Towards the prevention of obesity: An experimental study to shape policy decisions

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Over the years, Malta underwent, and is still undergoing, changes in its cultural and behavioural attitudes. This transformation is reflected in popular lifestyle and a shift from a Mediterranean to a Western diet. Technological advances have led to a more sedentary lifestyle. These changes have led to an increase in obesity among the Maltese, rendering Malta the most obese nation in the European Union (Cuschieri et al., 2016). Maltese men placed in the second place at 66.8%, while Maltese women placed first at 55.2% (Eurostat, 2019).

Sammut et al. (2012, p. 16) maintain that obesity leads to non-communicable diseases (NCDs) such as cancers, asthma, cataracts, and musculoskeletal disorders. Obesity can lead to bullying, anxiety and depression, not only among youngsters but also among adults. Besides societal implications, there are also economic repercussions since obese people absent themselves from work in order to attend hospital appointments, and/or because of their presenteeism.[1]

Research scope

In this contextual scenario, questions to improve the situation crop up. Are alternative means of influencing consumer behaviour more effective than fiscal strategies to control obesity? To what extent are consumers responsive to food labelling as a way of identifying health risks and alternative health options? What theoretical frameworks could help public officers deal with this phenomenon?

These questions form the foundations of this study. It seeks a deeper understanding of the obesity problem in Malta through experimental research, involving 'live' grocery shopping. This experiment also assesses the potential of employing tools drawn from Behavioural Economics (BE) in altering people's forma mentis and attitudes.

Given the experimental research design, this study seeks to test the validity of two mutually exclusive hypothesis:

Alternative Hypothesis: consumers respond positively to nudging measures involving food labelling;
Null Hypothesis: where consumers ignore nudging measures involving food labelling.

In the two hypotheses, the independent variable is the nudging technique, whereas consumers' reactions constitute the dependant variable. Thus, this study intends to query the cause-and-effect relationship between consumers' behaviour and food labelling as a potential policy to overcome the obesity syndrome.

Revolutionizing economics: sustaining evidence-based policy

Decisions are not always taken with the intension to maximise financial return or minimise the opportunity cost, and people can be irrational in their choices. Indeed, some of the forefathers of economics such as Smith, Marx, Keynes, and Friedman (Cable, 2011) were inclined to categorise the individual as a "rational economic man" (Kishtainy, 2012, p. 266; Simon, 1955, p. 99). The question of whether the human is rational or irrational is a dilemma for many economists, especially those who combine human behaviour with economics. Diagrams 1 and 2 below show the difference between the neoclassical and behavioural models of economics.

[1] The problem of workers being on the job but who, because of medical conditions, are not fully functioning. (Marks, 2021)

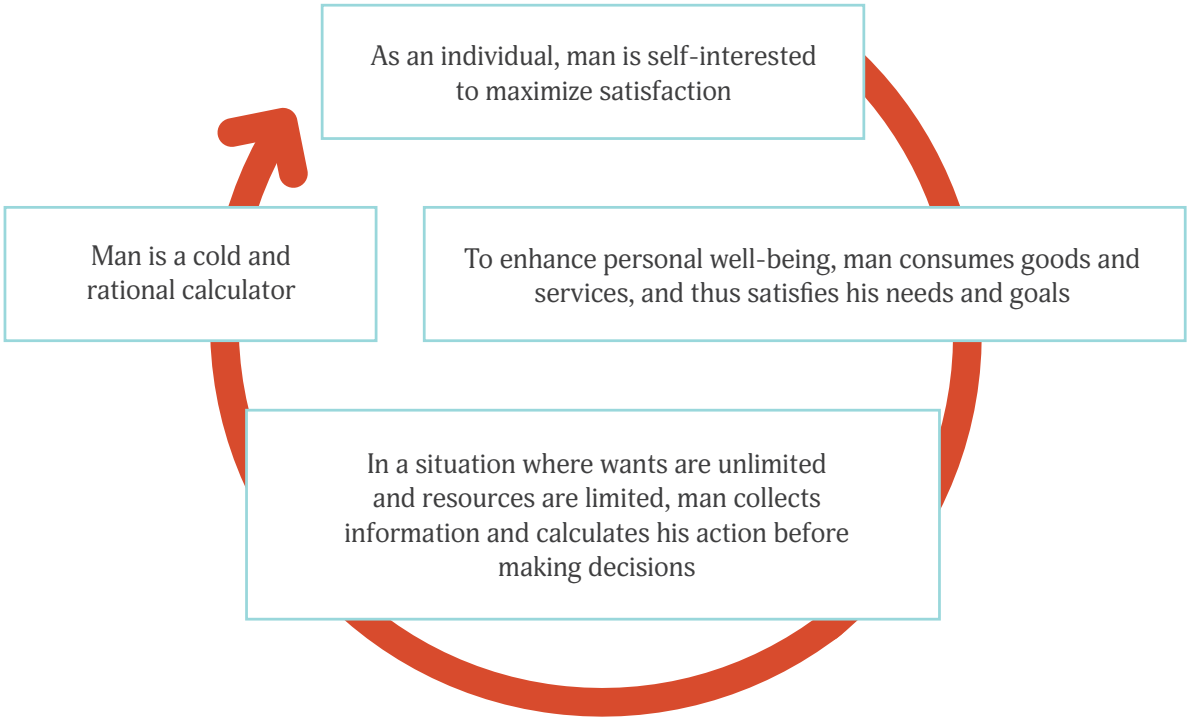
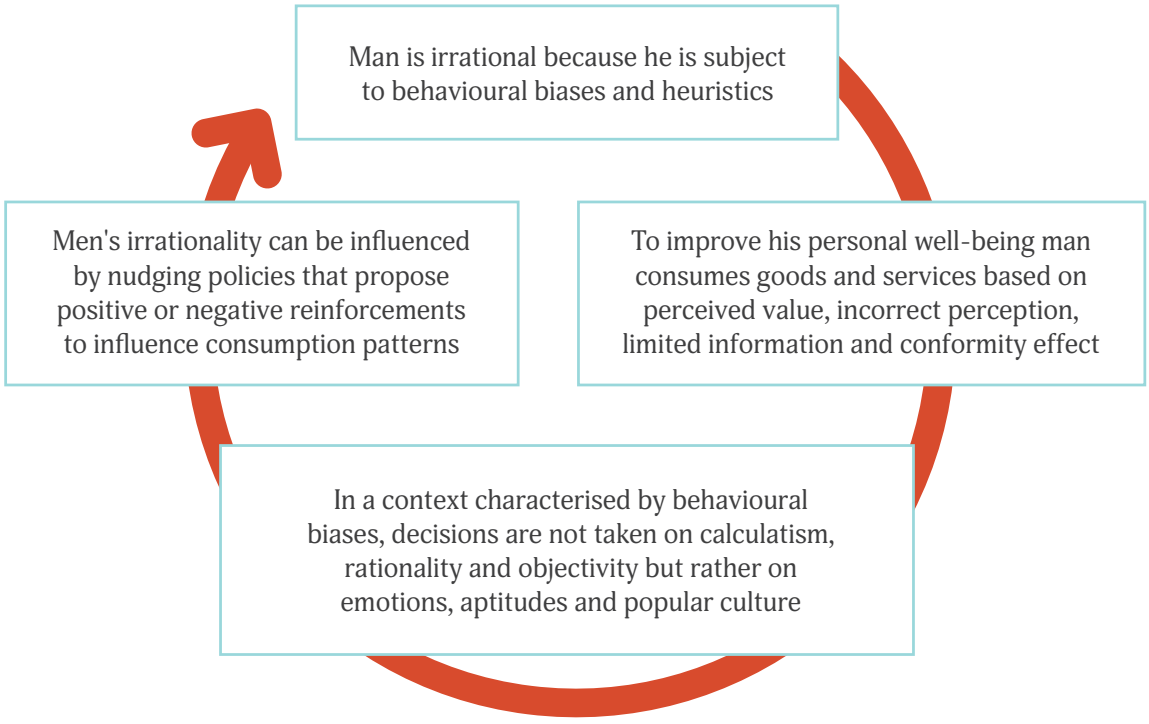


Diagram 1: Neoclassical Economics (Source: Liberata Vassallo, 2019)



To explain neoclassical economics, economists formulated the "Economic Man [model], or homo œconomicus" (Ogaki and Tanaka, 2017, p. 4). This concept portrays man as rational and self-centred and, moreoever, a being which can learn from past mistakes. Later scholars criticised this model because it does not reflect the real Man – Homo sapiens. Unlike what neoclassical economists sustain, man is most often irrational and impulsive. There can be instances where irrationality takes over and so BE is applied in order to understand the choices made. This does not exclude that there are times when man takes rational decisions and calculates any eventuality.

BE is the study of how psychological and social factors affect decision-making (Kishtainy, 2012, p. 340). Ogaki and Tanaka (2017, p. 4) outline that:

> Behavioral economics employs theories and results from psychology, sociology, anthropology, neurology, and other disciplines, and makes use of empirical studies, including experimental ones, to demonstrate the inconsistency between the assumption of an economic man and actual economic decision-making.

Based on this definition, one can conclude that BE has the potential to serve a more pioneering role in the formulation of policy alternatives. Furthermore, social media plays an important role in forming people's mindset, particularly when one takes into consideration the implication of big data. It is of no surprise that decisions are based more on instinct and aptitude rather than on rationality.

Behavioural Economics and Obesity

Worldwide experience shows that BE is gaining momentum in policymaking. Markey-Towler (2018), Guthrie (2017), Marlow and Abdukadirov (2012) together with Just and Payne (2009) are of the opinion that BE can fight obesity on a global scale. By using the right nudges, people can be led to a healthier selection of food and, most importantly, their patterns are sustained over the long term. One has to keep in mind that not all the people are the same and this can be an obstacle when dealing with polices and regulations. According to Marlow and Abdukadirov (2012), people prefer having an opt-out option than an opt-in option.[2]

Guthrie (2017) states that governments should use BE to encourage citizens, even from a young age, to lead a healthier lifestyle. These nudges can be introduced in schools, workplaces, restaurants, and grocery shops. The most basic place where nudges should be introduced is home. Nevertheless, there are aspects of the marketing sector that cannot be ignored.

From Behavioural Economics to Evidence-Based Policy

At the core of the conceptual framework adopted in this study is the duality of BE and EBP, where the former acts as an input to

[2] The opt-out option is when a person no longer wants to be part of a scheme. This nudge is becoming very popular, especially concerning healthcare, and also for emails, newspapers, junk mail, pension schemes, etc. (Centre for Advanced Hindsight (2018) [accessed 05.04.2019)

the latter. Their cause-and-effect relationship as an alternative to the 'old school' of ideology-based policy is manifested through the process wherein the research output derived from BE experiments serves as input to EBP. Ideology-based policy, stemming from political doctrine, is based on beliefs and systems that "our way is the best governance for assuring liberty and justice" (Milio, 2005, p. 814). Pawson (2006, p. 1) tries to link "evidence to power", "research to realpolitik", "ivory tower with corridors of power" and "knowing with doing": all combined into one revolutionary idea—EBP.

The challenge of Obesity

For policies to be effective and have a long-term tenure, they have to be based on evidence. To combat this global problem, fiscal incentives are not always the best solution since taxing fatty food might have an adverse effect on low-income families and "people with problems [related to obesity] will simply pay higher taxes" (Marlow and Abdukadirov, 2012, p. 17). Research shows that "Taxes steer the elastic consumers, more than the inelastic [...] such as obese citizens"[3] (Marlow and Abdukadirov, 2012, p. 17).

Methodology

Based on this concept, the author comes up with a research design embracing EBP and BE to alternative non-fiscal measures to lower obesity rates in Malta. The selected research design is fundamentally exploratory as it tests the research hypothesis through experimentation and observation. Although the cause-and-effect relationship between fat food and health problems has long been established, the idea of introducing new policy measures to influence consumption patterns in Malta presents a new challenge. This calls for fieldwork experiment wherein the researcher must study, examine, analyse, and investigate live processes of behaviour (Stebbins, 2001, p. 2).

In this study the experiment is carried in a small grocery in the southwest of Malta. Four products, mainly Twistees, non-diet soft drinks, butter, and Cadbury chocolate bars were given a special treatment through labelling. One product, (pasta) had no treatment and acted as a control product and so no labelling was attached.[4] The experiment was phased in stages as shown in Table 1.

	Twistees	Drinks	Butter	Chocolate	Pasta
Phase 1	Pilot Study (no recording of consumption)				
Phase 2	With Label	With Label	Without Label	Without Label	Control Group
Phase 3	Without Label	Without Label	With Label	With Label	

[3] Elasticity refers to the degree of responsiveness in supply or demand in relation to changes in price. If a curve is more elastic, then small changes in price will cause large changes in quantity consumed. If a curve is less elastic, then it will take large changes in price to effect a change in quantity consumed. (Sparknotes.com, n.d.)

[4] A control product is utilised as a benchmark measure, however, it does not get the treatment or the trial control that the treatment group gets.

To this effect, the author personally spent forty hours in the grocery, observing and taking notes of what customers consumed and how labelling effected their behaviour as shown in Table 2.

Date	Time
09/04/2019	7:15am - 12:15pm
11/04/2019	8:15am - 12:30pm
11/04/2019	5pm - 7pm
12/04/2019	8:15am - 1:15pm
15/04/2019	5:15pm - 7:15pm
16/04/2019	5:30pm - 7:15pm
17/04/2019	10:30am - 12:30pm
18/04/2019	6:30am - 12:30pm
22/04/2019	4:15pm - 7:15pm
23/04/2019	6:30am - 12:30pm
23/04/2019	4:15pm - 7:15pm

Front-of-package labels (FoPLs) entice customers' consciousness and lead to healthier choices (Egnell et al., 2018). Countries like France, Belgium, and Spain opted for the Nutri-Score, as shown in Figure 2.

After several FoLPs were analysed and taken into consideration, Nutri-Score proved to be the most effective labelling to influence consumers' purchases (Kelly and Jewell, 2018, p. 26 & 40).

This 'traffic light' labelling is very easy to understand since it contains only five letters (A, B, C, D and E), where A represents healthy food and E represents unhealthy food. Consumers who have difficulty with literacy and vision problems can easily read this score and identify the healthfulness of the products (Kelly and Jewell, 2018, p.12). Nevertheless, one cannot generalise and put all the food considered unhealthy under label E. The Nutri-Score calculator calculates the score. Calculations are based on the percentage of energy, total fats, saturated fats, sugars, protein, fibre, salt and the ratio of fruit, vegetables, and nuts per 100g.

The difference-in-differences technique (DID) is used to analyse the findings of the experiment. This technique, as described by Abadie (2005, p. 1), is "one of the most popular tools for applied research in economics to evaluate the effects of public interventions and other treatments of interest on some relevant outcome variables." Chang (2019, p. 1), maintains that DID is utilised in experiments using "treated and untreated group(s)." This technique calculates the "effect of treatment on the outcome variable" (Chang, 2019, p. 2). This technique was used to measure the impact of the products before and after treatment, which in this case was the labelling, and subsequently compared it to the control group. Instead of absolute change we use percentage change per hour to account for the fact that the number of hours of observation varied by day.

> When it comes to food, people tend to act irrationally and choose food that satisfies their immediate appetite.

Considering that everything remained equal, DID was measured by the ΔTreatment – ΔControl = 0[5] for every treated product.

Findings and analysis

Man can be both rational and irrational, depending on circumstances. Sometimes man must be rational, especially when costs and benefits are involved (like when buying a house or a car). Nevertheless, when it comes to everyday life decisions, man tends to be intuitive. When it comes to food, people tend to act irrationally and choose food that satisfies their immediate appetite. The fact that man is both rational and irrational is also corroborated by Table 3, which summarises first-hand observations recorded during the 40 hours of fieldwork. Findings are grouped under three interdependent themes:

Observational Category	List of observations during experiment
Rational Consumption	• Some come with a shopping list, others don't • Customers ask for a specific product. if not in stock they do not buy a substitute e.g.: butter and bread • Buy in quantity so to take a free gift when spending €25/free packet of water when spending €50
Behavioural Consumption	• People alweys buy the same products • Customers buy new products out of curiosity • They also buy products with special offers, irrelevant from its healthiness (in case of food products) • Old people, of ell genders, and men always in a hurry • An individual buys only one product at a time • The same customers are alweys waiting for the shop to open at 8am • Others come to shop in the last minute • Some prefer going to the shop. buy and then have their goods delivered at a later time
Shop Layout	• Detergents and cleaning products st the back because of smells • Cigarettes and alcohol are not within children's reach • Fruit and vegetables on racks outside the shop due to lack of space - prone to elements and theft • Sweets and sugary food at the front of the shop • Certain products are placed on lower shelves due to safety (e.g.: glass bottles) • Fresh products are kept sealed in the counter; countertop and cutlery cleaned all the time for hygiene purposes • The shop owner/assistant alweys cleaning the countertop and cutlery

[5] Δ = change in

The list of observations confirms that people tend to be habitual rather than rational in their consumption behaviour, including daily grocery items. Furthermore, the shop is intentionally designed in such a way as to lessen the degree of rationality at consumption point, to help trigger routine habits, instincts, and aptitudes of consumers.

The experimental exercise was carried out between 9th and 23rd April, 2019. Using the mechanisms of Randomized Controlled Trails (RCTs), four products (Twistees, butter, soft drinks, and chocolate) were selected as treated products and a Nutri-Score label was assigned to each, whereas one product (pasta) acted as a control group but no labelling was assigned.

DID technique was used to calculate changes between each treated product and the control group. The following results emerged

	Twistees	non-diet Soft Drinks	Butter	Chocolate	Pasta
period 1: consumption rate per hour	0.8	1.4	0.6	0.2	2.0
period 2: consumption rate per hour	0.6	3.0	0.6	0.1	1.5
% change in difference: ((period 2/period 1)*100)-100	-26.7	118.5	0.0	-50.0	-23.1
DID: % change in difference product - % change in difference pasta	**-3.6**	**141.6**	**23.1**	**-26.9**	

Table 4: Experiment Results: Difference-in-Difference calculation

From Table 4, it can be noted that when the difference in consumption is under 1 for Twistees and chocolate, the DID is negative. However, this is not the case for butter since the difference in consumption between both periods is zero and, thus, the DID of butter is the same as the percentage change difference of pasta. In the case of the non-diet soft drink, the DID is very high because the difference between consumption in period 1 and 2 is more than double. Charts 1 and 2 show the consumption of all products relative to the control group. This reflects the daily consumption of these products divided by the control group. The consumption of Twistees, butter, and chocolate was relatively low, even when compared to that of soft drinks. The peak points in Charts 1 and 2 indicate that the consumption of the four treated products was bigger than that of the control group. Contrarily, when the consumption of pasta is high, the relative consumption goes down.

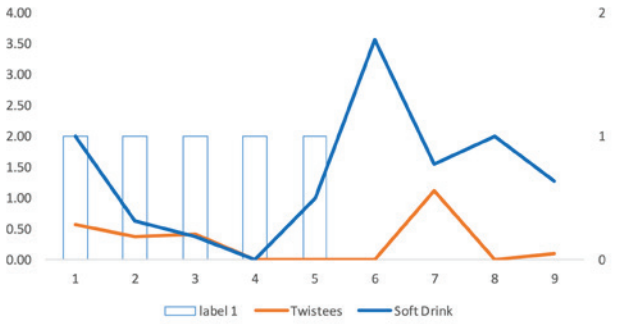


Chart 1: Consumption relative to Control Group (Twistees and Soft-Drinks)

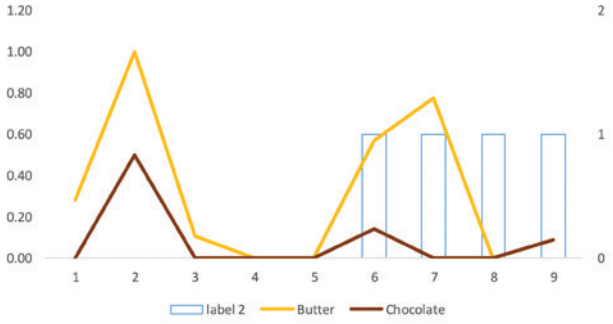


Chart 2: Consumption relative to Control Group (Butter and Chocolate)

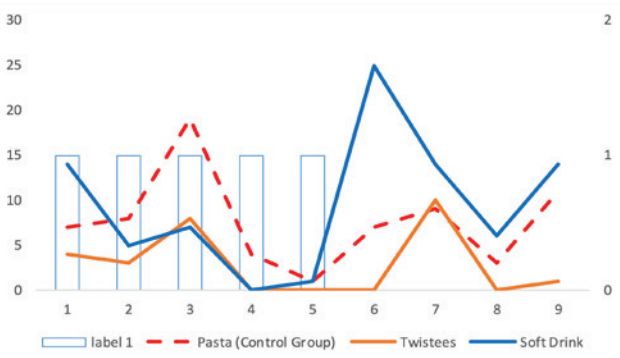


Chart 3: Consumption of Twistees, Chocolate and Pasta

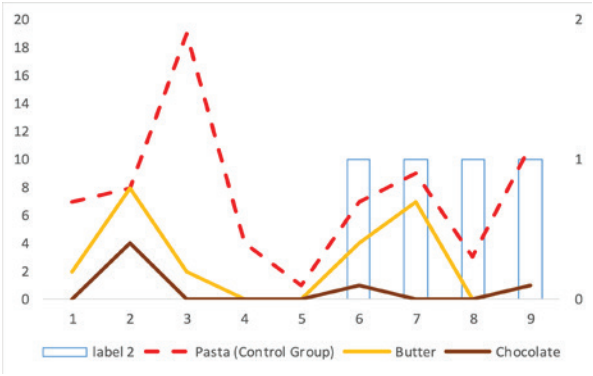


Chart 4: Consumption of Butter, Chocolate and Pasta

Charts 3 and 4 show the consumption of all products, including pasta. From the DID and from the charts it can be concluded that consumption of pasta was quite high when compared to Twistees, butter, and chocolate, both when products were treated and even when they were not. When consumption of pasta is compared to that of soft drinks, it is lower when no treatment was applied to the product (period 2), but at par with period 1 when soft drinks were treated. This can also be interpreted as indicating that the Nutri-Score labelling was effective on one product (soft drink) but not on the other three products.

Overt observations by the researcher suggest that people are loyal to the brand, especially when it comes to butter, and this could influence consumption. Another point is that the products did not have any special offers, apart from the offer on soft drinks which was in place prior to the initiation of the fieldwork. Furthermore, buying a packet is more convenient than buying a bottle. Given that the grocery shop identified for the experiment is a small local one, consumption is relatively low and, consequently, due to lack of frequent consumption rates, results may not be amenable to generalisation.

Concluding reflections

People tend to stick to inherited traditions or are affected by momentary attitudes and do not foresee the consequences of their actions. Combining public policy with BE using nudges may lead people to change their way of thinking and encourage them to act more

rationally to engage in a healthier lifestyle. Fiscal policies may not be the solution for Malta since their negative effect on low socio-economic class could lead to increasing the size of the poverty gap. Taxation on staple/basic take-away food is felt more heavily by the lower strata of social classes. Policy cases like those of cigarettes and chewing gum taught us that people continued buying these products even though the tax imposed on them was intended to discourage consumption.

Irrational patterns of consumption were observed during the fieldwork specifically undertaken for this study. Customers tend to always buy the same products, suggesting habitual behaviour. Others tend to buy products marked as special offers, or new products out of curiosity, without noticing the products' nutritional value. Shop layout leaves customers no choice but to buy sweets when approaching the cash till. For the shop owners this is a great way of increasing profit because sweets are a good source of income and are purposefully placed near the cash till, knowing full well that customers find it hard to resist this temptation, especially when accompanied by children.

From this RCT exercise, it was concluded that the labels had no significant effect on the consumption of selected products, except in the case of soft drinks where consumption, after the treatment, more than doubled. DID technique was used to calculate the consumption of the four products—Twistees, butter, chocolate, and soft drinks—in relation to the control group: pasta. Since the consumption of pasta was high when compared to Twistees, butter, and chocolate, the relative consumption was low. This was not the case for soft drinks because the relative consumption at points was higher than that of pasta—double on a certain day. This high consumption of soft drinks led to a DID of over 100. The other products resulted in either a negative DID, or a positive but low DID.

From both observations and the experiment, it can be deducted that although customers were to a medium or lesser degree interested in Nutri-Score labelling, their reactionary response was low since the difference in consumption of treated or non-treated products was very minimal. Given the experimental research design, the researcher can conclude that the Null Hypothesis was stronger than the Alternative Hypothesis since customers ignored the nudging measures of food labelling. This does not mean that food labelling does not affect consumption behaviour about fatty and/or sugary food and beverages. In countries such as France, a great collaboration between the public and the private sectors resulted in a successful campaign which led to the introduction of Nutri-Score food labelling on a national scale. If introduced in Malta, will this type of food labelling have the same effect as in France and would it lead to more healthy choices?

Nudging obesity is perhaps one of the most effective policies that can be introduced in our policy-making system. The Nutri-Score label has been successfully introduced elsewhere in Europe, including France, Spain and Belgium. This labelling is very easy to read and understand. Since our products are imported, the government may opt to subsidise this labelling system with the help of the private sector. Consequently, these labels can be put on shelves where food products are displayed according to their respective score. Introducing nutritional values for products served in take-aways, fast foods and restaurants can be another option so that customers can have a clearer picture of the nutritional value, or obesity risk, of the food and meals offered.

References

Abadie, A. 2005. Semiparametric difference-in-differences estimators. The Review of Economic Studies, 72(1), pp. 1-19.

Cable, V. 2011. Karl Marx to John Maynard Keynes: Ten of the greatest economists. [Online]. Mail Online. [Accessed on 15 June 2022]. Available from: https://www.dailymail.co.uk/home/moslive/article-2014647/Karl-Marx-John-Maynard-Keynes-Ten-greatest-economists-Vince-Cable.html.

Chang N.C. 2019. Semiparametric difference-in-differences with potentially many control variables. [Online]. [Accessed 15 June 2022]. Available from: https://arxiv.org/pdf/1812.10846.pdf.

Cuschieri, S., Vassallo, J., Calleja, N., Camilleri, R., Borg, A., Bonnici, G. and Mamo, J. 2016. Prevalence of obesity in Malta. Obesity Science & Practice, 2(4), pp. 466-470.

Egnell, M., Talati, Z., Hercberg, S., Pettigrew, S. and Julia, C. 2018. Objective understanding of front-of-package nutrition labels: An international comparative experimental study across 12 countries. Nutrients, 10 (10) .

Eurostat. 2019. Statistics Explained: Overweight and obesity – BMI Statistics. [Online]. Eurostat. [Accessed 15 June 2022]. Available from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Overweight_and_obesity_-_BMI_statistics#Obesity_by_age_group.

Guthrie, J. 2017. Integrating behavioral economics into nutrition education Research and Practice. Journal of Nutrition Education and Behavior, 49(8), pp. 700-705.

Just, D.R. and Payne, C.R.2009. Obesity: Can behavioral economics help?, Annals of Behavioral Medicine, 38(1) pp. 47–55.

Kelly, B. and Jewell, J. 2018. What is the evidence on the policy specifications, development processes and effectiveness of existing front-of-pack food labelling policies in the WHO European Region? [Online]. World Health Organisation - Regional Office for Europe. [Accessed on 15 June 2022]. Available from: https://apps.who.int/iris/bitstream/handle/10665/326187/9789289053686-eng.pdf?sequence=1&isAllowed=y.

Kishtainy, N. 2012. The Economics Book. Dorling Kindersley.

Markey-Towler, B. 2018. Obesity is a market failure and innovation, not sin taxes, may be the solution. [Online]. The Conversation. [Accessed 15 June 2022]. Available from: https://theconversation.com/obesity-is-a-market-failure-and-innovation-not-sin-taxes-may-be-the-solution-100970.

Marks, J.W. 2021. Medical definition of presenteeism. [Online] MedicineNet. [Accessed 15 June 2022]. Available from:: https://www.medicinenet.com/script/main/art.asp?articlekey=40516.

Marlow, M. L., and Abdukadirov, S. 2012. Can behavioral economics combat obesity? Regulation, 35, pp. 14-18.

Milio, N. 2005.Ideology, science, and public policy. Journal of Epidemiology & Community Health 59, pp. 814-815.

Ogaki, M. and Tanaka, S.C. 2017 Behavioural Economics: Toward a New Economics by Integration with Traditional Economics. Springer.

Pawson, R. 2006. Evidence-Based Policy: A Realist Perspective. Sage Publications.

Sammut, D., Sammut, D. and Bonnici, J. 2012. Audit of the diagnosis and management of adult obesity in a Maltese general practice. Malta Medical Journal. 24(1), pp. 16-20.

Simon, H. 1955. A behavioral model of rational choice. The Quarterly Journal of Economics, 69(1), pp. 99-118.

Stebbins, R. A. 2001. Exploratory Research in the Social Sciences: Qualitative Research Methods. Sage Publications.