'Globesity'? The effects of globalization on obesity and caloric intake

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ABSTRACT

We examine the effect of globalization, in its economic and social dimensions, on obesity and caloric intake, namely the so –called 'globesity' hypothesis. Our results suggest a robust association between globalization and both obesity and caloric intake. A one standard deviation increase in globalization is associated with a 23.8 percent increase in obese population and a 4.3 percent rise in calorie intake. The effect remains statistically significant even with an instrumental variable strategy to correct for some possible reverse causality, a lagged structure, and corrections for panel standard errors. However, we find that the primary driver is 'social' rather than 'economic' globalization effects, and specifically the effects of changes in 'information flows' and 'social proximity' on obesity. A one standard deviation increase in social globalization increased the percentage of obese population by 13.7 percent.

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

JEL: I18, F69, P46

1. INTRODUCTION

The upsurge in the prevalence of obese or overweight population between 1985 and 2005 is still largely unexplained (Finucane *et al.*, 2011). However, it noticeable that it coincides with an increasing economic and social interdependence which is conventionally regarded as the 'globalization period' (ILO, 2004)[1]. The latter, that is the association between obesity and globalization, can be denoted as the "*globesity* hypothesis". Some have referred to 'globesity' to argue that is the outcome of the speeding of the "nutrition transition" (Frenk , 2012). However, to the best of our knowledge, the hypothesis has not been successfully tested. The only exception is Ljungvall (2013) who examines one of the dimensions of interest, namely economic globalization, and finds evidence that with obesity.

This paper is the first one to carefully take the 'globesity hypothesis' to the data. That is, firstly we examine whether the expansion in economic and social interdependence is explained the expansion of the epidemic of obesity and overweight[2], and secondly, we identify some of the potential explanatory pathways.

In disentangling the effect of globalization, it is important to distinguish at least two relevant dimensions, namely an *economic dimension*, relative to the world's increasing economic interdependence, and an equally relevant *social dimension* that pertains to lifestyle changes influencing how people live and work (ILO, 2004). Physiologically, obesity and being overweight result from an energy imbalance

[1] To date, the size of the overweight population exceeds the size of the underweight population measured using body mass index (BMI), (Popkin, 2007).

[2] Obesity is regarded as an epidemic, and its regarded as 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).

(Jéquier and Tappy, 1999), which has both environmental and genetic determinants (Bell et al, 2005). However, the global nature of these health phenomena suggests the need to analyze other underlying mechanisms such as the decline of food prices (Hummels, 2007)[3] which can have an independent effect. The same applies to the effect of idiosyncratic economic shocks and, social changes (Appadurai, 1998), which can lead to the expansion of income inequality (Bergh and Nilson 2010b; Karlsson et al. 2010; Milanovic, 2005; Williamson, 1997). Given that obesity can be traced back to an imbalance between calories consumed and burned, we specifically undertake an econometric analysis of the effect on caloric intake patterns. The latter complements our argument, and stands as a robustness test for our argument.

A visual examination the data suggests evidence of a smooth association between obesity and globalization can be retrieved from Figure 1 primarily at the level of globalization [4]. Such association is reproduced when globalization and calorie intake is examined in Figure 2. Hence, can these associations alone explain the effects of globalization, or are other confounders driving the relationship? If globalization does indeed exert an effect on obesity and overweight, what mechanisms are the most likely at play in driving a causal influence? Is there still an effect of globalization, or of some of its components in driving obesity and overweight patterns.

[Insert Figure 1 and 2 about here]

[3] The average revenue per ton-kilometre shipped dropped by 92 percent between 1955 and 2004 (Hummels, 2007).

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

This papers sets out to empirically study the hypothesized association between globalization (and its different types) on both obesity and caloric intake by examining a balanced panel of countries over the period where the obesity epidemic materialized. We control for a battery of specifications employing different controls, conducive of alternative explanations of such epidemic including living standards, income inequality, women's labor market participation[5], and food prices to define the arithmetic of the 'globesity phenomenon' (Bleich et al. 2008; Jéquier and Tappy, 1999; Popkin, 2001). Furthermore, given that potential endogeneity of globalization on health outcomes, we follow the literature and employ an instrumental variable (IV) strategy to account for potential effects biasing our estimates. Consistently with prior research on globalization (Potrafke and Usprung, 2012), we avoid using single measures of globalization such as trade liberalization, and we have decided to follow instead an index measure that summarize different components of what globalization entails. Specifically, we draw on widely accepted measure of globalization, the KOF index (and an alternative index for robustness purposes). The advantage of using an index measure is that in addition to measuring globalization, it allows for a decomposition of its different dimensions, and distinct categories within each dimension (Dreher, 2006a). The latter is important when one needs to control for socio-economic constraints that cannot be measured individually (Offer et al. 2013). Globalization indexes have been widely employed in a number of previous studies[6], although the effects on health and nutrition have been overlooked with the exception

[5] There is a literature on the effect of female labour market participation on obesity as it increases the opportunity cost of time, giving people incentives to consume more convenience foods (Finkelstein, 2005).

[6] Mostly that globalization has been beneficial for trade, growth, and gender equality and has not hampered welfare development (Potrafke, 2014)

of the effects on life expectancy (Bergh and Nilsson, 2010a), which primarily capture wider welfare effects on the time span individuals life, rather than on their quality of life.

We exploit cross-country and time-series variation coming from a panel of 26 countries over the years 1989–2005,[7] a period when globalization exhibited the most dramatic expansion. Our data set comprises aggregate data from a large, balanced panel containing the maximum number of countries we could have data, for the longer homogeneous period (namely for through three decade), and different dimensions of globalization (see Tables A1 and A2 in the Appendix). The comprehensive nature of our data enables us to distinguish the impact of globalization on both the country specific obesity rate and total caloric intake. We have employed data from official sources published by the Organization or Economic Cooperation and Development (OECD). In addition, we have employed a second dataset, Finucane (2011), for comparative purposes, which employ comprehensive data from a number of different sources. Time- and country-fixed effects are used to avoid biased estimates (Achen 2000; Carson et al. 2010; Lewis-Beck, 2006; Lewis-Beck et al. 2008).

In addition to estimates containing a long list of controls, we report both evidence of lagged effects, and, especially those resulting from employing an instrumental variable (IV) strategy. The reason to employ a number of controls is important to net out the influence of other confounding and compositional effects

[7]Data 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.

(e.g., increased urban and built environments, lower food prices due to lower tariffs,[8] employment opportunities for women). The latter inevitably capture some unobserved heterogeneity, which we wish to control for, and allow us to disentangle the 'residual' effect of globalization on obesity after a number of other alternative explanations have been accounted for.

In the next section, we summarize existing research on the explanation for an epidemic of obesity and overweight. Section three reports the data and methods. We then report our results in a separate section and finally section five concludes with some key implications.

2. OBESITY DETERMINANTS AND GLOBALISATION

Gains in body weight in the last decades such as those reported in Figures 1 are unlikely to be explained by genetic change alone, and instead point towards a wider modification of the environment individuals live in (Hill *et al.*, 2000). Instead, it can be argued that an imbalance can likely arise between consumption patterns and calorie intake, the latter remains anchored in pre-globalization energy demands for a few decades giving rise to globesity phenomenon.

Among different sources of environmental change, one can cite the role of *technology* (Phillipson and Posner, 2003; Lakdawalla and Phillipson, 2009) which combined with new forms of socialization and economic activity have transformed both workplace and leisure activities. Shifts in economic activity from both agriculture and manufacturing sectors furthering economic activity in services can be

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

lead to a reduction in the demand for physical activity at the workplace (Prentice and Jebb, 1995), which in turn is unlikely to be homogenous across the world[9], and explained by a sluggish adaptation to energy-saving technological changes (Blecih et al, 2008, Cutler et al., 2003).

The effects of globalization are concomitant to a reduction of transport costs, and subsequently of *food prices* which would increase energy consumption, might not follow up by an subsequent reduction of energy expenditure. Such mismatch between energy consumed and expended can be argued to underpin an expansion in obesity and overweight. However, the effect of globalization exceeds in magnitude that of food prices alone. The latter is the case insofar as globalization can be linked to more general dietary changes worldwide in accordance with the so-called "nutrition transition" (Hawkes, 2006; Kim et al., 2000; Monteiro et al., 1995). That is, diets change toward greater consumption of fat, added sugar, and animal food products, but reduced intake of fiber and cereals (Bray and Popkin, 1998; Duffey et al. 2010).

Another source of influence refers to changes socio-*cultural environments* people live as a result of a higher exposure to globalization (Egger et al. 2012; McLaren, 2007; Monteiro et al., 2000; Costa-Font and Gil, 2004; Costa-Font et al, 2010; Ulijaszek and Schwekendiek, 2012, Ulijaszek, 2007). 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

[9] An exception is Paeratakul et al. (1998) who find evidence of changes in physical activity and obesity in China even where some population is less exposed to globalization, (including social globalization).

characteristics triggering escalator use and transportation systems reducing energy consumed by their passengers. 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.

Another socio- environmental effect results form *an increasing share of* women in the labor market, who have traditionally played a role in household preparation and shopping regularly for fresh foods (Welch *et al*, 2009), and such a reduction has not has not been fully substituted by male partners. Similarly, worldwide urbanization has been linked to sedentary lifestyles (Popkin, 2004) and greater food variety (Raynor and Epstein, 2001), both of which can explain an expansion of obesity rates (Bleich et al. (2007, *Hu et al*. 2003, Robinson, 1999). Social lifestyle factors also can reduce neighborhood socialization while, at the same time, increasing the use of information technologies or promoting sedentary recreation activities through television, telephones, or computers (Frenk et al., 2003). 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).

Socioeconomic changes play a role in explaining obesity and overweight . Sobal and Stunkard (1989) who review more than a hundred studies find clear evidence of an association between socio-economic status and obesity. More specifically, an inverse association between social class (Sobal, 1991), education (Sundquist and

Johansson, 1998)[10] and income (Costa-Font and Gil, 2007) and obesity is well established worldwide. 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, *time constraints* (related to globalization) engender stressful and sedentary lifestyles (Philipson, 2001) as well as the consumption of fast food both are found to increase the risk of obesity (Chou et al. 2008, Bowan and Gortmaker, 2004; Jeffery and French, 1998; Offer at al. 2010),

This discussion points towards the need to empirically test whether either economic (e.g., lower prices) or social (e.g., Westernization of diets, lifestyles) dimensions of globalization underpin the obesity epidemic, considering the distinct implications that each factor poses for policy.

3. DATA AND EMPIRICAL STRATEGY

3.1. Data

We 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 2005. Due to restrictions in data availability, we faced a trade-off in terms of the number of countries to include in the study: a very large number of countries over a short

[10] Recent studies argue that inequalities in obesity can be traced to gender, age, and ethnicity (Dreeben, 2001; Zhan and Wang, 2004). However, the interpretation of income inequality is not causal when using individual data.

time period versus a longer time period, at the expense of reducing the number of countries studied. We chose the sample that provided us with the largest possible number of observations, and as we explain below we then tested the effect with an alternative sample with a larger number of countries for a short period. 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.[11] A person is considered obese if her BMI (kg/m^2) is at least 30.[12] The average obesity rate for the sample of countries in our study is 11.99%, 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 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

[11] For detailed information on OECD country surveys, see http://www.oecd.org/eco/surveys/ . Additional data can be found at http://apps.who.int/bmi/index.jsp.

[12] In a few cases, we inferred missing data by assuming a constant growth rate.

into account we also measure the effect of globalization on caloric intake[13], using data from FAOSTAT.[14]

3.1.4. 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 0.48, whereas correlations for the social and political indices are of magnitudes 0.70 and 0.82, respectively (see Table A3).

3.1.5. Other explanatory variables

[13] 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)

[14] Food and Agricultural Organization of the United Nations (http://faostat.fao.org/site/354/default.aspx).

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 economically 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 all countries; except for Malaysia and Lithuania that it came from FAO.[15]

We used the *Gini index* from the Standardized World Income Inequality Database, Version 3.1, released on 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 indicates maximal inequality, such that only one person possesses all the country's income.

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

[15] http://stats.oecd.org/Index.aspx?DataSetCode=MEI_PRICES. http://faostat.fao.org/site/683/DesktopDefault.aspx?PageID=683#ancor.

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.[16]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 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:

$$O_{tj} = \alpha + G_{tjs}\beta + \Sigma X_{jt}\,\delta + \gamma_t + u_j + \varepsilon_{tj}, \qquad (1)$$

where *s* denotes the sth dimension of globalization, *i* refers to the country, *t* indicates to the time dimension, O_{tj} 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

[16] In a few cases, we lacked data for a few years, and we inferred them by assuming a constant growth rate.

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.

We first 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 heterocedasticity 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 employing the above-mentioned instruments, which met both the theoretical, and exhibited statistical significance and overall significant F-test in a first stage. Estimates reported are estimated employing generalized methods of moments (GMM), and we report the 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 which have been extensively employed to proxy the effect of

globalization. Theoretically, coastline and land boundaries would stand out as barriers to trade and social communication, hence we expect higher that the larger the boundaries, the slower the globalization process will be**.** 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. Similarly, we have examined a nonlinear (both quadratic and cubic) association between globalization and obesity and calorie intake but then the results did fail to show evidence of a nonlinear association.

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). Similarly, we have employed another dataset for obesity from Finicane (2011), which employs estimates from published and unpublished health examination surveys and epidemiological studies.

4. RESULTS

4.1. Baseline Estimates

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

[Insert Table 2 around here]

According to Table 2, a naïve specification exhibited no association between globalization and obesity, but the inclusion of a number of reasonable controls which capture the presence of compositional effects, delivers a large significant and positive coefficient. Next, we seek to disentangle the specific effect of various dimensions of globalization and, subsequently we 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 after controlling for inequality and economic development. However, when we distinguish between economic and social globalization, we find that this effect is primarily driven by changes in social globalization alone. When we control for GDP per capita, inequality measures (Expression 2b), these effects overshadow the influence of economic globalization on obesity, and even lead to small non- robust s coefficient. In contrast, social globalization displays a robust effect on both obesity and calorie intake, which, judging on the dimensions that appear as significant suggests that wider social constraints on personal contact and information flows might affect obesity. We have further tested whether our

specifications are driven by outliers (e.g., US), but the results still hold invariant to its exclusion.

Expressions 1c and 2c in Tables 2 expand further the number of controls and they include also the relative variation of food prices, women in the economically 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 23.8 percent in the proportion of obese population and calorie consumption increase of 4.3 percent.

We then specify the contributions of different components of economic and social globalization in 2a to 2d, and then we further disaggregate such components in personal contact and information flows both of which appear as significant determinants of obesity rates in columns 3a to 3d. However, the effect only becomes significant after we controlled for food price declines and the increasing percentage of women in the labor force, which had a constantly positive, significant effect on obesity. When we decompose the globalization effect on that of its components, economic components appear to be either not significant or exhibit negligible coefficient, whilst social globalization effects are robust. When we in turn decompose social globalization effect, we find that they appear to be driven by changes in personal contact, and information flows. These provide some initial confirmation of the intuitive effects of social globalization components on obesity described in previous sections.

Table 3 reports the same empirical specification as in Table 2 but for calorie intake. That is, we measure the effect of overall globalization and its economic

and social dimensions on calorie intake, and we find that results are consistent with Table 2. Overall results from Table 3 suggest that globalization increases caloric intake, and that whilst social globalization exerts a positive and significant association with calorie intake, economic globalization turns out to be non-significant or even revert sign. The significant of such effect only depends on the inclusion of urbanization controls. The effect size indicates that a one standard deviation increase in social globalization is found to increase obesity rate by 13.7 percent.

[Insert Table 3 around here]

As in with Table 2, when we distinguish in Table 3 the contributions of different components of economic and social globalization (expressions 3a, 3b 3c and 3d in Table 3), we consistently find that the social globalization effect is mainly driven by personal contact (and information flows in explaining obesity), consistently with a general hypothesis of the westernization of lifestyles.

When we control for some compositional effects by including a longer list of controls, we find that the percentage of active women in the labor market exhibited expected, consistent, positive associations with the percentage of obese population. The effect size indicates that one standard deviation increase in the active female labor force led to a rise of 2.4 percentage points in the share of obese population. Urbanisation appears to be significantly and positively associated with obesity rates, but display a counter effect on calorie intake.

Finally, a rise in income had a negative effect on population obesity rates, though this impact grew less important among poorer countries. Inequality the opposite effect, a higher inequality increases the 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 consumed[17].

4.2. Robustness Checks

In Tables 4 and 5 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]

When considering this type of specification, 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. As mentioned before, we used two alternative and widely used variables to instrument for globalization, which are substantially different than regional effects and refer to the following: *coastline*, or the total length (kilometers) of the boundary between the land area (including islands) and the sea,

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

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 in the above tables consisted in using an alternative index of globalization. Specifically, we use the CSGR index as an alternative measure (see Table A2 in the Appendix). We display both OLS and the PCSE specification estimates and distinguish between total CSGR globalization and social and economic CSGR globalization. Once again, we find evidence consistent with robust effects[18]. The effects of social globalization exhibit comparable coefficient as previous estimates.

. **[Insert Tables 6 about here]**

We then address the question of a lagged effect of globalization on obesity and calorie intake (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

[18] 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

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.

Finally, Table 7 reports the estimates of comparable regressions as above employing the obesity estimates from Finucane (2011) as a dependent variable. For both men and women, we find a positive and significant effect of globalization. The estimates remain robust whether we instrument the variable globalization or not. Consistently, when we distinguish between economic and social globalization, only the effects of social globalization appear significant consistently with previous results.

[Insert Table 7 about here]

An important picture comes out of our findings, namely the relationship between globalization and obesity is robust and positive consistently with visual evidence. However, when we disentangle the various mechanisms at play, we find that economic globalization per se does not exert a robust effect on obesity and calorie intake. In contrast, social globalization does indeed exhibit a consistently positive relationship suggesting that globalization by impacting the social life of individuals, exerts deeper effect on individuals lifestyles and fitness.

5. CONCLUSIONS

This paper set out to examine the association between globalization (including its dimensions) and obesity alongside calorie intake. We find some intriguing results. First, we find evidence of an effect of globalization on obesity which is robust to different specifications and empirical strategies. Second, we find that such effect is mainly(though not exclusively) driven by changes in 'social globalization' which are found to exert a rather robust and significant effect, irrespective of the measures employed. Third, upon disentangling the effect of different subcomponents of social globalization, we find strong a significant effect of changes in 'information flows' and 'social proximity'. In contrast, we find that our previously significant effects of economic globalization (in naïve specifications without controls) were primarily driven by compositional effects, and more specifically, they were sensitive to the inclusion of the reduction in relative food price. Importantly, when the effect of social globalization is decomposed further, we find that information flows and cultural proximity components of social globalization are driving the social globalization association.

Our results are found to be robust to the use of different globalization indexes and measures of obesity prevalence and caloric intake, alongside alternative explanations to the globesity hypothesis such as the increasing female labour market participation, income inequality and national income, alongside urbanization. Specifically, we confirm the influence of other the expansion of female labor market participation on all dependent variables. In contrast, the effect of urbanization, on the other hand, is found to be more ambiguous. This

might reflect the fact that, although urbanization might trigger the availability in one location of diverse foods, the effects might be netted out by the expansion of sedentary habits associated to larger cities. We find that national income exerts a negative effect on population obesity rates, though the effect is non linear as the impact grew less important among poorer countries. The latter might be partially explained by the effect of income inequality, which is found to trigger an expanding prevalence of obesity.

In a nutshell, we find that that social globalization—and more specifically changes in information flows and personal contact— stands out as a robust explanation for the expansion of the obesity and overweight population and greater calorie consumption. Although not the result of an exogenous intervention to be interpreted causally, our findings are consistent with the original thesis. That is, we provide empirical support to the 'globosity hypothesis'. The obvious policy implication lies in the need of policy interventions to assist individuals in adjusting people's life to the social demands of a global lifestyle (e.g., making use of defaults and nudges). The latter might help mitigating the otherwise expanding world obesity and overweight trend.

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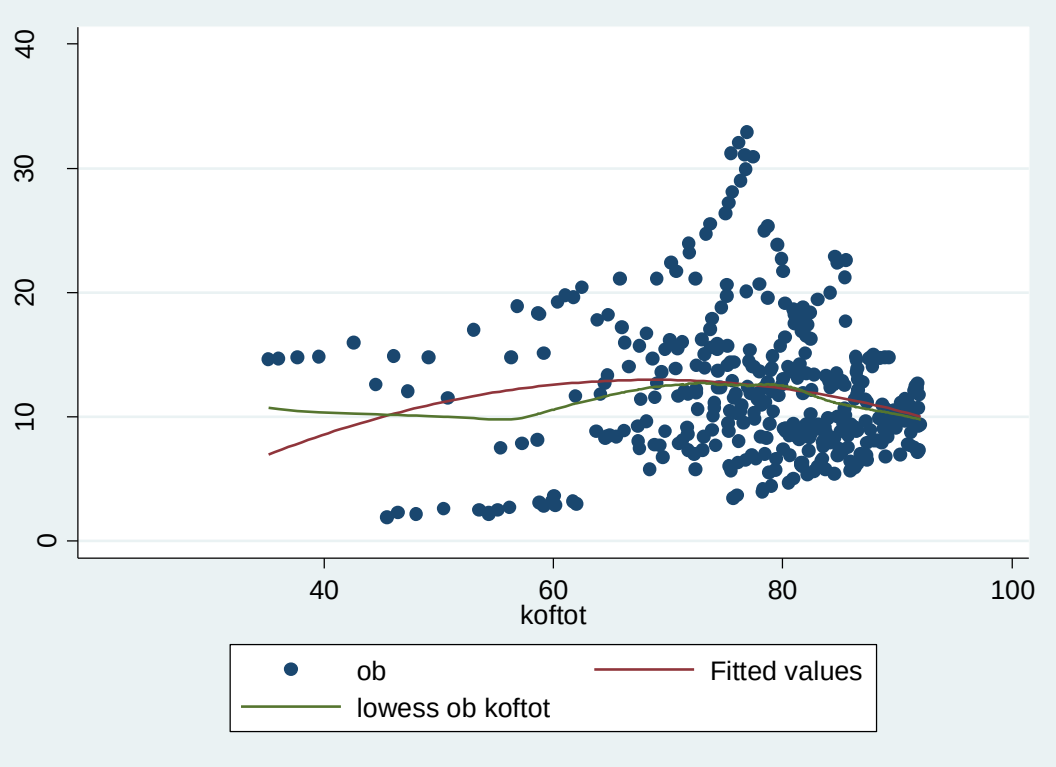
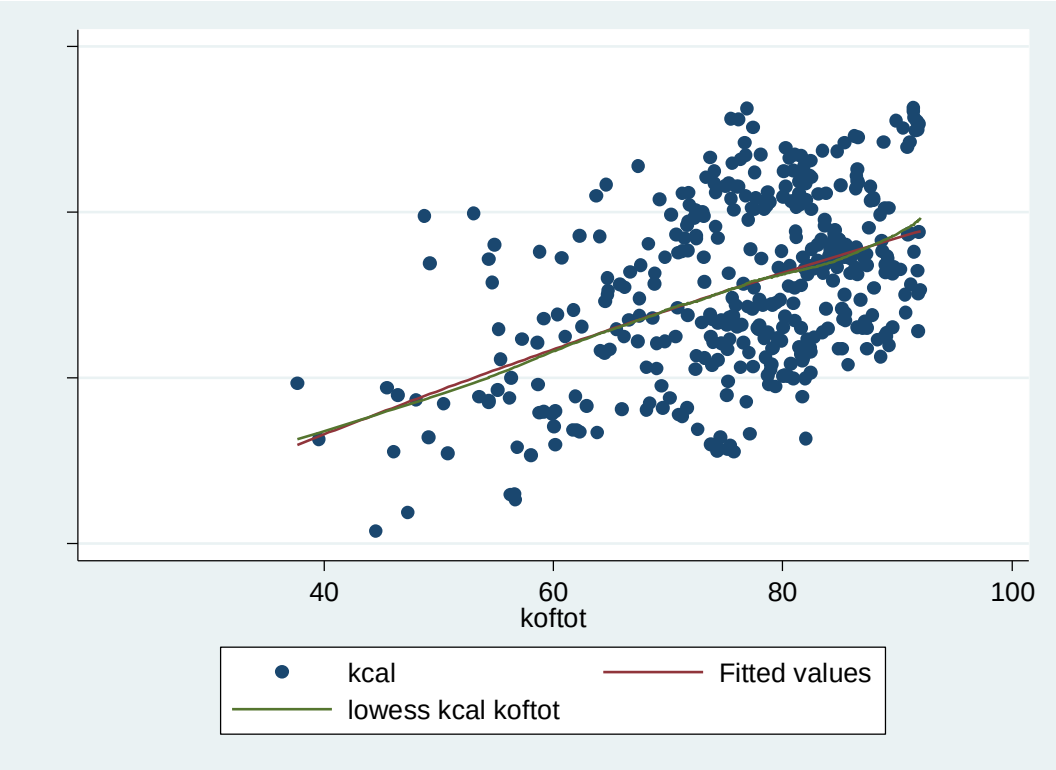
Figure 1. Variation of obesity rates (adult population) and globalization



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 (percentage of population with BMI>30)	11.9937	5.683745
Daily kcal per capita	3273.473	262.4789
Daily grams of fat per captia		
Globalization Measures		
KOF Index of Globalization	76.38137	11.2139
KOF Economic Globalization	73.26112	13.1
KOF Actual Flows	64.01112	19.50979
KOF Restriction	82.97882	11.69536
KOF Social Globalization	74.45437	12.27322
KOF Personal Contact	71.65053	11.39363
KOF Information Flows	76.17981	12.18239
KOF Cultural Proximity	75.42042	23.77102
KOF Political Globalization	83.05968	15.78976
CSGR Globalization Index	51.84125	0.1967204
CSGR Economic Globalization	15.28149	0.0583496
CSGR Social Globalization	27.80759	0.1848005
CSGR Political Globalization	54.42806	0.1988458
Social, Economic and Geographic Controls		
GDP per capita (in thousands)	21.69923	11.66909
GINI Inequality Index	29.32482	5.161923
Population of the country	31.64149	55.23773
Female labor market participation	43.76999	3.558793
Food price/consumer Price Index	1.051514	0.0785037
Population in urban areas (per cent)	73.78697	11.22828
Education (girls to boys ratio at school)	1.027249	0.0596855

Notes: KOF index: Index from the Swiss federal institue of technology. BMI = bodi mass index.
CSGR Index: Index from the University of Warwick GDP: Gros 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	OLS			PCSE	OLS			PCSE
	1A	1B	1C	1D	2A	2B	2C	2D	3A	3B	3C	3D
Measures of Globalization												
Overall Globalization Index	-0.087	0.231	0.255***	0.118***								
	[0.114]	[0.153]	[0.067]	[0.035]								
Economic Globalization Index					-0.126	0.075	0.110	0.065***				
					[0.119]	[0.070]	[0.068]	[0.023]				
Actual Flows (Economic Glob. Index)									-0.082	0.016	0.067	0.037**
									[0.096]	[0.058]	[0.047]	[0.017]
Restrictions (Economic Glob. Index)									-0.143	-0.103	-0.064	-0.035
									[0.098]	[0.070]	[0.074]	[0.025]
Social Globalization Index					0.078	0.209**	0.134*	0.080***				
					[0.131]	[0.086]	[0.078]	[0.023]				
Personal Contact (Social Glob. Index)									-0.072	0.229**	0.117	0.144***
									[0.119]	[0.101]	[0.083]	[0.035]
Information Flows (Social Glob. Index)									0.234***	0.216***	0.128*	0.036
									[0.062]	[0.065]	[0.075]	[0.022]
Cultural Proximity (Social Glob. Index)									-0.018	-0.012	0.005	-0.011
									[0.038]	[0.037]	[0.034]	[0.008]
Social, Economic and Geographic Controls												
GDP per capita (in thousands)		-0.577	-0.525**	-0.414***		-0.576**	-0.488**	-0.423***		-0.486**	-0.416**	-0.404***
		[0.296]	[0.197]	[0.076]		[0.229]	[0.196]	[0.074]		[0.200]	[0.201]	[0.091]
(GDP per capita (in thousands))²		0.006	0.006*	0.005***		0.006	0.005	0.005***		0.004	0.004	0.005***
		[0.005]	[0.003]	[0.001]		[0.004]	[0.003]	[0.001]		[0.004]	[0.003]	[0.001]
Gini		0.026	0.614***	0.422***		0.023	0.540***	0.343***		-0.090	0.406**	0.268***
		[0.196]	[0.174]	[0.081]		[0.195]	[0.177]	[0.076]		[0.156]	[0.186]	[0.072]
Population of the country		0.063***	0.054***	0.046***		0.070***	0.061***	0.052***		0.087***	0.075***	0.066***
		[0.021]	[0.011]	[0.003]		[0.018]	[0.010]	[0.004]		[0.014]	[0.010]	[0.004]
% of Women in the Active Population			0.706***	0.624***			0.653***	0.595***			0.562***	0.533***
			[0.167]	[0.062]			[0.187]	[0.064]			[0.171]	[0.067]
Food price/ CPI			29.971***	12.288***			25.452***	11.666***			21.579***	8.760***
			[6.591]	[3.661]			[6.598]	[3.454]			[6.763]	[3.226]
Urbanization			0.166***	0.102***			0.140**	0.093***			0.135**	0.083***
			[0.057]	[0.027]			[0.059]	[0.026]			[0.050]	[0.026]
Education (% of girls respect			-0.577	0.165			0.893	0.399			1.962	1.192
% of boys at school)			[7.209]	[2.561]			[7.721]	[2.674]			[6.809]	[2.473]
N	375	362	341	341	375	362	341	341	375	362	341	341
R-squared	0.087	0.491	0.731	0.631	0.112	0.554	0.738	0.644	0.195	0.656	0.766	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 Standard 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
Measures of Globalization												
Overall Globalization Index	12.5667***	14.128***	12.583**	10.008***								
	[3.470]	[5.080]	[5.323]	[1.797]								
Economic Globalization Index					0.673	4.720	4.122	3.467**				
					[5.084]	[5.268]	[4.379]	[1.472]				
Actual Flows (Economic Glob. Index)									-4.876	-2.533	-5.066***	-2.498*
									[2.918]	[3.060]	[1.759]	[1.316]
Restrictions (Economic Glob. Index)									5.490	1.305	5.805	1.799
									[4.363]	[5.293]	[3.408]	[1.361]
Social Globalization Index					8.466*	5.391	6.428	5.486***				
					[4.726]	[4.874]	[3.927]	[1.420]				
Personal Contact (Social Glob. Index)									10.618*	15.084***	17.551***	14.691***
									[4.981]	[5.274]	[3.171]	[2.034]
Information Flows (Social Glob. Index)									-1.362	-0.981	1.501	1.942
									[5.044]	[5.238]	[4.003]	[1.462]
Cultural Proximity (Social Glob. Index)									1.482	-0.623	-0.814	-0.405
									[2.139]	[1.940]	[1.559]	[0.491]
Social, Economic and Geographic Controls												
GDP per capita (in thousands)		4.051	28.603**	13.963***		10.386	33.22**	16.333***		9.341	5.623	6.912*
		[11.969]	[11.825]	[4.393]		[12.848]	[12.063]	[4.555]		[14.581]	[11.510]	[4.180]
(GDP per capita (in thousands))²		-0.064	-0.457**	-0.171**		-0.172	-0.538**	-0.213***		-0.219	-0.160	-0.118*
		[0.198]	[0.199]	[0.068]		[0.214]	[0.205]	[0.070]		[0.250]	[0.192]	[0.061]
Gini		4.007	8.832	0.527		3.905	6.472	-0.740		-1.086	-13.517	-10.180**
		[11.491]	[8.538]	[4.452]		[11.389]	[8.738]	[4.483]		[9.517]	[8.592]	[4.587]
Population of the country		1.439**	1.089**	1.240***		1.486**	1.242**	1.399***		1.893**	1.950***	2.058***
		[0.556]	[0.431]	[0.215]		[0.612]	[0.517]	[0.270]		[0.697]	[0.603]	[0.300]
% of Women in the Active Population			8.094	-1.859			6.909	-3.362			-18.821	-15.119***
			[12.648]	[5.722]			[13.034]	[5.633]			[11.479]	[5.682]
Food price/ CPI			176.866	148.331			-1.792	78.349			-569.223**	-164.451
			[349.734]	[162.280]			[336.127]	[161.732]			[262.779]	[150.150]
Urbanization			-10.349**	-6.866***			-12.065**	-7.794***			-8.390**	-7.027***
			[4.161]	[2.166]			[4.466]	[2.249]			[4.011]	[1.724]
Education (% of girls respect			-501.435	-211.603			-406.113	-188.021			-316.336	-113.14
% of boys at school)			[441.671]	[169.185]			[469.321]	[169.473]			[339.533]	[161.343]
N	395	384	353	353	395	384	353	353	395	384	353	353
R-squared	0.227	0.320	0.495	0.956	0.154	0.271	0.482	0.955	0.275	0.378	0.585	0.958

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
Measures of Globalization					
Overall Globalization Index	0.255**	0.078**	0.037***		
	[0.103]	[0.037]	[0.011]		
Economic Globalization Index				0.031	0.039
				[0.088]	[0.029]
Social Globalization Index				0.114***	0.053***
				[0.035]	[0.013]
Social, Economic and Geographic Controls					
Socioeconomic	YES	YES	YES	YES	YES
Demographic	YES	YES	YES	YES	YES
Food price/ CPI	YES	YES	YES	YES	YES
N	341	315	315	315	315
R-squared	0.731	0.711	0.646	0.720	0.656

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.
Socioeconomic controls include: GDP, GDP squared, Gini index, % of women in active population, Education as defined in previous tables.
Demographic controls include: Population, Urbanization
Countries included: Austria, Finland, France, Iceland, Japan, Netherlands, New Zealand, Spain, Sweden, Switzerland, UK, USA, Belgium, Canada, Denmark, Italy, Norway, Poland, Portu
Australia, Estonia, Hungary, Ireland, Lithuania, Malaysia

Table 5. Robustness Checks (I). Dependent variable: kcal consumed

	IV	CSGR			
	IV-1C	OLS-1C	PCSE-1D	OLS-2C	PCSE-2D
Measures of Globalization					
Overall Globalization Index	19.708***	5.286*	4.179***		
	[5.692]	[2.877]	[0.652]		
Economic Globalization Index				1.786	2.363
				[8.629]	[3.044]
Social Globalization Index				3.684	2.984***
				[2.331]	[0.751]
Social, Economic and Geographic Controls					
Socioeconomic	YES	YES	YES	YES	YES
Demographic	YES	YES	YES	YES	YES
Food price/ CPI	YES	YES	YES	YES	YES
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.
Socioeconomic controls include: GDP, GDP squared, Gini index, % of women in active population, Education as defined in previous tables.
Demographic controls include: Population, Urbanization
Countries included: Austria, Finland, France, Iceland, Japan, Netherlands, New Zealand, Spain, Sweden, Switzerland, UK, USA, Belgium, Canada, Denmark, Italy, Norway, Poland, Portu
Australia, Estonia, Hungary, Ireland, Lithuania, Malaysia

Table 6. Robustness Checks (II). Lagged globalization effects

	Dependent variable: Obestiy			Dependent variable: Kcal		
	KOF	KOF	IV	KOF	KOF	IV
	OLS-1C	OLS-2C	IV-1C	OLS-1C	OLS-2C	IV-1C
Measures of Globalization						
Overall Globalization Index	0.246***		0.255***	11.981**		19.107***
	[0.063]		[0.097]	[5.255]		[5.602]
Economic Globalization Index		0.099			4.229	
		[0.068]			[4.411]	
Social Globalization Index		0.137*			5.738	
		[0.075]			[4.049]	
Social, Economic and Geographic Controls						
Socioeconomic	YES	YES	YES	YES	YES	YES
Demographic	YES	YES	YES	YES	YES	YES
Food price/ CPI	YES	YES	YES	YES	YES	YES
N	340	340	340	352	352	352
R-squared	0.734	0.739	0.733	0.488	0.472	0.734

The IV 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.
Socioeconomic controls include: GDP, GDP squared, Gini index, % of women in active population, Education as defined in previous tables.
Demographic controls include: Population, Urbanization
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 7. Robustness Checks (III). Dependent variable: Obesity from Finucane (2011)

	Mean Women			Mean Men		
	KOF OLS-1C	KOF OLS-2C	IV IV-1C	KOF OLS-1C	KOF OLS-2C	IV IV-1C
Measures of Globalization						
Overall Globalization Index	0.070**		0.010***	0.069**		0.092***
	[0.031]		[0.024]	[0.028]		[0.025]
Economic Globalization Index		0.003			0.000	
		[0.015]			[0.019]	
Social Globalization Index		0.054**			0.055**	
		[0.023]			[0.022]	
Social, Economic and Geographic Controls						
Socioeconomic	YES	YES	YES	YES	YES	YES
Demographic	YES	YES	YES	YES	YES	YES
Food price/ CPI	YES	YES	YES	YES	YES	YES
N	46	46	46	46	46	46
R-squared	0.657	0.667	0.626	0.578	0.601	0.559

The IV 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.
Socioeconomic controls include: GDP, GDP squared, Gini index, % of women in active population, Education as defined in previous tables.
Demographic controls include: Population, Urbanization
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
Economic Globalization	73.261 (13.100)
(i) Actual Flows	64.011 (19.510)
Trade (%GDP)	
Foreign Direct Investment, stocks (% GDP)	
Portfolio Investment (% GDP)	
Income Payments to Foreign Nationals (% GDP)	
(ii) Restrictions	82.979 (11.696)
Hidden Import Barriers	
Mean Tariff Rate	
Taxes of International Trade (% total population)	
Capital Account Restrictions	
Social Globalization	74.454 (12.273)
(i) Personal Contact	71.651 (11.394)
Telephone Traffic	
Transfers (% GDP)	
International Tourism	
Foreign Population (% total population)	
International letters (per capita)	
(ii) Information Flows	76.180 (12.182)
Internet Users (per 1000 people)	
Television (per 1000 people)	
Trade in Newspapers (% GDP)	
(iii) Cultural Proximity	75.420 (23.771)
Number McDonald´s restaurants (per capita)	
Number Ikea (per capita)	
Trade in books (% GDP)	
Political Globalization	83.060 (15.790)
Embassies in Country	
Membership in International Organizations	
Participation in UN Security Missions	
International Treaties	

GDP: Gross domestic product. Data from 1989-2004

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

Table A2. Alternative Globalization Measures: The CSGR Globalization Index

	Mean and Standard deviation in data*
Economic Globalization	15.281 (5.835)
Trade (% GDP)	
Foreign Direct Investment (%GDP)	
Portfolio Investment (%GDP)	
Income (% GDP)	
Social Globalization	27.808 (18.480)
(i) People	
Foreign Population Stock (% total population)	
Foreign Population Flow (% total population)	
Worker Remittances (% GDP)	
Tourists (% total population)	
(ii) Ideas	
Phone Calls (per capita)	
Internet users (% population)	
Films	
Books and Newspapers (imported and exported)	
Mail (per capita)	
Political Globalization	54.428 (19.885)
Embassies in country	
UN Missions	
Membership in International Organizations	

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 A3:Correlations between the two different globalization indices

	KOF Economic	KOF Social	KOF Political
CSGR Economic	0.48		
CSGR Social		0.70	
CSGR Political			0.82

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
Measures of Globalization												
Overall Globalization Index	1.538***	1.649***	1.772***	1.260***								
	[0.265]	[0.395]	[0.468]	[0.167]								
Economic Globalization Index					0.003	0.058	0.001	0.135				
					[0.260]	[0.281]	[0.257]	[0.097]				
Actual Flows (Economic Glob. Index)									-0.245	-0.092	-0.382*	-0.199**
									[0.208]	[0.259]	[0.2076]	[0.098]
Restrictions (Economic Glob. Index)									0.315	-0.031	0.265	0.018
									[0.205]	[0.330]	[0.214]	[0.099]
Social Globalization Index					1.269***	1.157***	1.503***	0.993***				
					[0.316]	[0.328]	[0.339]	[0.141]				
Personal Contact (Social Glob. Index)									0.897**	1.003*	1.427***	1.305***
									[0.382]	[0.490]	[0.395]	[0.140]
Information Flows (Social Glob. Index)									-0.227	-0.349	-0.099	0.023
									[0.365]	[0.363]	[0.317]	[0.101]
Cultural Proximity (Social Glob. Index)									0.441***	0.404***	0.410***	0.223***
									[0.147]	[0.136]	[0.137]	[0.054]
Social, Economic and Geographic Controls												
Socioeconomic	NO	YES[+]	YES	YES	NO	YES[+]	YES	YES	NO	YES[+]	YES	YES
Demographic	NO	YES[++]	YES	YES	NO	YES[++]	YES	YES	NO	YES[++]	YES	YES
Food price/ CPI	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES
N	395	384	353	353	395	384	353	353	395	384	353	353
R-squared	0.227	0.320	0.495	0.956	0.154	0.271	0.482	0.955	0.275	0.378	0.585	0.958

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.
Socioeconomic controls include: GDP, GDP squared, Gini index, % of women in active population, Education as defined in previous tables.
Demographic controls include: Population, Urbanization
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
[+] We only include GDP, GDP squared, Gini inde
[++] We only include Population

Table A5. Number of Observations per variable

	Number of Observations
Dependent Variables	
Obese (percentage of population with BMI>30)	378
Daily kcal per capita	395
Daily grams of fat per captia	
Globalization Measures	
KOF Index of Globalization	409
KOF Economic Globalization	409
KOF Actual Flows	409
KOF Restriction	409
KOF Social Globalization	409
KOF Personal Contact	409
KOF Information Flows	409
KOF Cultural Proximity	409
KOF Political Globalization	409
CSGR Globalization Index	367
CSGR Economic Globalization	383
CSGR Social Globalization	382
CSGR Political Globalization	409
Social, Economic and Geographic Controls	
GDP per capita (in thousands)	398
GINI Inequality Index	413
Population of the country	416
Female labor market participation	390
Food price/consumer Price Index	395
Population in urban areas (per cent)	416
Education (girls to boys ratio at school)	416

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