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The Expansion of Modern Grocery Retailing and Trade in Developing Countries

Sharad Tandon, Maurice R. Landes, and Andrea Woolverton



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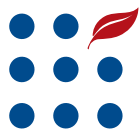
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The Expansion of Modern Grocery Retailing and Trade in Developing Countries

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Abstract

Over the past few decades, modern grocery retailing has been expanding rapidly in developing countries. The implications for food demand and trade are influenced by the extent to which modern food retailers focus primarily on growing preferences for nonprice characteristics, such as dietary diversity, convenience, and quality, as opposed to introducing supply chain efficiencies that may reduce real food prices over time. Based on a data set of 103 developing countries, there is suggestive evidence that the expansion has been associated with growth in demand for nonprice characteristics, such as convenience in food shopping and preparation. On the other hand, growth in modern food retailing appears to be uncorrelated with variables indicative of the emergence of more efficient food supply chains. The impacts of modern grocery retailing in developing countries are potentially important to U.S. agricultural markets. Growth in developing-country imports of U.S. agricultural products has outpaced growth in developed-country imports in the 1990s and 2000s, with developing countries accounting for 64 percent of U.S. agricultural exports during 2007-09.

Keywords: modern grocery retailing, supply chain, efficiency, developing countries, food demand, trade

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Summary

Domestic and multinational modern grocery retailers are accounting for an expanding share of food sales in many developing countries, with potentially significant implications for food demand and trade. This report examines two mechanisms that are potentially important in driving the growth in modern food retailing. First, modern retailers may be meeting rising demands for dietary diversity, shopping and preparation convenience, and food safety that are commonly associated with rising incomes among some groups of consumers. Second, modern grocery retailers may be investing to improve the supply chain and reduce food prices, which can lead to a stream of efficiency gains to be shared between producers and consumers. Such efficiency gains are likely to be more significant in a developing-country context than in more developed countries because lower income consumers tend to be more responsive to income and price changes, and because agriculture and food account for large shares of both income and expenditures in developing-country households.

What Is the Issue?

Although the expansion of modern food retailing may boost food demand and trade, actual gains may be influenced by the extent to which retailers focus on accommodating consumer demand for food quality and convenience by investing in modern retail formats versus improving the efficiency of the food supply chain. If modern retailers introduce significant supply chain efficiencies, both farmers and consumers stand to benefit from the additional income they can devote to both food and all other goods. If, on the other hand, the expansion of modern food retailing is not accompanied by supply chain efficiencies, then the economy-wide benefits might be muted. Although consumers will still benefit, farmers' income and overall consumption may not significantly change. The impacts of modern grocery retailing in developing countries are potentially important to U.S. agricultural markets. Growth in developing-country imports of U.S. agricultural products has outpaced growth in developed-country imports in the 1990s and 2000s, with developing countries accounting for 64 percent of U.S. agricultural exports during 2007-09.

What Did the Study Find?

- The share of total grocery expenditure captured by modern retailers is correlated with the income level in developing and transition countries. Penetration of modern grocery formats is higher in countries where gross domestic product (GDP) per capita is higher. However, countries with the highest growth in modern grocery formats tend to be much poorer on average, suggesting a relationship between the rate of penetration and base income level.
- Growth of modern grocery retailing across developing and transition countries between 1999 and 2009 is correlated with the share of the working-age population, suggesting demand factors, such as increased convenience, are important to the recent growth.

- Countries with high growth in modern retailing also observed higher growth in the sale of packaged and readymade foods, suggesting that modern outlets are growing fastest where demand for increased convenience is growing fastest.
- Growth in modern retailing is uncorrelated with a number of supply-side factors, such as conducive business environments and infrastructure (share of paved roads), that would likely be important if efficiency gains in the supply chain were aiding the growth in modern grocery retailing. Case studies of Brazil, China, India, and Russia further suggest that the growth of modern grocery retailing is not accompanied by immediate efficiency gains in the supply chain.
- Exports of U.S. processed foods are growing fastest in countries where modern grocery retailing is growing the fastest, suggesting that modern grocery formats in developing countries are an important outlet to promote U.S. agricultural products.

How Was the Study Conducted?

This study uses a newly constructed data set from Euromonitor, International describing the spread of modern grocery retailing. The data set covers a larger sample of developing countries (103) than previously available and allows disaggregated analysis by type of modern format and type of food items. Analysis using this data set finds that variation in demographic characteristics, such as share of the population most likely to benefit from the convenience offered by modern formats, is associated with the widely varying rates of retail penetration across developing countries over 1999-2009. On the other hand, growth in modern food retailing appears uncorrelated with variation in efficiency growth variables like ranking for business environments and growth in foreign direct investment, as derived from the World Bank Development Indicators database. This basic pattern is corroborated by a number of case studies of transition countries: Brazil, India, China, and Russia.

Introduction

The growth of supermarkets, hypermarkets, and other modern grocery retail formats has accelerated recently in developing countries, after being relatively nonexistent a few decades ago.¹ Average expenditures in modern grocery formats in many non-Organisation for Economic Co-operation and Development (OECD) countries are now catching up to more developed countries, driven by expansion of both multinational and domestic retailers. The fact that this transformation of food retailing is occurring at lower levels of per capita income and economic development may have important impacts on food demand, marketing, and trade (Reardon et al., 2003; Currah and Wrigley, 2004; Wrigley et al., 2005; Minot and Roy, 2007).

Studies have postulated that the expansion of modern food retailing in developing countries is driven in part by growing consumer demand for nonprice characteristics of food supplied by modern formats—primarily convenience, quality, and product diversity. Another potential source of growth may be the lower prices arising from efficiency gains associated with supply chain investments made by modern retailers (Minten and Reardon, 2008). Both drivers can stoke demand for and supply of food products from modern formats.

While nonprice factors and improved marketing efficiency can both stimulate food demand and trade, improvements in supply chain efficiency may have the larger potential impacts. More efficient food markets may not only have direct impact on demand by reducing retail food prices and boosting grower income, but can also lead to indirect gains in output and consumption through economywide effects (Landes and Burfisher, 2009). These impacts are likely to be heightened in developing countries because the shares of income earned in agriculture and spent on food are relatively large compared with the shares in developed countries, and developing-country consumers are more responsive to changes in both income and food prices (Deaton and Subramanian, 1996).

Worldwide growth in modern grocery retailing can benefit U.S. agricultural exporters by raising the purchasing power of consumers in developing countries and creating new markets for U.S. agricultural exports. Between 1990 and 2009, as modern grocery retailing took hold in many developing countries, imports of U.S. agricultural products by developing countries grew 6.6 percent annually versus 3.6 percent for developed-country markets. Developing countries registered strong annual growth in agricultural imports across a broad range of U.S. bulk (5.5 percent annual growth), intermediate (5.8 percent), and consumer-oriented products (10.4 percent) over 1990-2009, and now account for 64 percent of U.S. agricultural exports (2007-09 average).²

The cross-country evidence and case studies examined in this report suggest that the recent expansion of modern food retailing in developing countries is associated with demand factors, which include growing preferences for dietary diversity, safety, and particularly convenience. However, there is less evidence that the recent expansion of modern retailing is associated with large efficiency gains in the supply chain or lower food prices offered at modern formats in developing countries. Thus, the full impacts on food demand and trade by developing countries may yet be unrealized.

¹In the database used in this study, hypermarkets were defined as chained or independent retail outlets with a selling space of over 2,500 square meters and with a primary focus on selling groceries.

²These figures were derived from the Census Bureau data, accessed from USDA's Foreign Agricultural Service in March 2010 (www.fas.usda.gov/trade.asp).

Trends in the Expansion of Modern Grocery Retailing

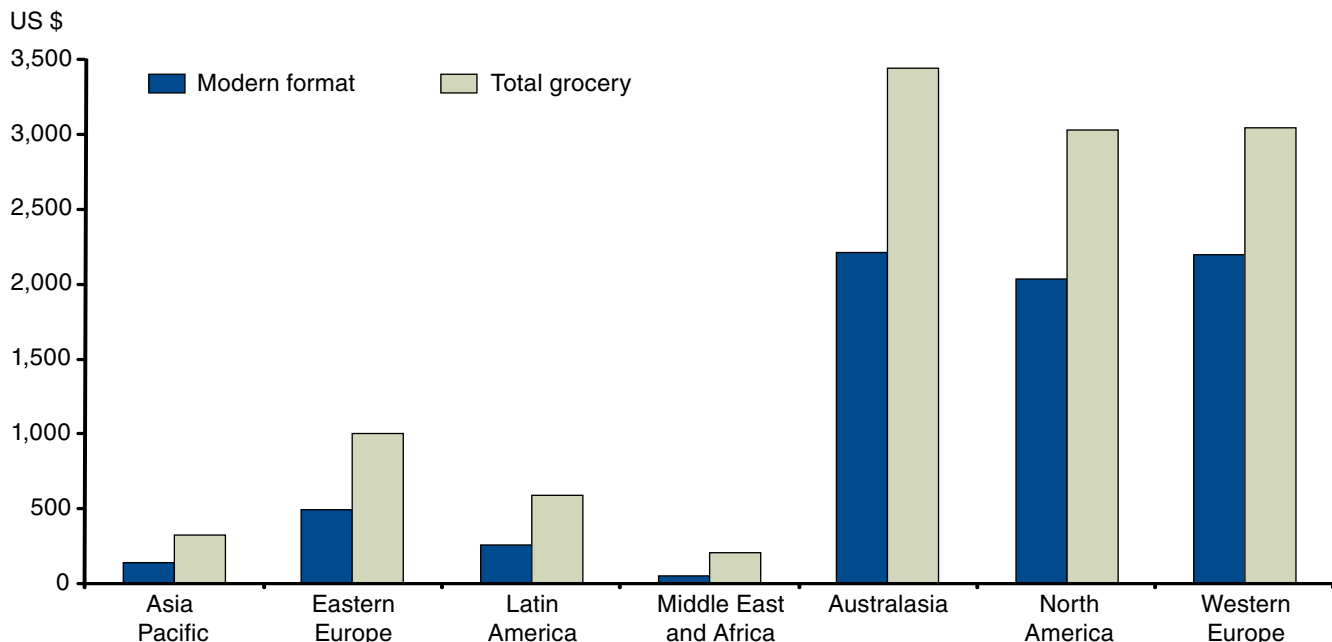
Drawing on grocery retailing data collected by Euromonitor, International through a combination of trade surveys, store checks, and a compilation of national official statistics, this section presents regional trends in modern grocery retailing. Though modern formats are proliferating in developing countries, the developed world continues to have the largest per capita market for both total grocery expenditures and total grocery sales in modern formats. Per capita expenditures in North America (excluding Mexico), Western Europe, and Australasia (Australia and New Zealand) dwarfed those of other regions in 2009 (fig. 1); grocery expenditures were at least 3 times larger than in Eastern Europe and over 10 times larger than in Asia, the Middle East, and Africa.³ These regional differences widen for the share of grocery expenditures in modern formats.

There are also large differences, based on the share of the population living in developing countries, in the growth of modern formats. Over the past decade, growth in modern formats seems to have stalled in the regions where penetration is highest, including Australasia, North America, and Western Europe (fig. 2a), whereas both Asia and Eastern Europe—with many developing and transition countries—show faster growth. However, this growth is not uniform across all developing regions; modern grocery formats in the Middle East, Africa, and Latin America are growing slower than in Asia and Eastern Europe (fig. 2b).

Different rates of penetration in developing regions are roughly consistent with the four “waves” of modern food retail expansion identified by Reardon et al. (2003). In Latin America, higher income countries were in the first

³Although the Asian averages include nondeveloping countries like Japan and South Korea, these countries have a small population compared with that in developing Asian countries, and thus receive very little weight in the per capita calculations.

Figure 1
Per capita spending on grocery retailing in 2009 in U.S. dollars



Source: Euromonitor, International.

wave of retail modernization starting in the 1980s, so that region began the 2000s with a larger share of total grocery expenditures in modern formats than other developing regions. Later waves of modern food retail penetration, including countries in Southeast Asia and Eastern Europe, began in the 1990s and either caught up with or surpassed Latin America in the 2000s. Selected South Asian and Sub-Saharan countries appear to constitute a fourth wave of expansion beginning in the mid-2000s.

Figure 2a
Share of total grocery retailing sold in modern formats, developing regions, 1999-2009

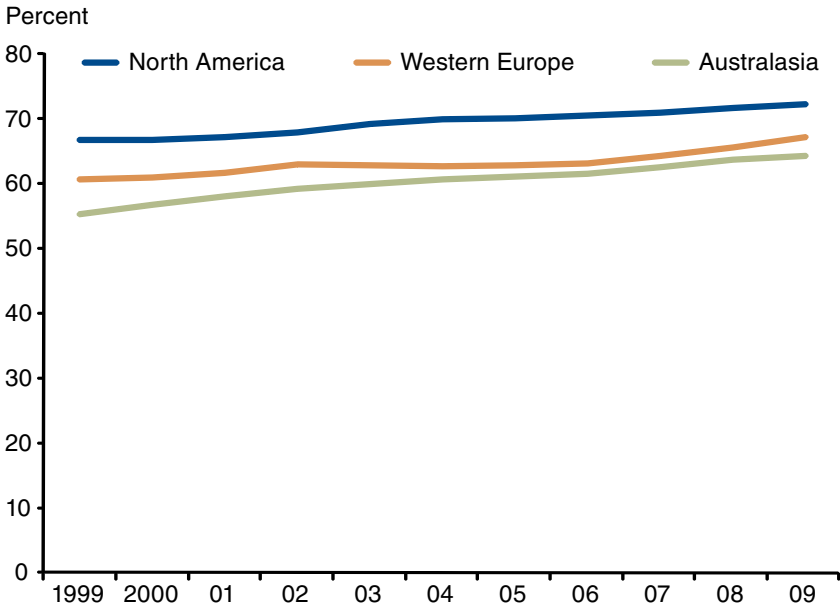
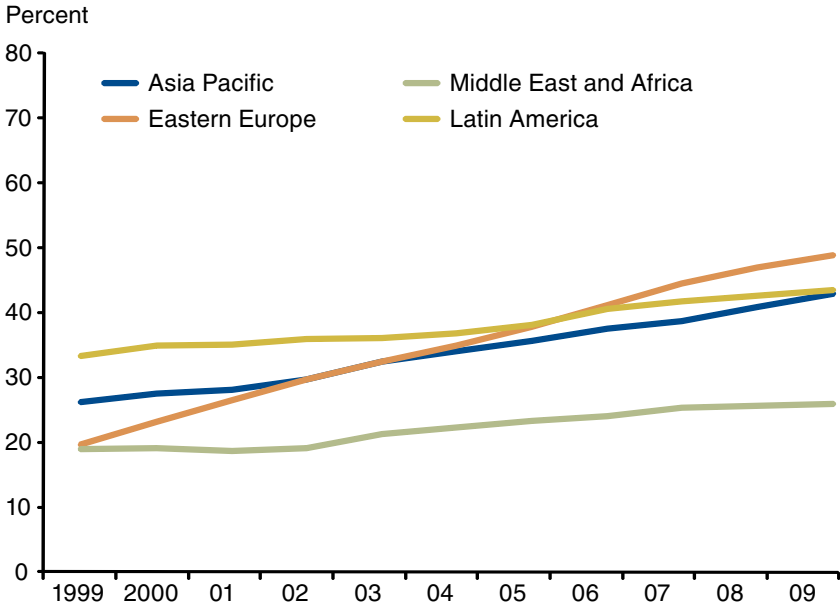


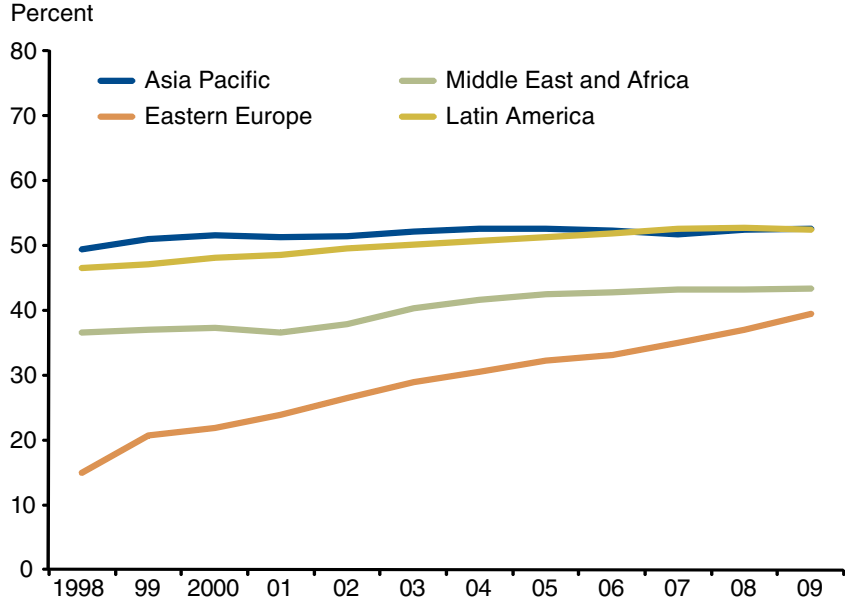
Figure 2b
Share of total grocery retailing sold in modern formats, developed regions, 1999-2009



Source: Euromonitor, International.

The driver of growth in the penetration of modern food retailing seems to be different across the fast-growing developing regions. Over the last decade, Eastern Europe experienced rapid growth in the share of packaged foods sold through modern formats, while Asia showed no growth in this share.^{4, 5} Eastern Europe began the decade with the lowest penetration by modern formats in the sale of packaged foods, but is fast catching up to the Middle East and Africa. Thus, despite Eastern Europe and Asia having similar growth in modern grocery formats, this growth is seemingly being driven by different food products.

Figure 3
Share of total packaged foods sold by modern formats



Source: Euromonitor, International.

⁴Packaged foods refer to food items denoted as such by Euromonitor, International. These items are goods from bakeries, canned goods, chilled processed foods, goods from a confectionary, dried processed foods, frozen processed foods, meal replacement goods, noodles, pasta, ready meals, sauces and condiments, snack bars, soup, spreads, sweet and savory snacks, ice cream, dairy products, oils and fats, and baby food.

⁵This trend is not being driven by Japan and South Korea. India and China both show little to no growth in packaged foods, despite high growth in supermarket penetration over the decade.

Supply and Demand for Modern Grocery Retailing

The introduction of modern food retailing can influence food demand in developing countries through both price and nonprice factors. Studies identify a variety of sometimes conflicting evidence on the approaches adopted by domestic and multinational modern retailers, as well as the influence of those strategies on food demand and marketing (Reardon and Berdegue, 2002; Schwentesius and Gomez, 2002). Rather than pointing to one universal model, the evidence suggests that a variety of country-specific factors influence the level of penetration and impacts of modern formats across developing countries.

Several nonprice factors are commonly associated with increased demand for food from modern formats across developing countries. First, modern formats better address the desire for convenience, which is being driven by urbanization and changes in consumer preferences (Veeck and Veeck, 2000, Gale and Hu, 2007). Second, consumers often value modern formats because they are perceived to provide higher quality and safer food (Veeck and Veeck, 2000). Thus, demand for modern formats can expand as consumers place more value on food quality and safety characteristics not met by traditional retailers. Additionally, the overall demand for modern food retailing is associated with growth in traditional drivers of aggregate food demand, such as income and population (Reardon et al., 2003).

The expansion of modern food retailing can also shape food demand by introducing cost advantages that improve the efficiency of food distribution and lead to lower marginal costs compared with traditional outlets like open-air markets or bodegas. First, modern grocery retailers can set up national and international procurement, processing, transportation, and distribution systems that exploit economies of scale (Boselie et al. 2003). Second, the consolidation of firms that procure goods from upstream distributors allows modern grocery retailers to bargain for better prices (Reardon et al., 2003). Also, modern retailers can access cheaper capital and benefit from foreign direct investments that spur transfers of technology and capital to developing countries (Chavez, 2002; Belik and dos Santos, 2002).

The cost advantages of modern food retailers have been documented in developed countries. Artz and Stone (2006) found a 17-percent reduction in food prices paid by consumers associated with the entry of Wal-Mart supercenters in Mississippi. Hausman and Leibtag (2007), using a national data set, found that Wal-Mart supercenters undersold traditional supermarkets by 15-25 percent. Both studies found evidence that the food price declines were associated with both the direct sales of the supercenters at lower prices, and subsequently reduced prices from competitor retailers.

However, anecdotal evidence on whether modern retailers offer lower prices in developing countries is mixed. Some studies find that particular prices are lower (Reardon and Berdegue, 2002), while others find modern retailers actually charge higher prices for many goods (Schwentesius and Gomez, 2002; Farina, 2002; Tschirley et al., 2004). In addition to the mixed evidence, these price analyses are complicated by the possibility of quality differences

between modern and traditional formats. However, Minten and Reardon (2008) reviewed price differences across 10 developing countries and found that cost reductions occur over time. Specifically, they suggest that modern retailers tend to initially focus on processed and high-quality products, compete with traditional retailers on price for processed and staple products over time, and finally introduce price competition in fresh products, such as fruit and vegetables. Eventually, modern retailers reduce costs through marketing innovations like centralized procurement, logistics technology, specialized wholesalers, and contracting (Reardon and Timmer, 2007; Minot and Roy, 2007).

The expansion of the modern retail sector might also increase productivity in upstream industries in the supply chain. In particular, consolidating the buyers of agricultural goods may alter the relationship between farmers and buyers, leading to increased agricultural productivity. Given the large share of the economy devoted to agriculture in developing countries, these efficiency gains might significantly increase welfare. Several studies have found evidence of farmers benefitting from technical assistance and contracting arrangements provided by modern retailers (Faigenbaum et al. 2002; Dries et al., 2004; Hu et al., 2005; Birtal et al., 2005; Minten et al., 2009). However, other studies find smaller benefits (Dries et al., 2004; Hernandez et al., 2007) or no benefits to domestic agricultural producers (Wang et al., 2006).

Although both nonprice factors and efficiency gains can spur the growth of modern grocery retailing, the possible welfare effects might be different. If growth is driven by nonprice factors, such as convenience, and the expansion of modern retailing is not accompanied by significant investment in supply chains, then significantly lower food prices are unlikely.⁶ On the other hand, if the growth is accompanied by significant investments in supply chains and efficiency gains, then—provided the markets are competitive and there are no significant barriers to entry by new retailers—food prices might decrease.

In developed countries, increases in efficiency leading to decreases in retail prices have been shown to reduce poverty (Goetz, 2006; Goetz and Swaminathan, 2006). These benefits can be even larger in developing countries. Relative to developed countries, households in developing countries devote a much larger share of their income to food consumption (Deaton and Subramanian, 1996). Even modest efficiency gains that are passed on to the consumer can significantly reduce the share of household income budgeted for food, allowing consumers to allocate more expenditures to both food and all other goods. However, the potential for such welfare gains depends on whether the market for food retailing is competitive. If food prices are no cheaper in modern outlets relative to traditional shops, then the demand impacts are similar to when growth is driven only by nonprice factors such as convenience, product diversity, and food quality (Cotterill, 2006; Competition Commission, 2000).

The research findings diverge on the extent to which modern retailers, due to their size and market power, may be appropriating gains from improved market efficiency rather than passing them to producers and consumers. Analyzing developed countries, Cotterill (1986) and Cotterill and Harper (1995) associate levels of retail sector concentration with higher consumer prices in the United States, while Kaufman and Handy (1989) and Binkley

⁶Convenience might incur a savings in time, which consumers could devote to more labor and higher wages. However, these gains would be secondary relative to a decrease in food prices, given that higher wages are contingent on finding more labor opportunities. In developing countries with pervasive underemployment, this type of gain would likely be mitigated.

Potential Impacts of More Efficient Food Markets: The Case of India⁷

⁷Derived from Landes and Burfisher (2010).

Modern food retailing is a relatively recent phenomenon in India, accounting for only about 2 percent of retail food sales, but is growing rapidly. While it is too early to assess the impacts of modern retailers in India, a recent study suggests the potential effects of increased investment and efficiency in agricultural marketing that might be associated with the expansion of the modern retail sector. The study was conducted using a general equilibrium modeling framework that accounts for economywide impacts in a developing country where large shares of income are earned from agricultural production and spent on food—factors that are likely to magnify the impacts of improvements in food marketing efficiency.

Indian food retailing is dominated by small, independent sellers, and the agricultural marketing system is comprised primarily of a large number of fragmented, non-integrated marketing and processing firms using low levels of technology. Except in a few instances—such as the poultry industry in south and central India where successful vertical market

integration is occurring—the evidence indicates that food markets are inefficient and deliver mostly unprocessed products to consumers at relatively high cost. Central and state government policies make it risky to invest in large-scale or vertically integrated agribusiness enterprises, leading to chronically low levels of private investment.

Landes and Burfisher (2010) simulated the impacts of a 50-percent increase in efficiency—or total factor productivity—in India's marketing system for food products. The results indicate that improvements in agricultural marketing efficiency could have substantial and broad impacts, generating gains in output and wages, raising agricultural producer prices, reducing consumer food prices, and increasing private consumption. The analysis also examines potential impacts for rural and urban households by income class and finds that the gains from improvements in food marketing efficiency are largest for low-income rural and urban households.

Table 1
Aggregate impacts of efficiency gains in agricultural and food marketing in India

Variable	50% increase in total factor productivity in agricultural and food marketing
	<i>Percent change from base</i>
Real gross domestic product	1.0
Real household consumption	1.4
Real investment demand	0.4
Government revenue	1.0
Producer price index	0.4
Land rents	5.6
Wages	1.6
Capital rents	0.1
Exports	0.7
Imports	0.7

Table 2
Price effects of efficiency gains in agricultural and food marketing in India

Selected sectors	50% increase in total factor productivity in agricultural and food marketing	
	Producer price	Consumer price
	<i>Percent change from base</i>	
Rice	1.2	-0.8
Wheat	1.8	-0.5
Corn	2.2	-0.2
Fruit, vegetables	2.3	-1.0
Oils, fats	0.4	-2.1
Sugar	1.0	-1.8
Fibers	2.4	-0.1
Poultry and pork	2.7	0.6
Dairy products	1.9	-0.7

and Connor (1996) find no such relationship. The developing-country literature focuses primarily on asymmetric market power faced by small farmers when dealing with large modern retailers. Swinnen and Vanderplas (2007) find no consistent evidence of modern retailers appropriating efficiency gains or otherwise exploiting producers or consumers. They suggest that developing-country outcomes may have as much to do with imperfections in factor markets and contract enforcement regimes faced by growers than with the practices of modern retailers.

Supply Chain Investment and Price Competition, by Country

Although modern grocery retailers are proliferating across developing and middle-income countries, it is difficult to assess their impact. The investments such retailers make in developing efficient supply chains are critical in assessing their impact on welfare and food demand. Anecdotal evidence from several large developing and transition countries suggests that modern grocery retailers have invested in the supply chain to varying degrees, but there is little evidence that consumers pay lower prices in modern grocery formats.

Brazil. Evidence suggests more investment in developing efficient supply chains in Brazil than in many other developing countries (U.S. Department of Agriculture, Foreign Agricultural Service, 2009). The country has been experiencing rapid growth in modern grocery retailing for longer than most other developing and middle-income countries. Furthermore, beginning with the economic reforms enacted in 1995, which included privatization and trade liberalization, Brazil's retail food sector began to undergo a series of structural reforms that facilitated foreign investment, greater consolidation of the food industry through mergers and acquisitions, and a rapid rise in hypermarkets and convenience stores (U.S. Department of Agriculture, Foreign Agricultural Service, 2009).

Prior to the entrance of foreign retailers, Brazil's modern grocery retailers purchased over 60 percent of their products from traditional sources (IBGE, 2010). However, foreign firms not only acquired domestic firms as they entered the market, but also brought their own supply chain models. Now retailers, both foreign and domestic, have started purchasing directly from farmers and have incorporated them into the supply chain (IBGE, 2010).

Although there have been large changes to Brazil's retail industry in the past decade, it is difficult to assess the degree to which these investments have increased efficiency and lowered prices. A recent survey by the Brazilian Supermarket Association (ABRAS, 2010) found that high- and middle-income Brazilian consumers were attracted to supermarkets, in part, by competitive prices. However, the survey also found that these same consumers also preferred the brand information and wider range of products—including perishables, baked goods, wine, ready-to-eat dishes, and deli items—available through modern retailers. The same survey found that lower income consumers tended to shop in traditional formats like open-air markets and corner stores.

China. Like other fast-growing developing countries, China's modern retail sector has been growing rapidly over the past decade. This growth is driven by both foreign and domestic retailers, and has been encouraged by the Government (Gale and Hu, 2007). However, despite this growth and a supportive regulatory environment, there is circumstantial evidence that modern grocery retailers have not significantly invested in more efficient supply chains. First, although it is difficult to compare the quality and safety of the food products offered, prices at modern retailers tend to be a little higher than those in traditional formats (Hu, 2007). Second, retailers tend to rely on independent suppliers and traditional wholesale formats for their food items, with only a few retailers establishing their own distribution centers (Hu, 2006; Goldman and Vanhonacker, 2006).

On the other hand, modern grocery retailers have accommodated an increasing demand for more convenience and better food quality and safety that is being driven, in part, by rising incomes and urbanization (Hu, 2006). Also, modern grocery retailers themselves are helping to shape food demand and trade by supplying a wider variety of domestic and imported food items (Gale and Hu, 2007).

Government efforts to increase efficiency in the supply chain include promotion of farmer cooperatives in an attempt to help coordinate small farmers and to streamline the supply chain between farmers and retailers (Hu et al., 2005). The number and scale of cooperatives is still small, and fresh food sales account for very little of the growth of modern retail formats in the past decade. Given the supportive environment provided by both the national and local governments and their current initiatives to stimulate supply chain investment, modern retailers may focus more on supply chain efficiency and price competition in the future.

India. India's food marketing system continues to be dominated by traditional, small-scale traders and retailers, but rising incomes and diversification of diets have led to more modern grocery retailing by domestic and international firms since 2000 (Minten et al., 2009). Although modern grocery retailing remains a nascent industry with little evidence of major investments in supply chain efficiency, a recent study found that modern retailers are providing more choices to consumers, and selling basic foods at the same or lower prices than traditional retailers (Minten et al., 2010). Both domestic and international investors are experimenting with a variety of formats—including hypermarkets, supermarkets, convenience stores, and cash-and-carry wholesale outlets—and exploring various approaches to vertical coordination or integration of supply chains, particularly for fresh produce.

Distinct from the expansion of modern grocery retailing, more efficient food supply chains are developing in India, including the vertical integration of the broiler industry (Landes et al., 2004) and vertically integrated farmer-owned dairy cooperatives. Several of the emergent modern retailers—including domestic players Reliance and Big Bazaar and international players Walmart-Bharti and Metro AG—are trying to similarly reshape traditional supply chains, but progress is slow (U.S. Department of Agriculture, Foreign Agriculture Service, 2009).

Indian agriculture continues to receive relatively low levels of public and private investment, with agricultural marketing dominated by small-scale, non-integrated enterprises employing low levels of technology (Landes, 2008). While modern retailers are beginning to spark new investment, they face a difficult climate for successful investment in larger, vertically integrated, and modern enterprises. Agricultural policy in India is determined at the state level, and this has discouraged private investment in agricultural markets, particularly in enterprises that operate across state borders or seek to integrate farmers into supply chains. Impediments by state government authorities include the imposition of movement and storage limits on most major food products through the Essential Commodity Act, the requirement that all primary marketing of farm commodities occur in government markets under the state Agricultural Produce Market Committee Acts, and the interstate taxing of many farm commodities. At present, modern retailers are finding some state governments, including Gujarat and Punjab, to be more supportive of private investment than others.

In India, modern retailers also must cope with significant infrastructure constraints and institutional weaknesses that tend to raise the cost of investing in agricultural markets. Investment in road and rail transport capacity, power generation, water supply, and cold storage capacity has lagged well behind the needs of a rapidly expanding economy. Public agricultural market services and institutions—including public goods such as grades and standards, inspection services, regulatory oversight, market information, futures markets, and extension services—are either underdeveloped or nonexistent in most areas, imposing increased costs and risks for private investment in agricultural markets. For front-end retailing, the high cost of real estate in most of India's urban areas has been prohibitive.

Although foreign investment in modern food retailing is expanding, growth has been constrained by policies that prevent foreign direct investment (FDI) in multi-brand retailing in any sector. As a result, FDI in food marketing has been limited to “cash-and-carry” or wholesale trading, such as Metro AG's operations in south and east India, or to joint ventures with Indian firms in which the Indian partner owns the retail operation and the foreign partner has ownership of the wholesale and supply chain operation, such as the Walmart-Bharti joint venture in north India. While this policy has likely slowed FDI growth in India's food markets, it is not clear if the FDI restriction or the state regulatory, institutional, and infrastructure constraints are the primary causes of weak investment in modern food supply chains.

Russia. Modern food retailers grew substantially in Russia during the 2000s, first in Moscow and St. Petersburg, and then in other cities. Although most modern retailers are domestically owned and operated, foreign chains (mainly EU-based) are becoming increasingly active, establishing the first hypermarkets within the country (FAO, 2009).

Russia's transition from a planned to a market economy in the early 1990s generated conditions strongly conducive to supermarket growth. The variety, convenience, and service levels of modern grocery retailers were in stark contrast to the Soviet-era food stores, where any single urban store usually sold only one food product group, such as bread, milk, or meat. Early modern

from the European Union, previously unavailable during the Soviet period (FAO, 2009).

Modern grocery retailers initially had to rely on inefficient supply systems, and slowly upgraded their supply chain. The severe disruption to the entire agro-food system during the economic transition created similar challenges for all food retailers. Although supplier relationships are varied, modern retailers are contributing to the vertical integration of the country's food supply chain, and this has helped improve the productivity, quality, and reliability of Russian food production and supply, particularly vegetables and potatoes. However, continued constraints include weak food supply infrastructure, which increases transaction costs. As with Brazil, it is difficult to identify whether early investment in the supply chain has translated into lower prices for consumers (Koester, 2005).

Although the supply chain in Russia has begun to develop since the growth of modern grocery retailers, other concurrent factors have helped this development. For example, the rise of large corporate farms has contributed to vertical integration within the country's agro-food system and altered the supply chain. These enterprises typically combine primary agriculture, processing, and distribution (though usually not retailing), and can deliver investment, superior technology, and better management practices. In so doing, these integrated firms appear to be increasing productivity within Russian agriculture, especially for grains. Although most large corporate farms are domestically owned and managed, there is some foreign participation, especially by multinational corporations such as Cargill (Rylko and Jolly, 2005).

Empirical Analysis of the Growth of Modern Grocery Retailing

Given data limitations, it is difficult to directly assess the extent to which the expansion of modern food retailing in developing countries is associated with improved supply chain efficiencies, with growing consumer preferences for nonprice characteristics of food, or both. Ideally, it would be best to look at the price differences between modern and traditional formats, and the amount of investment by each firm in their supply chains. However, data on price differences and firm investments are not available across developing countries.

Although it is difficult to further assess possible efficiency gains directly, it is possible to investigate which factors are contributing to growth in modern grocery formats. A number of country characteristics could proxy for both the size of demand growth for nonprice characteristics and the size of possible efficiency gains, and these indicators vary widely across developing countries. Thus, it is possible to analyze whether growth in modern grocery formats is largest in regions where indicators suggest demand growth to be large, where expected efficiency gains are largest, or both.

Euromonitor, International presents country-level data describing the growth of modern grocery retailing, as well as data on income, demographics, and other country characteristics. Supplementing the data with variables from the World Bank Development Indicators database, a number of proxies for growth in demand for nonprice characteristics and growth in efficiency gains are created for 103 developing and middle-income countries.⁸ Specifically, the data allow the creation of the following proxies:

Demand Growth:

- Growth in Population—an indicator of growth in aggregate demand.
- Growth in Income—an indicator of growth in aggregate demand.
- Level of Income—a proxy of growth in aggregate demand.
- Share of Working-Age Population—an indicator of the demand for convenience in food shopping and preparation.

Efficiency Growth:

- Share of Total Roads That Are Paved—a measure of the quality of infrastructure and the ease of setting up supply chains and distribution centers.
- Ranking for Business Environments—an indicator of the ease of doing business.
- Growth in Foreign Direct Investment (FDI)—a measure of attractiveness of business environment.
- Average Number of Days Required To Start a Business—an indicator of the ease of starting new businesses.

⁸The data set includes countries for which all variables were available, less Australia, Canada, Japan, New Zealand, South Korea, the United States, and countries located in Western Europe. See the appendix for a list of countries included in the data set.

Higher growth in income, a higher level of income, higher growth in population, and a higher share of working-age population should all be associated with stronger demand for modern retail grocery formats. On the other hand, setting up efficient supply chains is a dynamic process that takes place over time. Thus, if efficiency gains are actually a driver of modern retail growth, such expansion may be more likely in countries with environments conducive—i.e., more paved roads—to the development of efficient supply chains. The literature suggests that a conducive business environment also includes competition, freedom of entry and exit for firms, property rights, and flexible and enforceable legal environments. These factors are measured here by world rankings of business environments, the average number of days required for starting a business in each country, and growth in foreign direct investment (FDI), where better business environments are expected to be associated with larger efficiency gains and greater modern retail penetration (Reardon et al., 2003).

The empirical strategy is to analyze differences in a country's share of total grocery sales sold by modern formats between 1999 and 2009, denoted as the difference in the penetration of modern formats. The definition of growth in modern grocery penetration and all proxy variables, along with the summary statistics, are presented in appendix table 1. This change in penetration is regressed on the demand growth and efficiency growth variables:

$$\begin{aligned} \Delta Penetration_i = & \beta_0 + \beta_1 BusRank_1 + \beta_2 DaysStartBus_1 + \beta_3 PavedRoad_1 \\ & + \beta_4 FDIGrowth_1 + \beta_5 PopGrowth_1 + \beta_6 ShareWorking_1 \\ & + \beta_7 GDPGrowth_1 + \beta_8 GDP_1 + \beta_9 Controls_1 + u_1 \end{aligned}$$

where $\Delta Penetration_i = Penetration_{2009} - Penetration_{1999}$ and denotes the growth in modern food retailing penetration between 1999 and 2009 for country i ; $BusRank$ denotes the rank of country i for the ease of setting up a business; $DaysStartBus$ denotes the average number of days to start a business; $PavedRoad$ denotes the share of roads that are paved in the country; $FDIGrowth$ and $PopGrowth$ denote the FDI and population growth in country i between 1999 and 2009; $ShareWorking$ denotes the share of the population of country i that is between the ages of 15 and 64; $GDPGrowth$ denotes the growth in gross domestic product (GDP) between 1999 and 2009; GDP denotes the 2004 per capita GDP in country i ; and $Controls$ denote a number of other variables for country i that may be correlated with both $\Delta Penetration$ and the other independent variables and confound the true correlation between modern retail penetration and the variables of interest.^{9, 10}

The variables $DaysStartBus$ and $PavedRoad$ are not available for all 103 developing countries in the data set, so the estimates for a number of specifications are shown in table 3. First, in column 1 are the results for a specification that includes proxies that are available for all countries. Column 2 provides the results when the proxy variables not available for each country are included.

The estimates suggest that growth in consumer demand is associated with growth in the penetration of modern grocery retailing over the past decade.

⁹Control variables include the population density in 2004, the population level in 2004, and regional indicators for whether the country was in Asia, Eastern Europe, Latin America, or the Middle East/Africa. Results are identical when using control variables from 1999.

¹⁰There are a variety of other approaches to estimating these relationships, such as estimating nonlinear relationships or estimating the relationship between the independent variables and penetration in 1999 and 2009 separately, and testing the equality of the coefficients. Results are similar regardless of approach, and we report the above specification for ease of interpreting the coefficients.

Only the share of the working-age population is statistically significant. Furthermore, this variable has a large and significant impact on the growth of penetration in all specifications. The results in column 1 imply that an increase in *ShareWorking* by one standard deviation (.068) is associated with an increase in penetration by 4.0 percent. On the other hand, none of the other variables—either supply or demand proxies—are consistently correlated with growth in modern penetration across specifications.

Examination of the extent to which growth in modern retail penetration is associated with different subsets of the working-age population may provide additional insight. For example, growth can stem primarily from younger workers adopting new formats and products, or possibly from all of the working population utilizing the convenience of readymade foods and one-stop shopping. To investigate the role of various population segments, the share of working-age population variable is disaggregated into the shares of the working-age population under age 30, between 30 and 49, and from 50 to 64. These results are shown in column 3 of table 3 and indicate that the share of the working-age population ages 30-49 has the most significant impact on modern retail growth; the coefficients estimated for the other age groups are both smaller in magnitude and not statistically significant. Given that the correlation is not driven by younger households only, it seems likely that faster growth in modern retailing has been primarily associated with populations demanding convenience rather than changes in food preferences associated with younger consumers.

By contrast, none of the proxies for efficiency growth is associated with growth in modern retail penetration. None of the coefficients on the efficiency proxies are statistically significant in any of the specifications (table 3). Furthermore, the estimated standard errors of the coefficients are small enough to preclude a relationship as economically meaningful as the share of working-age population in any of the specifications. For example, in column (2), the effect of increasing the *BusRank* coefficient by one standard deviation using the bounds of the 95-percent confidence interval is still smaller than the effect of increasing the share of working-age population coefficient by one standard deviation.¹¹

A previous study (Traill, 2006), using a smaller sample consisting of both developed and developing countries, found the level of penetration of modern formats to be positively correlated with income per capita. Thus, column 4 of table 3 estimates a specification that regresses the level of penetration in 2004 on the proxies for demand growth for nonprice characteristics and efficiency growth in the supply chain associated with the expansion of modern formats. These results also suggest that penetration of modern grocery formats is higher in countries where GDP per capita is higher. Additionally, penetration is smaller where GDP growth is faster. However, countries with the highest growth rates also tend to be much poorer on average, suggesting a relationship between the rate of penetration and base income level.

Despite these correlations between the level of penetration and the level and growth of income, columns 1-3 demonstrate that these relationships do not survive the first difference, in which many time-invariant factors drop out of the estimation.¹² Thus, we cannot uncover whether supermarket penetration is higher in richer developing and transition countries simply because of

¹¹Given that modern grocery retailing began at different times in different regions, we also analyze whether these proxies for efficiency gains were correlated with the growth in penetration in different waves. Specifically, we estimate the baseline empirical specification but interact the efficiency proxies with dummy variables indicating the order in which countries started to develop modern grocery retailing, as described by Reardon et al. (2003). None of these differences are statistically different. We also allow for the effect of proxies to vary by income level. However, in those specifications, we still find that only the share of working-age population is correlated with penetration of modern grocery retailing.

¹²Although many of the variables in the estimation are static, including the share of the working-age population, these factors are being interpreted as proxies for either growth in demand for nonprice characteristics of food or growth in supply chain efficiency.

Table 3

Relationship between modern grocery penetration and proxies for demand and efficiency growth

	Dependent variable:			
	Δ Modern penetration			Penetration level 2004
	(1)	(2)	(3)	(4)
Proxies for demand growth:				
Population growth	-.044 (.050)	.076 (.144)	.034 (.050)	.069 (.064)
GDP growth	.009 (.007)	.044 (.030)	.003 (.008)	-.046*** (.015)
GDP per capita	-.001 (.001)	-.002 (.002)	-.001 (.001)	.006*** (.002)
Share of working-age population	.587** (.290)	1.05* (.615)	-	.030 (.460)
Share of population age 15-29	-	-	-.153 (.402)	-
Share of population age 30-49	-	-	1.10*** (.406)	-
Share of population age 50-64	-	-	.228 (.695)	-
Proxies for efficiency growth:				
Business rank	.000004 (.0003)	.00001 (.0005)	-.00006 (.0003)	-.0006 (.0004)
Foreign direct investment growth	-.00008 (.00009)	.00003 (.00009)	-.00009 (.0001)	-.0001 (.0003)
Days to start a business	-	.0001 (.0001)	-	-
Length of paved roads	-	-.0002 (.0008)	-	-
Observations	103	63	103	103
R ²	.505	.590	.538	.407

Notes: *Significant at the 10% level; ** significant at the 5% level; *** Significant at the 1% level.. Robust standard errors are reported in parentheses. All specifications include regional indicator variables, the population level in 2004, and the population density in 2004. R² = share of total variation in the dependent variable explained by the regression.

Source: Euromonitor, International.

income, or unobserved factors which cause both income and penetration of modern formats to be high.

Although there is little correlation between penetration growth and the proxies for efficiency growth, these empirical patterns do not imply that there is no efficiency gain associated with modern grocery retailing. However, the lack of correlations between growth in modern grocery retailing and the efficiency growth proxies above, combined with the lack of strong evidence that consumers pay lower prices at modern grocery retailers, suggest that further empirical study on how modern grocery retailing might affect food prices by improving supply chain efficiency is warranted.

Growth in Packaged and Pre-Prepared Foods

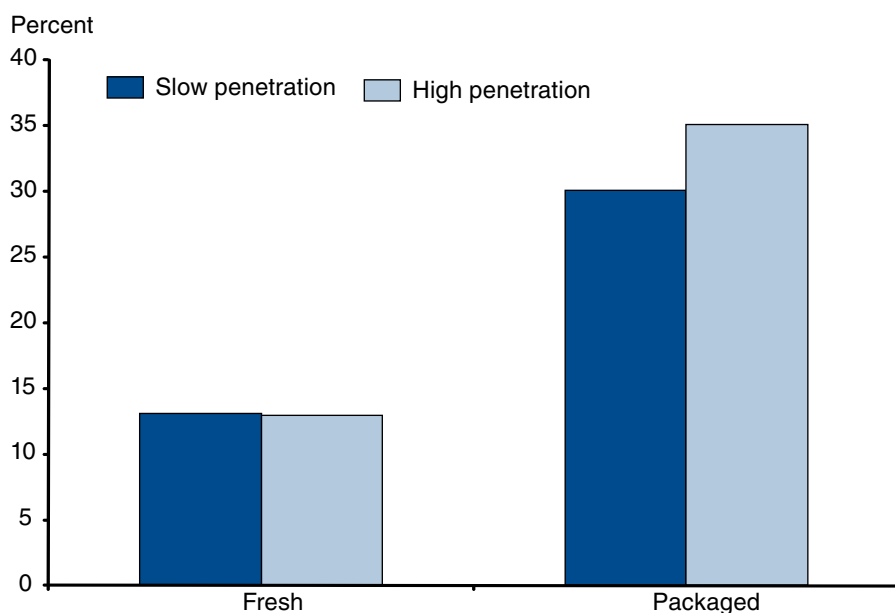
The expansion of modern food retailing appears to be correlated with nonprice factors such as convenience, as corroborated in analysis of the types of goods sold through modern formats. The expectation is that countries with rapid growth in modern formats, based on consumer demand for convenience and diet diversity, would also exhibit strong growth in sales of pre-prepared and packaged foods. This issue is studied by splitting the sample of 103 countries in half based on fastest versus slowest growth in modern formats, and comparing the average growth in total food sales for both fresh and packaged foods. Sales of total packaged foods grew somewhat faster in countries where penetration grew most, although the difference is not large (fig. 4). There was, however, essentially no difference in growth between these two groups of countries in the sale of fresh food.¹³

The growth of packaged food sales was not uniform across different food categories, with large differences in sales growth between high- and low-penetration countries for specific types of packaged foods. Sales growth across the readymade convenience food categories was generally faster in high-penetration countries (fig. 5a), and the growth rate was twice as fast or faster in some categories such as snacks and snack bars, baby food, ice cream, soups, and meal replacements (fig. 5b).

However, to make sure that these differences are statistically significant and not capturing differences in GDP per capita, we also estimate the following specification:

¹³Neither of these differences in averages between the two groups are statistically significant at standard significance levels. The p-value for the difference in growth of packaged food between the two types of countries is .311; the p-value for the difference in growth of fresh food is .943.

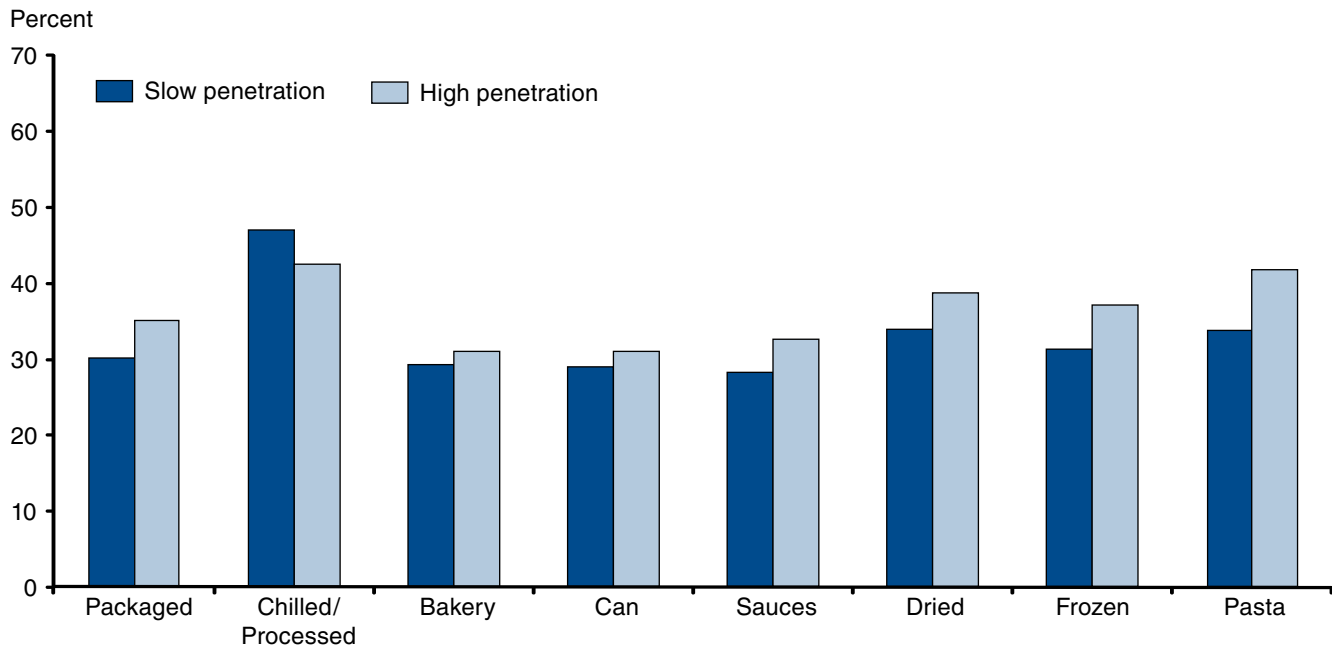
Figure 4
Annual growth in sales of packaged and fresh foods by rate of retail penetration, 1999-2009



Source: Euromonitor, International.

Figure 5a

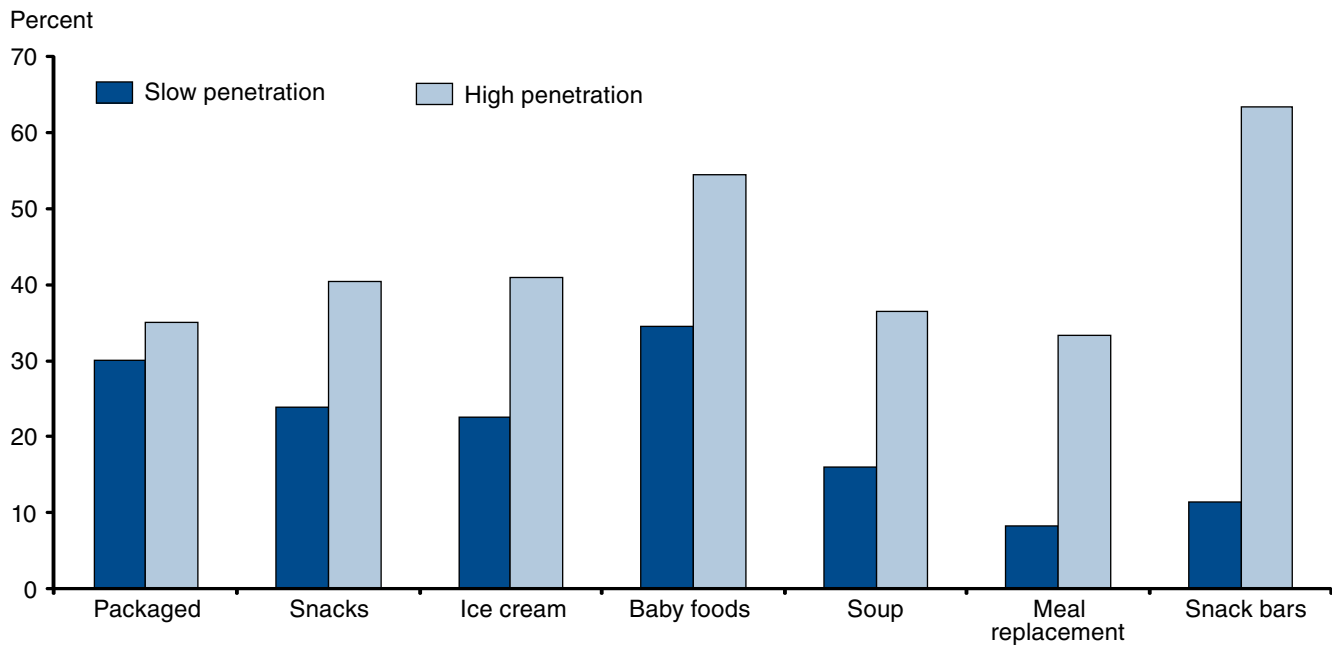
**Annual growth in sales of packaged foods by rate of retail penetration, 1999-2009:
subcategories with small differences in sales growth**



Source: Euromonitor, International.

Figure 5b

**Annual growth in sales of packaged foods by rate of retail penetration, 1999-2009:
Subcategories with large differences in sales growth**



Source: Euromonitor, International.

$$\text{Growth in Packaged Food Category}_i = \beta_0 + \beta_1 \Delta \text{PenDif}_i + \beta_2 \text{GDPPerCapita}_i + \beta_3 \text{GDPGrowth}_i + u_i$$

where *Growth in Packaged Food Category_i* is the growth in each of the six subcategories of packaged foods in figure 5b; Δ *Penetration* is the change in penetration of modern grocery retailing as defined in appendix table 1; *GDP* is the level of GDP per capita in 2004; and *GDP Growth* is growth in GDP between 1999 and 2009.

Estimates of this specification are reported in table 4. These results suggest that the differences in growth of these particular types of packaged foods are not capturing GDP differences and that sales of these particular food items are growing faster in places where modern grocery retailing is growing faster.¹⁴

The pattern of faster growth in demand for packaged and convenience foods accompanying the penetration of modern food retailers can also be observed in the pattern of food import demand. World Trade Atlas data on imports of packaged foods were available for 33 of our samples' 103 developing and middle-income countries. Using this restricted sample, the relationship between modern retail penetration and import demand was estimated using the following specification:

$$\Delta \text{ProcessedImports} = \beta_0 + \beta_1 \Delta \text{Penetration}_i + \beta_2 \text{GDP}_i + \beta_3 \text{GDPGrowth}_i + u_i$$

where $\Delta \text{ProcessedImports}$ is the change in the value of imports (from chapters 19-21 of the Harmonized System) for country *i* between 1999 and 2009; $\Delta \text{Penetration}$ is the change in the penetration of modern grocery retailing between 1999 and 2009; and *GDP* and *GDPGrowth* are defined as before.

Although the estimates are derived from only a subset of countries in the original data set, the results indicate that imports of packaged foods are growing faster in countries where penetration of modern grocery retailing is growing fastest (table 5, column 1). In addition, these correlations are robust to the inclusion of both GDP per capita and GDP growth in column 2.¹⁵

¹⁴The relationship between penetration difference and growth in Meal Replacement and Snack Bars is less precise than the other relationships. This follows from the smaller number of countries that consumed these goods at all in 2009. All countries where consumption of these goods was not reported in either year (1999 or 2009) were assigned a growth rate of 0. All other goods were consumed in all 103 countries.

¹⁵Given the small number of observations, it is necessary to assume that the errors are normally distributed in order for these statistical inferences to be valid. A histogram of the estimated residuals is in fact bell-shaped, suggesting the assumption is not obviously violated.

Table 4

Relationship between growth in processed foods and the change in modern retailing penetration

	Dependent variable: Growth in sales in processed food subcategory					
	Snacks	Ice cream	Baby foods	Soup	Meal replacement	Snack bars
Δ Penetration	1.17** (.481)	1.28*** (.429)	1.79*** (.435)	1.37*** (.513)	1.85 (1.17)	4.98 (3.91)
GDP per capita	-.002 (.002)	-.0007 (.002)	-.002 (.002)	.0002 (.002)	.002 (.003)	-.003 (.009)
GDP growth	-.026 (.029)	.036 (.027)	-.049 (.069)	-.031 (.033)	-.059 (.051)	-.107 (.099)

Notes: Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level. Robust standard errors are reported in parentheses. All specifications contain 103 observations.

Source: Euromonitor, International.

Table 5

Relationship between imported processed food and the expansion of modern grocery retailing

	Dependent variable: Δ Processed imports	
	(1)	(2)
Δ Modern penetration	7.07*** (2.32)	5.27** (2.21)
GDP per capita	-	-.033 (.020)
GDP growth	-	2.39** (.892)
Observations	33	33
Controls?	No	Yes
R ²	.255	.430

Notes: * Significance at the 10% level; ** Significance at the 5% level; *** Significance at the 1% level. Robust standard errors are reported in parentheses. R² = share of total variation in the dependent variable explained by the regression.

Source: Euromonitor, International.

These patterns are consistent with consumers patronizing modern formats, at least in part, for added convenience. The correlation between growing imports and penetration of modern grocery retailing might interest U.S. food processors trying to find new markets for their goods.

Conclusions

Modern grocery retailing is expanding quickly in many developing countries, which has implications for food demand and trade. This report hypothesizes that two mechanisms are potentially important in explaining the growth in modern food retailing. First, modern retailers may be meeting rising demands for dietary diversity, shopping and preparation convenience, and food safety that are commonly associated with rising incomes among some groups of consumers. Second, modern grocery retailers may be investing in the supply chain and improving efficiency, which can lead to a stream of efficiency gains to be shared between producers and consumers. The potential impact of improved marketing efficiency on food demand and trade is possibly more significant in a developing-country context than in more developed countries because lower income consumers tend to be more responsive to income and price changes, and because agriculture and food account for relatively large shares of both income and expenditures in developing-country households.

This report finds that the growth of modern grocery retailing in developing countries is correlated with the share of the working-age population, which suggests that demand factors such as increased convenience might be important to that expansion. This finding is supported by sales of convenient packaged foods, which are growing fastest in countries where modern grocery retailing is expanding the most. On the other hand, this report finds no correlation between the growth of modern grocery retailing and factors that would support efficiency gains in a country, such as better business environments and infrastructure. This lack of a correlation is not conclusive but, combined with the lack of primary data sources on how much modern grocery retailers are investing in the supply chain, these findings warrant further empirical study of how modern retailers might be affecting the supply chain.

References

- Artz, G., M. and K.E. Stone (2006). "Analyzing the Impact of Wal-Mart Supercenters on Local Food Store Sales," *American Journal of Agricultural Economics*, vol. 88, issue 5, pp. 1296-1303.
- Associação Brasileira de Supermercados (ABRAS) (2010). Accessed January 2011 at <http://www.abrasnet.com.br>.
- Belik W., and R. dos Santos (2002). "Regional Market Strategies of Supermarkets and Food Processors in Extended MERCOSUR," *Development Policy Review* 20(4): 515-528.
- Binkley, J.K., and J.M. Connor (1996). "Market Competition and Metropolitan-Area Grocery Prices." Working Paper #44, Food Marketing Policy Center, University of Connecticut.
- Birthal, P.S., P.K. Joshi, and A. Gulati (2005). "Vertical Coordination in High Value Commodities: Implications for the Smallholders." MTID Discussion Paper No. 85. International Food Policy Research Institute. Washington, DC.
- Boselie, D., H. Spencer, and D. Weatherspoon (2003). "Supermarket Procurement Practices in Developing Countries: Redefining the Roles of the Public and Private Sectors," *American Journal of Agricultural Economics* 85(4): 1155-1161.
- Chavez, M. (2002). "The Transformation of Mexican Retailing with NAFTA," *Development Policy Review* 20(4): 503-513.
- Cotterill, R.W. (1986). "Market power in the retail food industry: Evidence from Vermont," *Review of Economics and Statistics*, Vol. 68.
- Cotterill, R.W., and C.D. Harper (1995). "Market power and the Demsetz quality critique: an evaluation for food retailing." Food Marketing Policy Center Research Report No. 29. University of Connecticut.
- Cotterill, R.W. (2006). "Antitrust Analysis of Supermarkets: Global Concerns Playing Out in Local Markets," *Australian Journal of Agricultural and Resource Economics* 50 (1): 17-32.
- Competition Commission (2000). "Supermarkets: A Report on the Supply of Groceries from Multiple Stores in the United Kingdom." London: Her Majesty's Stationary Office.
- Currah, A., and N. Wrigley (2004). "Networks of Organizational learning and adaptation in Retail," *Global Networks* 4: 1-23.
- Deaton A., and S. Subramanian (1996). "The Demand for Food and Calories," *Journal of Political Economy* 104 (1): 133-161.
- Dries L., T. Reardon, and J.F.M. Swinnen (2004). "The Rapid Rise of Supermarkets in Central and Eastern Europe: Implications for the

- Agrifood and Rural Development,” *Development Policy Review*, vol. 22, no. 5, pp. 525-556.
- FAO (2009). “Russian Federation: Analysis of the Agribusiness Sector in Southern Russia.” FAO Report Series – N. 13.
- Faigenbaum, S., J. Berdegue, and T. Reardon (2002). “The Rapid Rise of Supermarkets in Chile: Effects on Dairy, Vegetable, and Beef Chains,” *Development Policy Review* 20(4): 459-471.
- Farina, E. (2002). “Consolidation, Multinationalisation, and Competition in Brazil: Impacts on Horticulture and Dairy Products Systems,” *Development Policy Review* 20 (4): 441-457.
- Gale F., and D. Hu (2007). “Supermarkets in China: Fierce competition brings change,” *Farm Institute Insights* 4(2): 3-5.
- Goetz, S.J. (2006). “Wal-Mart and Social Capital,” *American Journal of Agricultural Economics* 88(5): 1304-1310.
- Goetz, S.J., and H. Swaminathan (2006). “Wal-Mart and County-Wide Poverty,” *Social Sciences Quarterly* 87(2): 211-226.
- Goldman, A., and W. Vanhonacker (2006). “The Food Retail System in China: Strategic Dilemmas and Lessons for Retail Internationalization/Modernization.” Globalizing Retail Seminar, University of Surrey, UK. <http://www.som.surrey.ac.uk/research/groups/globalizingretailseminar/Goldman.pdf>.
- Hausman, J., and E. Leibtag (2007). “Consumer benefits from increased competition in shopping outlets: Measuring the effect of Wal-Mart,” *Journal of Applied Econometrics*, 22: 1157–1177.
- Hernández, R., T. Reardon, and J.A. Berdegue (2007). “Supermarkets, Wholesalers, and Tomato Growers in Guatemala,” *Agricultural Economics* 36(3), May: 281-290.
- Hu, D. (2006). “Supermarket Development (in Chinese).” Report to China Ministry of Commerce.
- Hu, D. (2007). “Investigation Report on Pork Support Chain in Zizhong County Sichuan Province (in Chinese).” Unpublished Manuscript, Institute of Agricultural Economics, Chinese Academy of Agricultural Sciences.
- Hu, Y., Z. Huang, G. Hendrikse, and X. Xu (2005). “Organization and Strategy of Farmer Specialized Cooperatives in China.” ERIM Report Series Research Management, ERS-2005-059-ORG.
- Instituto Brasileiro de Geografia e Estatística (IBGE) (2010). *Pesquisa Anual de Comercio*. Accessed January 2011 at <http://www.ibge.gov.br>.
- Kaufman, P., and C.R. Handy (1989). “U.S. Fresh Produce Markets: Marketing Channels, Trade Practices, and Retail Pricing.” U.S.

- Department of Agriculture, Economic Research Service. Agricultural Economic Report No. 825.
- Koester, U. (2005). "A Revival of Large Farms in Eastern Europe- How Important are Institutions?" *Agricultural Economics* 32(1), pp. 103-114.
- Landes, M. (2008). *The Environment for Agricultural and Agribusiness Investment in India*. U.S. Department of Agriculture, Economic Research Service. EIB-37. <http://www.ers.usda.gov/Publications/EIB37>.
- Landes, M., and M. Burfisher (2009). *Growth and Equity Effects of Agricultural Marketing Efficiency Gains in India*. U.S. Department of Agriculture, Economic Research Service. Economic Research Report No. 89. www.ers.usda.gov/publications/err89.
- Landes, M., S. Persaud, and J. Dyck (2004). "India's Poultry Sector: Development and Prospects." U.S. Department of Agriculture, Economic Research Service. Agriculture and Trade Report No. WRS04-03. <http://ers.usda.gov/publications/WRS0403>.
- Minot, N., and D. Roy (2007). "Impact of High-Value Agriculture and Modern Marketing Channels on Poverty: An Analytical Framework." Unpublished manuscript, Trade and Institutions Division, International Food Policy Research Institute, Washington, DC.
- Minten, B., and T. Reardon (2008). "Food Prices, Quality, and Quality's Pricing in Supermarkets Versus Traditional Markets in Developing Countries," *Review of Agricultural Economics* 30(3): 480-490.
- Minten, B., T. Reardon, and R. Sutradhar (2010). "Food Prices and Modern Retail: The Case of Delhi," *World Development*, Vol. 38, No. 12, pp. 1775-1787.
- Minten, B., L. Randriannarison, and J.F.M. Swinnen (2009). "Global Retail Chains and Poor Farmers: Evidence from Madagascar," *World Development*, Vol. 37, No. 11, pp. 1728-1741.
- Minten, B., T. Reardon, and A. Vandeplas (2009). "Linking Urban Consumers and Rural Farmers in India A Comparison of Traditional and Modern Food Supply Chains," IFPRI Discussion Paper 00883, New Delhi.
- Reardon, T., and C.P. Timmer (2007). "Transformation of Markets for Agricultural Output in Developing Countries Since 1950: How Has Thinking Changed?" in R.E. Evenson and P. Pingali (eds). *Handbook of Agricultural Economics*. Amsterdam: Elsevier Press.
- Reardon, T., C. Timmer, C. Barrett, and J. Berdegue (2003). "The Rise of Supermarkets in Africa, Asia, and Latin America," *American Journal of Agricultural Economics* 85(5): 1140-1146.
- Reardon, T., and J.A. Berdegue (2002). "The Rapid Rise of Supermarkets in Latin America: Challenges and Opportunities for Development," *Development Policy Review* 20 (4): 317-334.

- Rylko, D., and R.M. Jolly (2005). "Development of Agroholdings in Russian Agriculture," *Comparative Economic Studies* 47 (1): 1-14.
- Schwentesius, R., and M. Gomez (2002). "Supermarkets in Mexico: Impacts on Horticultural Systems," *Development Policy Review* 20 (4): 487-502.
- Swinnen, J.F.M., and A. Vandeplas (2007). "Quality, Efficiency Premia, and Development." Discussion Paper 184, LICOS Centre for Institutions and Economic Performance, Katholieke Universiteit Leuven.
- Traill, W. (2006). "The Rapid Rise of Supermarkets?" *Development Policy Review* 24 (2): 163-174.
- Tschirley D., M. Ayieko, M. Mathenge, and M. Weber (2004). "Where Do Consumers in Nairobi Purchase Their Food and Why Does This Matter? The Need for Investment to Improve Kenya's Traditional Food Marketing System." Tegemeo Institute of Agricultural Policy and Development, Policy Brief #2, Egerton University.
- U.S. Department of Agriculture, Foreign Agricultural Service (2009). "India: The Retail Food Sector – 2009." GAIN Report IN1005.
- U.S. Department of Agriculture, Foreign Agricultural Service (2009). "Brazil Retail Food Sector." GAIN Report BR9012.
- Veeck, A., and G. Veeck (2000). "Consumer Segmentation and Changing Food Purchase Patterns in Nanjing, PRC," *World Development* 28 (3): 457-471.
- Wang, H., X. Dong, S. Rozelle, J. Huang, and T. Reardon (2006). "Producing and Procuring Horticultural Crops with Chinese Characteristics: A Case Study in the Greater Beijing Area." Staff Paper 2006-05, Department of Agricultural Economics, Michigan State University.
- Wrigley, N., N. Coe, and A. Currah (2005). "Globalizing Retail: Conceptualizing the Distribution-Based Transnational Corporation," *Progress in Human Geography* 29: 437-457.

Appendix

Appendix Table 1

Variable	Description	Sample average (Standard deviation)
Δ Penetration _i	The difference in the share of total expenditure on grocery retailing accounted for by modern formats—hypermarkets, supermarkets, and chained convenience stores. Specifically, it is: $(\text{Modern Expenditure}_{2009} / \text{Total Expenditure}_{2009} - \text{Modern Expenditure}_{1999} / \text{Total Expenditure}_{1999})$.0804 (.114)
Penetration _i	The share of total expenditures on grocery retailing accounted for by modern formats—hypermarkets, supermarkets, and chained convenience stores. Specifically, it is: $\text{Modern Expenditure}_{2004} / \text{Total Expenditure}_{2004}$.247 (.196)
GDPGrowth _i	Percentage change in GDP between 1999 and 2009. Specifically, it is: $(\text{GDP}_{2009} - \text{GDP}_{1999}) / \text{GDP}_{1999}$	1.10 (.782)
GDP _i	GDP per capita in thousands of U.S. dollars per person. This was obtained by dividing the level of GDP in millions of U.S. dollars in 2004 by the population level in thousands of people in 2004.	9.82 (12.3)
PopGrowth _i	Percentage change in GDP between 1999 and 2009. Specifically, it is: $(\text{Population}_{2009} - \text{Population}_{1999}) / \text{Population}_{1999}$.233 (.235)
ShareWorking _i	The share of total population between age 15 and 64 in 2004. Specifically, it is: $\text{Population Age 15-64}_{2004} / \text{Total Population}_{2004}$.619 (.069)
BusRank _i	Ranking covers the period from June 2008 to May 2009. The ease-of-doing-business index ranks economies from 1 (best) to 183 (worst), calculated as the ranking on the simple average of its percentile rankings on each of the ten topics covered in <i>Doing Business</i> 2010, published by the World Bank.	103.2 (51.8)
PavedRoad _i	Share of total roads that were paved in 2004, as reported by the World Bank.	.417 (.304)
DaysStartBus _i	Average number of days to start a business, as calculated in 2004 by the World Bank.	56.8 (75.7)
FDI Growth _i	Percentage change in FDI between 1999 and 2009. Specifically, it is: $(\text{FDI}_{2009} - \text{FDI}_{1999}) / \text{FDI}_{1999}$.012 (70.5)
Growth in Packaged Food Category _i	Equals the percentage change in sales in particular types of packaged foods between 1999 and 2009. Specifically, it is: $(\text{Packaged-Category}_{2009} - \text{Packaged-Category}_{1999}) / \text{Packaged-Category}_{1999}$	-
Δ ProcessedImports _i	Percentage change in value of imports (from chapters 19-21 of the Harmonized System) between 1999 and 2009. Specifically, it is: $(\text{Imports}_{2009} - \text{Imports}_{1999}) / \text{Imports}_{1999}$	2.47 (2.08)

Notes:

1. All data acquired from Euromonitor, International. There are 103 countries in the data set; for Share of Roads that are Paved, Days to Start a Business, and Δ ProcessedImports, values are reported for 94, 67, and 33 countries respectively.
2. Column 1 reports the variable name; column 2 defines each variable; and column 3 reports the sample average, with the standard deviation reported in parentheses.

FDI = Foreign direct investment. GDP = Gross Domestic Product.

Appendix: Country List

Afghanistan, Albania, Antigua, Argentina, Armenia, Bahamas, Bahrain, Belize, Benin, Botswana, Brazil, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cape Verde, Central African Republic, Chad, Chile, China, Colombia, Comoros, Côte d'Ivoire, Czech Republic, Djibouti, Dominica, Egypt, El Salvador, Equatorial Guinea, Eritrea, Ethiopia, Fiji, Gabon, Gambia, Ghana, Grenada, Guyana, Haiti, Honduras, Hong Kong, Hungary, Indonesia, Israel, Jamaica, Jordan, Kuwait, Kyrgyzstan, Laos, Lebanon, Lesotho, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Morocco, Mozambique, Namibia, Nicaragua, Niger, Oman, Panama, Papua New Guinea, Paraguay, Philippines, Poland, Qatar, Russia, Rwanda, Samoa, Sao Tomé e Príncipe, Senegal, Seychelles, Singapore, Slovakia, Solomon Islands, South Africa, St Kitts, St Lucia, St Vincent and the Grenadine, Sudan, Suriname, Swaziland, Syria, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Turkmenistan, Uganda, Ukraine, Vanuatu, Venezuela, Vietnam, Yemen, Zambia