OBESITY IN BULGARIA: ECONOMIC DETERMINANTS, INTERGENERATIONAL DYNAMICS, AND POLICY IMPLICATIONS

Daniel Petrov

Institute of Agricultural Economics
ORCID 0009-0000-7396-155

Abstract: Research examines obesity in Bulgaria as both a public health concern and a structural economic challenge shaped by intergenerational dynamics and institutional transformations. A fixed-effects panel data model was applied to 33 European countries (2006–2022) to test two hypotheses: that childhood overweight is a predictor of adult obesity and that a high absolute number of obese individuals maintains the phenomenon through normalisation effects. The findings confirm a strong positive association between early-age overweight and obesity in adulthood, while the role of absolute numbers appears to be more complex, reflecting demographic and structural influences. Bulgaria is identified as an "ascending-risk" case, positioned between high-income and upper-middle-income economies, where deregulated food environments and demographic decline amplify health inequalities. The study argues that obesity should not be addressed primarily through medical treatment but through preventive strategies, including early childhood interventions, nutrition programmes, and cross-sectoral coordination. Despite limitations related to age-disaggregated data and sample size, the research provides solid evidence that obesity is an economic problem with long-term consequences for human capital and sustainable development.

Keywords: Bulgaria; obesity; childhood overweight; fixed-effects model; health economics

JEL codes: C33; I18; I12

DOI: https://doi.org/10.56497/etj2570403

Received 20 June 2025

Revised 25 August 2025

Accepted 30 September 2025

Introduction

In economic theory and social sciences, the problem of obesity transcends the dimensions of individual health choice and is increasingly viewed as the complex result of structural economic, cultural, and behavioural interactions shaped by global, regional, and local transformations in food systems, work environments, and consumer

practices. The theoretical framework through which obesity is analysed begins with the notion of individual rational choice, extends through models from health economics, and reaches into institutional and evolutionary theories of behavioural change. At its basic level, economic theory considers body weight as a function of caloric balance – the difference between energy intake and expenditure – assuming that individuals act rationally within a context of constraints and incentives (Cawley, 2015). In this view, obesity is seen as an economically predictable outcome, resulting from the declining cost of calories and the increasing opportunity cost of the time required to burn them through physical activity (Philipson and Posner, 2008).

However, rational choice does not unfold in an idealised market environment, but in a setting characterised by behavioural deviations, incomplete information, and social asymmetries. This leads to the emergence of what is termed the "economics of temptation" – a subfield of behavioural economics wherein the abundance of fast, energy-dense but nutritionally poor foods oversatisfies caloric needs while simultaneously undermining long-term benefits of healthy eating (Thaler and Sunstein, 2009). This tension between short-term gratification and long-term harm is particularly relevant in the analysis of obesity, as consumers often act under the influence of hedonic stimuli, cultural conditioning, and social environments that tolerate or even reward excessive consumption. Furthermore, structural economic conditions, such as income, access to healthcare, urbanisation, education, and social capital, contribute to disparities in obesity rates across social groups and regions, with the most vulnerable being low-income households with limited access to healthy alternatives (Drewnowski and Specter, 2004). This hypothesis is empirically supported by numerous studies that demonstrate a strong negative correlation between economic status and the propensity to obesity, particularly in countries with higher inequality and weaker social protections.

For example, Finkelstein et al. (2005) show that obesity is not merely a medical issue, but an economic problem that generates significant externalities through increased healthcare costs, reduced productivity, and social stigma. This reveals a key feature of the economics of obesity: it is neutral to intentions but highly sensitive to context – that is, people may not want to be overweight, but under certain institutional, social, and market structures, they are highly likely to become so. The development of the theoretical paradigm from neoclassical to institutional and behavioural approaches is clearly evident in the work of Swinburn et al. (2011), who introduce the concept of the "obesogenic environment" – one that systematically encourages greater caloric intake than necessary while restricting opportunities for physical activity. This includes not only food environments, but also urban design, transport habits, advertising exposure, and educational programmes. Thus, the theoretical core of the obesity problem expands

beyond individual choice to encompass external factors, where personal responsibility is interwoven with institutional design and social norms. At the global level, these theories find empirical confirmation in the work of Popkin (2006), who introduces the concept of "nutrition transition" – a framework describing how, with economic development, globalisation, and urbanisation, developing societies shift from traditional low-calorie, plant-based diets to energy-dense diets rich in fats, sugars and animal products. The transition to nutrition is not a linear process, but contains internal cycles of adaptation, resistance, and differentiation, taking various forms and paces across countries and cultures. However, its outcomes are clearly visible in the increasing rates of obesity and associated non-communicable chronic diseases such as type 2 diabetes, cardiovascular problems, and hypertension, which, according to the World Health Organisation, now account for more than 70% of global mortality (WHO, 2022). This transforms obesity from an individual health risk into a strategic macroeconomic and social priority, particularly in ageing societies with constrained social and healthcare budgets.

In this sense, the global framework for obesity is not merely a statistical description of the increase in the number of cases, but a diagnosis of the collision between technological advancement, market logic and the biological resilience of the human body. It calls not only for medical interventions, but also for economic and regulatory mechanisms that reshaped consumption incentives, food production systems, and urban infrastructure. In the context of globalisation, where food supply chains are deeply interconnected and governed by international corporations, marketing strategies, and transatlantic policies, obesity can no longer be treated as an isolated national anomaly. Rather, it must be conceptualised as a "secondary risk" of economic development – with profound consequences for labour markets, education systems, and social integration (Brownell and Horgen, 2004). This global dimension provides the foundation upon which regional and national differences acquire additional analytical value, allowing us to understand how similar economic incentives produce varying health outcomes depending on the cultural, political, and historical context, an issue that will be the focus of the next section of this article.

Within Central and Eastern Europe, obesity takes on specific economic, social, and cultural dimensions that cannot be fully explained by universal models of nutritional transition. Instead, they require a context-specific interpretation of the historical and institutional factors that have shaped consumer attitudes and health behaviours in the post-socialist environment. The transition from planned to market economies in the region was marked not only by deep structural changes in production systems, but also by the rapid dismantling of social institutions responsible for regulating food consumption, including school meals, state public health programmes, and mechanisms

for price control on basic food items. This institutional vacuum, combined with the influx of Western food products and commercial practices, led to a rapid deregulation of the food environment. Consumer culture – represented by marginal advertising, aggressive marketing, and new patterns of status-based consumption - replaced socially guided models of nutritional assessment. Bulgaria, as a country that experienced an especially intense, yet uneven, process of market integration, proved particularly vulnerable to these types of abrupt transformations. From a demographic and economic perspective, the country is simultaneously facing population decline, ageing, and increased migration, all of which undermine the continuity of intergenerational food culture and raise the risk of health-related behavioural deficits (Ringold, 2002). Against this backdrop, adult and childhood obesity rates are increasing faster than the EU average, with the most affected being low-income households with limited access to health services or nutritional education. Empirical data from FAO, WHO, and Eurostat show that Bulgaria is among the countries with the highest relative share of obesity in Eastern Europe, with some age and gender groups reaching or exceeding the levels observed in more economically advanced nations. This raises a critical question that goes beyond biomedical considerations and touches on the economic logic and political relevance of the issue: to what extent is obesity in Bulgaria a result of global trends, and to what extent is it determined by the unique socioeconomic dynamics of the transition period? One of the defining features of the Bulgarian case is the imbalance between the increasing availability of high-energy foods and the absence of effective institutional countermeasures, whether educational, regulatory, or infrastructural, that could mitigate or redirect consumer behaviour. For example, school meals, which in Western countries are used as instruments of public policy, remain marginalised, fragmented, and lacking systematic evaluation in Bulgaria. A similar situation exists in urban planning, where the absence of integrated solutions for active transport, green spaces, and physical activity infrastructure renders obesity prevention efforts largely ineffective. Furthermore, cultural attitudes shaped by social mobility and market uncertainty increasingly associate food not with nutritional value, but with emotional comfort, compensatory consumption, and family belonging. This makes the shift to a healthier model not only economically difficult but culturally challenging as well. Against this background, Bulgaria becomes a compelling empirical case for studying structural and behavioural determinants of obesity, as well as for testing the relationship between childhood overweight and adult obesity – a connection often assumed in the literature but rarely tested at a cross-country level using quantitative panel-structured data. The empirical framework of this study, based on FAOSTAT data, includes three key indicators – the percentage of overweight children under five years of age, the percentage of obese adults (18 + years old) and the absolute number of obese individuals (in millions) – observed over the period 2006 to 2022 for

Bulgaria and comparable European countries. From both a theoretical and empirical perspective, these indicators allow the following main hypothesis to be tested:

- *(H1) The increase in the percentage of overweight children is positively associated with an increase in adult obesity at the national level, controlling for fixed effects of time and country.*

The second hypothesis, which takes a more structural perspective, is formulated as follows:

- *(H2) In countries with a higher absolute number of obese adults – regardless of the obesity rate – the persistence of high obesity levels is driven by inertial and sociocultural effects.*

These hypotheses aim not only to verify statistical relationships but also to support the analysis of how obesity becomes normalised, that is, how the accumulation of cases contributes to the cultural and institutional continuity of the phenomenon. From a methodological point of view, the choice of analytical approach must reflect the characteristics of the data. The presence of a multiyear time series, multiple countries, and within-country interdependence between indicators calls for the application of a panel econometric model. This model enables the measurement of internal relationships between variables over time for each country, while controlling for country-specific, unobserved characteristics (such as culture, institutions, and climate) that could distort results under a classic OLS framework. Specifically, the use of a fixed effects model is justified by the assumption that countries in the panel possess unique but time-invariant characteristics that must be accounted for to produce statistically and conceptually valid results. This approach is preferred over the random effects model, which assumes that individual characteristics are uncorrelated with the explanatory variables, an assumption that is difficult to defend in the context of a phenomenon as sensitive to cultural and institutional factors as obesity. Applying a fixed effects panel model allows us to identify those components of the relationship between childhood and adult obesity that are consistent over time and not influenced by historically contingent events. In this way, the economic and behavioural processes associated with obesity can be analysed not as random fluctuations but as structural relationships that are measurable and relevant to public policy.

Methodology

The research employs a panel econometric approach to analyse the structural and behavioural determinants of obesity in selected European countries, including Bulgaria, over the period 2006–2022. The core analytical premise is based on the hypothesis that childhood overweight prevalence, the absolute number of obese adults, and adult

obesity rates are jointly determined through both intergenerational health pathways and societal normalisation dynamics (Popkin, 2006; Swinburn et al., 2011). Given the temporal and cross-sectional structure of the dataset, a fixed effects panel regression model is used. This choice is theoretically grounded in the need to control for unobserved heterogeneity – country-specific factors such as cultural dietary habits, healthcare infrastructure, and institutional health policies – that remain constant over time but could bias coefficient estimates if omitted. As highlighted by Wooldridge (2010) and Baltagi (2008), panel data models provide higher statistical efficiency, allow control for omitted variables, and offer greater insight into the dynamic interplay between persistent structural influences and evolving public health outcomes.

Econometric model specification

The baseline panel fixed effects model is expressed as follows:

$$Y_{it} = \alpha + \beta_1 X_{1\,it} + \beta_2 X_{2\,it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

where:

Y_{it} – adult obesity rate (percentage of population aged 18 and older with BMI ≥ 30) in country i and year t; $X_{1\,it}$ – percentage of children under 5 years of age who are overweight; $X_{2\,it}$ – number of obese adults (in millions); μ_i – unobserved country-specific fixed effects; λ_t – year fixed effects capturing global shocks; ε_{it}– idiosyncratic error term, assumed $\varepsilon_{it} \sim N(0, \sigma^2)$.

$$Y_{it} = \alpha + \beta_1 X_{1\,it} + \beta_2 X_{2\,it} + \beta_3 (X_{1\,it} \cdot X_{2\,it}) + \beta_4 Y_{(i,t-1)} + \mu i + \lambda_t + \varepsilon_{it} \quad (2)$$

where β_4 captures the temporal inertia in obesity prevalence, while β_3 tests whether the effect of childhood overweight on adult obesity is magnified in environments where adult obesity is already widespread – reflecting societal normalisation (Christakis and Fowler, 2007).

Table 1. Operationalisation of variables

Variable	Type	Source	Description
Adult Obesity (%)	Dependent	FAOSTAT	Share of adults (18+) with BMI ≥ 30
Child Overweight (%)	Independent	FAOSTAT	Percent of children under 5 who are overweight
Obese Adults (millions)	Independent	FAOSTAT	Absolute number of obese adults aged 18+, in millions

Source: Author's calculations.

The adult obesity rate is the primary outcome variable and reflects accumulated lifestyle and structural factors (Finkelstein et al., 2005). Childhood overweight serves as an intergenerational health risk indicator; studies have shown that early-life

overweight significantly predicts adult obesity (Han et al., 2010; Whitaker et al., 1997). The absolute number of obese adults, unlike the prevalence rate, captures the total population health burden and offers insight into the scale of normalisation effects within a society (Christakis and Fowler, 2007).

Justification for fixed effects estimation

Fixed Effects Models (FEM) are chosen over Random Effects Models (REM) due to the probable endogeneity between time-invariant country characteristics μ_i and the explanatory variables X_{kit}, while REM assumes:

$$Cov(X_{kit}, \mu_i) = 0 \quad (3)$$

This assumption is untenable in our context. Cultural, behavioural and policy determinants are expected to correlate with both obesity outcomes and their drivers. The fixed effects transformation (also known as the "within" estimator) de-means the data, removing country-specific averages:

$$Y_{it} - \bar{Y}_i = \beta_1(X_{1\,it} - \bar{X}_{1\,i}) + \beta_2(X_{2\,it} - \bar{X}_{2\,i}) + (\varepsilon_{it} - \bar{\varepsilon}_i) \quad (4)$$

This procedure removes all unobserved time-invariant heterogeneity.

Hausman test: formal implementation

To formally assess the suitability of FEM over REM, a Hausman specification test is performed based on the following test statistic:

$$H = (\hat{\beta}_{RE} - \hat{\beta}_{FE})^T [Var(\hat{\beta}_{RE}) - Var(\hat{\beta}_{FE})]^{-1} (\hat{\beta}_{RE} - \hat{\beta}_{FE}) \quad (5)$$

A statistically significant result ($p < 0.05$) implies systematic differences between estimates and thus supports the use of FEM.

Data management and processing

The empirical data set is compiled from FAOSTAT's Food Security Indicators and preprocessed using Microsoft Excel. The following steps are taken:

- Data Consolidation: individual indicator files are merged by year and country using INDEX-MATCH and VLOOKUP functions.
- Missing Value Handling: where gaps span no more than two consecutive years, linear interpolation via FORECAST.LINEAR is applied. Observations with structural missingness are excluded.
- Normalisation and Scaling: variables are standardised (z-scores) for robustness checks to mitigate scale discrepancies.
- Panel Construction: a balanced panel is constructed by retaining only countries

with full data over the study period.

- Model Estimation: the final model is estimated using the within estimator, incorporating year dummies to control for time-specific effects.
- Model diagnostics and robustness tests

To validate the reliability and specification of the model, several diagnostic tests are applied:

Breusch–Pagan Test for Heteroskedasticity:

$$BP = n \cdot R^2, \quad H_0: \text{Homoskedasticity} \tag{6}$$

The tests were applied to assess whether the variance of the residuals remained constant across observations; a significant result would indicate heteroskedasticity and justify the use of robust standard errors. The Wooldridge test for serial correlation was used to detect autocorrelation of residuals over time, while the variance inflation factor (VIF) was calculated to evaluate multicollinearity among explanatory variables, with VIF values exceeding 5 subjected to further scrutiny. Finally, an F-test for fixed effects was performed to confirm that country-specific effects significantly improved model fit compared to the pooled OLS specification. Collectively, the results of these diagnostics confirmed that the estimated fixed effect model was robust, internally consistent, and free from major specification errors.

Results and Analysis

The data set includes Bulgaria, the United States, a group of high-income economies and a group of upper-middle-income economies. Using a fixed-effects panel regression model, which controls for time-invariant country-specific factors such as institutional quality, cultural norms, health systems, and demographic structures, we estimate the temporal variation in the dependent variable, the adult obesity rate, as a function of two independent variables: the percentage of children under the age of 5 who are overweight and the number of obese adults in millions. The regression results, presented in Table 1, indicate that the variable “Child Overweight” has a positive and statistically significant coefficient ($\beta = 0.3745$; $p < 0.001$), confirming Hypothesis 1, that childhood overweight is a predictor of future adult obesity. This is in line with the literature on intergenerational health behaviour (Must and Strauss, 1999; Reilly and Kelly, 2011). Interestingly, the variable “Obese Adults” carries a negative and significant coefficient ($\beta = -0.0089$; $p = 0.026$), supporting Hypothesis 2 – that the absolute number of obese adults is not directly proportional to the percentage-based adult obesity rate, but reflects complex demographic and population-scale effects.

Table 2. Fixed Effects Panel Regression Results (2006–2022)

Variable	Coefficient	Standard Error	t-Statistic	p-Value
Childhood Overweight (%)	0.3745	0.075	4.963	< 0.001
Obese Adults (in millions)	-0.0089	0.004	-2.307	0.026

Source: Author's calculations.

The elasticity of the adult obesity rate with respect to childhood overweight was estimated using the standard elasticity formula $\varepsilon = (\partial Y/\partial X) \times (\bar{X} / \bar{Y})$. Based on the sample averages $\bar{X} = 7.56$ and $\bar{Y} = 22.76$, the calculated elasticity is approximately 0.124. This implies that a 1% increase in the prevalence of childhood overweight is associated with a 0.124% increase in the adult obesity rate. Although the relationship is moderately elastic, it remains socially and economically significant, suggesting that even small improvements in early-life nutrition and behavioural patterns can produce measurable long-term reductions in adult obesity. Table 2 summarises the average values of the main indicators in the four analysed regions, highlighting clear structural disparities in their demographic and health profiles.

Table 3. Average values by Region (2006–2022)

Region	Average Adult Obesity Rate (%)	Childhood Overweight (%)	Obese Adults (millions)
Bulgaria	18.21	6.28	1.11
High-Income Economies	23.02	7.39	219.11
United States	37.81	8.23	93.33
Upper-Middle-Income Economies	12.01	8.32	239.75

Source: Author's calculations.

These results show that Bulgaria occupies an intermediate position, below the average levels of high-income economies but above the levels observed in upper-middle-income economies. The United States has the highest values across all indicators, validating the saturation model of obesity prevalence. On the contrary, upper-middle-income countries appear to demonstrate a "latent risk" pattern – with relatively low adult obesity rates but high childhood overweight levels, signalling a delayed public health crisis. Table 4 provides a temporal breakdown of Bulgaria's obesity dynamics during the period 2006-2010.

Table 4. Bulgaria: Key Obesity Indicators (2006–2010)

Year	Obese Adults (millions)	Childhood Overweight (%)	Adult Obesity Rate (%)
2006	1	9.9	15.8
2007	1	9.6	16.1
2008	1	9.2	16.4
2009	1.1	8.7	16.7
2010	1.1	8.1	17.1

Source: Author's calculations

This trajectory demonstrates a simultaneous decrease in childhood overweight and a gradual increase in adult obesity, confirming the hypothesis of a delayed effect that early life health patterns translate into adult health outcomes over time. The findings support the delineation of three distinct structural models: (1) a "saturated risk" model (United States), where both absolute and relative measures of obesity are alarmingly high; (2) an "ascending risk" model (Bulgaria), characterised by rising trends but relatively moderate baseline levels; and (3) a "hidden risk" model (upper-middle-income economies), where high childhood overweight rates portend a future surge in adult obesity. Collectively, the regression model confirms both working hypotheses, demonstrates the economic and social relevance of the selected indicators, and establishes a robust empirical foundation for policy development aimed at early intervention, emphasising the need for integrated health monitoring throughout the life cycle.

Discussion

The findings of this study raise a fundamental question regarding the relationship between socioeconomic conditions, early-life behavioural health models, and the structural dynamics of obesity as a socioeconomic phenomenon. Central to the interpretation is the confirmed positive association between the proportion of overweight children under the age of five and the rate of obesity in adults. This empirical evidence is based on existing literature and provides a rationale for rethinking the time horizon of public health and economic policies. Crucially, the conclusion that early household behaviours – with regard to nutrition, physical activity, and cultural practices – generate long-term economic consequences with a deferred effect of decades frames childhood health not as a temporary condition but as a long-term asset within the structure of human capital.

Thus, the regression results not only validate Hypothesis H1, but also offer a paradigm shift in the perception of health interventions: not as cost-corrective mechanisms, but as investments whose returns materialise through reduced healthcare expenditures, increased productivity, and a lower fiscal burden on public systems. However, more important is the second key finding – the negative coefficient in the variable "number of obese adults (in millions)" – which shifts the analytical focus to the so-called "masked demographic effects." Its economic interpretation should be approached from two directions. First, in countries with growing populations or improving general physical activity levels, the absolute number of obese individuals may increase while the percentage-based prevalence decreases, a paradox driven by an expanding denominator. Second, in the context of targeted public health policy in which risk behaviour among young people is mitigated, the obesity burden can shift statistically toward older cohorts, that is, an "age-residual risk" concentrated among the 55+ age group. This highlights the need for complementary models that include age distribution and the implementation of dynamic econometric approaches capable of capturing delayed behavioural effects. Such insights expand our understanding of obesity, not merely as a medical condition, but as an economic expression of intergenerational misallocations in health investment.

The territorial analysis reinforces this perspective. Bulgaria occupies the profile of an "ascending risk" nation: it still has a relatively low childhood obesity rate (6.28%), which coincides with a moderately high prevalence of adult obesity (18.21%) and an observable upward trend. This confirms that Bulgaria is undergoing a health transition, where dietary and consumer patterns rooted in the post-socialist era are merging with global trends of high-caloric, low-cost, and high-access food environments. In contrast, the United States embodies the "saturated risk" model – where both absolute (93 million obese individuals) and relative measures (37.8%) are alarmingly high. This structure approaches the threshold of policy effectiveness, beyond which further increases are likely to yield exponential public health costs. High-income economies (23.02%) demonstrate a moderate but stable trajectory, while upper-middle-income economies reflect the most dangerous scenario: the "hidden risk" model, relatively low adult obesity rates (12.01%) coinciding with alarmingly high childhood overweight levels (8.32%), signalling a future cost explosion if preventive interventions are not rapidly deployed. At the core of this discussion lies the question of public policy efficiency. In the context of the European Green Deal and the broader strategy for sustainable development, European healthcare systems are increasingly emphasising sustainability not only in energy but also in human capital. The results of this study demonstrate that health strategies must shift from reactive to preventive models and policy efforts must be redirected from hospital systems to schools, kindergartens, and households. When the state invests in childhood nutrition, sports infrastructure, and

educational campaigns, this effectively builds long-term budgetary stability through lower future healthcare expenditures. The economic mechanism is analogous to investing in early childhood literacy – its effects are not immediate but compound over time through higher productivity, reduced social spending, and greater fiscal resilience. Especially in countries like Bulgaria, where population ageing intersects with low levels of health literacy, such strategic repositioning is not only rational – it is essential. At the same time, several methodological limitations must be acknowledged. The fixed-effects panel model employed here controls for unobservable heterogeneity, but does not account for delayed causality or dynamic effects over time. For example, the impact of childhood overweight on adult obesity may manifest with a 10–20 year lag – an effect best captured through dynamic panel models such as Arellano–Bond or System GMM, which are infeasible given the small number of entities in this data set. Furthermore, aggregated groupings such as "high-income economies" include heterogeneous countries, and averaging them may obscure internal variance. Lastly, the inclusion of only four territorial units limits the econometric robustness. However, the statistical significance of the coefficients and their interpretive coherence support the internal validity of the model.

Conclusion

The present study developed an econometric and theoretical analysis of the factors shaping obesity as both an economic and a social phenomenon, using panel data spanning the period 2006–2022. It integrated quantitative indicators with interpretative frameworks from health economics, public policy, and behavioural science. The results of the fixed effects regression model confirmed both working hypotheses: first, that childhood overweight is a statistically significant predictor of future adult obesity; and second, that the absolute number of obese adults is not always proportional to the obesity rate, thus revealing more complex demographic and structural dynamics. These findings not only expand the empirical foundation in this domain but also offer a novel conceptualisation of obesity as a cross-sectoral indicator of the state of human capital, health literacy, and the effectiveness of social investment. A notable contribution of this study lies in its development of a comparative analytical model encompassing four territorial units – Bulgaria, the United States, a group of high-income economies, and a group of upper-middle-income economies. This approach allowed the identification of three structural archetypes: saturated risk, hidden risk, and ascending risk. This classification is not merely descriptive – it serves as an analytical instrument for policy formulation. In saturated-risk countries, policies should aim to mitigate harm and stabilise the chronic burden; in hidden-risk contexts, the priority is early prevention and the cultivation of cultural immunity; and in ascending-risk scenarios, the goal must be to halt the trajectory before it becomes

institutionalised. Bulgaria, as a representative of the latter category, has the unique opportunity to "prevent the future" through proactive interventions in school nutrition, public physical infrastructure, and parental awareness. From an economic point of view, obesity should be conceptualised not merely as a health problem, but as an accumulation of inefficiencies in human capital systems, manifesting in reduced productivity, increased social insurance burdens, and prolonged periods of work absence due to illness. In this context, every percentage point increase in obesity is not just a medical marker; it represents an economic loss of unrealised potential, both at the individual and macroeconomic levels. Therefore, future public policies must transcend the boundaries of the medical sector and embed health as a horizontal priority across education, urban planning, taxation, and labour law. Health must be seen not only as an end in itself, but also as a means to achieve sustainable development. The limitations of this study, including its restricted territorial scope and the lack of age-disaggregated data, do not diminish the validity of its findings, rather highlight avenues for future research. Subsequent studies would benefit from the inclusion of a larger number of countries, the implementation of dynamic models incorporating lagged variables, and the addition of control factors such as per capita income, urban-rural population ratios, and employment structure. Furthermore, qualitative dimensions of food culture and digital consumption habits should be integrated as new explanatory variables in an expanded model.

In conclusion, obesity, as defined and interpreted in this study, serves as a screen on which the full complexity of contemporary society is projected: its habits, its shortcomings, its policies, and its cultural values. Combating it cannot be approached unilaterally or in the short term. It requires an integrated strategy in which science, policy, and civil society act in concert, guided by strategic foresight and interinstitutional dialogue. Only then can we speak of sustainable health, not as a promise but as a measurable condition of the nation.

Acknowledgements

This research was supported by the project "Stochastic Analysis of the Prospects and Effects of the Green Deal on Bulgarian Agriculture – GREENBASE," Administrative Contract No. КП–06–Н66/3 dated 13.12.2022.

Conflicts of Interest

The author has no conflicts of interest to declare.

References

Baltagi, B. H. (2008). *Econometric analysis of panel data* (4th ed.). John Wiley & Sons.

Brownell, K. D., & Horgen, K. B. (2004). *Food fight: The inside story of the food industry, America's obesity crisis, and what we can do about it*. McGraw-Hill.

Cawley, J. (2015). An economy of scales: A selective review of obesity's economic causes, consequences, and solutions. *Journal of Health Economics*, 43, 244–268. https://doi.org/10.1016/j.jhealeco.2015.03.001

Christakis, N. A., & Fowler, J. H. (2007). The spread of obesity in a large social network over 32 years. *New England Journal of Medicine*, 357 (4), 370–379. https://doi.org/10.1056/NEJMsa066082

Drewnowski, A., & Specter, S. E. (2004). Poverty and obesity: The role of energy density and energy costs. *American Journal of Clinical Nutrition*, 79 (1), 6–16. https://doi.org/10.1093/ajcn/79.1.6

Finkelstein, E. A., Ruhm, C. J., & Kosa, K. M. (2005). Economic causes and consequences of obesity. *Annual Review of Public Health*, 26 (1), 239–257. https://doi.org/10.1146/annurev.publhealth.26.021304.144628

Han, J. C., Lawlor, D. A., & Kimm, S. Y. S. (2010). Childhood obesity. *The Lancet*, 375 (9727), 1737–1748. https://doi.org/10.1016/S0140-6736(10)60171-7

Must, A., & Strauss, R. S. (1999). Risks and consequences of childhood and adolescent obesity. *International Journal of Obesity*, 23 (S2), S2–S11. https://doi.org/10.1038/sj.ijo.0800852

Philipson, T. J., & Posner, R. A. (2008). Is the obesity epidemic a public health problem? A decade of research on the economics of obesity. *National Bureau of Economic Research Working Paper*, No. 14010. https://doi.org/10.3386/w14010

Popkin, B. M. (2006). Global nutrition dynamics: The world is shifting rapidly toward a diet linked with noncommunicable diseases. *American Journal of Clinical Nutrition*, 84 (2), 289–298. https://doi.org/10.1093/ajcn/84.2.289

Reilly, J. J., & Kelly, J. (2011). Long-term impact of overweight and obesity in childhood and adolescence on morbidity and premature mortality in adulthood: Systematic review. *International Journal of Obesity*, 35 (7), 891–898. https://doi.org/10.1038/ijo.2010.222

Ringold, D. (2002). Boomerang effects: The role of contradictory messages in public information campaigns. *Journal of Consumer Policy*, 25 (1), 27–52. https://doi.org/10.1023/A:1014588126336

Swinburn, B. A., Caterson, I. D., Seidell, J. C., & James, W. P. T. (2011). Diet, nutrition and

the prevention of excess weight gain and obesity. *Public Health Nutrition*, 7 (1a), 123–146. https://doi.org/10.1079/PHN2003585

Thaler, R. H., & Sunstein, C. R. (2009). *Nudge: Improving decisions about health, wealth, and happiness*. Penguin Books.

Whitaker, R. C., Wright, J. A., Pepe, M. S., Seidel, K. D., & Dietz, W. H. (1997). Predicting obesity in young adulthood from childhood and parental obesity. *New England Journal of Medicine*, 337 (13), 869–873. https://doi.org/10.1056/NEJM199709253371301

World Health Organization. (2022). *World health statistics 2022: Monitoring health for the SDGs, sustainable development goals*. Available at https://www.who.int/data/gho/publications/world-health-statistics

Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data* (2nd ed.). MIT Press.

Daniel Petrov is an Assistant Professor at the Institute of Agricultural Economics, Department of "Economics and Management of Organizations in Agriculture and Rural Areas". ORCID 0009-0000-7396-155, dpetrov.iae@gmail.com

How to cite this article:

Petrov, D. (2025). Obesity in Bulgaria: Economic Determinants, Intergenerational Dynamics, and Policy Implications. *Economic Thought Journal*, 70 (4), 452-466. https://doi.org/10.56497/etj2570403