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Anita Regmi, Hiroyuki Takeshima, and Laurian Unnevehr

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Abstract

Using food expenditures and food sales data over 1990-2004, this report examines whether food consumption and delivery trends are converging across 47 high- and middle-income countries. Middle-income countries, such as China and Mexico, appear to be following trends in high-income countries, measured across several dimensions of food system growth and change. Convergence is apparent in most important food expenditure categories and in indicators of food system modernization such as supermarket and fast-food sales.

Keywords: food expenditure, food delivery, food demand convergence, retail food sales, foodservice sales, food label claims, supermarket sales, fast-food sales, global food market.

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Summary

Globalization and income growth are resulting in increasing similarities worldwide in diets and food delivery mechanisms. Using consumer food expenditure data and food vendors' sales data, this report demonstrates that food-purchasing patterns and food delivery mechanisms of high-income countries are being increasingly copied by both upper middle-income countries (Mexico and Poland, for example) and lower middle-income countries (Brazil and China, for example).

What Is the Issue?

With increasing convergence in food systems, both the benefits and problems associated with modern food delivery are becoming more universal. For example, income growth and globalization of the food industry have improved access to and availability of an array of nutritious food products worldwide, promoting global trade in these products. The ongoing changes in food supply chains have contributed to modernization of food marketing in many developing countries, spurring agribusiness development and the establishment of modern food standards and regulations.

However, greater access to highly processed and calorie-rich foods has also led to an increased incidence of obesity worldwide. And globalization, which facilitates the standardization of food delivery, also heightens the risk of cross-border food contamination. Given such potential concerns, there is a need to better understand the dynamics of the global food industry, the pace and direction of change in food consumption patterns, and the evolution of the food retailing and foodservice (restaurant) sectors across countries.

What Did the Study Find?

Middle-income countries are beginning to resemble high-income countries in their food purchasing patterns at both retail and foodservice outlets. Middle-income countries appear to be following trends associated with high-income countries, with upper middle-income countries fast approaching the per capita expenditure and sales levels of high-income countries and lower middle-income countries also gaining.

Analyses of food expenditures across 47 countries indicate significant convergence in consumption patterns for total food, cereals, meats, seafood, dairy, sugar and confectionery, caffeinated beverages, and soft drinks. That convergence reflects consumption growth in middle-income countries due to rapid modernization of their food delivery systems, as well as to global income growth.

The convergence trends were faster in the early 1990s but slowed somewhat during the late 1990s and early 2000s, perhaps a result of slower income growth during the latter period. Convergence in total food expenditures, though, remains significant, particularly for meat, dairy, sugar, and caffeinated beverages.

Significant convergence in food expenditures for high-value products and packaged food implies a modernized food delivery system that makes these products available to consumers. Convergence across high- and middle-income countries is evident in several measures of food system modernization, including consumer expenditures on packaged foods, supermarket sales, and foodservice (particularly fast-food) sales.

The analysis also found evidence of convergence in the attributes of new food products introduced in both high- and middle-income countries. The share of labels with attribute claims of "natural," "convenient," or "high quality" tends to increase with the affluence of a given market. Convenience, for example, accounted for 27 percent of all label claims in Japan (a high-income country), 12 percent of total claims in Mexico (an upper middle-income country), and 6 percent of claims in Egypt (a lower-middle-income country). Such differences are to be expected given the higher opportunity cost of time in high-income economies.

Labels claiming healthful nutrients, such as added vitamins and minerals, showed a reverse trend, accounting for 51 percent of all claims in Indonesia (lower middle-income), 33 percent in Hungary (upper middle-income), and 27 percent in Japan. Even though preferences in developing countries are evolving toward those of consumers in high-income countries, many consumers in developing countries still prioritize obtaining adequate nutrition. Consumers in high-income countries, who may take adequate nutrition as a given, focus more on avoiding unwanted nutrients (as represented, for example, in the sale of low-fat foods) or attaining other attributes like organic sourcing.

Findings of convergence in food expenditures are important because they imply that demand for higher valued food products will continue to be strong in developing countries. As market opportunities for agricultural producers, distributors, and retailers grow in these countries, regulations and standards for food safety and quality will become increasingly important.

How Was the Study Conducted?

Annual data on 47 countries were collected from Euromonitor International for food expenditures and for total food sales from retail and foodservice outlets, covering 1990-2004. Data on product label claims were obtained from Product Scan, covering 2001-05. Using regression analysis, the expenditure and sales data were examined to evaluate whether convergence trends exist in food expenditure patterns and in food sales by retail outlet type across different countries. While past studies have examined convergence in food consumption patterns among high-income countries in Europe and North America, this study expands the analysis to cover middle-income countries and methods of food delivery.

Consumer demand for various food attributes was also analyzed using label claims on new products introduced in high- and middle-income markets. Convergence trends in expenditures were analyzed for total food, packaged food, and 11 food subgroups. Convergence trends in food delivery examined food sales from retail outlets such as supermarkets, hypermarkets, discounters, and convenience stores, while trends in foodservice outlets included fast-food sales and total foodservice sales.

Introduction

Food markets throughout the world are being reshaped by income-driven changes in consumer demand coupled with expansion of food product and retail models from high- income countries. Consumers in developing countries have used their growing incomes to upgrade diets, increasing their demand for meats, dairy products, and other higher value food products (Regmi and Gehlhar, 2005). Increasing affluence has also coincided with higher sales for labor-saving food products and for products perceived to be safer, more healthful, or produced in accord with environmental considerations, animal welfare, and equitable labor practices. The global expansion of multinational retail and foodservice chains has shaped tastes and diets and begun to standardize the manner in which food is produced, delivered, and consumed around the world (Unnevehr, 2004), in keeping with the "deep integration" phenomenon (Birdsall and Lawrence, 1999). As the food marketing and retail sector evolves in middle-income countries, consumers buy fewer raw commodities and more value-added and/or processed products (Reardon and Timmer, 2007).

Changes in food preferences and food delivery mechanisms are often mutually reinforcing, as when modern retailing increases access to processed foods or to perishable meats, fruits, and vegetables. Quality attributes then become more similar as a larger share of food demand is met through uniformly processed foods or through regulated food chains. Convergence in food systems means that both the benefits and problems associated with changes in local diets will rapidly become global issues. Increased consumption of processed foods, which tend to have high levels of fats and added sugars, has been posited as contributing to the global obesity epidemic (Popkin, 2007). The potential hazards when food supply chains cross multiple national boundaries has recently been exemplified by FDA restrictions on seafood imports from China (Martin, 2007). Thus, food policy issues may also grow more similar across countries. Interventions in particular countries to set safety standards or to impart nutritional information can have global consequences for health.

Just how widespread is convergence in global food markets? Does it extend to most food product categories and methods of food delivery, and to countries that are only recently urbanized?

Past studies have examined trends in food expenditures and food markets on a regional basis. Convergence between the North American and European food systems has been documented by Blandford (1984), Hermann and Röder (1995), Cotterill (1997), and Regmi and Unnevehr (2006). The regional transformation of food marketing systems in developing countries, and the potential impact on local producers, has been the focus of studies by Reardon and colleagues (e.g., Reardon and Timmer, 2007). However, no study has explicitly addressed whether convergence is evident across food systems at different levels of development.

This report examines whether convergence trends exist across high-income, upper middle-income, and lower middle-income countries, and whether they are evident in food expenditure patterns, food delivery mechanisms, and

food attributes. In doing so, the study addresses whether convergence in food demand is occurring in economies with very different food cultures and historical food preferences. To test for similarities in food delivery systems and their evolution, we statistically examine whether converging trends are evident in food retailing and foodservice sectors across high-income and middle-income countries. We use product label claims to examine whether consumer demand for different product attributes is similar among high- and middle-income countries.

Background

The term "convergence" implies dynamics, or movement toward some common outcome. Convergence has been defined and examined most often as convergence in income levels. Barro and Sala-i-Martin (1992) defined beta convergence, in which the income growth of lower income regions or countries is faster than the world average and that of high-income regions is slower. The faster growth rates imply that lower income regions will eventually "catch up" with higher income regions and all regions will reach a "steady state." The concept of convergence has been applied to food expenditures to assess for example, if income dynamics and market integration, in the European Union (Hermann and Röder, 1995; Gil et al., 1995) are overcoming historical differences in preferences.

In food demand, the dynamics leading to convergence are driven primarily by income growth. It has long been recognized that diets change in predictable ways as incomes rise. For example Bennett's Law states that the share of animal products in calories consumed increases as incomes rise (Bennett, 1941; Delgado et al., 1999). Recent research has highlighted how dietary upgrades in middle- and high-income countries include high-value products, in addition to meat (Regmi and Gehlhar, 2005). Generally, these changes in food consumption patterns include an increased demand for services and quality attributes, and are accompanied by the modernization of the retail sector (Reardon and Berdegué, 2002). Seale et al. (2003) demonstrate that lower income consumers make bigger changes in food expenditures as income levels change. For example, an average consumer in the United States is expected to increase meat expenditures by 1-percent for every 10-percent increase in income. But, in a middle-income country such as Brazil, a 10-percent increase in income is likely to translate to a 7-percent increase in meat expenditures. As income-induced changes occur more rapidly in lower income countries, consumption patterns across countries trend toward convergence. The projected outcome is some universal "saturation" level of demand for food, including demand for higher quality food, which is achieved at high income levels.

Regmi and Unnevehr (2005) examined whether the coefficient of variation (CV) in food expenditures among 18 high-income countries was declining over time, and found convergence in broad categories such as cereals, meats, and overall food expenditures. The study also indicated convergence in food retailing across these countries from 1998 to 2004, with standardized outlets such as supermarkets and hypermarkets replacing independent stores. (Convergence in food retail outlets was not formally tested.) Finally, similar food products appeared to be introduced in the United States and Europe, with the number of products claiming greater convenience, better quality, or improved natural or nutritional attributes growing.

In this report, Regmi and Unnevehr's study is expanded to cover 47 countries that are grouped into the original 18 high-income countries, 10 other high-income countries, 7 upper middle-income countries, and 12 lower middle-income countries (table 1). Convergence is tested using β-convergence, as defined by Barro and Sala-i-Martin (1992). Convergence tests are extended beyond total food expenditures, to method of food delivery, as evident in

sales of different retail and foodservice outlets. Finally, product label claims, assumed to reflect underlying consumer preferences, are again examined to ascertain whether the product trends noted among a few high-income countries are apparent in the larger cross-section of countries.

Table 1
Countries included in the analysis

Original 18 countries		Other high-income	Upper middle-income	Lower middle-income
Canada	Belgium	Norway	Czech Republic[1]	Brazil[1]
USA[1]	Finland	Switzerland	Hungary[1]	Colombia
Australia	Greece	Singapore	Poland	Peru
Japan[1]	Italy	South Korea	Chile	China[1]
France[1]	Spain	Taiwan	Mexico[1]	Indonesia[1]
UK[1]	Sweden	New Zealand	Malaysia[1]	Philippines
Germany[1]	Denmark	Israel	South Africa[1]	Thailand[1]
Netherlands	Ireland	Kuwait		Algeria[2]
Austria	Portugal	Saudi Arabia		Egypt[1]
		United Arab Emirates		Jordan
				Morocco
				Tunisia

Countries are grouped based on World Bank's classification, using 2003 PPP data.

[1]Denotes countries for which product label data were available.

[2]Excluded in the analysis of packaged foods.

Data and Methodology

Data on 47 countries were obtained from Euromonitor International, which derives its expenditure estimates from national statistics and statistics available from other agencies such as the OECD, Eurostat, and the World Bank (appendix B). Data on retail and foodservice sales are collected by Euromonitor staff in regional offices. Data on product label claims were obtained from Product Scan, a service of Datamonitor, which reports new product introductions in many countries (appendix C).

Total food expenditures and expenditures on different food categories were available, in current U.S. dollars, on a per capita basis for 1990-2004. Data on retail sales of packaged food products (in current U.S. dollars) were available for 1998-2005, while data on product label claims were obtained for 15 countries (see table 1) for 2001-2005. Data on food sales share by different outlets—such as supermarkets, hypermarkets, convenience stores, and foodservice—were available for 1999-2004 (see appendix B). Middle- and high-income countries were selected for analysis based on whether the country was represented in both the expenditure and sales data, and whether data were available for all years included in the analysis.

The model specification used to examine convergence follows Barro and Sala-i-Martin (1992, p. 247) and is presented below.

$$\left(\frac{1}{T}\right)\log(y_{i,t_0+T}) = B + \frac{e^{-\beta T}}{T}\log(y_{i,t_0}) + u_{i,t_0,t_0+T} \quad (1)$$

Above, y_{i,t_0+T} is the expenditure level in the ending year, and y_{i,t_0} is the expenditure level in the starting year; the subscript *i* denotes a particular country and T is the number of years in the data series. β, which can be interpreted as some measurement of the speed of convergence, is represented as (Barro and Sala-i-Martin, 1992, p. 247):

$$\beta = -\frac{ln(T * slope)}{T}. \quad (2)$$

The slope in equation (2) is the coefficient estimate of $\log(y_{i,t_0})$ in equation (1). The standard error of β, $SE(\beta)$, can be asymptotically estimated by equation (3).

$$SE(\beta) \approx \left|\frac{1}{T * slope}\right| * SE(slope). \quad (3)$$

A positive β indicates convergence and a negative β indicates divergence, with the speed of convergence reflected by the magnitude of β. For food expenditures, the expenditure at the end of the period of observation is determined by the expenditure in the beginning (1990) and the convergence expenditure that will be reached at some steady state. A significant positive β indicates that countries with lower expenditures are experiencing faster growth in expenditures and "catching up" to countries with high expendi-

tures.[1] However, the intercept may also be influenced by structural factors that vary among groups of countries, putting them on a path to a different steady state. Barro and Sala-i-Martin (1992) posit that the intercept in equation (1) may vary among countries with differences in technology or preferences. These types of structural differences, such as lower labor costs in food processing or delivery, may also influence convergence in the food sector.

Since the rate of convergence can be influenced by such structural differences, data are examined for 4 separate groups: the initial 18 high-income countries included in the analysis by Regmi and Unnevehr (2005), other high-income countries, upper middle-income countries, and lower middle-income countries. Food expenditure patterns are distinct across the four groups (table 2), and indicate various levels of food system modernization. The original 18 high-income countries, with the most modern food systems, have the largest share of total food sales occurring in standardized retail outlets. These countries also have higher per capita expenditures on foodservice and on soft drinks, both indicators of modern food delivery systems. Lower middle-income countries, with the least modernized food systems, register the smallest share of food sales in standardized retail outlets, and the lowest per capita expenditures on foodservice and soft drinks. However, with rapidly growing economies, middle-income countries are witnessing more standardized retail and foodservice outlets.

Wealthier countries have higher total food expenditures (although the food share of total expenditures is smaller), but middle-income countries show faster growth in food expenditures. Figure 1 indicates that countries with lower initial food expenditures (within each group) experienced faster growth over 1990-2004, in expenditures, or beta convergence.[2] Faster growth for countries with lower food expenditures implies that they are "catching up" to countries with higher expenditures. The rate of convergence appears similar, but each income group appears to be on a path toward a somewhat different steady state. Therefore, the intercept in equation (1) could differ for countries at different levels of development. Accordingly, dummy variables are used to denote country groupings in the actual estimation: d_H for high-income countries other than the original 18, d_{UM} for upper middle-income countries, and d_{LM} for lower middle-income countries.

---

[1] A positive β is associated with a negative slope in figure 1 due to the negative sign in front of β in equation (1). More explicitly, we can express (1) as,

$$\left(\frac{1}{T}\right)\log(y_{i,t_0+T}) - \left(\frac{1}{T}\right)\log(y_{i,t_0}) = B + \frac{e^{-\beta T}-1}{T}\log(y_{i,t_0}) + u_{i,t_0,t_0+T}$$

or

$$\left(\frac{1}{T}\right)\log\left(\frac{y_{i,t_0+T}}{y_{i,t_0}}\right) = B + \frac{e^{-\beta T}-1}{T}\log(y_{i,t_0}) + u_{i,t_0,t_0+T}$$

The left hand side in the second equation is an approximation of the annual growth rate, which is the y-axis in figure 1. If $\beta > 0$, then $e^{-\beta T} < 1$ and $e^{-\beta T} - 1 < 0$, which indicates that the growth rate and natural log of the expenditure level in the beginning year is negatively correlated.

[2] The estimated β in equation 2 has the opposite sign of the slope, which is represented by the data plot in figure 1. A negative slope gives a positive β.

Table 2

Selected indicators of food system modernization across country groups

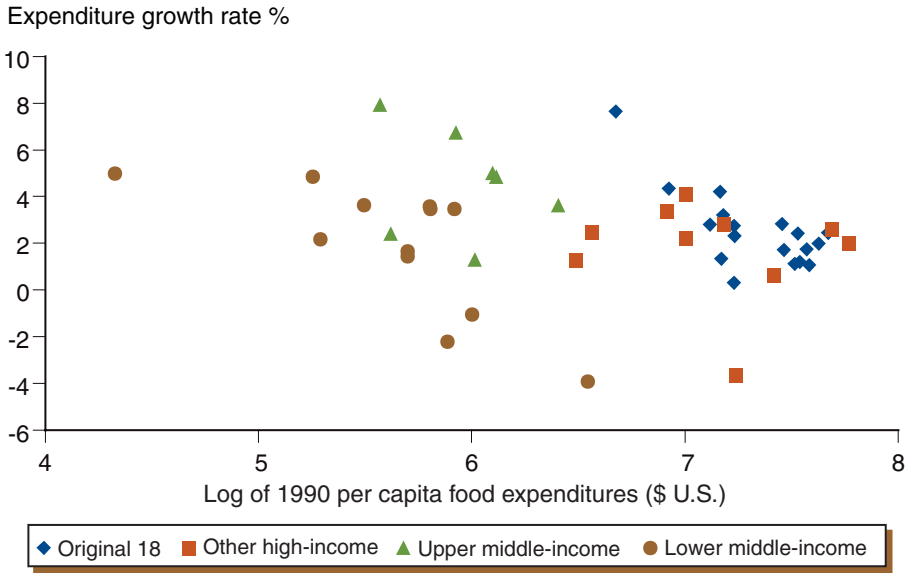
	Original 18	Other high-income	Upper middle-income	Lower middle-income
		Percent		
Share of food sales in standardized retail outlets[1]	77	60	58	32
Share of packaged food in total food expenditures	52	33	40	26
		US $		
Per capita foodservice expenditures	855	649	260	95
Per capita fast-food expenditures	191	157	34	15
Per capita soft drink expenditures	144	116	42	33
Per capita total food expenditures	2,195	1,772	775	388

Note: The indicators are average values for 2004, except for share of retail outlets, which is a 2005 value.

[1]Share of total 2005 sales from hypermarket, supermarket, discounter, and convenience stores.

Figure 1

Relationship between food expenditure level (per capita) and growth rate, 1990-2004



Results

Regmi and Unnevehr (2005) indicate a declining CV for 18 high-income countries, implying convergence, from 1990 to 2004, for total food expenditures and for expenditures on cereals, meats, fish, and vegetables. In examining the CV for 47 high- and middle-income countries, strong convergence trends are apparent for total food expenditures, and expenditures on cereals, meats, and possibly fish and vegetables. However, the declining CV trend is uneven from 1990 to 2004. A break in declining CV around 1997 and 1998 is likely associated with the concurrent global financial downturn, when gross national income declined in most countries in our analysis (WDI, 2006). Annual average growth for 1998-2004 is significantly lower than for 1990-97 for all groups of countries (fig. 2). Therefore, in addition to testing β convergence during this entire period, the data are broken into two time periods, 1990-1997 and 1998-2004, which are separately tested for β convergence in food expenditures.

Convergence in Food Expenditures

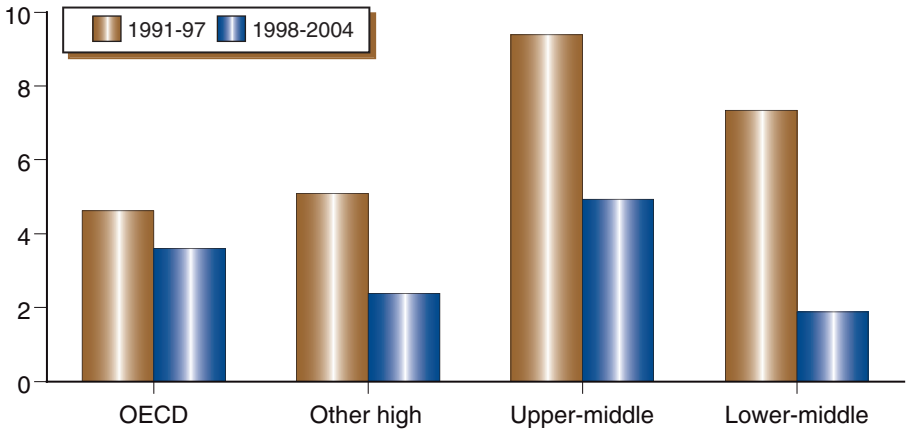
Beta convergence analyses on food expenditures indicate significant (at the 5-percent level) convergence across all 47 countries for total food, cereals, meats, seafood, dairy, sugar and confectionery, caffeinated beverages, and soft drinks (table 3) over 1990-2004. Faster convergence (larger β) is evident in the earlier time period (1990-97) for total food expenditures and most product groups (excluding seafood and dairy, for which the results are not significant). The large estimated β for meats reflects the well-documented effects of Bennett's Law. The large values of β for vegetables, sugar and confectionary, and other high-value products like soft drinks may reflect faster consumption growth in middle-income countries due to more modern food delivery and global income growth.

Insignificant or slowing convergence trends during 1998-2004 may be the result of slower income growth. Convergence in total food expenditures,

Figure 2

Annual average growth in gross national income (GNI)

Percent



Source: World Development Indicators 2006, World Bank.

Table 3
Estimated beta convergence for food expenditures

Expenditure Categories	1990-2004 (t_{0+T}) = 2004 and t_0= 1990			Divided into 2 time periods (t_{0+T}) = 1997 and t_0= 1990			(t_{0+T}) = 2004 and t_0= 1998		
	β	Std.dev	p-value	β	Std.dev	p-value	β	Std.dev	p-value
Total food	0.039	0.013	0.002	0.068	0.018	0.000	0.044	0.019	0.019
Cereals	0.021	0.006	0.001	0.019	0.009	0.029	0.018	0.012	0.131
Meats	0.022	0.007	0.004	0.042	0.012	0.000	0.033	0.011	0.003
Seafood	0.012	0.006	0.042	0.014	0.009	0.121	0.006	0.008	0.502
Dairy	0.017	0.007	0.015	0.012	0.009	0.185	0.020	0.009	0.029
Oil & fats	0.012	0.008	0.145	0.033	0.012	0.005	-0.003	0.010	0.776
Fruit	0.015	0.009	0.074	0.024	0.013	0.063	0.021	0.012	0.091
Vegetables	0.014	0.009	0.107	0.039	0.013	0.002	0.006	0.015	0.703
Sugar & confectionery	0.013	0.006	0.039	0.022	0.009	0.016	0.019	0.010	0.047
Caffeinated beverages	0.020	0.005	0.000	0.030	0.008	0.000	0.019	0.009	0.030
Soft drinks	0.029	0.009	0.001	0.037	0.011	0.001	0.026	0.013	0.056
Other food	0.009	0.005	0.092	0.020	0.009	0.028	0.001	0.008	0.875

though slower, remains significant. Among product groups, convergence remains significant for meat, dairy, sugar, and caffeinated beverages.

Lack of noticeable convergence trends in some product groups—such as oils and fats, fruits, and "other" foods—could be due to the heterogeneity of income-led demand growth among different products within the food group, or to persistent differences in preferences among countries that prevent convergence. The oils and fats category contains products that are inferior and those that are preferred as incomes grow, and the mix of such income-led preferences may vary across countries. The type and amount of fruit eaten, for example, may still be shaped by local varieties and availability.

Breaking the time period into two, in general, improved the model fit, as reflected in higher R^2 within each time period versus the entire period (see appendix A for regression details). The dummy variable for lower middle-income countries was significant and negative in most food product categories for the entire time period (1990-2004) and for 1998-2004 (table 4). This indicates that food expenditures in lower middle-income countries are moving toward a lower steady-state expenditure level, than that of the 18 high-income countries. The dummy variable for other high-income countries was significant and negative for some categories only in the later time period. The dummy variable for the upper middle-income countries was significant and negative only for total food expenditures in 1998-2004; it was significant and positive in the early time period (1990-97) for dairy and oils/fats, possibly indicating higher prices for these items in these countries.

In summary, differences among the 47 countries in the underlying costs of food or structure of the food sector were most apparent for the lower middle-income countries, which may reflect less modern food systems and lower labor costs in the food sector. Structural differences—indicated by significant

Table 4
Direction and significance of coefficients on dummy variables for food expenditure regressions

Expenditure categories	1990-2004			Divided into 2 time periods					
	(t_{0+T}) = 2004 and t_0= 1990			(t_{0+T}) = 1997 and t_0= 1990			(t_{0+T}) = 2004 and t_0= 1998		
	d_H	d_{UM}	d_{LM}	d_H	d_{UM}	d_{LM}	d_H	d_{UM}	d_{LM}
Total food	-NS	-NS	-S	+ NS	-NS	-S	-S	-S	-S
Cereals	-NS	-NS	-S	-NS	-NS	-NS	-NS	+NS	-S
Meats	-NS	+NS	-S	+NS	+NS	-NS	-S	-NS	-S
Seafood	-NS	-NS	-S	+NS	+NS	+NS	-NS	-NS	-S
Dairy	-NS	+NS	-S	+NS	+S	+NS	-S	-NS	-S
Oil & fats	-NS	-NS	-NS	+NS	+S	-NS	-NS	-NS	-NS
Fruit	-NS	-NS	-S	+NS	+NS	-NS	-NS	-NS	-S
Vegetables	-NS	-NS	-S	+NS	-NS	-NS	-NS	-NS	-S
Sugar & confectionery	-NS	-NS	-S	-NS	+NS	-NS	-S	-NS	-S
Caffeinated beverages	-NS	-NS	-S	+NS	+NS	-NS	-S	-NS	-S
Soft drinks	-NS	-NS	-S	-NS	+NS	-NS	-NS	-NS	-S
Other food	-NS	-NS	-S	+NS	+NS	-NS	-NS	-NS	-S

Note: NS denotes not significant and S denotes significant at the 5-percent level.

coefficients on the country dummy variables—were also more apparent in the later time period, when trends in economic growth may have differed more widely across income groupings. It is striking, however, that upper middle-income countries, like Mexico and Poland, appear to be on a path toward convergence with high-income countries for most expenditure categories.

Since data on retail sales of packaged food were only available for 1998-2005, two-period regression was not feasible for this expenditure category. Still, estimated β indicate significant convergence for packaged food sales, reflecting the growth in modern retail food delivery systems in middle-income countries (table 5). Dummy variables for other high-income countries and lower middle-income countries are significant and negative, as in the later time period for many other food expenditure categories. The magnitude of the estimated β (0.015) is smaller than that reported for total food expenditures during the later time period (0.044). Thus, overall food consumption appears to be converging faster across countries than packaged food expenditures. This may reflect the differing pace of change in food delivery systems across country categories, which we examine next.

Convergence in the Food Delivery System

Significant convergence in food expenditures for high-value products and packaged food implies growth in a modernized food delivery system that makes these products available to consumers. Recent studies by Reardon et al., 2007 have also noted the growth in modern retailing in middle-income countries. Regression results (table 6) support such findings. We examined convergence for retail sales from all standardized retail formats—supermarkets, hypermarkets, convenience stores, and large discounters—and for supermarkets alone. The relatively large and highly significant estimated β (0.036 for all outlets and 0.035 for supermarkets alone) indicate rapid

Table 5

Beta convergence regression results for per capita packaged food expenditures

Ending year (t_{0+T})	2005
Beginning year (t_0)	1998
$\log(y_{i,t_0})$	0.128
Std.dev	0.007
p-value	[.000]
d_H	-0.031
Std.dev	0.014
p-value	[.032]
d_{UM}	-0.021
Std.dev	0.017
p-value	[.212]
d_{LM}	-0.065
Std.dev	0.022
p-value	[.005]
Constant	0.148
Std.dev	0.047
p-value	[.003]
R^2	0.972
Adj R^2	0.969
P-value	0.000
Degrees of freedom	41.000
Beta estimate results	
$\log(y_{i,t_0})$	0.015
Std.dev	0.008
p-value (asymptotic)	[.050]

convergence trends in food retailing during 1999-2005. Although the dummy variables were negative, the only significant dummy was for supermarket growth in lower middle-income countries. Thus, convergence is occurring toward a similar steady-state level of per capita expenditures in all standardized retail outlets for both high- and middle-income countries.

Growth in foodservice is another dimension of food system modernization. Estimated β on per capita foodservice expenditures are reported in table 7 for 1999 to 2004 for all foodservice and for fast-food outlets within this category. Significant convergence in foodservice sales over 1999-2004 is apparent, but is much more rapid for sales from fast-food outlets (table 7). The dummy variable for lower middle-income countries is significant and negative in both equations; upper middle-income countries have a significant negative dummy for fast food only. Thus, foodservice sales show strong and rapid convergence, but middle-income countries are converging to a steady state of per capita expenditures that is lower than for high-income countries. This may reflect a lower cost structure for foodservice in countries with lower wage costs.

The β estimates can provide the "half-life" of progress toward convergence, i.e., the number of years required for progress halfway toward the steady-state

Table 6

Beta convergence regression results for per capita retail sales by outlet type

	All standarized outlet[1] sales	Supermarket sales
Ending year (t_{0+T})	2005	2005
Beginning year (t_0)	1999	1998
$\log(y_{i,t_0})$	0.135	0.135
Std.dev	0.012	0.011
p-value	[.000]	[.000]
d_H	-0.025	-0.031
Std.dev	0.025	0.025
p-value	[.314]	[.222]
d_{UM}	-0.005	-0.038
Std.dev	0.003	0.035
p-value	[.879]	[.275]
d_{LM}	-0.082	-0.109
Std.dev	0.049	0.044
p-value	[.101]	[.018]
Constant	0.307	0.271
Std.dev	0.086	0.071
p-value	[.001]	[.000]
R^2	0.956	0.959
Adj R^2	0.952	0.955
P-value	0.000	0.000
Degrees of freedom	43.000	42.000
	Beta estimate results	
$\log(y_{i,t_0})$	0.036	0.035
Std.dev	0.014	0.013
p-value (asymptotic)	[.013]	[.007]

[1]Standardized outlets denote supermarkets, hypermarkets, discount and convenience stores.

level. Table 8 reports the implied half-life for different food system indicators, based on estimates of β from the most recent time period. There is remarkable similarity in the half-life estimates for total foodservice, standardized retail outlets, and total food and meat expenditures. Convergence in fast-food sales appears to be occurring much more rapidly than convergence in any other type of expenditure. Packaged food expenditures are converging much less rapidly, which we did not expect, given other trends. While all of these different data may not be collected on the same basis, and therefore may not be strictly comparable, these results do support the observation that structural advances in food delivery are taking place very rapidly in many countries.

Similarity in Product Preferences

New product introductions further demonstrate how food trends permeate global markets. We group product attribute claims into six categories (see appendix C for full list). Examination of labels on new products in 15 coun-

Table 7

Beta convergence regression results for per capita foodservice expenditures

	Total foodservice	Fast food expenditures
Ending Year (t_{0+T})	2004	2004
Beginning Year (t_0)	1999	1999
$\log(y_{i,t_0})$	0.166	0.134
Std.dev	0.011	0.010
p-value	[.000]	[.000]
d_H	-0.020	-0.017
Std.dev	0.020	0.025
p-value	[.310]	[.492]
d_{UM}	-0.042	-0.098
Std.dev	0.025	0.030
p-value	[.102]	[.002]
d_{LM}	-0.084	-0.158
Std.dev	0.030	0.035
p-value	[.009]	[.000]
Constant	0.268	0.376
Std.dev	0.073	0.049
p-value	[.001]	[.000]
R^2	0.959	0.947
Adj R^2	0.955	0.942
P-value	0.000	0.000
Degrees of freedom	42.000	42.000
	Beta estimate results	
$\log(y_{i,t_0})$	0.038	0.080
Std.dev	0.013	0.015
p-value (asymptotic)	[.005]	[.005]

Table 8

Estimated half life for convergence of different food system indicators

	Years	Beta estimate	Half life (years)
Total foodservice	99-04	0.038	18
Fast food	99-04	0.080	9
All standardized retail outlets	99-05	0.036	19
Supermarkets	99-05	0.035	20
Total food expenditures	98-04	0.044	16
Meat expenditures	98-04	0.033	21
Packaged food expenditures	98-05	0.015	46

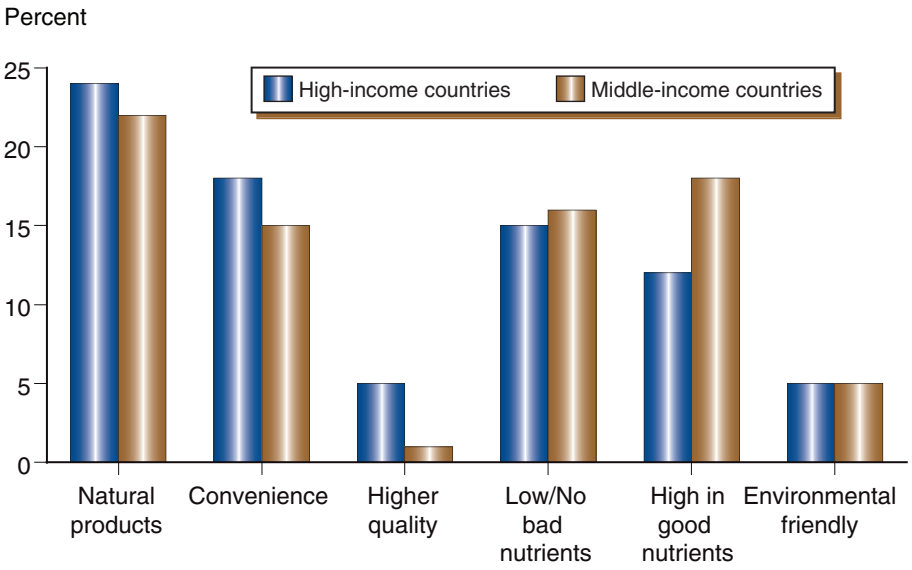
tries (see table 1 for country names) indicate that attribute claims are similar on new food products introduced to consumers in high- and middle-income countries. The share of labels with attribute claims indicating "natural," "convenient," or "high quality" tends to increase with the affluence of a given market (fig. 3). For example, while convenience accounted for 27 percent of all label claims in Japan, it accounted for only 12 percent of total claims in Mexico and 6 percent of claims in Egypt. This is expected given the higher opportunity cost of time in high-income economies. Labels claiming healthful nutrients such as added vitamins and minerals showed a reverse trend. For example, claims of healthful nutrients accounted for 51 percent of all claims in Indonesia, 33 percent in Hungary, and 27 percent in Japan. Even though preferences in developing countries are evolving toward those of consumers in high-income countries, many consumers in developing countries prioritize obtaining adequate nutrition. Consumers in high-income countries, who may take adequate nutrition as a given, focus more on avoiding unwanted nutrients (e.g., low fat) or on other attributes like organic sourcing.

Other claims such as those targeting demographic groups, indicating private labels, or touting vegan (no animal product) content were also more common in high-income countries. The shares of these labels ranged from 0 to 14 percent. The presence of these claims in a given market may reflect conditions pertinent to the market. For example, the more frequent targeting of demographic groups in high-income countries may be a function of an older population in these countries.

In spite of differences among countries or across categories, the similarity of product claims on packaged food introductions in both high- and middle-income countries is striking. This speaks to a more general convergence in food preferences, which underlies the results obtained for high-value food product expenditures.

Figure 3

Percent share of different label claims



Source: Euromonitor, Inc, 2006.

Conclusions

Our results point to a high degree of convergence in global food systems. Middle-income countries are indeed following trends in high-income countries, measured across several dimensions of food system growth and change. Although convergence may have slowed recently, it is still significant and apparent in most important food system indicators.

Convergence is apparent in food expenditures for most important food categories, such as meats and vegetables, and for high-value products such as sugar/confectionery and soft drinks. While lower middle-income countries are approaching a lower steady state of expenditure, especially during 1998-2004, they are still participating in the overall convergence trends. Upper middle-income countries appear to be converging toward the same steady state of food spending as the high-income countries.

Convergence is also strongly apparent in several measures of food system modernization, including packaged food expenditures, supermarket sales, and foodservice sales. The pace of change is rapid in the foodservice sector, particularly in fast-food sales. Middle-income countries are on the same path of convergence as high-income countries in most cases.

Overall, our results provide strong, broad-based statistical evidence to support other observational or partial studies of food system modernization.

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Appendix A—Details of Convergence Regression Results for Food Expenditure Categories

Table A-1
Regression results for total food expenditures

Ending year (t_{0+T})	2004	1997	2004
Beginning year (t_0)	1990	1990	1998
$\log(y_{i,t_0})$	0.041	0.089	0.128
Std.dev	0.007	0.011	0.015
p-value	[.000]	[.000]	[.000]
d_H	-0.013	0.006	-0.030
Std.dev	0.008	0.011	0.014
p-value	[.086]	[.601]	[.039]
d_{UM}	-0.021	-0.017	-0.048
Std.dev	0.013	0.020	0.022
p-value	[.127]	[.407]	[.031]
d_{LM}	-0.057	-0.062	-0.097
Std.dev	0.014	0.021	0.026
p-value	[.000]	[.006]	[.001]
Constant	0.245	0.408	0.335
Std.dev	0.055	0.081	0.108
p-value	[.000]	[.000]	[.003]
R^2	0.903	0.929	0.941
Adj R^2	0.894	0.923	0.935
P-value	0.000	0.000	0.000
Degrees of freedom	42	42	42

Where,

y_{i,t_0+T} = expenditure level in the ending year,

y_{i,t_0} = expenditure level in the starting year,

i = a particular country

T = the number of years in the data series,

d_H = high-income countries other than the original 18,

d_{UM} = upper middle-income countries, and

d_{LM} = lower middle-income countries.

Table A-2

Regression results for total cereal expenditures

Ending year (t_{0+T})	2004	1997	2004
Beginning year (t_0)	1990	1990	1998
$\log(y_{i,t_0})$	0.053	0.125	0.150
Std.dev	0.005	0.008	0.011
p-value	[.000]	[.000]	[.000]
d_H	-0.015	-0.015	-0.016
Std.dev	0.008	0.016	0.021
p-value	[.079]	[.386]	[.455]
d_{UM}	-0.005	-0.032	0.037
Std.dev	0.011	0.019	0.023
p-value	[.656]	[.110]	[.124]
d_{LM}	-0.032	-0.011	-0.089
Std.dev	0.011	0.021	0.027
p-value	[.005]	[.602]	[.004]
Constant	0.123	0.125	0.137
Std.dev	0.026	0.043	0.061
p-value	[.000]	[.009]	[.036]
R^2	0.900	0.963	0.963
Adj. R^2	0.890	0.954	0.954
P-value	0.000	0.000	0.000
Degrees of freedom	42	42	42

Where,

y_{i,t_0+T} = expenditure level in the ending year,

y_{i,t_0} = expenditure level in the starting year,

i = a particular country

T = the number of years in the data series,

d_H = high-income countries other than the original 18,

d_{UM} = upper middle-income countries, and

d_{LM} = lower middle-income countries.

Table A-3
Regression results for total meat expenditures

Ending year (t_{0+T})	2004	1997	2004
Beginning year (t_0)	1990	1990	1998
$\log(y_{i,t_0})$	0.053	0.107	0.137
Std. dev.	0.006	0.009	0.009
p-value	[.000]	[.000]	[.000]
d_H	-0.008	0.015	-0.031
Std. dev.	0.008	0.013	0.014
p-value	[.319]	[.244]	[.030]
d_{UM}	0.006	0.022	-0.033
Std. dev.	0.012	0.019	0.018
p-value	[.651]	[.248]	[.071]
d_{LM}	-0.033	-0.027	-0.083
Std. dev.	0.013	0.021	0.021
p-value	[.017]	[.202]	[.000]
Constant	0.125	0.212	0.216
Std. dev.	0.032	0.051	0.055
p-value	[.000]	[.000]	[.000]
R^2	0.916	0.937	0.956
Adj. R^2	0.908	0.931	0.952
P-value	0.000	0.000	0.000
Degrees of freedom	42	42	42

Where,

y_{i,t_0+T} = expenditure level in the ending year,

y_{i,t_0} = expenditure level in the starting year,

i = a particular country

T = the number of years in the data series,

d_H = high-income countries other than the original 18,

d_{UM} = upper middle-income countries, and

d_{LM} = lower middle-income countries.

Table A-4

Regression results for total seafood expenditures

Ending year (t_{0+T})	2004	1997	2004
Beginning year (t_0)	1990	1990	1998
$\log(y_{i,t_0})$	0.060	0.130	0.161
Std. dev.	0.005	0.008	0.008
p-value	[.000]	[.000]	[.000]
d_H	-0.002	0.032	-0.031
Std. dev.	0.011	0.017	0.016
p-value	[.848]	[.072]	[.066]
d_{UM}	-0.001	0.036	-0.025
Std. dev.	0.015	0.024	0.021
p-value	[.951]	[.135]	[.246]
d_{LM}	-0.030	0.005	-0.053
Std. dev.	0.013	0.020	0.019
p-value	[.022]	[.789]	[.007]
Constant	0.076	0.064	0.077
Std. dev.	0.023	0.035	0.035
p-value	[.002]	[.072]	[.033]
R^2	0.888	0.929	0.957
Adj. R^2	0.877	0.921	0.953
P-value	0.000	0.000	0.000
Degrees of freedom	42	42	42

Where,

y_{i,t_0+T} = expenditure level in the ending year,

y_{i,t_0} = expenditure level in the starting year,

i = a particular country

T = the number of years in the data series,

d_H = high-income countries other than the original 18,

d_{UM} = upper middle-income countries, and

d_{LM} = lower middle-income countries.

Table A-5

Regression results for total dairy expenditures

Ending year (t_{0+T})	2004	1997	2004
Beginning year (t_0)	1990	1990	1998
$\log(y_{i,t_0})$	0.057	0.132	0.148
Std. dev.	0.005	0.008	0.008
p-value	[.000]	[.000]	[.000]
d_H	-0.012	0.016	-0.031
Std. dev.	0.011	0.017	0.016
p-value	[.267]	[.337]	[.054]
d_{UM}	0.004	0.048	-0.025
Std. dev.	0.014	0.021	0.019
p-value	[.789]	[.031]	[.210]
d_{LM}	-0.035	0.018	-0.079
Std. dev.	0.017	0.026	0.024
p-value	[.048]	[.499]	[.002]
Constant	0.099	0.067	0.142
Std. dev.	0.030	0.045	0.044
p-value	[.002]	[.142]	[.002]
R^2	0.917	0.948	0.967
Adj. R^2	0.910	0.943	0.964
P-value	0.000	0.000	0.000
Degrees of freedom	42	42	42

Where,

y_{i,t_0+T} = expenditure level in the ending year,

y_{i,t_0} = expenditure level in the starting year,

i = a particular country

T = the number of years in the data series,

d_H = high-income countries other than the original 18,

d_{UM} = upper middle-income countries, and

d_{LM} = lower middle-income countries.

Table A-6

Regression results for total oil and fat expenditures

Ending year (t_{0+T})	2004	1997	2004
Beginning year (t_0)	1990	1990	1998
$\log(y_{i,t_0})$	0.061	0.114	0.169
Std. dev.	0.007	0.010	0.010
p-value	[.000]	[.000]	[.000]
d_H	-0.001	0.005	-0.004
Std. dev.	0.013	0.018	0.017
p-value	[.922]	[.787]	[.818]
d_{UM}	-0.029	0.054	-0.001
Std. dev.	0.016	0.022	0.020
p-value	[.077]	[.017]	[.950]
d_{LM}	-0.017	-0.013	-0.028
Std. dev.	0.015	0.021	0.020
p-value	[.269]	[.532]	[.169]
Constant	0.053	0.110	0.025
Std. dev.	0.028	0.038	0.039
p-value	[.065]	[.007]	[.519]
R^2	0.791	0.864	0.928
Adj. R^2	0.771	0.851	0.921
P-value	0.000	0.000	0.000
Degrees of freedom	42	42	42

Where,

y_{i,t_0+T} = expenditure level in the ending year,

y_{i,t_0} = expenditure level in the starting year,

i = a particular country

T = the number of years in the data series,

d_H = high-income countries other than the original 18,

d_{UM} = upper middle-income countries, and

d_{LM} = lower middle-income countries.

Table A-7

Regression results for total fruit expenditures

Ending year (t_{0+T})	2004	1997	2004
Beginning year (t_0)	1990	1990	1998
$\log(y_{i,t_0})$	0.058	0.121	0.147
Std. dev.	0.007	0.011	0.011
p-value	[.000]	[.000]	[.000]
d_H	-0.002	0.024	-0.019
Std. dev.	0.011	0.018	0.018
p-value	[.884]	[.170]	[.304]
d_{UM}	-0.001	0.024	-0.029
Std. dev.	0.015	0.024	0.024
p-value	[.952]	[.340]	[.224]
d_{LM}	-0.033	-0.012	-0.064
Std. dev.	0.016	0.025	0.025
p-value	[.044]	[.619]	[.013]
Constant	0.088	0.110	0.137
Std. dev.	0.032	0.051	0.052
p-value	[.010]	[.037]	[.012]
R^2	0.859	0.893	0.929
Adj. R^2	0.845	0.882	0.922
P-value	0.000	0.000	0.000
Degrees of freedom	42	42	42

Where,

y_{i,t_0+T} = expenditure level in the ending year,

y_{i,t_0} = expenditure level in the starting year,

i = a particular country

T = the number of years in the data series,

d_H = high-income countries other than the original 18,

d_{UM} = upper middle-income countries, and

d_{LM} = lower middle-income countries.

Table A-8

Regression results for total vegetable expenditures

Ending year (t_{0+T})	2004	1997	2004
Beginning year (t_0)	1990	1990	1998
$\log(y_{i,t_0})$	0.059	0.109	0.161
Std. dev.	0.007	0.010	0.014
p-value	[.000]	[.000]	[.000]
d_H	-0.015	0.006	-0.029
Std. dev.	0.009	0.013	0.017
p-value	[.131]	[.615]	[.104]
d_{UM}	-0.009	-0.003	-0.017
Std. dev.	0.013	0.018	0.024
p-value	[.517]	[.861]	[.468]
d_{LM}	-0.040	-0.036	-0.055
Std. dev.	0.014	0.019	0.027
p-value	[.006]	[.065]	[.050]
Constant	0.097	0.186	0.079
Std. dev.	0.036	0.048	0.073
p-value	[.011]	[.000]	[.289]
R^2	0.876	0.918	0.922
Adj. R^2	0.864	0.910	0.914
P-value	0.000	0.000	0.000
Degrees of freedom	42	42	42

Where,

y_{i,t_0+T} = expenditure level in the ending year,

y_{i,t_0} = expenditure level in the starting year,

i = a particular country

T = the number of years in the data series,

d_H = high-income countries other than the original 18,

d_{UM} = upper middle-income countries, and

d_{LM} = lower middle-income countries.

Table A-9

Regression results for total sugar and confectionery expenditures

Ending year (t_{0+T})	2004	1997	2004
Beginning year (t_0)	1990	1990	1998
log(y_{i,t_0})	0.059	0.123	0.149
Std. dev.	0.005	0.008	0.009
p-value	[.000]	[.000]	[.000]
d_H	-0.020	-0.002	-0.037
Std. dev.	0.011	0.016	0.018
p-value	[.074]	[.913]	[.044]
d_{UM}	-0.002	0.023	-0.022
Std. dev.	0.015	0.022	0.023
p-value	[.892]	[.287]	[.335]
d_{LM}	-0.044	-0.035	-0.079
Std. dev.	0.016	0.023	0.026
p-value	[.008]	[.133]	[.004]
Constant	0.083	0.109	0.132
Std. dev.	0.026	0.038	0.043
p-value	[.002]	[.006]	[.003]
R^2	0.920	0.948	0.960
Adj. R^2	0.913	0.943	0.956
P-value	0.000	0.000	0.000
Degrees of freedom	42	42	42

Where,

y_{i,t_0+T} = expenditure level in the ending year,

y_{i,t_0} = expenditure level in the starting year,

i = a particular country

T = the number of years in the data series,

d_H = high-income countries other than the original 18,

d_{UM} = upper middle-income countries, and

d_{LM} = lower middle-income countries.

Table A-10

Regression results for caffeinated beverage expenditures

Ending year (t_{0+T})	2004	1997	2004
Beginning year (t_0)	1990	1990	1998
log(y_{i,t_0})	0.054	0.116	0.149
Std. dev.	0.004	0.007	0.008
p-value	[.000]	[.000]	[.000]
d_H	-0.018	0.009	-0.037
Std. dev.	0.009	0.016	0.016
p-value	[.060]	[.557]	[.023]
d_{UM}	-0.007	0.019	-0.035
Std. dev.	0.013	0.021	0.020
p-value	[.612]	[.370]	[.095]
d_{LM}	-0.039	-0.013	-0.067
Std. dev.	0.011	0.018	0.019
p-value	[.001]	[.489]	[.001]
Constant	0.117	0.149	0.137
Std. dev.	0.019	0.031	0.036
p-value	[.000]	[.000]	[.001]
R^2	0.907	0.929	0.952
Adj. R^2	0.898	0.923	0.948
P-value	0.000	0.000	0.000
Degrees of freedom	42	42	42

Where,

y_{i,t_0+T} = expenditure level in the ending year,

y_{i,t_0} = expenditure level in the starting year,

i = a particular country

T = the number of years in the data series,

d_H = high-income countries other than the original 18,

d_{UM} = upper middle-income countries, and

d_{LM} = lower middle-income countries.

Table A-11

Regression results for total soft drink expenditures

Ending year (t_{0+T})	2004	1997	2004
Beginning year (t_0)	1990	1990	1998
$\log(y_{i,t_0})$	0.041	0.089	0.128
Std. dev.	0.006	0.009	0.012
p-value	[.000]	[.000]	[.000]
d_H	-0.030	-0.015	-0.030
Std. dev.	0.015	0.022	0.025
p-value	[.062]	[.513]	[.246]
d_{UM}	-0.016	0.023	-0.056
Std. dev.	0.018	0.026	0.028
p-value	[.394]	[.393]	[.060]
d_{LM}	-0.064	-0.051	-0.097
Std. dev.	0.018	0.027	0.031
p-value	[.003]	[.071]	[.006]
Constant	0.148	0.182	0.161
Std. dev.	0.026	0.038	0.054
p-value	[.000]	[.000]	[.008]
R^2	0.905	0.945	0.954
Adj. R^2	0.884	0.932	0.944
P-value	0.000	0.000	0.000
Degrees of freedom	42	42	42

Where,

y_{i,t_0+T} = expenditure level in the ending year,

y_{i,t_0} = expenditure level in the starting year,

i = a particular country

T = the number of years in the data series,

d_H = high-income countries other than the original 18,

d_{UM} = upper middle-income countries, and

d_{LM} = lower middle-income countries.

Table A-12

Regression results for other food expenditures

Ending year (t_{0+T})	2004	1997	2004
Beginning year (t_0)	1990	1990	1998
log(y_{i,t_0})	0.063	0.124	0.166
Std. dev.	0.005	0.008	0.008
p-value	[.000]	[.000]	[.000]
d_H	-0.008	0.003	-0.014
Std. dev.	0.013	0.021	0.019
p-value	[.522]	[.897]	[.457]
d_{UM}	-0.006	0.027	-0.006
Std. dev.	0.016	0.026	0.023
p-value	[.718]	[.306]	[.806]
d_{LM}	-0.028	-0.017	-0.041
Std. dev.	0.013	0.022	0.020
p-value	[.038]	[.440]	[.040]
Constant	0.066	0.095	0.058
Std. dev.	0.021	0.035	0.033
p-value	[.003]	[.009]	[.086]
R^2	0.861	0.888	0.944
Adj. R^2	0.848	0.877	0.939
P-value	0.000	0.000	0.000
Degrees of freedom	42	42	42

Where,

y_{i,t_0+T} = expenditure level in the ending year,

y_{i,t_0} = expenditure level in the starting year,

i = a particular country

T = the number of years in the data series,

d_H = high-income countries other than the original 18,

d_{UM} = upper middle-income countries, and

d_{LM} = lower middle-income countries.

Appendix B—Euromonitor International

Data Background

The data used in this report were obtained primarily from the commercial data vendor Euromonitor International. Their Integrated Market Information System (IMIS) provides data on market volume and value of sales for products by company, brand, and distribution channels. This information is compiled by a network of 600 researchers carrying out primary and secondary research. To ensure global comparability, standardized international product sectors are developed. In addition to in-depth data collection from core countries, Euromonitor generates data using statistical models for those countries where official data cannot be obtained.

In 2005, IMIS data on retailing and foodservice covered 52 core countries from which detailed data were collected. Currently, data on retailing is available for 80 core countries. However, information on foodservices is available for only 52 core countries. Our study focused only on the core countries from which primary data on both retail and foodservice sales were collected. From the set of core countries, low-income countries, countries with incomplete historical data, and countries with extreme exchange rate movements were eliminated. The final data used in the analysis included 47 middle- and high-income countries (see table 1).

In addition to IMIS, the Global Market Information Database (GMID) component of Euromonitor provides business intelligence on countries, consumers, and industries. It offers integrated access to statistics, reports, and other business information, much of it assembled from other sources such as individual country's national statistics, the OECD, and Eurostat. Food expenditure data used in our study were obtained from GMID. Although the GMID contains over 200 countries, for consistent comparison with the retail and foodservice analyses our report used food expenditure data from only the 47 countries selected from the IMIS database.

All food, retailing, and foodservice expenditures were converted into U.S. dollars at current exchange rates.

Data Definitions

Food expenditure and sales categories used in our study are pre-established in Euromonitor data.

Data obtained from IMIS

Euromonitor defines *retail sales* as sales through establishments primarily engaged in the sale of fresh, packaged, and prepared foods for home preparation and consumption. This excludes hotels, restaurants, cafés, duty-free sales, and institutional sales (such as canteens, prisons/jails, hospitals, and the army). This retail definition also excludes the purchase of food products from foodservice outlets for consumption off premises, like impulse confectionery bought from counters of cafés/bars. This sale is included in consumer foodservice sales.

Packaged foods are products sold through retail establishments primarily in the form of prepared foods for home preparations or direct consumption such as baked, canned, frozen, or dried food products. Fresh products such as fruit, vegetables, and meat, or basic ingredients such as sugar, flour, and salt are not included.

Based on Euromonitor, *supermarkets* are defined as stores with a selling area of between 400 and 2,500 square meters, selling at least 70 percent foodstuffs and everyday commodities. Outlets below 400 square meters may also be included in certain countries, on the basis of format, product mix, and opening hours (for example "superettes" in Italy). *Hypermarkets* are defined as stores with a sales area of over 2,500 square meters, with at least 35 percent of selling space devoted to nonfoods. All *independent food stores* (non-chained) are defined as those stores with selling space of less than 400 square meters, usually specializing in packaged groceries, where food accounts for at least 50 percent of total retail sales. *Convenience stores* are defined as shops selling a wide range of goods with extended opening hours such as 7-Eleven and Eurofoods. *Discounters* include stores such as Aldi, Lidl and Eda, typically 300-900 square meters and stocking fewer than 1,000 product lines, largely in packaged groceries. Goods are mainly own-label or budget brands. Discounters may also include variety stores/mass merchandisers usually located on one floor, offering a wide assortment of extensively discounted fast-moving consumer goods on a self-service basis. These are normally at least 1,500 square meters in size, and give priority to fast-moving nonfood and textile goods that have long shelf-lives. This includes primarily large chained retail operations such as Wal-Mart, Kmart, and Target in the U.S., Canada, and Mexico.

Consumer foodservice is composed of cafés/bars, full-service restaurants, fast-food, 100 percent home delivery/takeaway, self-service cafeterias and street stalls/kiosks. Fast-food outlets are typically distinguished by the following characteristics: a standardized and restricted menu; food for immediate consumption; tight individual portion control on all ingredients and on the finished product; individual packaging of each item; a young and unskilled labor force; and counter service.

Data Obtained from GMID

Consumer expenditure on food is defined as expenditure incurred on food brought into the home.

Expenditure on bread and cereals includes grain, flour or meal, bread and other bakery products, mixes and dough for the preparation of bakery products, pasta products in all forms, couscous, breakfast cereal preparations, and other cereal products such as malt, malt flour, malt extract, potato starch, tapioca, sago, and other starches.

Expenditure on meat includes fresh, chilled or frozen meat, edible offal, dried, salted or smoked meat and offal such as sausages, salami, bacon, ham, and pâté, other preserved or processed meat and meat-based preparations such as canned meat, meat extracts, meat juices, meat pies, and others.

Expenditure on seafood includes fresh, chilled, or frozen fish and other seafood such as crustaceans, mollusks, other shellfish and sea snails, dried, smoked or salted fish and seafood, other preserved or processed fish and seafood and fish and seafood-based preparations such as canned fish and seafood, caviar and other hard roes, fish pies, and others.

Expenditure on dairy includes raw milk, pasteurized or sterilized milk, condensed, evaporated, or powdered milk, yogurt, cream, milk-based desserts, milk-based beverages and other similar milk-based products, cheese and curd, eggs, and egg products made wholly from eggs.

Expenditure on oils and fats includes butter and butter products such as butter oil and ghee, margarine, other vegetable fats including peanut butter, edible oils such as olive oil, corn oil, sunflowerseed oil, cottonseed oil, soybean oil, groundnut oil, walnut oil and other oils, and edible animal fats.

Expenditure on fruit includes fresh, chilled or frozen fruit, dried fruit, fruit peel, fruit kernels, nuts and edible seeds, preserved fruit, and fruit-based products. Melons are also included in this group.

Expenditure on vegetables includes fresh, chilled, frozen, or dried vegetables cultivated for their leaves or stalks such as asparagus, broccoli, cauliflower, endives, fennel, spinach, and others; for their fruit such as aubergines, cucumbers, courgettes, green peppers, pumpkins, tomatoes, and others; and for their roots such as beetroots, carrots, onions, parsnips, radishes, turnips, fresh or chilled potatoes, and other tuber vegetables such as manioc, arrowroot, cassava, and sweet potatoes; preserved or processed vegetables and vegetable-based products; products of tuber vegetables such as flours, meals, flakes, purées, and chips/crisps, including frozen preparations such as chipped potatoes.

Expenditure on sugar and confectionery includes cane or beet sugar, unrefined or refined, powdered, crystallized, or in lumps, jams, marmalades, compotes, jellies, fruit purées and pastes, natural and artificial honey, maple syrup, molasses and parts of plants preserved in sugar, chocolate in bars or slabs, chewing gum, sweets, toffees, pastilles and other confectionery products, cocoa-based foods and dessert preparations, edible ice, ice cream, and sorbet.

Expenditure on other food includes salt, spices, culinary herbs, sauces, condiments, seasonings, vinegar, prepared baking powders, baker's yeast, dessert preparations, soups, broths, stocks, culinary ingredients, homogenized baby food, and dietary preparations.

Expenditure on caffeinated beverages includes coffee (whether or not decaffeinated, roasted or ground, including instant coffee) tea, maté and other plant products for infusions, cocoa, and chocolate-based powder.

Expenditure on soft drinks includes mineral or spring waters, all drinking water sold in containers, soft drinks such as sodas, lemonades, and colas, fruit and vegetable juices, and syrups/concentrates for the preparation of beverages.

http://www.euromonitor.com/pdf/Multi_industry_IMIS.pdf

Appendix C—Product Label Data

These data, obtained from Product Scan, are collected by Datamonitor staff in each country, and product label information is reported in English in the database. These data are not limited to food products marketed by multinational firms, and include many products marketed only locally.

Product claims not included in these summary categories include those relating to allergen alerts, targeting demographic groups, private labels, or other miscellaneous claims.

Table C-1
Product label claims included in categories

Natural products	Convenience	Higher quality	Low or no "bad" nutrients	High in "good" nutrients	Environmentally friendly
Fresh	Disposable	Gourmet	Low calories	High amino acids	Biodegradable
Natural	Hand held	Upscale	Low carbohydrates	High antioxidants	Recyclable
No additives	Instant		Low cholesterol	High calcium	Recycled materials
No added hormones	Microwaveable		Low fat	High carbohydrates	
No antibiotics	Quick		Low glycemic	High fiber	
No artificial color	Single serving		Low salt	High iron	
No artificial flavor			Low saturated fat	High magnesium	
No artificial ingredients			Low sodium	High minerals	
No artificial sweeteners			Low sugar	High omega	
No chemicals			No tropical oils	High omega-3	
No genetic modification			Low trans fats	High omega-6	
No pesticides			No calories	High polyphenols	
No phosphates			No carbohydrates	High potassium	
No preservatives			No cholesterol	High protein	
No sweeteners			No fat	High vitamins	
No toxic materials			No salt		
Organic			No saturated fat		
Pure			No sodium		
Real			No sugar		