-Group Fixed Effects	✓	✓	✓	✓	✓	✓
Group-by-Quarter FX	×	✓	✓	×	✓	✓
State-by-Group Time Trends	×	×	✓	×	×	✓
Observations	4,165,301	4,165,301	4,165,301	5,423,801	5,423,801	5,423,801
R-squared	0.335	0.336	0.336	0.061	0.062	0.063
Number of Individuals	1,544,669	1,544,669	1,544,669	1,758,883	1,758,883	1,758,883
Number of Municipality-by-Quarter Cells	8,568	8,568	8,568	8,568	8,568	8,568
Number of State-by-Group Time Trends	192	192	192	192	192	192
Number of Municipality Clusters	273	273	273	273	273	273

Notes: Estimations are based on 273 urban municipalities over the period 2002-2012. We exclude an adjustment period of two years. Standard errors are clustered at the municipality level and reported in parenthesis below the point estimates. * 10%, ** 5%, *** 1% significance levels.

Table 6: Effect on Store Profits and Exit

[Work in Progress]

Notes: Estimations are based on 608 urban municipalities in the confidential microdata of the Mexican retail census for 2003 and 2008. * 10%, ** 5%, *** 1% significance levels.

Table 7: Demand Parameter Estimates

Dependent Variable:	(1) Log(Phi) OLS	(2) Log(Phi) IV
Log(Store Price Index)	0.535*** -0.0153	-2.819** (1.248)
Product-by-Income-by-Municipality-by-Quarter FX	✓	✓
Store-by-Quarter FX	✓	✓
Observations	115,224	104,979
R-squared	0.735	
First-Stage F-Statistic		18.940

Notes: The estimates are based on the microdata of the Mexican operation of a large international market research company and the specifications discussed in 6.

Table 8: Household Welfare Effect - Decomposition

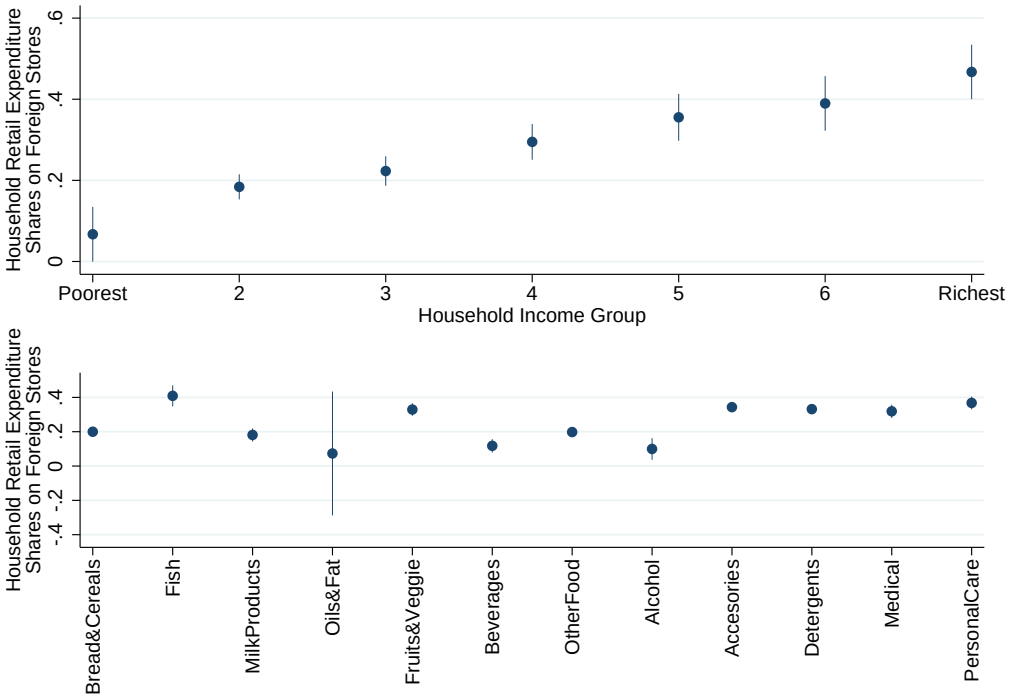
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Exact Under CES Approach						
Dependent Variable:	Total Effect	Direct Price Index Effect	Pro-Comp Price Index Effect	Pro-Comp Exit	Wage Effect	Profit Effect	Other Income Effect
Average Effect	0.0790***	0.0617***	0.0158***	-0.00158***	0.00525***	-0.00224***	0
	(0.00127)	(0.00115)	(0.000247)	(7.62e-05)	(0.000417)	(0.000259)	(0)
Max	0.249	0.204	0.055	0.000	0.025	0.000	0.000
Min	-0.979	0.000	0.000	-0.005	-0.057	-1.000	0.000
Proportion Negative	0.0133	0	0	0.988	0.0643	0.0581	0
Observations (Households)	12,293	12,293	12,293	12,293	12,293	12,293	12,293
Number of Municipality Clusters	240	240	240	240	240	240	240
	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	First Order Approach						
Dependent Variable:	Total Effect	Direct Price Index Effect	Pro-Comp Price Index Effect	Pro-Comp Exit	Wage Effect	Profit Effect	Other Income Effect
Average Effect	0.0346***	0.0207***	0.0109***	0	0.00525***	-0.00224***	0
	(0.000621)	(0.000288)	(0.000240)	(0)	(0.000417)	(0.000259)	(0)
Max	0.074	0.062	0.019	0.000	0.000	0.000	0.000
Min	0.094	0.060	0.031	0.000	0.025	0.000	0.000
Proportion Negative	-0.991	0.000	0.000	0.000	-0.057	-1.000	0.000
Observations (Households)	12,293	12,293	12,293	12,293	12,293	12,293	12,293
Number of Municipality Clusters	240	240	240	240	240	240	240

Notes: The graph is based on 12,293 households residing in 240 urban municipalities between 2006-2012 that had not experienced foreign retail entry at the time of the ENIGH survey. The graph depicts 95% confidence intervals based on standard errors that are clustered at the municipality level. * 10%, ** 5%, *** 1% significance levels.

Online Appendix - Not for Publication

Additional Figures and Tables

Figure A.1: Effect on Foreign Retail Market Shares: Restricted Estimation Sample



Notes: The graphs depict quarterly household retail expenditure shares on foreign stores among municipalities that have experienced foreign store entry between two and three years ago. The point estimates are based on regressions of household expenditure shares on the indicated income group or product group dummy variables in addition to municipality-by-quarter fixed effects. The data source for this graph are the microdata of the Mexican operation of a large international market research company for the years 2011-14. Both graphs depict 95% confidence intervals based on standard errors that are clustered at the municipality level.

Table A.1: Effect on Municipality Average Incomes and Employment

Dependent Variable:	(1) Log Monthly Income	(2) Log Monthly Income	(3) Log Monthly Income	(4) Employed	(5) Employed	(6) Employed
Foreign Entry - Four Quarters Before	-0.0238	-0.0183	-0.0160	-0.00502*	-0.00590**	-0.00352
	(0.0146)	(0.0147)	(0.0179)	(0.00283)	(0.00296)	(0.00392)
Foreign Entry - Three Quarters Before	-0.0176	-0.0154	-0.00525	-0.00219	-0.00191	-0.000605
	(0.0122)	(0.0126)	(0.0120)	(0.00270)	(0.00273)	(0.00341)
Foreign Entry - Two Quarters Before	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)
Foreign Entry - One Quarter Before	-0.0182	-0.0193	-0.0127	-0.00630*	-0.00844***	-0.00499
	(0.0153)	(0.0143)	(0.0161)	(0.00332)	(0.00314)	(0.00354)
Foreign Entry - One Quarter After	-0.0150	-0.0171	-0.0143	-0.00304	-0.00491*	-0.00287
	(0.0130)	(0.0126)	(0.0154)	(0.00275)	(0.00283)	(0.00388)
Foreign Entry - Two Quarters After	0.00196	-0.00887	0.0104	0.000311	-0.000487	0.00211
	(0.0156)	(0.0158)	(0.0177)	(0.00284)	(0.00280)	(0.00397)
Foreign Entry - Three Quarters After	-0.0244	-0.0345**	-0.0190	-0.00271	-0.00383	0.00105
	(0.0154)	(0.0156)	(0.0199)	(0.00314)	(0.00310)	(0.00497)
Foreign Entry - Four Quarters After	-0.0217	-0.0309*	-0.0124	1.90e-05	-0.00212	-8.29e-06
	(0.0166)	(0.0162)	(0.0231)	(0.00376)	(0.00339)	(0.00508)
Foreign Entry - Five Quarters After	-0.0111	-0.0245	0.000904	0.000454	-0.00100	0.00424
	(0.0156)	(0.0165)	(0.0227)	(0.00336)	(0.00318)	(0.00572)
Foreign Entry - Six Quarters After	-0.00179	-0.0171	0.00225	-0.00346	-0.00475	0.000676
	(0.0152)	(0.0155)	(0.0254)	(0.00448)	(0.00405)	(0.00671)
Foreign Entry - Seven Quarters After	0.0206	0.00278	0.0156	0.00149	0.000496	0.00444
	(0.0156)	(0.0166)	(0.0243)	(0.00322)	(0.00333)	(0.00799)
Foreign Entry - Eight Quarters After	0.0105	-0.00785	0.00910	-0.00214	-0.00397	0.00135
	(0.0187)	(0.0189)	(0.0231)	(0.00324)	(0.00342)	(0.00695)
Foreign Entry - Nine Quarters After	0.000988	-0.0150	0.00424	-0.00255	-0.00525	0.00256
	(0.0173)	(0.0186)	(0.0277)	(0.00379)	(0.00401)	(0.00891)
Foreign Entry - Ten Quarters After	0.0203	9.25e-05	0.00559	0.00303	0.000888	0.00860
	(0.0179)	(0.0197)	(0.0248)	(0.00334)	(0.00368)	(0.00889)
Foreign Entry - Eleven Quarters After	-0.00660	-0.0283	-0.00798	0.000801	-0.000671	0.00926
	(0.0176)	(0.0194)	(0.0251)	(0.00378)	(0.00389)	(0.00936)
Foreign Entry - Twelve Quarters After	0.0126	-0.00956	0.0184	0.00394	0.00250	0.00890
	(0.0150)	(0.0160)	(0.0278)	(0.00348)	(0.00346)	(0.0102)
Quarter FX	✓	✓	✓	✓	✓	✓
Municipality FX	✓	✓	✓	✓	✓	✓
Person Controls	✓	✓	✓	✓	✓	✓
Region-By-Quarter FX	×	✓	×	×	✓	×
Municipality Size-By-Quarter FX	×	✓	×	×	✓	×
Person FX	×	×	✓	×	×	✓
Observations	4,307,362	4,307,362	4,307,362	5,610,685	5,610,685	5,610,685
R-squared	0.300	0.301	0.809	0.020	0.021	0.561
Number of Individuals	1,579,372	1,579,372	1,579,372	1,796,587	1,796,587	1,796,587
Number of Municipality Clusters	273	273	273	273	273	273

Notes: The dependent variable is log monthly incomes in Column 1-3 and a binary employment indicator in Columns 4-6 across 273 urban municipalities over the period 2002-2012. Standard errors are clustered at the municipality level and reported in parenthesis below the point estimates. * 10%, ** 5%, *** 1% significance levels.