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'Globesity'? The Effects of Globalization on Obesity and Caloric Intake

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Abstract

This study considers the effects of globalization, in its economic and social dimensions, on obesity and caloric intake. In assessing these effects using longitudinal analysis, this study adopts an extensive list of controls to account for compositional changes and effects, as well as different specifications. The results suggest a robust association between globalization and both obesity and caloric intake. A one standard deviation increase in globalization is associated with a 20 percent increase in obese population and a 4 percent rise in calorie intake. The effect remains statistically significant even with an instrument variable strategy, a lagged structure, and corrections for panel standard errors. The primary driver is social globalization, and specifically the effects of changes in information flows and social proximity. A one standard deviation increase in social globalization increased the percentage of obese population by 14.5 percent and the consumption of calories by 2.8 percent, respectively.

JEL-Code: I180, F690, P460.

Keywords: globalization, obesity, calorie intake, health production, social globalization, economic globalization, KOF Index.

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1. INTRODUCTION

The unprecedented increase in average body mass index (BMI) since World War II, in both developed and developing countries has resulted in 500 million adults worldwide who are obese and 1.5 billion who are overweight (Finucane *et al.*, 2011). This is the first time in human history that a larger share of the population is overweight rather than underweight (Popkin, 2007), especially in the past two decades, which have been marked by increasing globalization and integration across economies and societies (ILO, 2004) and thus affected lifestyles in several ways. This observation suggests a “*globesity*” hypothesis, predicting a contemporaneous association between progressive economic globalization and the so-called obesity epidemic¹.

Globalization has a pure *economic dimension*, relative to the world’s increasing economic interdependence, as well as an equally relevant *social dimension* that pertains to lifestyle changes that affect how people live and work (ILO, 2004). Physiologically, obesity and being overweight result from an energy imbalance, such that energy intake exceeds energy expenditures (Jéquier and Tappy, 1999), but the global nature of these health phenomena suggest the need to analyze the underlying mechanisms, such as reduced food prices and transport costs that expand access to food and lower energy expenditures (Hummels, 2007)². Although these trends appear beneficial, critics of how globalization has been managed also highlight the

¹ Obesity is regarded as an epidemic because its one of the most important risk factors contributing to morbidity in advanced economies (Rosenbaum et al., 1997; WHO, 2002), and it accounts for a fairly large proportion of healthcare expenditures in many advanced economies (Cawley and Meyerhoefer, 2012; Knai et al., 2007; Thomson and Wolf, 2001; Ebbeling et al., 2002).

² The average revenue per ton-kilometer shipped dropped by 92 percent between 1955 and 2004 (Hummels, 2007).

effects of vulnerability to economic shocks and income inequality (Milanovic, 2005; Williamson, 1997), as well as social and cultural changes (Appadurai, 1998). Other scholars such as Bergh and Nilsson (2010b) assert that economic globalization increases within-country income inequality. There is also some evidence relating inequality with undesirable health outcomes (Karlsson et al. 2010). Hence, it is an empirical question to identify whether globalization does indeed explain, even when only partially, the expansion of the obesity prevalence. To understand whether the thermodynamic effects operate on caloric intake or consumption it is important to examine the effect of globalization on calorie intake. Similarly, to disentangle the underlying mechanisms associated with globalization, it is important to identify the effect of globalization dimensions.

Some early descriptive evidence can be retrieved from Figure 1, which suggests a correlation between globalization (measured using the KOF index³) and obesity rates, which smoothes out at the highest levels of globalization. Similarly, we find a comparable association between globalization with calorie intake in Figure 2. Can these associations alone explain the effects of globalization, or are other confounders in effect? That is, what mechanism is most likely at play in these influences?

[Insert Figure 1 and 2 about here]

We address this question empirically by examining a panel of countries over several decades, controlling for multiple effects and accounting for the potential endogeneity of globalization with an instrumental variable strategy and by examining

³ This index was developed by Dreher (2006a). The acronym KOF comes from Konjunkturforschungsstelle, the institute where the index is published.

the lag structure of globalization. Our empirical approach thus starts with a traditional method; we measure the direct effects of globalization on obesity and calorie intake, then control for a battery of alternative explanations, such as changes in living standards, inequality, women's labor market participation, and food prices. In line with prior globalization scholars (Potrafke and Usprung, 2012), we avoid single measures of globalization such as trade liberalization and adopt an index measure (KOF index and an alternative index for robustness purposes) that considers different dimensions and distinct categories within each dimension (Dreher, 2006a), to include socio-economic constraints that cannot be measured individually (Offer et al. 2013). This index has been already widely used in numerous studies revealing mostly that globalization has been beneficial for trade, growth, and gender equality and has not hampered welfare development (Potrafke, 2014). However, its effects on health and obesity have been significantly overlooked. We investigate changes in the number of calories consumed and expended, as well as the net effect, that can be attributed to the effects of globalization, to define the arithmetic of the globesity phenomenon (Bleich et al. 2008; Jéquier and Tappy, 1999; Popkin, 2001).

We exploit cross-country and time-series variation in a panel of 26 countries over the years 1989–2004,⁴ when globalization has expanded dramatically. Our data set comprises aggregate data from a large, unbalanced panel containing a large number of countries through three decades. The comprehensive nature of our data enables us to distinguish the impact of globalization on obesity rate changes, total caloric intake,

⁴Data on percentages of the population that are obese include all 26 countries for 1994–2004. From 1989 to 1993, we have data on 12 countries: Austria, Finland, France, Iceland, Japan, the Netherlands, New Zealand, Spain, Sweden, Switzerland, United Kingdom, and United States.

and total fat intake. Time- and country-fixed effects are used rather than lags to avoid biased estimates (Achen 2000; Carson et al. 2010; Lewis-Beck, 2006; Lewis-Beck et al. 2008). With a rich list of controls and an instrumental variable (IV) strategy, we also identify the unique effect of our focal variable, net of the influence of other confounding variables. Furthermore, the control variables reflect data that capture indirect and compositional effects of globalization (e.g., increased urban and built environments, lower food prices due to lower tariffs,⁵ employment opportunities for women).

Previous literature has examined the impacts of different forms of globalization on life expectancy; producing suggestive evidence that economic globalization is most correlated with greater life expectancies (Bergh and Nilsson, 2010a). However, life expectancy cannot fully capture changes in health, and instead other alternative measures should be used. In response, this study provides the most detailed investigation to date of the relationship so far between aggregate changes in a country's globalization and obesity by taking advantage of a three-dimensional classification of globalization, comprising social, economic, and political dimensions (see Tables A1 and A2 in the Appendix), and thereby identifying the different macro-mechanisms that underlie any associations. Frenk (2012) posits that globalization has helped promote obesity by speeding the “nutrition transition,” but to the best of our knowledge, no published study has examined the empirical evidence linking overall and specific types of globalization to obesity rates, while controlling for specific micro-mechanisms that convey these effects.

⁵ For example, the price of beef has dropped an astounding 80 percent, largely due to global trade liberalization (Duffey et al., 2010).

We find some intriguing results. First, the effect of globalization on obesity is robust to different specifications and instrumental strategies. Second, when we distinguish across several globalization dimensions, we find that the effect of social globalization remains as a robust and significant effect, irrespective of the globalization index we adopt. Third, exploring different components of social globalization, we find strong influences of changes in information flows and social proximity.

In the next section, we summarize existing research. Section three reports the data and methods. We then present our results and finally section five concludes with some key implications.

2. GLOBALIZATION AND OBESITY

Genetic factors have been found responsible for 20–75% of variability in body weight (Hill *et al.*, 2000). However, increases in body weight such as those observed cannot be explained by genetic changes. Rather, changes in the environment, which operate differently depending on genetics, appear to be at play.

Reduced energy expenditure: Changes in technology have transformed the workplace and related activities, such that they require less energy to perform. Phillipson and Posner (2003) and Lakdawalla and Phillipson, (2009) find evidence of a link between technological change and obesity, and Prentice and Jebb (1995) argue that reduced physical activity is the main cause of the rise in obesity in Britain. Several low- and middle-income countries have experienced shifts from agriculture and mining to manufacturing or services, reducing the extent of physical activity people perform in the workplace. Paeratakul et al. (1998) find evidence of a link

between changes in physical activity and the rise of obesity in China. However, many of the shifts toward automatism in the workplace have been gradual, making them hard to reconcile with the recent dramatic increase in obesity in the developed world (Bleich et al., 2008). Such a case can trigger a hypothesis of obesity has resulted from a sluggish adaptation to energy-saving technological changes (Cutler et al., 2003; Lakdawalla and Philipson 2009; Philipson and Posner 2003). However, given the expansion of medical innovations (Deaton, 2004), one could argue that globalization should improve society's ability to cope with the effects.

Decline in the relative prices of food: If food prices increase less than the prices of other goods, simple microeconomics rationale would suggest increased food consumption; if not balanced out by a concomitant fitness effect, this trend could give rise to expansions in the rates of obesity and overweight. Powell and Bao (2009) estimate that a 10 percent increase in the price of healthy fruits and vegetables increased BMI by 0.7 percent among US children. In addition, evidence suggests significant dietary changes taking place all over the world (Hawkes, 2006; Kim et al., 2000; Monteiro et al., 1995) known as “nutrition transition”. In a nutrition transition, diets change toward greater consumption of fat, added sugar, and animal food products, but reduced intake of fiber and cereals. Such changes have been linked to increases in obesity (Bray and Popkin, 1998; Duffey et al. 2010).

Income and inequality: Several studies cite an association between changes in obesity rates and various socioeconomic environments (Egger et al. 2012; McLaren, 2007; Monteiro et al., 2000). In a review of around one hundred separate studies, Sobal and Stunkard (1989) find clear evidence of an association between socio-

economic status and obesity. More specifically, some studies find an inverse association between social class and obesity (Sobal, 1991). Environmental effects also have play a role: for instance, consumption of fatty foods appears associated with lower socio-economic status, and obesity prevention is less a matter of concern among the least educated and poorest classes. Yet little is known about the potential socio-economic vector underlying the prevalence of obesity or its determinants. Some authors argue that fat storage is linked to socio-economic status (Sundquist and Johansson, 1998), but more recent studies argue that inequalities in obesity can be traced to gender, age, and ethnicity (Dreeben, 2001; Zhan and Wang, 2004).

Urbanization: rising Urbanization trends also are associated with more sedentary lifestyles and greater food variety (Popkin, 2004). Urban areas are often associated with greater food variety than rural areas, and food variety is found to be associated with obesity (Raynor and Epstein, 2001). Bleich et al. (2007) note the positive relationship between urbanization and obesity in advanced economies. *Television viewing and other sedentary activities have been found to be associated with obesity* (Hu et al. 2003, Robinson, 1999). However, urbanization also might vary with economic development, as we discuss subsequently, such that different socio-cultural environments arise in developed urban areas compared with less developed sites. The empirical effect thus is ambiguous (Eid et al., 2008; Lopez, 2004; Zhao and Kaestner, 2010).

Women in the labor force: The number of women participating in the labor market has been increasing in the last decades in many economies, leaving them less time to devote to traditional roles related to food preparation and shopping regularly

for fresh foods. Welch et al. (2009) recognize the importance of household purchasing behaviors, and the time required to perform them, on the achievement and maintenance of healthy weights. Cawley and Liu (2007) assert that maternal employment is associated with an increased risk of childhood obesity.

The socio-cultural aspects of obesity are less well understood. Given that obesity is a household-produced good, socio-environmental influences likely help explain it (Ulijaszek, 2007). Some evidence indicates that these factors affect individuals' BMI (Costa-Font and Gil, 2004; Costa-Font et al, 2010; Ulijaszek and Schwegendiek, 2012). Eating and physical activity patterns are likely to be culturally driven behaviors, and a recent paper (Wansink, 2004) finds that the eating environment (e.g., time taken to eat, standard portions, socialization) is closely associated with the quantity of food consumed.

Such social environmental sources increasingly are recognized as responsible for an “obesogenic environment” (Lake and Townshend, 2006; Swinburn et al., 1999) that predisposes people to being obese if they follow environmental norms. The latter include the built environment characteristics triggering escalator use and transportation systems reducing energy consumed by their passengers. Social lifestyle factors also can reduce neighborhood socialization while increasing the use of information technologies or promoting sedentary recreation activities through television, telephones, or computers (Frenk et al., 2003). Thus an imbalance likely arises between consumption patterns and intergenerational calorie consumption patterns, which remain anchored in pre-globalization energy demands. At a macroeconomic level, using time-series analyses of US states between 1972 and 1991,

Ruhm (2000) finds both obesity increases and physical activity declines during business cycle expansions.

Finally, another variable connected with health knowledge is schooling, which potentially increases the efficiency of health production (Kenkel, 2000), although one might argue – following human capital theory, – that education likely interacts by raising individuals' income. The effect of schooling might as well result from time preferences (Fuchs, 1982), as empirically explored by Komlos et al. (2004).

Time constraints and the consumption of *fast-food* both could increase the risk of obesity (Bowen and Gortmaker, 2004; Jeffery and French, 1998; Offer et al. 2010), especially among children who shift their consumption of vegetables to increased salts and fats. With a quantile regression, Kan and Tsai (2004) show that knowledge of obesity risk factors affects people's obesity, though differently for men and women. Globalization time constraints and engenders stressful and sedentary (Philipson, 2001) lifestyles. In examining the specific determinants of individual obesity-such as the density of fast food restaurants and the prices of meals-, Chou et al. (2008)⁶, find significant correlations that suggest some key micro-determinants can trigger obesity epidemics.

This discussion suggests the need to consider whether economic (e.g., lower prices) or social (e.g., Westernization of diets, lifestyles) effects of globalization drive its association with obesity, considering the distinct implications that each factor poses for policy.

⁶ These authors examine how relative price variations determine positive variations in BMI and obesity. The price variations include the increased value of women's time, due to their increased participation in the labor force and hours worked, as well as the reduction in the relative costs of meals consumed in fast-food restaurants versus meals prepared at home.

3. DATA AND EMPIRICAL STRATEGY

3.1. Data

We examine attempt to examine the association between obesity and caloric intake with globalization using the largest sample available at the time of this study. Accordingly, we gathered unique, country-level data from several sources, such that our analysis relies on an unbalanced panel data set from 1989 to 2004. Due to restrictions in data availability, we face a trade-off in terms of the number of countries to include in the study: a very large number of countries over a short time period versus a longer time period, at the expense of reducing the number of countries studied. We summarize the study data in Table 1.

[Insert Table 1 about here]

3.1.1. Obesity Rate. As one of our dependent variables, we measure the percentage of the population of a given country that is obese, using data from the OECD Health Data and the Data Global Database on Body Mass Index provided by the World Health Organization.⁷ A person is considered obese if her BMI (kg/m^2) is at least 3.⁸ The average obesity rate for the sample of countries in our study is 12%, and it has grown over time (see Table 1).

3.1.2. Daily Intake of Calories.

As an alternative approach, we use calorie intake as a dependent variable. Previous literature has found that the main driving force behind the increase in

⁷ For detailed information on OECD country surveys, see <http://www.irdes.fr/ecosante/OECD/814010.html>. Additional data can be found at <http://apps.who.int/bmi/index.jsp>.

⁸ In a few cases, we inferred missing data by imputing the average between the year before and the year after the missing data.

obesity is mainly an increase in calorie intake, rather than a reduction in energy expended (Bleich et al., 2008). Using data from Russia, Huffman and Rizov (2007) confirm the strong positive effect of caloric intake on obesity. Taking this into account we also measure the effect of globalization on caloric intake⁹, using data from FAOSTAT.¹⁰

3.1.3. Globalization Measures. Globalization is a multi-dimensional concept that cannot be captured by one dimension, so we employ a comprehensive index employed in a large number of studies that integrates three dimensions of globalization, which in turn comprise 24 subcomponents. The data reveals that globalization is a rapidly occurring phenomenon, such that the average value of 37 in 1970 almost doubled to 62 in 2009. In order to disentangle the mechanisms by which greater globalization could lead to a rise in obesity, we consider two dimensions of globalization: economic and social (see Tables A1–A3 in the Appendix), following Keohane and Nye's (2000) disaggregation. We also consider two alternative globalization indices (Bergh and Nilsson, 2010; Dreher, 2006b; Potrafke, 2010): the *CSGR Globalization Index*, developed by the University of Warwick Globalization Project (see Lockwood and Redoano, 2005) and the *KOF Index* (Dreher, 2006a; Dreher and Gaston, 2008; Dreher et al. 2008). The description of their components and the correlation between these two indices suggests that their results should be very similar (see the Appendix). The CSGR and KOF economic indices exhibit a correlation of only 0.45, whereas correlations

⁹ For robustness checks we also look at the relationship between Globalization and the grams of fat consumed (resulting regressions can be found in the Appendix)

¹⁰ Food and Agricultural Organization of the United Nations
(<http://faostat.fao.org/site/610/default.aspx#ancor>).

for the social and political indices are of magnitudes 0.87 and 0.91, respectively (see Table A3).

3.1.4. Other explanatory variables

GDP per capita at current prices (US dollars), we extracted data from the IMF's World Economic Outlook Database. To take into account the possibility that obesity rates are higher or growing more quickly among the poor than among the rich, we control for GDP per capita and its square. We include the *percentage of women in the active population*, using data obtained from the World Bank's Health, Nutrition, and Population (HNP) statistics. To measure *urbanization*, we calculated the percentage of urban populations in a country with data from the United Nations' 2011 World Urbanization prospects report. These data refer to five-year spans, so we inferred changes corresponding to the four years in between each measure. We also measured *food prices/CPI*, or the index of food prices over the consumer prices index in the country. These data came from the OECD and Eurostat for most countries; for Malaysia and Lithuania though, the data came from FAO,¹¹ and for Spain, they came from the Spanish National Statistics Institute.

We used the *Gini index* from the Standardized World Income Inequality Database, Version 3.1, December 2011. The Gini index is a common measure of income inequality within a country, such that a value of 0 represents perfect equality, with all citizens earning the exactly same income, whereas a value of 1

¹¹ http://stats.oecd.org/Index.aspx?DataSetCode=MEI_PRICES.
<http://faostat.fao.org/site/683/DesktopDefault.aspx?PageID=683#ancor>. For the INE data, see <http://www.ine.es/>.

indicates maximal inequality, such that only one person possesses all the country's income. This variable from the source above reflects the net income inequality for all countries except for Slovakia, New Zealand, United Kingdom, and United States. For the remaining data, we used the UNU-WIDER World Income Inequality Database (WIID), though due to data limitations, we inferred the U.S. Gini net income inequality from 1997 to 2004 by assuming the same growth rate as that determined for U.S. Gini gross income inequality. When a single year was missing, we inferred it calculating the average of the previous and next years.

We adopted the gender parity index for the net enrollment rate to account for the effect of *education*. This ratio of female to male net enrollment for secondary education is calculated by dividing the female value for the indicator by the male value. A gender parity index (GPI) equal to 1 indicates parity across genders; a value less than 1 generally indicates disparity in favor of men, whereas values greater than 1 would imply disparity in favor of women. We gathered these data from the UNESCO Institute for Statistics.¹² We measured *population* in millions, with data obtained from the World Bank Database.

In addition, we used two geographical variables (constant over time, extracted from the CIA Factbook) to instrument for globalization: *coastline*, or the total length (kilometers) of the boundary between the land area (including islands) and

¹² In a few cases, we lacked data for a few years, and we inferred them by imputing the average between the year before and after the missing data. If there were two years missing, we imputed the same growth rate as that found over the next three years.

the sea, and *land boundaries*, equal to the total length (kilometers) of all land between the country and its bordering country or countries.

3.2. Empirical Strategy

To examine the relationship of interest, we use a specification that relates overall globalization, as well as economic and social globalization, to the variables of interest: obesity and daily calorie intake in different countries over time. The basic specification is:

$$O_{ijt} = \alpha + G_{ijs} \beta + \sum X_{ijt} \delta + \gamma_t + u_j + \varepsilon_{ijt}, \quad (1)$$

where s denotes the s^{th} dimension of globalization, i refers to the country, t indicates to the time dimension, O_{ijt} reflects obesity rates (or daily intake of calories) in a year t and a country j , G is a measure of globalization, X includes all relevant country characteristics that have an impact on obesity, γ_t refers to time effects, u_j encompasses country fixed effects, and ε is the error term.

To start, we tested the effect of the overall index of globalization on obesity and calorie intake, with only standards of living and inequality controls, as a baseline specification. Next, we included the different dimensions of economic and social globalization (political globalization never resulted in significant findings, so we do not discuss it further), as well as its distinct dimensions and components. All of our ordinary least square (OLS) specifications used robust standard errors to correct for potential heteroscedasticity. Because globalization implies a greater integration between economies and societies, the errors could be correlated across countries. To allow for heteroscedasticity and contemporaneously

correlated errors across countries, we also used a panel-corrected standard error procedure (PCSE; following Beck and Katz, 1995). In addition, we have also expanded our controls to include a battery of controls and other compositional variables affected by globalization, which might indirectly explain the development of obesity.

Finally, to account for some potential endogeneity of globalization on obesity, we followed an instrumental variable (IV) strategy, with generalized methods of moments (GMM) and report standard errors, which are robust to heteroscedastic and serially correlated residuals (see Tables 4 and 5). Specifically, our instrument refers to coastline and land boundaries. We calculated an F-test for the exclusion of instrument(s) based on the first-stage regression; and consider our instrument(s) valid if the F-statistic Staiger and Stock test. We also applied the Cragg-Donald test of the null prediction that the model is underidentified, that is, that Z does not sufficiently identify X. Only if the instrument(s) satisfied both tests did we proceed.

Finally, we have examined the equation using time lags ($t - p$), acknowledging that the effect of globalization on obesity might not be contemporaneous:

$$O_{ijt} = \alpha + G_{t-pjs} \beta + \sum X_{jt} \delta + \gamma_t + u_j + \varepsilon_{ijt} \quad (2)$$

3.3. Robustness

To check for the robustness of our findings, we used several alternative specifications in which we varied the number of control variables, the

globalization index (KOF or CSGR), the econometric approach, and the different definitions of the globalization index measures (and its components as reported see Tables A1 and A2 in the Appendix).

4. RESULTS

4.1. Baseline Estimates

Tables 2 and 3 contain the OLS and PCSE results, measuring the effect of overall globalization and its economic and social dimensions on obesity and calorie intake. In all cases, total globalization exhibited a significantly positive relationship with the three dependent variables.

[Insert Table 2 -3 around here]

According to Table 2, a naïve specification exhibited no association between globalization and obesity, but including the controls and compositional effects led to a large effect. This trend suggests that several effects might cancel one another out when we assess the overall effect of globalization. Thus, we seek to distinguish among the various dimensions of globalization and examine their subcomponents to ascertain which dimensions have the most potential for engendering an obesity epidemic. We find that total globalization increased the prevalence of obesity, especially when we controlled for inequality and economic development. However, when we distinguished between economic and social globalization, we found that this effect was primarily driven by social globalization. When we controlled only for GDP per capita, inequality measures (Expression 2b), these effects overshadowed the influence of economic

globalization on obesity, such that economic globalization was no longer significant. Social globalization also exhibited a robust effect across both obesity and calorie intake, which suggested that wider social constraints on behavior and information flows might affect diets and types of food consumed.

Expressions 1c, 2c and 3c in Tables 2 and 3 expand even more the number of controls and they include also the relative variation of food prices, women in the active population and education. When looking at the overall impact of globalization (expression 1c), we conclude that a one standard deviation increase in the KOF globalization index related to a rise of 20 percent in the proportion of obese population and a calorie consumption increase of 4 percent.

The (in)significant effect of (economic) social globalization also remained, even after we controlled for food price decreases due to increasing economic liberalization and the percentage of women in the labor force, which had a constantly positive, significant effect on obesity and calorie intake. A one standard deviation increase in social globalization increased obesity by 14.5 percent and the consumption of calories by 2.8 percent, respectively. We also can specify the contributions of different components of economic and social globalization (expressions 3a, 3b 3c and 3d in Tables 2 and 3): Personal contact and information flows were significant determinants of obesity rates, and calorie intake. The fact that the effects of social globalization appeared mainly driven by personal contact and information flows, may suggest a general Westernization of lifestyles. If we assume information flows are a reasonable proxy for activity speed and

interconnectedness, we can confirm the impacts of such effects on obesity and calorie intake.

Regarding the effects of different compositional elements, we found that the percentage of women active in the labor market exhibited expected, consistent, positive associations with the percentage of obese population and caloric intake. A one standard deviation increase in the active female labor force led to a rise of 2.5 percentage points in the share of obese population and an additional daily consumption of 38 kcal. Also as expected, relative food prices had negative impacts on these variables.

The urban population percentage was positively associated with the level of obesity but had a consistently negative impact on calorie intake. This result indicates that, even though more urbanization could lead to more sedentary lifestyles, it also creates more food availability and hence, the effect is somewhat ambiguous.

Finally, a rise in income had a negative effect on population obesity rates, though this impact grew less important among poorer countries. Inequality exerted a contrary effect, such that higher inequality triggered prevalence of obesity, consistent with the existence of a well-known social gradient of obesity.

Similar regressions have been run looking at the impact of globalization on the grams from fat consumed¹³.

¹³ The results can be found in the Appendix (Table A4) and they are consistent with the ones described here for obesity and calorie intake.

4.2. Robustness Checks

In Tables 4, 5 and 6, display the results of our robustness checks and sensitivity analysis. We focus on several features that could influence our results: the index employed (KOF versus CSGR), the specification performed (IV or PCSE) and the consideration of lags. All of these estimates include the full set of control variables; the results confirm our previous findings.

[Insert Tables 4 and 5 and 6]

When considering this type of estimation, it could be the case that some unobserved characteristics are both correlated with globalization and obesity (or calorie intake). To address this concern, we incorporate the use of an instrumental variable (IV) approach. We used two geographical variables to instrument for globalization: *coastline*, or the total length (kilometers) of the boundary between the land area (including islands) and the sea, and *land boundaries*, equal to the total length (kilometers) of all land between the country and its bordering country or countries. Frankel and Romer (1999) pioneered the technique of using geography as an instrument for openness and since then several studies in the literature have adopted geographical measures as instruments for openness or globalization (Rose et al., 2003 or Wei and Wu, 2001, for example). Results for obesity and calorie intake are presented in the first column of Tables 4 and 5, respectively. The overall effect of globalization remained significant with our IV specification.

The second robustness check we performed consisted in using an alternative index of globalization, the CSGR (see Table A2 in the Appendix). The results

present both the OLS and the PCSE specifications. They also distinguish between total CSGR globalization and social and economic CSGR globalization. Once again, they are robust¹⁴.

Finally, we then address the question of a lagged effect of globalization on obesity and calories (Table 6) by examining the effect of a lagged structure. When we follow this approach only the first lag appeared as significant. However, the results suggest that the lagged effects picked up the previous contemporaneous effects, which were not significant together with the effect of one-year lag. As suggested further lags were not significant, and unit root tests suggested no evidence of unit roots. The instrumented and non-instrumented overall lagged effects of globalization on obesity thus were robust in magnitude, though they appeared slightly different when the effect is evaluated on calories consumed.

[Insert Table 6 about here]

To summarize, the relationship between globalization and obesity is robust and positive. However, when we disentangle the various mechanisms at work, we find that economic globalization per se does not relate significantly positively to obesity and calorie intake. Instead, social globalization exhibits a consistently positive relationship with obesity, which indicates that globalization has indeed

¹⁴ We performed another analysis for a subsample of 23 countries that did not feature any missing information. The relationship of globalization with obesity, calories, and fat consumed persisted

impacted on social life of individuals, which do not appear to have adjusted their calorie intake and consumption accordingly.

5. CONCLUSIONS

With this study, we set out to examine the relationship of different dimensions of globalization with obesity and calorie intake. Our findings offer evidence consistent with the hypothesis that only social globalization exhibits a positive relationship with obesity, and the effects of economic globalization were instead conveyed by other compositional effects, such as relative food price decreases and female labor market participation. Our results also are robust to the inclusion of other pathways that plausibly might influence obesity. Social globalization encompasses environmental effects that we could not capture fully with the compositional effects we controlled. More specifically, we find that information flows and cultural proximity components of social globalization to reveal an unambiguous association with the obesity epidemic.

We confirmed the influence of female labor market participation on all dependent variables. The effect of urbanization, on the other hand, is found to be more ambiguous. This might reflect the fact that, on the one hand, urbanization might trigger an expansion in the availability of diverse foods while, on the other; it might influence sedentary habits yet the combine influence is uncertain. A rise in national income exerts a negative effect on population obesity rates, though this impact grew less important among poorer countries. The latter might be tamed by

the specific effect of income inequality exerted, which is found to trigger an expanding prevalence of obesity.

Overall, our results suggest that social globalization—and more specifically changes in information flows and personal contact—are important drivers of the development of overweight population and greater calorie consumption that need to be identified using natural experiments to compute the specific influence. However, the evidence is suggestive that some interventions to help individuals adjust to a global social lifestyle might prove effective in counterbalancing the otherwise expanding trend in obesity and overweight worldwide.

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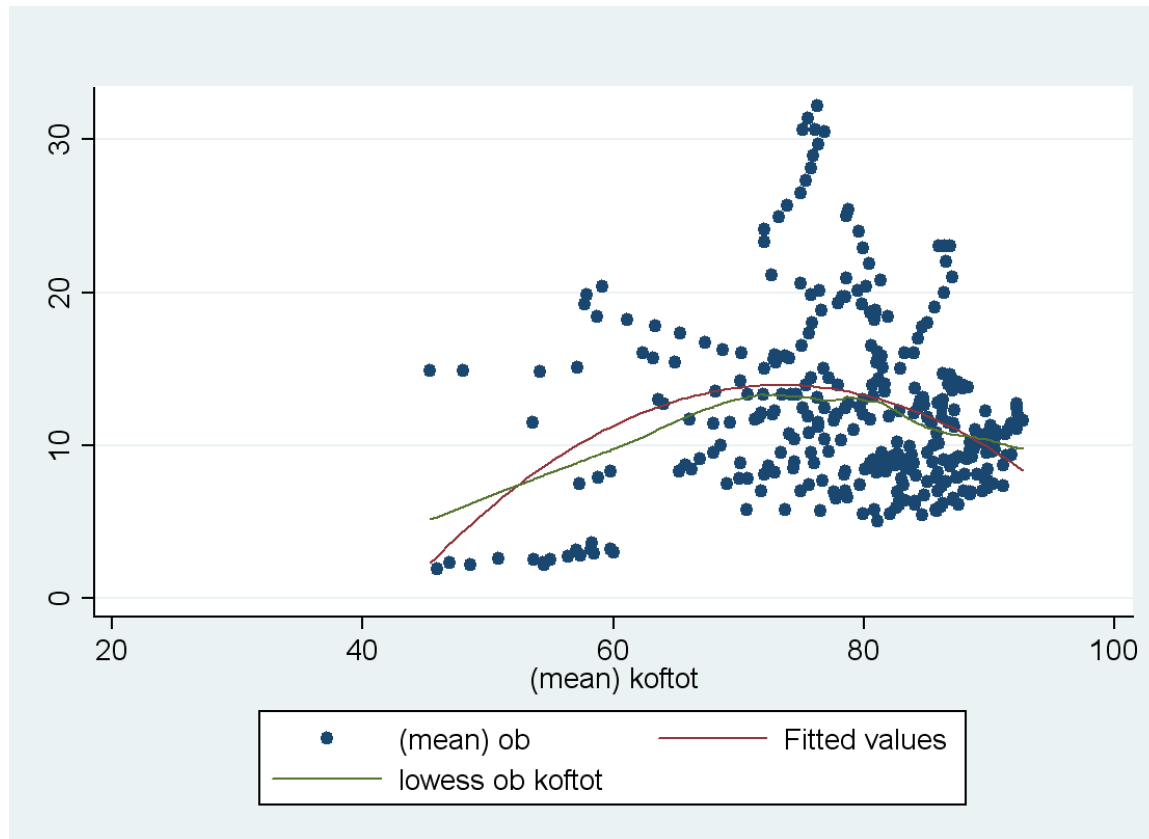
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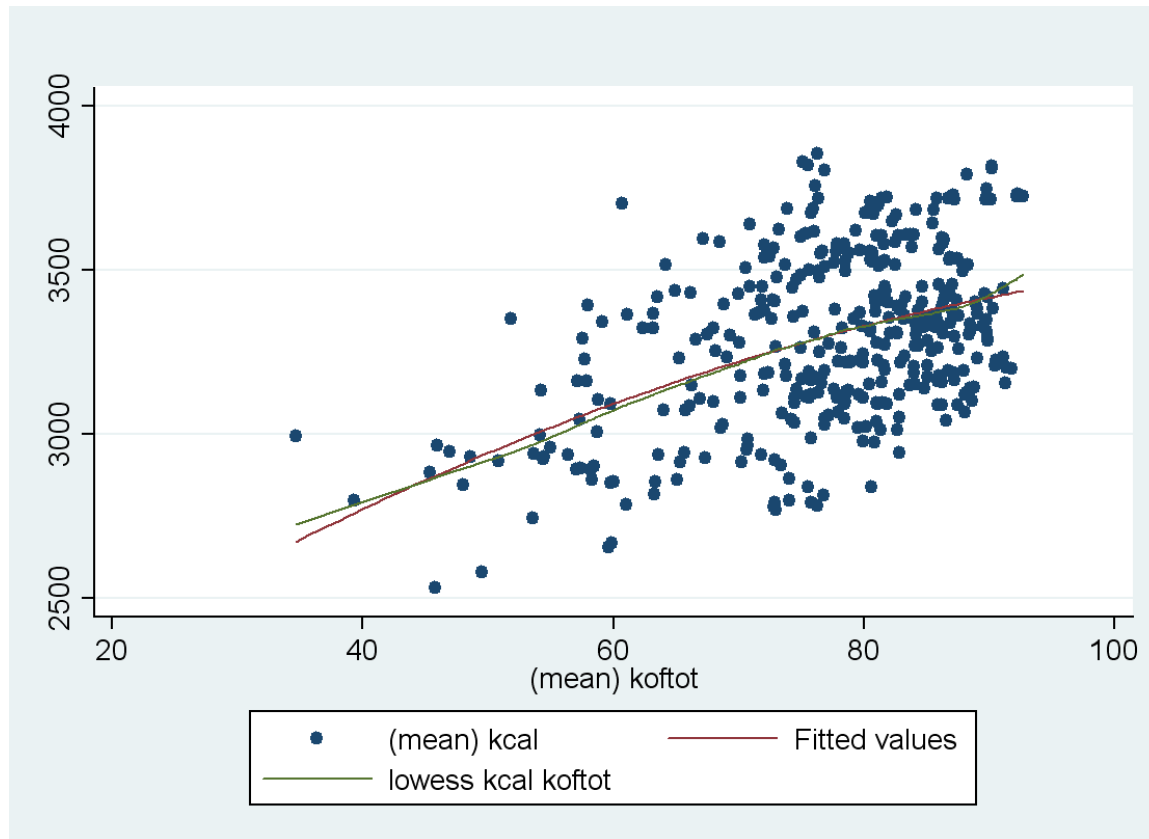
Figure 1. Variation of obesity rates (adult population) and globalization



Note: Obesity rate refers to the prevalence in the population of a country of people with a body mass index in excess of 30, plotted against the variation in the KOF index of globalization on a 0–100 scale. A linear trend indicates the fitted least square value and the lower confidence interval.

Source: OECD, KOF index of globalization.

Figure 2. Variation of kilocalorie intake (adult population) and globalization



Note: Kilocalorie intake rate refers to the population's daily per capita consumption of kilocalories, plotted against the variation in the KOF index of globalization on a 0–100 scale. A linear trend indicates the fitted least square value and the lower confidence interval.

Source: OECD, KOF index of globalization.

Table 1. Summary statistics

	Mean	Std Dev.
Dependent Variables		
Obese (percent of population with BMI > 30)	12.08	5.77
Daily kcal per capita	3287.08	262.39
Daily grams of fat per capita	129.66	22.73
Globalization Measures		
KOF Index of Globalization	76.99	11.02
KOF Economic Globalization	74.23	13.12
KOF Actual Flows	65.70	18.59
KOF Restrictions	82.31	11.77
KOF Social globalization	74.73	10.95
KOF Personal Contact	70.72	11.70
KOF Information Flows	77.83	8.85
KOF Cultural Proximity	74.99	23.01
KOF Political Globalization	84.03	16.35
CSGR Globalization Index	0.52	0.20
CSGR Economic Globalization	0.15	0.06
CSGR Social Globalization	0.28	0.18
CSGR Political Globalization	0.54	0.20
Socioeconomic and Geographical Controls		
GDP per capita ('000)	21.11	11.34
GINI Inequality Index	29.80	5.32
Population of the country	32.66	56.50
Female labor market participation	43.50	3.40
Food price/ Consumer Price Index	1.85	6.59
Population in urban areas (per cent)	74.19	10.93
Education (girls to boys ratio at school)	1.03	0.06

Notes: KOF index: Index from the Swiss federal institute of technology. BMI = body mass index. CSGR Index: index from the University of Warwick GDP: Gross domestic product data from 1989-2004. Countries included: Austria, Finland, France, Iceland, Japan, Netherlands, New Zealand, Spain, Sweden, Switzerland, UK, USA, Belgium, Canada, Denmark, Italy, Norway, Poland, Portugal, Slovakia, Australia, Estonia, Hungary, Ireland, Lithuania, Malaysia

Table 2. OLS and Panel Corrected Standard Error (PCSE) Regressions (dependent variable: obesity)

	OLS			PCSE 1D	OLS			PCSE 2D	OLS			PCSE 3D
	1A	1B	1C		2A	2B	2C		3A	3B	3C	
<i>Measures of Globalization</i>												
Overall Globalization Index	-0.045 [0.141]	0.202 [0.154]	0.226** [0.084]	0.129*** [0.041]								
Economic Globalization Index					-0.086 [0.133]	0.080 [0.086]	0.080 [0.081]	0.037 [0.031]				
Actual Flows (Economic Glob. Index)									-0.073 [0.110]	0.003 [0.067]	0.057 [0.055]	0.010 [0.023]
Restrictions (Economic Glob. Index)									-0.053 [0.095]	-0.019 [0.077]	-0.021 [0.075]	-0.032 [0.031]
Social Globalization Index					0.084 [0.145]	0.192* [0.102]	0.160* [0.092]	0.120*** [0.040]				
Personal Contact (Social Glob. Index)									-0.009 [0.105]	0.183* [0.101]	0.077 [0.089]	0.129*** [0.039]
Information Flows (Social Glob. Index)									0.257** [0.118]	0.210** [0.093]	0.082 [0.100]	0.102** [0.041]
Cultural Proximity (Social Glob. Index)									0.013 [0.049]	0.013 [0.035]	0.041 [0.038]	0.009 [0.016]
<i>Social, Economic and Geographic Controls</i>												
GDP per capita (in thousands)		-0.455 [0.299]	-0.471** [0.226]	-0.362*** [0.072]	-0.500* [0.247]	-0.437** [0.211]	-0.360*** [0.068]		-0.588** [0.245]	-0.382 [0.226]	-0.385*** [0.093]	
(GDP per capita (in thousands)) ²		0.005 [0.005]	0.005 [0.004]	0.004*** [0.001]	0.005 [0.004]	0.004 [0.004]	0.004*** [0.001]		0.006 [0.004]	0.003 [0.004]	0.004** [0.002]	
Gini		0.064 [0.189]	0.407** [0.194]	0.343*** [0.085]	0.036 [0.196]	0.352* [0.183]	0.336*** [0.080]		-0.087 [0.181]	0.314 [0.206]	0.239*** [0.076]	
Population of the country		0.059** [0.023]	0.049*** [0.015]	0.040*** [0.004]	0.069*** [0.022]	0.056*** [0.014]	0.044*** [0.004]		0.083*** [0.020]	0.062*** [0.016]	0.056 [0.006]	
% of Women in the Active Population			0.736*** [0.179]	0.557*** [0.097]		0.658*** [0.166]	0.542*** [0.092]			0.664*** [0.175]	0.456*** [0.091]	
Food price/ CPI			-0.116** [0.054]	0.033 [0.069]		-0.133** [0.062]	-0.116 [0.072]			-0.112 [0.086]	-0.105 [0.074]	
Urbanization			0.133** [0.063]	0.129*** [0.025]		0.101 [0.064]	0.116*** [0.024]			0.095 [0.065]	0.104*** [0.024]	
Education (% of girls respect % of boys at school)			-3.908 [6.412]	-1.061 [3.277]		-0.454 [7.110]	0.165 [3.206]			0.155 [6.916]	1.189 [3.094]	
N	326	314	307	307	326	314	307	307	326	314	307	307
R-squared	0.083	0.479	0.679	0.641	0.095	0.544	0.696	0.652	0.157	0.596	0.700	0.666

Expressions A, B and C correspond to a pooled OLS, clustered by country while expressions D correspond to Panel Corrected Standard Errors

Robust standard error values appear in brackets below the regression coefficient

All regressions include a time trend and they are clustered by country

Statistically significantly different from zero: * at the 10 percent level; ** at the 5% level; *** at the 1% level.

GDP: Gross Domestic Product; CPI: Consumer Price Index; Globalization Index: KOF

Countries included: Austria, Finland, France, Iceland, Japan, Netherlands, New Zealand, Spain, Sweden, Switzerland, UK, USA, Belgium, Canada, Denmark, Italy, Norway, Poland, Portugal, Slovakia, Australia, Estonia, Hungary, Ireland, Lithuania, Malaysia

**Table 3. OLS and Panel Corrected Styandard Error (PCSE) Regressions
(dependent variable: kcal consumed)**

	OLS			PCSE	OLS				PCSE	OLS				PCSE
	1A	1B	1C	1D	2A	2B	2C	2D		3A	3B	3C	3D	
<i>Measures of Globalization</i>														
Overall Globalization Index	11.851*** [3.430]	15.044*** [4.466]	13.091** [4.909]	12.669*** [0.786]										
Economic Globalization Index					-0.558 [4.955]	4.139 [4.904]	4.138 [4.445]	3.510 [1.229]						
Actual Flows (Economic Glob. Index)										-4.277 [3.288]	-1.616 [3.390]	-3.329 [2.788]	-1.261 [1.379]	
Restrictions (Economic Glob. Index)										3.544 [4.398]	0.495 [5.092]	4.086 [3.240]	1.692** [0.797]	
Social Globalization Index					10.536** [5.122]	8.477 [4.989]	8.326* [4.667]	8.766*** [0.861]						
Personal Contact (Social Glob. Index)										7.427 [5.235]	13.056** [5.669]	12.09*** [3.611]	9.320*** [1.370]	
Information Flows (Social Glob. Index)										3.821 [6.316]	3.344 [7.717]	10.335* [5.135]	9.103*** [1.473]	
Cultural Proximity (Social Glob. Index)										2.095 [2.186]	0.143 [1.991]	0.131 [1.517]	1.014** [0.413]	
<i>Social, Economic and Geographic Controls</i>														
GDP per capita (in thousands)		-1.621 [12.164]	20.348 [12.155]	11.196*** [3.629]		4.080 [13.285]	24.292* [12.474]	13.934*** [4.019]			2.549 [14.720]	2.718 [10.303]	7.458** [2.976]	
(GDP per capita (in thousands)) ²		0.016 [0.215]	-0.344 [0.211]	-0.142** [0.060]		-0.091 [0.235]	-0.414* [0.216]	-0.191*** [0.065]			-0.122 [0.275]	-0.067 [0.186]	-0.101** [0.049]	
Gini		2.760 [11.709]	6.473 [9.765]	3.114 [2.635]		2.744 [11.508]	3.820 [10.613]	1.822 [2.744]			-2.455 [10.395]	-9.471 [10.158]	-4.415 [3.647]	
Population of the country		1.595** [0.658]	1.294** [0.543]	1.387*** [0.118]		1.677** [0.707]	1.600** [0.617]	1.593*** [0.176]			2.250** [0.897]	2.435*** [0.787]	2.165*** [0.271]	
% of Women in the Active Population			11.282 [12.189]	2.972 [2.681]			7.513 [12.626]	0.026 [3.065]				-14.464 [10.787]	-8.831 [6.307]	
Food price/ CPI			-0.020 [2.812]	-2.221* [1.210]			-1.124 [2.626]	-1.279 [1.080]				-6.275** [2.644]	-1.084 [1.545]	
Urbanization			-9.876** [4.546]	-7.201*** [1.175]			-11.791** [4.692]	-8.488*** [1.232]				-10.154** [4.047]	-9.277*** [1.284]	
Education (% of girls respect % of boys at school)			-678.888 [427.010]	-323.026*** [120.106]			-494.813 [521.269]	-211.308* [113.619]				-306.177 [428.878]	-176.357 [141.676]	
N	384	368	316	316	384	368	316	316	384	368	316	316		
R-squared	0.217	0.317	0.521	0.965	0.174	0.283	0.520	0.966	0.243	0.361	0.602	0.967		

Expressions A, B and C correspond to a pooled OLS, clustered by country while expressions D correspond to Panel Corrected Standard Errors

Robust standard error values appear in brackets below the regression coefficient

All regressions include a time trend and they are clustered by country

Statistically significantly different from zero: * at the 10 percent level; **at the 5% level; *** at the 1% level.

GDP: Gross Domestic Product; CPI: Consumer Price Index; Globalization Index: KOF

Countries included: Austria, Finland, France, Iceland, Japan, Netherlands, New Zealand, Spain, Sweden, Switzerland, UK, USA, Belgium, Canada, Denmark, Italy, Norway, Poland, Portugal, Slovakia, Australia, Estonia, Hungary, Ireland, Lithuania, Malaysia

Table 4. Robustness Checks (dependent variable: obesity)

	IV	CSGR			
	IV-1C	OLS-1C	PCSE-1D	OLS-2C	PCSE-2D
<u>Measures of Globalization</u>					
Overall Globalization Index	0.243** [0.130]	0.054 [0.047]	0.025*** [0.012]		
Economic Globalization Index				-0.014 [0.100]	-0.035 [0.041]
Social Globalization Index				0.099** [0.055]	0.057*** [0.017]
<u>Social, Economic and Geographic Controls</u>					
GDP per capita (in thousands)	-0.497** [0.258]	-0.185 [0.249]	-0.213*** [0.074]	-0.265 [0.262]	-0.265*** [0.075]
(GDP per capita (in thousands)) ²	0.005 [0.004]	-0.000 [0.004]	0.002 [0.001]	-0.000 [0.004]	0.002* [0.001]
Gini	0.404*** [0.189]	0.587** [0.240]	0.486*** [0.096]	0.460* [0.243]	0.444*** [0.086]
Population of the country	0.050*** [0.016]	0.026 [0.020]	0.026*** [0.005]	0.038** [0.018]	0.032*** [0.005]
% of Women in the Active Population	0.735*** [0.170]	0.782*** [0.232]	0.581*** [0.080]	0.671** [0.246]	0.531*** [0.081]
Food price/ CPI	-0.114*** [0.056]	-0.135** [0.056]	0.031 [0.058]	-0.135** [0.057]	0.024 [0.059]
Urbanization	0.134*** [0.062]	0.160*** [0.056]	0.164*** [0.033]	0.119* [0.060]	0.137*** [0.030]
Education (% of girls respect % of boys at school)	-3.924 [6.331]	-3.457 [5.860]	-0.971 [3.056]	0.389 [5.141]	0.767 [3.036]
N	307	286	286	286	286
R-squared	0.679	0.642	0.641	0.651	0.648

The first column reproduces expression 1C instrumenting for globalization using Coastline and Landboundaries as IVs

The next four columns replicate expressions 1C, 1D, 2C and 2D using an alternative globalization index from CSGR

Robust standard error values appear in brackets below the regression coefficient

All regressions include a time trend and they are clustered by country

Statistically significantly different from zero: * at the 10 percent level; ** at the 5% level; *** at the 1% level.

GDP: Gross Domestic Product; CPI: Consumer Price Index; Globalization Index: CSGR

Countries included: Austria, Finland, France, Iceland, Japan, Netherlands, New Zealand, Spain, Sweden, Switzerland, UK, USA, Belgium, Canada, Denmark, Italy, Norway, Poland, Portugal, Slovakia, Australia, Estonia, Hungary, Ireland, Lithuania, Malaysia

Table 5. Robustness Checks (dependent variable: kcal consumed)

	IV	CSGR			
	IV-1C	OLS-1C	PCSE-1D	OLS-2C	PCSE-2D
<u>Measures of Globalization</u>					
Overall Globalization Index	24.118*** [6.292]	5.551* [2.897]	3.946*** [0.644]		
Economic Globalization Index				4.001 [8.394]	4.003 [2.805]
Social Globalization Index				3.719* [2.148]	3.716*** [0.898]
<u>Social, Economic and Geographic Controls</u>					
GDP per capita (in thousands)	2.225 [16.146]	17.929 [13.056]	12.327*** [4.032]	24.966** [10.721]	24.966*** [3.674]
(GDP per capita (in thousands)) ²	-0.043 [0.284]	-0.376 [0.231]	-0.200*** [0.062]	-0.514** [0.210]	-0.514*** [0.082]
Gini	4.412 [10.126]	-3.193 [7.518]	-3.454 [3.873]	-7.511 [7.375]	-7.511*** [2.891]
Population of the country	2.033*** [0.652]	0.878 [0.726]	0.879*** [0.203]	1.514** [0.600]	1.514*** [0.198]
% of Women in the Active Population	9.561 [13.028]	10.203 [14.608]	4.054 [4.621]	8.685 [14.488]	8.685*** [2.646]
Food price/ CPI	-1.314 [3.584]	1.29 [2.150]	-2.193 [1.934]	0.343 [2.492]	0.343 [2.683]
Urbanization	-7.923*** [4.656]	-11.900** [4.549]	-9.883*** [1.881]	-14.144*** [4.975]	-14.144*** [1.132]
Education (% of girls respect % of boys at school)	-673.133 [521.209]	-731.618* [430.135]	-303.677* [162.674]	-580.712 [428.048]	-580.712*** [128.417]
N	316	294	294	294	294
R-squared	0.434	0.489	0.866	0.427	0.427

The first column reproduces expression 1C instrumenting for globalization using Coastline and Landboundaries as IVs

The next four columns replicate expressions 1C, 1D, 2C and 2D using an alternative globalization index from CSGR

Robust standard error values appear in brackets below the regression coefficient

All regressions include a time trend and they are clustered by country

Statistically significantly different from zero: * at the 10 percent level; ** at the 5% level; *** at the 1% level.

GDP: Gross Domestic Product; CPI: Consumer Price Index; Globalization Index: CSGR

Countries included: Austria, Finland, France, Iceland, Japan, Netherlands, New Zealand, Spain, Sweden, Switzerland, UK, USA, Belgium, Canada, Denmark, Italy, Norway, Poland, Portugal, Slovakia, Australia, Estonia, Hungary, Ireland, Lithuania, Malaysia

Table 6. Robustness Checks: Lagged globalization effects

	Dependent variable: Obesity			Dependent variable: Kcal		
	KOF OLS-1C	KOF OLS-2C	IV IV-1C	KOF OLS-1C	KOF OLS-2C	IV IV-1C
<u>Measures of Globalization</u>						
Overall Globalization Index (1 st lag)	0.219** [0.080]		0.238* [0.128]	12.629** [4.718]		23.657*** [6.255]
Economic Globalization Index (1 st lag)		0.069 [0.078]			4.066 [4.537]	
Social Globalization Index (1 st lag)		0.166* [0.087]			8.055* [4.711]	
<u>Social, Economic and Geographic Controls</u>						
GDP per capita (in thousands)	-0.468* [0.222]	-0.428* [0.209]	-0.500* [0.259]	20.648* [11.937]	24.569* [12.467]	2.122 [16.367]
(GDP per capita (in thousands)) ²	0.004 [0.004]	0.004 [0.004]	0.005 [0.004]	-0.357* [0.206]	-0.424* [0.215]	-0.056 [0.285]
Gini	0.404* [0.193]	0.356* [0.177]	0.400** [0.189]	6.275 [9.712]	3.738 [10.591]	3.967 [10.129]
Population of the country	0.048*** [0.015]	0.055*** [0.014]	0.050*** [0.016]	1.267*** [0.537]	1.567** [0.617]	2.010*** [0.650]
% of Women in the Active Population	0.743*** [0.180]	0.664*** [0.156]	0.743*** [0.171]	11.690 [12.199]	7.825 [12.657]	10.263 [13.042]
Food price/ CPI	-0.101* [0.054]	-0.119* [0.063]	-0.097 [0.060]	0.927 [2.945]	-0.449 [2.696]	3.138 [3.858]
Urbanization	0.129* [0.064]	0.094 [0.064]	0.131** [0.063]	-10.098** [4.520]	-11.92** [4.701]	-8.269* [4.617]
Education (% of girls respect % of boys at school)	-3.701 [6.509]	0.588 [7.249]	-3.703 [6.474]	-667.284 [429.981]	-473.136 [538.487]	-651.185 [533.359]
Time (in years)	0.136 [0.108]	0.125 [0.095]	0.120 [0.147]	1.380 [6.872]	1.990 [6.445]	-7.549 [7.030]
N	306	306	306	316	316	316
R-squared	0.680	0.697	0.649	0.522	0.519	0.428

The IV column reproduces expression 1C instrumenting for globalization using Coastline and Landboundaries as Ivs

Robust standard error values appear in brackets below the regression coefficient

All regressions include a time trend and they are clustered by country

Statistically significantly different from zero: * at the 10 percent level; **at the 5% level; *** at the 1% level.

GDP: Gross Domestic Product; CPI: Consumer Price Index; Globalization Index: KOF

Countries included: Austria, Finland, France, Iceland, Japan, Netherlands, New Zealand, Spain, Sweden, Switzerland, UK, USA, Belgium, Canada, Denmark, Italy, Norway, Poland, Portugal, Slovakia, Australia, Estonia, Hungary, Ireland, Lithuania, Malaysia

APPENDIX

Table A1. The KOF Index of Globalization

	Mean (Standard Deviation) in Data
<i>Economic Globalization</i>	73.890 (13.490)
<i>(i) Actual Flows</i>	66.533 (18.994)
Trade (% GDP)	
Foreign direct investment, stocks (% GDP)	
Portfolio investment (% GDP)	
Income payments to foreign nationals (% GDP)	
<i>(ii) Restrictions</i>	82.560 (11.707)
Hidden import barriers	
Mean tariff rate	
Taxes of international trade (% total population)	
Capital account restrictions	
<i>Social Globalization</i>	76.647 (10.861)
<i>(i) Personal Contact</i>	71.223 (11.923)
Telephone traffic	
Transfers (% GDP)	
International tourism	
Foreign population (% total population)	
International letters (per capita)	
<i>(ii) Information Flows</i>	78.129 (8.923)
Internet users (per 1000 people)	
Television (per 1000 people)	
Trade in newspapers (% GDP)	
<i>(iii) Cultural Proximity</i>	75.580 (22.962)
Number McDonald's restaurants (per capita)	
Number IKEA (per capita)	
Trade in books (% GDP)	
<i>Political Globalization</i>	87.736 (12.140)
Embassies in country	
Membership in international organizations	
Participation in UN security missions	
International treaties	

Notes: GDP: Gross domestic product. Data are from 1989–2004. Countries included: Austria, Finland, France, Japan, Netherlands, New Zealand, Spain, Sweden, Switzerland, UK, USA.

Table A2. Alternative Globalization Measures: The CSGR Globalization Index

	Mean (Standard Deviation) in Data
<i>Economic Globalization</i>	13.365 (3.322)
Trade (% GDP)	
Foreign direct investment (%GDP)	
Portfolio investment (%GDP)	
Income (% GDP)	
<i>Social Globalization</i>	31.998 (18.634)
<i>(i) People</i>	
Foreign population stock (% total population)	
Foreign population flow (% total population)	
Worker remittances (% GDP)	
Tourists (% total population)	
<i>(ii) Ideas</i>	
Phone calls (per capita)	
Internet users (% population)	
Films	
Books and newspapers (imported and exported)	
Mail (per capita)	
<i>Political Globalization</i>	58.57 (20.013)
Embassies in country	
UN missions	
Membership in international organizations	

Notes: GDP: Gross domestic product. Data are from 1989–2004. Countries included: Austria, Finland, France, Japan, Netherlands, New Zealand, Spain, Sweden, Switzerland, UK, USA.

Table A3. Correlations of Globalization Indices

	KOF Economic	KOF Social	KOF Political
CSGR Economic	0.45		
CSGR Social		0.87	
CSGR Political			0.91

Table A4. OLS and Pannel Corrected Styandard Error (PCSE) Regressions.
Dependent variable: GRAMS FROM FAT CONSUMED

	OLS			PCSE	OLS			PCSE	OLS			PCSE
	1A	1B	1C	1D	2A	2B	2C	2D	3A	3B	3C	3D
<u>Measures of Globalization</u>												
Overall Globalization Index	1,691*** [0,205]	1,737*** [0,352]	1,755*** [0,387]	1,382*** [0,122]								
Economic Globalization Index					-0,133 [0,269]	0,092 [0,268]	0,216 [0,318]	0,259*** [0,099]				
Actual Flows (Economic Glob. Index)									-0,365* [0,193]	-0,246 [0,227]	-0,406 [0,274]	-0,203** [0,098]
Restrictions (Economic Glob. Index)									0,472 [0,278]	0,187 [0,346]	0,500*** [0,257]	0,184** [0,078]
Social Globalization Index					1,720*** [0,330]	1,395*** [0,334]	1,085** [0,428]	0,975*** [0,120]				
Personal Contact (Social Glob. Index)									0,751** [0,319]	0,986** [0,440]	1,033*** [0,342]	1,020*** [0,123]
Information Flows (Social Glob. Index)									0,239 [0,394]	0,142 [0,496]	0,763*** [0,368]	0,453*** [0,092]
Cultural Proximity (Social Glob. Index)									0,505*** [0,129]	0,380*** [0,131]	0,353*** [0,118]	0,203*** [0,053]
Political Globalization Index							0,450** [0,183]					
<u>Social, Economic and Geographic Controls</u>												
GDP per capita (in thousands)		0,421 [0,835]	1,064 [0,916]	0,868*** [0,221]		1,155 [0,918]	1,307 [0,900]	1,303*** [0,275]		0,984 [0,905]	0,307 [0,739]	0,709*** [0,260]
(GDP per capita (in thousands)) ²		-0,007 [0,015]	-0,020 [0,016]	-0,010*** [0,004]		-0,020 [0,017]	-0,023 [0,019]	-0,017*** [0,004]		-0,021 [0,017]	-0,007 [0,013]	-0,010*** [0,004]
Gini		-0,328 [0,687]	-0,403 [0,609]	-0,241 [0,286]		-0,087 [0,668]	-0,232 [0,550]	-0,325 [0,273]		-0,161 [0,785]	-1,151 [0,718]	-0,766** [0,301]
Population of the country		0,107*** [0,036]	0,104*** [0,035]	0,079** [0,173]		0,082* [0,042]	0,072** [0,036]	0,086*** [0,020]		0,077 [0,065]	0,121** [0,056]	0,118*** [0,021]
% of Women in the Active Population			0,184 [0,989]	0,340** [0,173]			-0,138 [1,024]	-0,636 [0,497]			-1,962 [1,781]	-1,339 [1,238]
Food price/ CPI			0,275 [0,191]	0,309*** [0,107]			0,344 [0,203]	0,190** [0,083]			-0,277 [0,178]	-0,014 [0,098]
Urbanization			-0,140 [0,227]	-0,098 [0,082]			-0,260 [0,243]	-0,260*** [0,089]			-0,405* [0,215]	-0,275*** [0,089]
Education (% of girls respect % of boys at school)			-75,703** [32,210]	-42,043*** [12,809]			-52,292 [41,307]	-26,765** [11,335]			-18,025 [34,855]	-21,644 [13,422]
N	384	368	316	316	384	368	316	316	384	368	316	316
R-squared	0.514	0.587	0.676	0.878	0.505	0.576	0.694	0.878	0.585	0.606	0.723	0.886

Expressions A, B a,d C correspond to a pooled OLS, clutered by country while expressions D correspond to Panel corrected Standard Errors

Robust standard error values appear in brackets below the regression coefficient

All regressions control for time trend ans they are clustered by country

Statistically significantly different from zero: * at the 10 percent level; **at the 5% level; *** at the 1% level.

GDP: Gross Domestic Product; CPI: Consumer Price Index; Globalization Index: KOF

Countries included: Austria, Finland, France, Iceland, Japan, Netherlands, New Zealand, Spain, Sweden, Switzerland, UK, USA, Belgium, Canada, Denmark, Italy, Norway, Poland, Portugal, Slovakia, Australia, Estonia, Hungary, Ireland, Lithuania, Malaysia