Journal of Economic Behavior & Organization 141 (2017) 210–232

Contents lists available at ScienceDirect

Journal of Economic Behavior & Organization

journal homepage: www.elsevier.com/locate/jebo

Protecting energy intakes against income shocks☆

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ARTICLE INFO

Article history:
Received 23 September 2016
Received in revised form 7 June 2017
Accepted 19 June 2017
Available online 3 July 2017

JEL-classification:
I1
I30
D12

Keywords:
Nutritional intakes
Food expenditures
Income shocks

ABSTRACT

Whether and how changes in economic circumstances or household income affect individuals' diet and nutritional intakes is of substantial interest for policy purposes. This paper exploits a period of substantial income volatility in Russia to examine the *extent to which*, as well as *how* individuals protect their energy intakes in the face of unanticipated shocks to household income. Using rich data from the Russia Longitudinal Monitoring Survey, our results suggest that households use substitution, disproportionally cutting back spending on non-foods to protect spending on foods, change the composition of the consumption basket, and increase the consumption of 'cheaper' calories. Taken together, however, we find that total energy intakes as well as the nutritional composition of the diet are almost fully protected against income shocks. Specifically, we find that 12–16% of the effect of permanent income shocks on food expenditures is transmitted to energy intakes, with 84–88% protected through insurance mechanisms.

1. Introduction

Changes in economic circumstances affect many individual and household decisions. For example, sudden shocks to income affect decisions with respect to consumption (Blundell et al., 2008), health behaviours (Adda et al., 2009), and investments in children (Carneiro and Ginja, 2012). We are interested in whether changes to the economic environment, and shocks to household income in particular, affect individuals' energy intakes. There is much interest in this relationship; its understanding is essential in evaluating how certain policies, economic circumstances or shocks impact on household resources and affect individuals' nutritional outcomes (see e.g. Ruhm, 2000). In addition, it is crucial in informing the design of social insurance and income maintenance schemes (e.g. tax reforms, cash transfers). Our starting point is that individuals have a steady-state daily energy intake, which they aim to keep constant.[1] Finding a drop in energy intake in response to a

☆ We are grateful to Scott Adams and two anonymous referees for helpful comments on an earlier version of this paper. We also thank James Banks, Richard Blundell, Hans-Martin von Gaudecker, Rachel Griffith, John Micklewright, Cheti Nicoletti, Olena Nizalova, Jim Smith, Sarah Smith, Emma Tominey, Flavio Toxvaerd, and Joachim Winter for helpful comments and suggestions. We gratefully acknowledge funding from the Medical Research Council (MRC), grant number G1002345 (von Hinke) and from the Economic and Social Research Council's (ESRC) National Centre for Research Methods LEMMA 3 project, grant reference RES-576-25-0035 (Leckie). We also thank the RLMS Phase 2, funded by the USAID and NIH (R01-HD38700), Higher School of Economics and Pension Fund of Russia, and provided by the Carolina Population Center and Russian Institute of Sociology for making these data available.

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[1] The nutrition literature suggests that preferences and dietary patterns are highly resistant to change (Dore et al., 2003). The amount of food that individuals eat is, in general, governed by their energy needs, where weight-stable individuals will consume enough food to satisfy their energy requirements (Scarborough et al., 2007). Hence, we argue that individuals aim to maintain a constant energy intake, as has been shown for e.g. monkeys (Hansen et al., 1981), rats (Adolph, 1947; Carlisle and Stellar, 1969), and gerbils (Kanarek et al., 1977). However, we note that there is no *universal* individual daily energy

http://dx.doi.org/10.1016/j.jebo.2017.06.007

fall in income therefore suggests that individuals do not have the resources to sustain their current energy intakes. Hence, in addition to examining *whether* income shocks affect energy intake, we investigate *the extent to which*, as well as *how* individuals smooth, or 'insure', their energy intake in the face of unanticipated shocks to household income. We use the term 'insurance' to denote any changes in behaviour aimed to protect, or keep constant, individuals' energy intakes.[2]

Broadly speaking, there are three ways to insure energy intake in response to an income shock. First, as discussed in the consumption insurance literature (see e.g. Besley, 1995; Townsend, 1995; Heathcote et al., 2009; Attanasio and Weber, 2010), individuals can make adjustments to their savings and labour supply to ensure a constant energy intake. In the context of our study, however, these more 'standard' insurance mechanisms do not play a large role. Indeed, we exploit a period of substantial income volatility in Russia, which only saw small fluctuations in employment rates and hours of work, and where most households do not have financial assets or access to financial institutions such as banks or credit unions. In addition, any insurance against income shocks depends to a large extent on the structure of the welfare state and the country's safety net, which was largely absent in Russia at the time (Curtis, 1996). Instead, we therefore focus on the other two mechanisms to insure energy intakes. With that, we add to a growing literature on how households adjust their food basket during recessions. First, individuals may use substitution, substituting non-food spending with food spending, as well as changing the composition of the food basket, replacing 'more expensive' calories with cheaper ones. This is closely tied to the food Engel Curve literature. Hence, although this concerns *substitution*, we use the term *insurance*, as the substitution reflects changes in behaviour that aim to protect energy intakes. Second, individuals may rely more on home produced foods, and on informal networks, such as family and friends (see e.g. Rosenzweig, 1988; Udry, 1994).

Our main contribution, therefore, is to examine the importance of these mechanisms. The absence of a labour supply response in this setting allows us to focus on the other (joint) mechanisms. We model both the household-level consumption response and individual-level nutrition response to income shocks. We not only explore differences in the consumption response of food versus non-food, but also differentiate between different food groups within total food spending. We do this within the partial insurance framework developed by Blundell et al. (2008), allowing for differential effects of permanent and transitory income shocks. To examine the individual-level nutrition response, we extend the partial insurance model, and investigate the effect of *household-level* income shocks on *individual-level* nutritional intakes, whilst (i) allowing for differential effects for different household members, (ii) allowing for clustering of individuals' diets within households, and (iii) investigating the importance of positive versus negative income shocks. This allows us to quantify the proportion of the response in food expenditures that is transmitted to energy intakes. With that, we are able to evaluate the importance of alternative insurance mechanisms available to individuals.

The results show that households are able to smooth their energy intakes substantially. We find that 12–16% of the effect of permanent income shocks on food expenditures is transmitted to changes in energy intakes, with 84–88% insured through the various insurance mechanisms available to individuals. We find no significant difference in the response to permanent shocks for men compared to that for women, though there is some suggestion that men respond more to transitory shocks than women. It is important to note that we explore these issues in the context of a mostly overweight or obese society. Indeed, neither child nor adult undernutrition seems to be a problem in the Russian Federation, with overweight and obesity dominating all income quintiles (FAO, 2003).

Key to our analysis is the rich data we use, the Russia Longitudinal Monitoring Survey (RLMS), as well as its unique context. Indeed, the analysis to address our research questions requires rich large-scale longitudinal data, linking individual-level nutritional intakes over time to detailed information on their incomes and expenditures. Few such datasets exist: longitudinal datasets tend to either include detailed information on income with limited information on nutrition, or detailed information on nutrition with limited information on income. In addition, where longitudinal datasets do include nutritional intakes, they tend to report *household-level* energy intakes, whereas the relevant unit of analysis is the individual.[3] The RLMS is unique in that it collects longitudinal data on *individual-level* energy and nutritional intakes, linked to data on income, as well as expenditures. Another advantage of these data is that they allow us to study a period of substantial income volatility. The radical, market-oriented reforms introduced in 1992 led to the collapse of the economy in the 1990s, with a recovery thereafter, leading to considerable variation in our variables of interest.

Our paper is closely linked to the food Engel curve literature, well summarized by Chai and Moneta (2010). Engel's law states that the poorer the family is, the larger the budget share it spends on food. He argued that, when a family cannot satisfy all of its wants, it tends to sacrifice the higher-order wants such as clothing to satisfy more basic ones such as food (Engel, 1857). Our results are consistent with Engel's law.

requirement, since it varies with factors such as body size, body composition, physical activity, as well as geographic, cultural and economic factors (FAO, 2001).

[2] Although individuals' dietary quality is clearly also related to their health, this paper focuses on nutritional intakes, rather than health, for two reasons. First, for many health outcomes, there is unlikely to be a contemporaneous effect of dietary intakes, as it takes time for individuals' health to be affected by their diet, where the relevant time lag is not necessarily clear *a priori*. Second, there is a large literature that specifically explores the effects of poor diets on later life health; we refer the reader to this literature (see e.g. Kuh and Ben-Shlomo, 2007).

[3] In an attempt to deal with the lack of such detailed data, Adda et al. (2009) use a synthetic cohort methodology to collect data on health and income for a 25 year period, whilst Schroeter (2008) specify a theoretical model, using income (and price) elasticities from the consumption literature to predict their effects on individual health, and Chesher (1997) estimates *individual*-level average nutrient intakes from *household*-level data.