# Unemployment and households' food consumption: a cross-country panel data analysis across OECD countries

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# Unemployment and households' food consumption: A cross-country panel data analysis across OECD countries

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## Abstract

Using a panel of all 38 OECD countries for the time period 1980–2020, we estimate elasticities between aggregate unemployment and households' average food consumption. For food consumption measured in calorie intake, we find a small but statistically and economically significant negative elasticity of about 0.02 with unemployment. This elasticity is about 0.03 for food spending measured in protein intake which suggests that unemployment most likely leads to decreases in the quality of food primarily, on average. These findings are robust to a wide variety of consumption definitions, functional forms, types of wealth and income fluctuations, countries considered, and institutions considered. Our results suggest that unemployment insurance benefits and households' savings both matter for the size of the elasticity, thereby operating as automatic stabilizers.

## 1 | INTRODUCTION

The seminal Life Cycle Model argues that agents maximize lifetime utility by smoothing consumption over all periods (Ando & Modigliani, 1963). Only unexpected and persistent income shocks lead to changes in consumption. A disruptive life event that can occur unexpectedly and can have persistent effects on income and, hence consumption, is

unemployment (Stevens, 1997).[1] A vast amount of literature has studied the effects of unemployment on consumption, and more particularly on food consumption due to a lack of detailed consumption data, with most studies finding substantial drops in (food) consumption at unemployment in the range of about 15%–20% (i.e., Aguiar & Hurst, 2005; Hendren, 2017; Landais & Spinnewijn, 2021; Stephens, 2004).

Much of these findings are based on evidence from either US households[2] or Canadian households.[3] Besides analyses for Spain (Ahn et al., 2008), Denmark (Gallen, 2013), Sweden (Landais & Spinnewijn, 2021), and the Netherlands (Been et al., 2023), there is little empirical evidence on the effect of unemployment on consumption in non-Anglo-Saxon countries. Let alone, any cross-country evidence on the effect of unemployment on consumption. As a result, it remains largely unknown to what extent priorly found effects can be extrapolated to different sets of countries. For example, in a study based on the Netherlands Been et al. (2023) tend to find smaller effects of unemployment on consumption (about 5%) than studies based on Anglo-Saxon households (i.e. Aguiar & Hurst, 2005; Hendren, 2017; Stephens, 2004). Due to the lack of large cross-country comparisons, it remains largely unclear to what extent the previously observed patterns hold for a larger group of countries with heterogeneous labor market institutions, such as the generosity of unemployment insurance (UI) benefits, preferences, and cultures. Ganong and Noel (2019) explicitly show for the United States that both benefit levels and the duration of UI benefits are important in consumption decisions.

The only cross-country evidence of the effects of unemployment on consumption that we are aware of is Bentolila and Ichino (2008), who compare consumption responses to unemployment using micro data sources for Italy, Spain, the United Kingdom, and the United States. They conclude that effects of unemployment on consumption are remarkably similar in these countries despite large discrepancies in unemployment insurance. They argue that this is due to the substitution between formal and informal insurance mechanisms, notably family networks.[4] However, due to a lack of cross-country comparable consumption data little is known about representativeness of such conclusions for a wider array of countries still.

Following the approach of Aguiar et al. (2013), who analyze the effects of unemployment on time use at the aggregate state-level in the United States, we contribute to the existing literature by analyzing the effects of unemployment on households' consumption by using aggregate data on all 38 OECD countries. In particular, we exploit publicly available harmonized and aggregated data on unemployment from the OECD. For consumption, we use harmonized information on households' food spending measured by daily calorie intake and daily protein intake from the OECD. Using this measure of consumption is consistent with the many papers that use food spending as their measure of consumption (e.g., Aguiar & Hurst, 2005; Bentolila & Ichino, 2008; Stephens, 2004) and corresponds to the idea that the value of food consumption in terms of calories and protein is more informative than the value in terms of monetary amounts (Griffith et al., 2016). Gwozdz et al. (2019) is one of few earlier papers that study food intake in an international perspective, but the authors do not analyze the consequences of unemployment.

By measuring food consumption in terms of daily calorie and daily protein intake, we follow Griffith et al. (2016) who analyze the adjustments of food spending over the Great Recession in UK households. The authors argue that calorie intake is a better way to approximate food consumption than spending on food as households tend to switch to cheaper alternatives (by increasing shopping time) while keeping the quantity of consumption equal. Though finding decreases in spending, they find no decreases in daily calories during the Great Recession. Moreover, Griffith et al. (2016) show that households especially substitute toward more unhealthy products with substantial decreases in whole grains, vegetables, and (quality) meat. Von Hinke and Leckie (2017) show how the persistency of an income shock affects calorie intake and find that permanent shocks reduce calorie intake more substantially than transitory shocks, in line with the Permanent Income Hypothesis (PIH), although their results also suggest that households'

[1]Next to effects on income and consumption, job loss can have substantial effects on other factors of well-being (i.e., Winkelmann, 2009), such as health (i.e., Schaller & Stevens, 2015) and trust (i.e., Friehe & Marcus, 2021).

[2]Dynarski and Sheffrin (1987); Gruber (1997, 1998); Stephens (2004); Aguiar and Hurst (2005); Michelacci and Ruffo (2015); Kroft and Notowidigdo (2016); Hendren (2017).

[3]Browning and Crossley (2001, 2008, 2009).

[4]This is consistent with studies showing the potential added worker effect (Stephens, 2002) and substitution by home production (Been et al., 2023) in a country with relatively generous UI benefits such as the Netherlands.

calorie intake also responds to transitory shocks. Further analyses show that households increase the consumption of "cheaper" calories, which is in line with Griffith et al. (2016). Along the same line, we use both calorie and protein intake in our analyses. Nutritional quality is, in general, better proxied by protein intake than by calories, which is consistent with the health literature (Singer et al., 2014).

Using an aggregate approach for OECD countries has the advantage of analyzing the representativeness of unemployment effects on consumption and of exploiting a broader range of cross-country variation in institutions. This has two main advantages over existing studies. Firstly, we can conclude to what extent the drops in consumption upon unemployment is a typical American phenomenon or whether it translates to other countries too. Secondly, we can analyze the importance of countries' heterogeneity in the social safety net as measured by formal insurance, that is, generosity of the unemployment insurance benefits, and informal insurance, that is, the savings and liquidity available to households. However, we lose two important sources of information at this aggregate level. First, we lose heterogeneity among households within particular countries, including information on which households actually face a drop in income due to an unemployment spell. However, as Malley and Moutos (1996) argue, the aggregate unemployment rate is a valuable measure of aggregate income uncertainty. Campos and Reggio (2015) analyze the extent to which Spanish households decrease consumption when the aggregate unemployment rate rises and find a negative elasticity of 0.7, which implies that households respond to aggregate income uncertainty. Contrasting Malley and Moutos (1996), who use an aggregate time series for the United States to estimate a substantial negative effect of unemployment on durable (vehicles) consumption, and Campos and Reggio (2015), who use Spanish micro panel data, we combine time-series of 38 different countries to construct a panel to analyze the effect of unemployment on non-durable consumption. Secondly, we have harmonized household consumption data on food consumption only. However, it should be noted that most of the micro estimates of the effects of unemployment on consumption solely rely on food spending information.[5] Only Gruber (1998), Gerard and Naritomi (2019), and Been et al. (2023) use more extended definitions of consumption. Although Chetty (2006) argues that it should be sufficient to rely on food spending only, aforementioned studies indicate substantial differences between consumption categories suggesting that responses in food spending may be a lower bound due to the necessary nature of this consumption category as opposed to most non-durable consumption.

Exploiting the panel dimension of our data, we estimate the elasticity between unemployment on food consumption in 38 OECD countries during the time frame 1980–2020. Although we use FD and GMM to partial out any potential issues regarding omitted variables bias and reverse causality as much as possible, the aggregate approach is less suitable to infer causal effects than the abovementioned micro approach. Since adverse health of a person might also increase his probability of unemployment, it is important to parse out such reverse causality.[6] However, in our aggregate analysis we have no availability of quasi-experimental techniques to do so. Therefore, the results we present in this paper should not be interpreted causally. Instead, the paper complements the micro-literature by showing how the relationship between unemployment and average food consumption compares across countries. In our preferred specification, we find a negative elasticity of about 0.02 between food consumption measured in calorie intake and unemployment. This elasticity is about 0.03 for food spending measured in protein intake. Overall, our results suggest a small but statistically and economically significant negative elasticity of food consumption with unemployment. This conclusion is robust to a wide variety of sensitivity checks regarding consumption definitions, functional form, wealth instead of income fluctuations, countries included, and the role of institutions.

Our results are robust to the exclusion of the United States and other Anglo-Saxon countries such as Canada and the United Kingdom, which has important consequences for the interpretation of prior country-specific analyses

[5]Dynarski and Sheffrin (1987); Gruber (1997); Stephens (2004); Aguiar and Hurst (2005); Michelacci and Ruffo (2015); Kroft and Notowidigdo (2016); Hendren (2017).

[6]O'Conner (2020), for example, empirically shows that people with a lower subjective well-being and more mental health issues are more likely to be unemployed in the future.

of unemployment and consumption. As most prior micro studies are based on US households, it was, so far, hard to extrapolate conclusions regarding the relation between unemployment and consumption to other countries. Based on our results, we conclude that the drop in consumption at unemployment is not a typical phenomenon for Anglo-Saxon or, more specific, US households, but widely present among OECD countries.

We analyze this further by estimating the differential effects of consumption decisions by labor market institutions, such as the generosity of UI benefits. We find that the replacement rate of such benefits is important in explaining the elasticity. More specifically, a higher replacement rate significantly reduces the responsiveness of households' food consumption to the unemployment rate. We find similar results for alternative measures of the social safety net, such as social expenditures.

Next to such formal insurance mechanisms, households in different countries might respond differently because of heterogeneity in informal insurance mechanisms, such as available savings and liquidity or social networks. Prior research has shown that both formal and informal insurance are interacted and matter for responses to unemployment (e.g., Bloemen & Stancanelli, 2005; Guler & Taskin, 2013). We find that households also use precautionary savings as an informal insurance mechanism to smooth consumption in case of unemployment. A more descriptive analysis, due to the lack of good panel data for social networks additionally suggests that family networks constitute another informal mechanism that enables households to insure against a lack of food.

Extending the argument of the paper to the recent phenomenon of surging inflation, our results show that decreases in real disposable income reduce food consumption. Based on our analysis, we would hypothesize that such decreases in real disposable income also lead to less food intake in terms of calories and proteins. Consistent with this hypothesis, adding the growth in CPI for food and non-alcoholic beverages, suggests that higher growth in food prices significantly decrease protein intake.

## 2 | DATA AND DESCRIPTIVES

### 2.1 | Data sources

#### 2.1.1 | Dependent variables

We use publicly available data[7] for all 38 OECD countries[8] in the time frame 1980–2020. In this way, we can analyze the consequences of unemployment for consumption in OECD countries. This leaves out many less developed countries in Africa, Asia, and Latin-America that are potentially less comparable. For the selection of years, we are primarily constrained by the availability of food consumption data which runs till 2020. For consumption, we rely on measures of total calories expressed in kilocalories per capita per day and by protein intake expressed in grams per capita per day. These data come from the *OECD Health Statistics* database and originate from the Food and Agriculture Organization (FAO) of the United Nations.[9] These measures of (food) consumption follow the study for the United Kingdom by Griffith et al. (2016). Although the generalizability of food consumption to total consumption is difficult (Been et al., 2023), Chetty (2006) argues that data on food consumption should be sufficient to analyze the smoothness of consumption in response to income shocks. For testing the robustness of our results, we also use OECD data on consumption expenditures from the *National Accounts Statistics*. The *OECD Health Statistics* data also include information on perceived health which are used to analyze the extent to which changes in food consumption lead to different health outcomes.

[7]Downloadable from OECD.Stat at https://stats.oecd.org/.

[8]Australia, Austria, Belgium, Canada, Chile, Colombia, Costa Rica, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Switzerland, Sweden, Turkey, United Kingdom, and United States.

[9]FAOSTAT, Food Balance Sheets: Food supply and Protein supply quantity at http://www.fao.org/faostat/en/#data/FBSH.

### 2.1.2 | Independent variables

To measure unemployment, we take the harmonized unemployment rate published by the OECD. These data come from the *OECD Labour Force Statistics* database which is based on administrative information from the countries' statistics bureaus and harmonized by the OECD to make unemployment rates comparable across countries. The unemployment rate is expressed in percentages. To analyze the robustness of our results we use three additional indicators. Specifically, we use the hours worked, available from the *OECD Labour Force Statistics*, and a House Price Index (HPI), available from the *Analytical house prices indicators* of the OECD as alternative indicators of the business cycle. The hours worked measure is expressed in the absolute number of average hours worked. Since the unemployment rate may be a somewhat conservative measure of the share of workers affected by economic downturns, we additionally include the share of workers participating in short-time work (STW) schemes. We specifically use the total share of economic short-time workers in employment as a percentage of employment available from the *OECD Labour Force Statistics*. Summary statistics of our data are reported in Appendix A.

## 2.2 | Descriptive analysis

The negative relationship between food consumption and unemployment described above is graphically displayed for both kilocalories and proteins on a country-by-country basis in the figures in Appendices B and C. Even without controlling for covariates, opposing trends can be observed in many countries, at least in certain periods. In Finland, for example, the trends in calories intake and unemployment are almost perfect mirror images. In Hungary, the calories intake declined after the rise of the unemployment rate since the mid-2000s and it started to increase again when the unemployment rate declined from 2013 onward. Also for the dependent variable protein intake the figures clearly indicate that food consumption and unemployment move in opposite directions. In Austria, for example, the trends are mirrored in most periods and a similar pattern can be observed in Spain. In the United States, the protein intake declined during the financial crisis when unemployed increased. When the unemployment started to decline again, from 2010 onward, the protein intake went up again not long after. Taken together, the overall picture shows that when unemployment increases, the consumption of calories and protein declines.

# 3 | EMPIRICAL MODEL

## 3.1 | Empirical specification

To estimate the effect of unemployment on consumption in a cross-country setup, we follow the approach by Aguiar et al. (2013). Originally, Aguiar et al. (2013) estimate the effect of market hours on time use in the United States with market hours and time use information aggregated to the state level:

$$\Delta c_{it} = \beta \Delta u_{it} + \Delta X'_{it}\delta + \epsilon_{it} \quad (1)$$

with $i$ US state, $t$ time period, $c$ time use in hours, $u$ unemployment measured by average hours worked, and $X'$ a vector of control variables. In a similar fashion, we define that $i$ indicates a country, $t$ time period, $c$ household consumption, and $u$ unemployment measured by the harmonized unemployment rate. $\epsilon$ measures the error term which is approximately $iid \sim N(0, \sigma^2)$. The first-differences (FD) specification captures all unobserved time-invariant heterogeneity within countries. To estimate elasticities between consumption and unemployment, we take the natural logs of $c$ and $u$:

$$\Delta ln\, c_{it} = \beta \Delta lnu_{it} + \Delta X'_{it}\delta + \epsilon_{it} \quad (2)$$

In this way, $\beta$ indicates an elasticity: a 1% change in the unemployment rate gives a $\beta$% change in consumption. We would like to stress that $\beta$ does not imply the effect of job loss of a household member on the household's consumption, but $\beta$ measures households' consumption responses to aggregate unemployment such that drops in consumption may in part be precautionary in response to the overall macroeconomic environment (Campos & Reggio, 2015), that is, the business cycle. Therefore, $\beta = 0$ may imply but does not necessarily mean smoothing of consumption in response to unemployment. $\beta = 0$ may also imply that households do not change their consumption in response to the overall macroeconomic environment as measured by the aggregate unemployment rate. Given that the use of natural logs for consumption and unemployment implies an elasticity for $\beta$, we would also like to stress that it captures a percentage increase in consumption following a 1% increase in the unemployment rate and not a 1%-point increase. For example, if the unemployment rate is at 6%, an increase to 6.06% (i.e. a 1% increases) induces a drop in food consumption by $\beta$%. As a corollary, an increase in the unemployment rate from 6 to 7% induces a drop in food consumption by $(1/0.06) * \beta$%.

## 3.2 | Assumptions

Micro-studies have been largely interested in finding the causal effects of unemployment on consumption. Estimates of unemployment on consumption do not simply imply causal effects because of two potential threats to the identification of causal effects: omitted variables bias and reverse causality. Micro studies have therefore relied on quasi-experimental techniques to infer causality in the effect of unemployment on consumption. Many studies exploited (unforeseen) mass layoffs (e.g. Gruber, 1997), exogenous changes in the institutional context (e.g., Kroft & Notowidigdo, 2016), subjective job loss expectations (e.g., Stephens, 2004), or individual fixed effects (e.g., Been et al., 2023).[10] At the aggregate level we use in this paper, such techniques are unavailable. However, to make our analysis at the aggregate level comparable to the micro-studies as much as possible, we take into account both (country) fixed effects and reverse causality in the relationship between households' average food consumption and the unemployment rate. Both rely on the panel nature of the data.

First, we assume that the first-differences (FD) specification in Equation (2) allows us to deal with omitted variables bias (i.e., households' preferences regarding food, and precautionary savings) similar to Aguiar et al. (2013). However, it should be noted that we cannot control for individual fixed effects, but only for country-fixed effects and, hence, the national levels of preferences regarding food, precautionary savings, and so on. A second note is that these fixed effects only control for time-invariant and not time-variant confounders. Therefore, we perform several additional analyses in which we try to control for the most important time-variant confounders related to demographics and formal and informal unemployment insurance mechanisms.

Second, another threat to identifying causal effects is potential reverse causality. This issues cannot be solved by the FD specification, but needs an instrumental variables strategy. Therefore, we check the robustness of our FD estimates by performing GMM estimation in FD. Here, we exploit the panel nature of the data by using lagged variables of $u_{it-s}$ as excluded instruments for $u_{it}$ with $s > 1$.

In the second stage, we estimate Equation (2). In the first-stage, we estimate the following equation:

$$\Delta ln\, u_{it} = \sum_{s=2}^{s=n} \Delta lnu_{it-s}\gamma + \Delta X'_{it}\theta + \varepsilon_{it} \quad (3)$$

[10]Been et al. (2023) show that subjective job loss expectations add little information to individual fixed effects.

These estimates should be able to partial out any reverse causality that runs from households' average food consumption to the unemployment rate, comparable to the micro-studies that correct for any consumption effects on unemployment. The two underlying assumptions of the excluded instruments used in the GMM are: $u_{it-s}$ should not affect $c_{it}$ other than through its effects on $u_{it}$ (i.e., validity) and $u_{it-s}$ should have sufficient predictive power of $u_{it}$ (i.e., relevance). The first assumption can generally not be empirically tested. However, Wang and Bellemare (2019) state that one should be careful with using lagged independent variables as instruments and interpreting results causally because biases might be larger than with using OLS in particular cases. We test these cases in Section 4.1. The second assumption can be empirically assessed using the *F*-statistic of the excluded instrument(s). In Section 4.1, we show the *F*-statistic of the excluded instrument(s).

### 3.3 | Functional form

We measure household consumption $c$ by total calories expressed in kilocalories per capita per day and by protein intake expressed in grams per capita per day.[11] $u$ is measured by the harmonized unemployment rate in percentages.[12] In $X'$ we include information regarding female labor force participation, the Consumer Price Index (CPI) for food and non-alcoholic beverages, and the ratio of inactive people (aged 20− and 65+) relative to active people (aged 20–64). Although adding particular control variables is debatable up to some extent, there are a couple of phenomena that we would like to control for, such as female labor force participation (a higher percentage might imply that there are more dual earner households which have more options to self-insure food consumption against income shocks), price levels (to control for potential consequences of inflation on households' food intake), and the share of inactive who are less vulnerable to unemployment. A final control variable considered in $X'$ is the incidence of economic short-time work (STW), which may cushion unemployment rates in times of recession. Although the OECD provides such information, it substantially reduces our number of observations (see Appendix A), because the indicator is only available for 29 of our 38 OECD countries and is highly unbalanced for available countries. We present estimation results including STW separately in Table 3 (Columns 5 and 6) and conclude that STW matters little for our analyses and conclusions. Furthermore, we test the importance of including Time Fixed Effects in $X$.

Additional analyses extend the considered control variables with variables characterizing both formal and informal insurance mechanisms in countries. We use labor market institutions, specifically the generosity of unemployment benefit and the strictness of employment protection, and social expenditures as formal mechanism. Results are presented in Section 4.4. To explore the role of more informal mechanisms, we use indicators related to households' savings and liquidity. Additionally, we explore the role of informal networks.

## 4 | ESTIMATION RESULTS

### 4.1 | Baseline results

In Table 1, we present the estimation results using both calories and protein intake as consumption measures. In Columns 1 and 2, we estimate the First-Differences (FD, as in Equation (2)) model without taking into account any time-variant confounders and potential reverse causality. Our results suggest an elasticity of about 0.016 and 0.031 for calories and protein intake, respectively. For interpretation: If the unemployment rate is 6% and rises to 7% (which is about the average in the data), for example, these elasticities imply an average decrease in calories and protein intake by about 0.25% and 0.50%, respectively. At the average amount of calories per day in our data (about 3300), this

[11]We perform robustness checks using different measures of consumption, such as consumption in USD and as a share of total household consumption or percentage of GDP (Table 2).

[12]We perform robustness checks for $u$ using average hours worked, similar to Aguiar et al. (2013), and a House Price Index (Table 3).

implies a decrease in somewhat more than 8 cal per day, on average. These estimates barely change if we use the same estimation method (FD) but include time-variant control variables (Columns 3 and 4), and year Fixed Effects (FE) (Columns 5 and 6). Our results suggest that controlling for female participation, food CPI, the dependency ratio, and year FE does not matter much for the estimated size of the elasticities and our conclusions. We find that the control variables have little significant explanation of food consumption measured by calories. The year FE primarily seem to absorb the otherwise significant relationship with food CPI. Therefore, we take the specification in columns 3 and 4 of Table 1 as our baseline specification.

Even though our estimated elasticities are relatively small, they are statistically significant and most likely also economically significant. First, of all types of consumption, food consumption is most likely one of the most income-inelastic. Nonetheless, our results in Table 2 (Columns 1–3) suggest that our findings do not depend on measuring food consumption by its nutritional value. We obtain significant elasticities between unemployment and households' consumption expenditure on food and non-alcoholic beverages measured in absolute (Column 1) and relative (as a share of total household consumption expenditure, Column 2, and percentage of GDP, Column 3) terms. Given the negative estimate in Column 1, we interpret the positive estimates in Columns 2 and 3 to indicate that decreases in food spending are smaller than decreases in spending on other, durable, categories, thereby resulting in a relatively larger share of income spent on food. For comparison, Ronchetti and Terriau (2021) analyze the effects of job loss on the relatively income- and price-inelastic consumption goods (i.e. necessities, Selvanathan & Selvanathan, 2006) of alcohol and tobacco. They find no significant changes in alcohol and tobacco use upon job loss. Following Griffith et al. (2016), the bigger elasticity of proteins compared to kilocalories may imply that households are switching toward cheaper and more unhealthy foods. However, we find no empirical evidence for this. Our results in Table 2 suggest that fat intake (grams per day) decreases in response to unemployment (Column 4), and we find no significant effect of unemployment on self-reported bad/really bad health (Column 5).[13]

Second, since our model estimates an average response of food consumption to aggregate unemployment it is likely that this significant effect is driven by a relatively small group with substantial drops in income and food consumption. Unfortunately, the aggregate macro data does not allow us to delve deeper into specific subgroups although doing so with micro data most likely leads to substantial heterogeneity in effects. This also means that the size of our estimated elasticities is hard to compare to the micro estimates of the effects of unemployment on consumption. Those households that face the 15%–20% drop in (food) spending upon unemployment are a very particular subgroup within the countries in our sample as not every household is confronted with unemployment. However, there is a direct link as micro studies estimate the change in consumption given job loss similar to a treatment effect on the treated. We, however, estimate the effect on both the treated (i.e. those who lose their job) and the untreated (i.e. those who do not lose their job and those who find a job). Depending on the size of the treated compared to the total, this means that our estimated elasticities are likely smaller than those reported in micro studies because the treatment effect on the untreated is most likely smaller as those households have no necessity to adjust consumption substantially. Moreover, our results can best be interpreted as the consequences of the business cycle for households' food consumption. Compared to micro studies, this approach has two advantages: it allows us to analyze whether the relation between consumption and unemployment is (1) driven by particular countries (more on this in Section 4.3) and (2) by heterogeneity in unemployment insurance mechanisms (more on this in Section 4.4).

In Columns 7 and 8 of Table 1, we control for both time-invariant unobservables, observables and potential reverse causality using GMM. Here, we use the lagged values of the unemployment rate as instruments (see Equation (3)) in order to correct for any potential reverse causality. We use lagged dependent variables of up to *t-5*.[14] The accompanied *F*-statistic of the excluded instruments in the first-stage is $F = 1480$ implying that our instruments are relevant and sufficiently strong. Based on the GMM estimator, we find elasticities that are very similar, albeit a bit smaller, to the simple FD specification. This result suggests that the FD specification might already

[13]This conclusion holds for the numerous specifications including control variables and GMM-estimation (not reported here). It also holds for restricting the sample to the sample for which self-reported health is observed (not reported here).

[14]Results are robust to using both fewer and more lagged dependent variables (results not shown here).

**TABLE 1** Regression results of estimating the effect of unemployment on food consumption.

| | (1) FD Δ ln (kcal) | (2) FD Δ ln (proteins) | (3) FD Δ ln (kcal) | (4) FD Δ ln (proteins) | (5) FD Δ ln (kcal) | (6) FD Δ ln (proteins) | (7) IV-FD Δ ln (kcal) | (8) IV-FD Δ ln (proteins) |
|---|---|---|---|---|---|---|---|---|
| Δ ln (unemployment) | −0.016*** | −0.031*** | −0.017*** | −0.031*** | −0.017*** | −0.028*** | −0.013*** | −0.025*** |
| | (0.003) | (0.006) | (0.003) | (0.005) | (0.004) | (0.006) | (0.003) | (0.007) |
| Δ (CPI food) (/100) | | | −0.015 | −0.036* | −0.007 | −0.039 | −0.004 | −0.016 |
| | | | (0.014) | (0.020) | (0.017) | (0.025) | (0.010) | (0.017) |
| Δ (female participation) (/100) | | | −0.063 | −0.013 | −0.068 | 0.020 | 0.002 | 0.037 |
| | | | (0.051) | (0.069) | (0.045) | (0.073) | (0.058) | (0.072) |
| Δ (dependency ratio) (/100) | | | −0.062 | −0.199** | −0.031 | −0.195* | −0.023 | −0.124 |
| | | | (0.067) | (0.091) | (0.072) | (0.109) | (0.062) | (0.087) |
| Constant | 0.003*** | 0.004*** | 0.003*** | 0.003*** | −0.004 | 0.004 | 0.002*** | 0.003*** |
| | (0.000) | (0.001) | (0.000) | (0.001) | (0.007) | (0.006) | (0.000) | (0.001) |
| Year FE | No | No | No | No | Yes | Yes | Yes | Yes |
| Observations | 1081 | 1081 | 1047 | 1047 | 1047 | 1047 | 926 | 926 |
| Countries | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 |
| *R*-squared | 0.029 | 0.038 | 0.034 | 0.041 | 0.103 | 0.084 | 0.031 | 0.034 |
| *F*-statistic first-stage | N/A | N/A | N/A | N/A | N/A | N/A | 1035 | 1035 |

*Note*: Standard errors (clustered at the country level) in parentheses. In Columns (7) and (8) the excluded instruments in the first stage entail: $\Delta^2$ ln (unemployment), $\Delta^3$ ln (unemployment), $\Delta^4$ ln (unemployment), and $\Delta^5$ ln (unemployment).
***$p < .01$, **$p < .05$, and *$p < .1$.

**TABLE 2** Regression results of using different dependent variables.

| | (1) Δ ln (hh food exp., $) | (2) Δ ln (hh food exp., % hh cons. exp) | (3) Δ ln (hh food exp., % GDP) | (4) Δ ln (fats) | (5) Δ bad health |
|---|---|---|---|---|---|
| Δ ln (unemployment) | −0.044*** | 0.088*** | 0.098*** | −0.023*** | −0.007 |
| | (0.011) | (0.009) | (0.011) | (0.007) | (0.280) |
| Controls | Yes | Yes | Yes | Yes | Yes |
| Observations | 932 | 924 | 933 | 1047 | 474 |
| Countries | 38 | 37 | 38 | 38 | 32 |
| *R*-squared | 0.151 | 0.292 | 0.251 | 0.015 | 0.005 |

*Note*: Standard errors (clustered at the country level) in parentheses;
***$p < .01$, **$p < .05$, and *$p < .1$.

capture much of the potential reverse causality. To test whether our GMM estimates are better at explaining causal effects, we perform the test of Wang and Bellemare (2019) and find that our results fit in their "Scenario 3," that is, the lagged variables of interest have no direct causal impact on the dependent variable, but it has a causal impact on the unobserved confounder.[15] As a consequence, Wang & Bellemare argue that the instrument cannot mitigate the endogeneity issue and OLS (in our case, the FD) should be preferred. The results in Table 1 suggest that the estimated elasticities do not substantially differ between using FD and GMM. In the case of GMM, the elasticities are slightly smaller with 0.012–0.013 and 0.024 for calories and protein intake, respectively. This may suggest that the bias from using lagged variables as instruments may be small.

To make a final comparison with micro estimates, we note that estimating Equation (2) implies that we assume that the effects of increases and decreases in the unemployment rate are identical. However, the micro literature has primarily focused on those losing a job and not on those finding a job. To test for potential asymmetries in decreases and increases, we add a variable to Equation (2) that is an interaction between the unemployment rate and a dummy indicating whether the unemployment rate decreases. For both calorie and protein intake, we find no statistically significant effect of this variable (not reported here) which suggests that the effect of increases and decreases on consumption are symmetrical.

## 4.2 | Hours worked, house prices, and economic short-time work

In Table 3 we present our baseline specification but use different indicators of the business cycle. Instead of using the unemployment rate as an independent variable, we use the average number of hours worked in Columns 1 and 2 and the House Price Index (HPI) in Columns 3 and 4. Based on working hours, we reach similar conclusions for protein intake: a decrease in the average number of hours worked decreases protein intake. For calorie intake, we find no significant elasticity. Based on hours worked, our estimated elasticities tend to be larger, but also less precisely estimated.

Using the HPI as an indicator of the business cycle, we find significant effects for both calories and protein intake. More specifically, a drop in the HPI decreases intake quite similarly to an increase in the unemployment rate. Namely, elasticities of 0.019 and 0.043 compared to elasticities based on the unemployment rate of 0.017 and 0.031. Please note that the elasticity with respect to the unemployment rate is negative and the elasticity with

[15]We find that $\gamma$ does not significantly explain $\Delta c_{it}$ (p-value = 0.527). $\gamma$ does significantly explain $\Delta X'_{it}$ (p-value = 0.018 of food CPI).

**TABLE 3** Regression results of using working hours, house price indices, and economic short-time work.

| | (1) Δ ln (kcal) | (2) Δ ln (proteins) | (3) Δ ln (kcal) | (4) Δ ln (proteins) | (5) Δ ln (kcal) | (6) Δ ln (proteins) |
|---|---|---|---|---|---|---|
| Δ ln (hours) | 0.026 | 0.073* | | | | |
| | (0.023) | (0.043) | | | | |
| Δ HPI (/100) | | | 0.019** | 0.043*** | | |
| | | | (0.009) | (0.011) | | |
| Δ ln (unemployment) | | | | | −0.020*** | −0.038*** |
| | | | | | (0.004) | (0.005) |
| Δ STW(/100) | | | | | 0.036 | 0.009 |
| | | | | | (0.063) | (0.074) |
| Controls | yes | yes | yes | yes | yes | yes |
| Observations | 1171 | 1171 | 1011 | 1011 | 591 | 591 |
| Countries | 38 | 38 | 37 | 37 | 29 | 29 |
| *R*-squared | 0.003 | 0.007 | 0.011 | 0.019 | 0.044 | 0.058 |

*Note*: Standard errors (clustered at the country level) in parentheses. Conclusions do not change when we use Δ ln (STW) instead of Δ STW.
***$p < .01$, **$p < .05$, and *$p < .1$.

respect to the HPI is positive, which can be explained by the fact that an increase in the unemployment rate indicates an economic downturn while a decrease in the HPI indicates an economic downturn.

Based on the estimation results of hours worked and the HPI, we conclude that our estimation results are quite robust to using either potential income shocks or potential (housing) wealth shocks as a measure of the business cycle. It should be noted that various measures of the business cycle are available, such as the output gap. However, using these measures go beyond the scope of the paper which is primarily interested in translating potential income shocks into consumption responses. We argue that the unemployment rate, the number of hours worked, and the HPI come closest to the interpretation of households' income of wealth shocks. Moreover, adding measures related to GDP are most likely highly multicollinear with our measure of unemployment as Okun's Law suggests.

Finally, we show estimates that control for short-time work (STW) arrangements in addition to unemployment in Columns 5 and 6 of Table 3. The existence of STW schemes may imply that the unemployment rate is not a perfect indicator of the business cycle. However, our results suggest that adding an indicator of STW does not substantially alter our main results from Table 1. Despite the substantially smaller sample we obtain elasticities that are highly comparable to those obtained when not controlling for the incidence of STW (columns 3 and 4 of Table 1): 0.020 compared to 0.017 for calories and 0.039 compared to 0.031 for protein intake.[16]

## 4.3 | Heterogeneity between country groups

Although much of the empirical evidence on the relationship between consumption and unemployment comes from micro studies studying American households, the sparse cross-country evidence suggests that differences in the effect of unemployment on consumption can be large. Whereas studies such as Stephens (2004) and Aguiar and Hurst (2005) find effects in the range of 15%–20% for the United States, recent evidence for the Netherlands from

[16]We also tested the importance of additionally including year FE in *X*′ and conclude that our results in relation to the unemployment rate and the share of STW do not change by including them (not reported here). Our results are also robust to the use of a natural log for STW (not reported here).

**TABLE 4** The importance of Anglo-Saxon country selections.

| | (1) No United States Δ ln (kcal) | (2) No United States Δ ln (proteins) | (3) No CA/ United Kingdom/ United States Δ ln (kcal) | (4) No CA/United Kingdom/ United States Δ ln (proteins) | (5) No Anglo-Saxon countries Δ ln (kcal) | (6) No Anglo-Saxon countries Δ ln (proteins) |
|---|---|---|---|---|---|---|
| Δ ln (unemployment) | −0.017*** | −0.032*** | −0.018*** | −0.033*** | −0.017*** | −0.031*** |
| | (0.003) | (0.005) | (0.003) | (0.006) | (0.004) | (0.006) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1007 | 1007 | 931 | 931 | 820 | 820 |
| Countries | 37 | 37 | 35 | 35 | 32 | 32 |
| *R*-squared | 0.033 | 0.042 | 0.036 | 0.044 | 0.036 | 0.046 |

*Note*: Standard errors (clustered at the country level) in parentheses. Anglo-Saxon includes Australia, Canada, Ireland, New Zealand, United Kingdom, and United States.
***$p < .01$, **$p < .05$, and *$p < .1$.

Been et al. (2023) suggests that this effect is about 5%. With a wide range of countries in our sample, we are able to test whether the estimates of the elasticity are robust to the inclusion or exclusion of specific countries or country groups. Any differences can likely be attributed to differences in social systems (Esping-Andersen, 1990), including options for formal and informal income insurance, or cultural differences (Bargain et al., 2013), for example, in preferences regarding leisure and consumption.

In Table 4, we show the extent to which our results are driven by the selection of Anglo-Saxon countries. Excluding the United States, United Kingdom, and Canada, and all Anglo-Saxon (Australia, Canada, Ireland, New Zealand, the United Kingdom, and the United States) countries from the sample does not alter our main conclusions. Estimated elasticities are highly comparable with our baseline estimates that include the full sample. This suggests that the consumption drop at unemployment is not driven by the United States, or more general Anglo-Saxon, countries but seems to be a OECD-wide phenomenon. In Table 5, we show whether elasticities differ by continent. We find estimates for the Americas and Europe that are comparable to our baseline estimates. For Asian countries (including Oceania) we find somewhat higher elasticities suggesting that the responses to unemployment are more substantial in these countries, although we lose some estimation precision. In Table 6, we take a closer look at European countries and exclude the Nordic countries, Central and Eastern European countries (including the Baltic states), and Mediterranean countries (excluding Turkey and Israel, but including these countries matters little for the estimation results), respectively. We find that the estimation results for Europe are quite homogenous regardless of the inclusion or exclusion of certain European countries from the sample. If anything, elasticities are slightly bigger (smaller) if Nordic (Central and Eastern European or Mediterranean) countries are not considered.

All in all, the estimation results in Tables 4–6 suggest that a significant elasticity between unemployment and food consumption exists regardless of the selection of countries. In particular, our results are robust to the exclusion of the United States and other Anglo-Saxon countries such as Canada and the United Kingdom, which has important consequences for the interpretation of prior country-specific analyses of unemployment and consumption. As most prior micro studies are based on US households, it is hard to extrapolate conclusions regarding the relation between unemployment and consumption to other countries. Based on our results, we conclude that the drop in consumption at unemployment is not a typical phenomenon for Anglo-Saxon or, more specific, US households, but widely present among OECD countries. However, the results do suggest that the size of the elasticity can differ between country groups. A potential explanation for this might be the cross-country differences in social institutions. Therefore, we

**TABLE 5** The importance of continent selections.

| | (1) Americas Δ ln (kcal) | (2) Americas Δ ln (proteins) | (3) Asia/Oceania Δ ln (kcal) | (4) Asia/Oceania Δ ln (proteins) | (5) Europe Δ ln (kcal) | (6) Europe Δ ln (proteins) |
|---|---|---|---|---|---|---|
| Δ ln (unemployment) | −0.017** | −0.025 | −0.025** | −0.044* | −0.016*** | −0.029*** |
| | (0.007) | (0.013) | (0.007) | (0.019) | (0.004) | (0.007) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 152 | 152 | 145 | 145 | 750 | 750 |
| Countries | 6 | 6 | 4 | 4 | 28 | 28 |
| *R*-squared | 0.068 | 0.054 | 0.102 | 0.070 | 0.027 | 0.036 |

*Note*: Standard errors (clustered at the country level) in parentheses. Americas includes Canada, Chile, Colombia, Costa Rica, Mexico, and United States. Asia/Oceania includes Australia, Japan, Korea, and New Zealand. Europe includes Austria, Belgium, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Lithuania, Latvia, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, and United Kingdom.
***$p < .01$, **$p < .05$, and *$p < .1$.

**TABLE 6** The importance of selections in Europe.

| | (1) Europe, no Nordic countries Δ ln (kcal) | (2) Europe, no Nordic countries Δ ln (proteins) | (3) Europe, no Central and Eastern countries Δ ln (kcal) | (4) Europe, no Central and Eastern countries Δ ln (proteins) | (5) Europe, no Mediterranean countries Δ ln (kcal) | (6) Europe, no Mediterranean countries Δ ln (proteins) |
|---|---|---|---|---|---|---|
| Δ ln (unemployment) | −0.019*** | −0.032*** | −0.013** | −0.025*** | −0.014*** | −0.028*** |
| | (0.003) | (0.007) | (0.005) | (0.008) | (0.004) | (0.007) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 596 | 596 | 574 | 574 | 622 | 622 |
| Countries | 23 | 23 | 20 | 20 | 24 | 24 |
| *R*-squared | 0.033 | 0.036 | 0.024 | 0.034 | 0.025 | 0.030 |

*Note*: Standard errors (clustered at the country level) in parentheses. Nordic include: Denmark, Finland, Iceland, Norway, and Sweden. Central and Eastern includes Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia. Mediterranean includes Greece, Italy, Portugal, and Spain.
***$p < .01$, **$p < .05$, and *$p < .1$.

analyze to what extent countries' heterogeneity in formal and informal insurance mechanisms are important in explaining the relationship between consumption and unemployment in the next section.

## 4.4 | The role of institutions

Consumption responses to unemployment may be dampened by labor market institutions such as UI benefits, which thereby operate as automatic stabilizers (e.g. Browning & Crossley, 2001; Di Maggio & Kermani, 2016; Gruber, 1997, 1998). Hence, in our approach it is important to account for the variation in labor market institutions across countries and over time. From a theoretical perspective, UI benefits and employment protection are likely to be the most important institutions to consider in analyzing responses in consumption to unemployment. Other labor market institutions that are frequently considered to explain (un)employment, such as union density/bargaining coverage, tax wedges, and

active labor market policies (e.g., Belot & Van Ours, 2004; Blanchard & Wolfers, 2000; Nickell et al., 2005), are likely to have a less direct effect on the relationship between consumption and unemployment.

UI benefits determine the income available during unemployment. This is generally expressed as a replacement rate: the share of previous income in work replaced by benefits received when out of work. A higher unemployment benefit replacement rate (UBRR) implies less necessity for households to adjust their consumption during unemployment. In the case that the (net) UBRR is close to 100%, households do not need to adjust consumption upon job loss. However, the duration of the benefits and the probability of receiving a job offer determine the extent to which the income drop is persistent (need for consumption adjustments) or transitory (no need for consumption adjustments). EPL determines how likely it is that people lose their job during economic downturns. On the one hand, stricter EPL and, hence, a smaller probability of job loss will result in smaller adjustments in consumption with rising unemployment. In addition, once an individual lost his job, severance pay is another element of EPL which could mitigate the consumption responses to unemployment, as smaller adjustments in consumption would be needed in case of high severance pay. On the other hand, strict EPL also hampers hiring workers such that those who actually become unemployed might need to make bigger consumption adjustments in case of relatively high EPL.

A drawback is that reliable measures of labor market institutions are not available for all countries. For UBRR, we use net replacement rates from the Unemployment Benefits Replacement Rates Dataset (Van Vliet et al., 2024), available for 30 of the 38 OECD countries we study.[17] These replacement rates measure the percentage income replaced by unemployment insurance and/or unemployment assistance benefits upon job loss for a "typical" worker aged 40 with a 20 year uninterrupted employment record, which is an established approach within the literature (e.g., Layard et al., 1991; Martin, 1996). The replacement rate is based on benefit levels received throughout the first six months of benefit receipt and thereby accounts for drops over time. Net replacement rates are preferred over gross replacement rates, because they provide a more accurate picture by taking income taxes and social security contributions on earnings and benefits into account. To measure the strictness of EPL, we use the EPL index provided by the OECD. The EPL index is an index that measures the strength of employment protection on a scale from 0 to 6 where 6 can be considered very strict and 0 not strict. We use version 1 of the index for regular contracts, which is available from 1985 onward.

In Figure 1, the levels of the UBRR and EPL are plotted for the 30 countries for which we have data on labor market institutions. For each country, the first (1985 at the earliest) and the last (2019) data year are displayed. The country with the most flexible EPL is the United States, followed by Canada, whereas the country with the most strict EPL is Portugal in 1985. Other countries with strict EPL are Spain, the Netherlands and Czechia, but in 2019 the Netherlands stands out as the country with the strictest EPL. Over time, EPL has been fairly stable in most countries. In countries where the EPL has been changed, EPL has become more flexible. Notable examples of such countries are Portugal and Spain. With regard to UI benefits, the highest UBRR can be found in Spain in 1985 and the lowest in Italy in 1985. In 2019, Luxembourg was the country with the highest UBRR and the United Kingdom the country with the lowest. In most countries, the UBRR has been decreased between 1985 and 2019.[18] Interestingly, three country clusters can be recognized in Figure 1, namely North-American countries, Anglo-Saxon countries and continental-European countries. Since UI benefits and EPL could both dampen households' changes in consumption in response to job loss, they could to some extent function as substitutes.[19] However, if anything, our data suggest that UI benefits and EPL can be considered as complements rather than as substitutes (correlation: 0.268; $p < .01$; 30 countries; $n = 894$).[20]

[17]The indicator is not available for Chile, Colombia, Costa Rica, Iceland, Israel, Korea, Mexico, and Turkiye. We use this indicator rather than the UBRR from the OECD, because while the OECD indicator provides data for five more countries, it is only available since 2001, whereas the indicator from the Unemployment Benefits Replacement Rates Dataset is available for all the years analyzed. In our regression analysis on the role of labor market institutions (presented in Table 7), this yields 887 observations instead of 612 observations.

[18]It should be noted that the declines in net UBRRs not always reflect changes in the unemployment benefit scheme but that they can also reflect changes in tax rates for example.

[19]In Mexico for instance, EPL functions as a safety net against unemployment since there is no UI benefit scheme (Ozkan, 2019).

[20]Also with the UBRR from the OECD we find a positive correlation between the UBRR and EPL (correlation: 0.338; $p < 0.01$; 35 countries; $n = 588$).

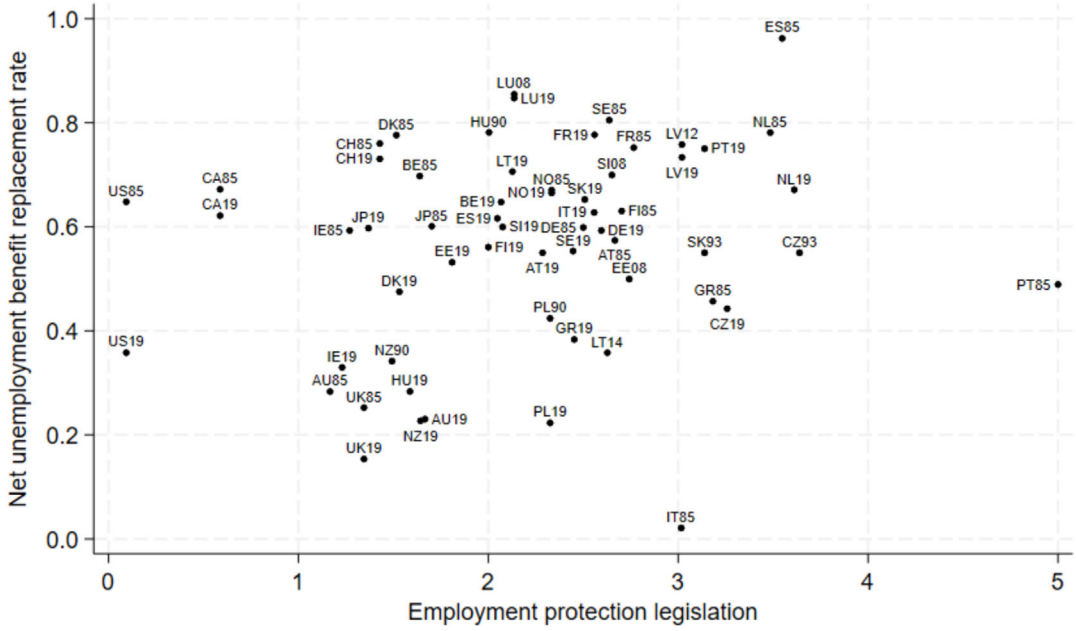


**FIGURE 1** Net unemployment benefit replacement rates and employment protection legislation across 30 countries in 1985 and 2019. [Colour figure can be viewed at wileyonlinelibrary.com]

In Table 7, we extend our baseline analysis with the inclusion of labor market institutions. More specifically, we take the specification as in Columns 3 and 4 in Table 1 and extend this specification with our indicators as well as the interaction between these variables and the unemployment rate. These interactions should indicate to what extent consumption responses to unemployment differ by the level of the labor market institution. In particular, this allows us to measure households' consumption responds to unemployment and the extent to which this differs by the UBRR. In line with the theoretical considerations, the estimation results in Columns 3 and 4 suggest that more generous UI benefits decrease the elasticity between consumption and unemployment.[21] This implies that higher replacement rates cushion the consequences of unemployment for consumption. Adding information on employment protection in Columns 5 and 6 results in non-significant effects of both UI replacement rates and employment protection. To some extent, this may be explained by the reduced number of observations. Nonetheless, previously estimated elasticities are robust to the inclusion of labor market institutions.

UI benefits provide probably the most direct income protection in case of unemployment, but other public policies as well as informal mechanisms could also be expected to cushion income shocks. We explore these alternative policies and mechanisms in turn for the 30 countries for which we also have data on the UBRR. A broad measure for such policies is government consumption expenditure. We take these expenditures, expressed as a percentage of GDP, from the *OECD National Accounts*. In addition, we use public social expenditure as a percentage of GDP from the *OECD Social Expenditure Database*.[22] The data, displayed in Appendix D, suggest that in many countries the developments in UI benefits, government consumption expenditures and public social expenditures point in the same direction. In Table 8, we present the results of regression analyses with which we examine the role of

[21]When we use the UBRR from the OECD, the number of observations is smaller (612 instead of 887; 544 instead of 766 when additionally controlling for EPL), but we obtain very similar regression results. The coefficients for the UBRR and the interaction term between unemployment and the UBRR reach conventional levels of statistical significance in even more columns (5 instead of 1 for UBRR; 3 instead of 1 for the interaction term).

[22]Alternative measures for public social expenditure are government expenditure on the function social protection and government expenditure on social benefits and social transfers, both available as a percentage of GDP from the *OECD National Accounts at a Glance* database. With these measures, we obtain similar regression results. For the regressions in Table 8, we use the Social Expenditure Database, because this enables us to also include private social expenditures.

**TABLE 7** The importance of labor market institutions.

| | (1) Δ ln (kcal) | (2) Δ ln (proteins) | (3) Δ ln (kcal) | (4) Δ ln (proteins) | (5) Δ ln (kcal) | (6) Δ ln (proteins) |
|---|---|---|---|---|---|---|
| Δ ln (unemployment) | −0.018*** | −0.032*** | −0.018*** | −0.034*** | −0.017*** | −0.032*** |
| | (0.004) | (0.007) | (0.004) | (0.007) | (0.006) | (0.008) |
| Δ ln (unemployment) × Δ unemployment benefits | | | 0.012 | 0.119*** | 0.063 | 0.070 |
| | | | (0.014) | (0.035) | (0.169) | (0.210) |
| Δ ln (unemployment) × Δ employment protection | | | | | −0.061 | −0.062 |
| | | | | | (0.043) | (0.043) |
| Δ unemployment benefits | 0.023* | 0.018 | 0.021 | −0.003 | 0.031 | 0.009 |
| | (0.012) | (0.021) | (0.014) | (0.023) | (0.027) | (0.032) |
| Δ employment protection | | | | | 0.016** | 0.022** |
| | | | | | (0.007) | (0.009) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 887 | 887 | 887 | 887 | 766 | 766 |
| Countries | 30 | 30 | 30 | 30 | 30 | 30 |
| *R*-squared | 0.033 | 0.036 | 0.033 | 0.041 | 0.036 | 0.038 |

*Note*: Standard errors (clustered at the country level) in parentheses.
***$p$ < .01, **$p$ < .05, and *$p$ < .1.

government and social expenditures. Columns 1–4 suggest that higher government consumption expenditures and higher public social expenditures reduce the elasticity between consumption and unemployment. In some countries, private social insurances play an important role in the provision of income protection. Private schemes can have a mandatory character, such as for instance pension schemes, but households may also participate in private insurance schemes in order to smoothen consumption on a voluntary basis. As shown in Appendix D, private social expenditures are the highest in Anglo-Saxon countries, where public social expenditures are relatively low. Columns 5 and 6 in Table 8 indicate that when we account for private social expenditures, the results for public social expenditures hold. Moreover, the results suggest that also higher voluntary private social expenditures decrease the elasticity between consumption and unemployment. More generally, the results in presented in Table 8 indicate that our estimated elasticities are robust to the inclusion of government and social expenditures. Furthermore, the results suggest that higher expenditures on government consumption and social policy dampen the impact of unemployment on consumption.

In addition to formal social insurance schemes, households could also use wealth and debt as informal insurance in case of job loss. In response to a negative income shock households could manage to smooth consumption by running down savings or by borrowing (Bloemen & Stancanelli, 2005). To account for aggregate savings in the empirical analysis we use net household savings as a percentage of households' net disposable income. To examine the role of borrowing we include household debt as a percentage of households' net disposable income, which we use as a measure to grasp the variation across countries and over time in households' access to credit. Appendix E shows the variation across countries and over time for these measures, which are both taken from the *OECD National Accounts at a Glance* database. In Table 9, we extend the regression analysis with household savings and debt. Again, the estimated elasticities between consumption and unemployment are reproduced. For UI benefits, a sharper picture emerges. The results suggest that higher UI benefits decrease the elasticity for protein intake, but not for calories. This suggests that in case of job loss UI benefits in particular mitigate the switch in household consumption toward more unhealthy food. Furthermore, the results suggest that higher household savings reduce the elasticity between consumption and unemployment whereas we do not find such results for household debt. Taken together, these results

**TABLE 8** The importance of government and social expenditures.

| | (1) Δ ln (kcal) | (2) Δ ln (proteins) | (3) Δ ln (kcal) | (4) Δ ln (proteins) | (5) Δ ln (kcal) | (6) Δ ln (proteins) |
|---|---|---|---|---|---|---|
| Δ ln (unemployment) | −0.022*** | −0.037*** | −0.027*** | −0.046*** | −0.029*** | −0.046*** |
| | (0.005) | (0.009) | (0.005) | (0.010) | (0.005) | (0.010) |
| Δ ln (unemployment) × Δ government expenditure | 0.007*** | 0.008 | | | | |
| | (0.002) | (0.007) | | | | |
| Δ ln (unemployment) × Δ public social expenditure | | | 0.006*** | 0.008*** | 0.006*** | 0.008*** |
| | | | (0.001) | (0.003) | (0.002) | (0.003) |
| Δ ln (unemployment) × Δ mand. priv. social exp. | | | | | 0.009 | −0.045 |
| | | | | | (0.017) | (0.052) |
| Δ ln (unemployment) × Δ vol. priv. social exp. | | | | | 0.017* | 0.022 |
| | | | | | (0.009) | (0.016) |
| Δ government expenditure | 0.001 | 0.001 | | | | |
| | (0.001) | (0.002) | | | | |
| Δ public social expenditure | | | 0.000 | 0.001 | 0.000 | 0.000 |
| | | | (0.000) | (0.001) | (0.000) | (0.001) |
| Δ mandatory private social expenditure | | | | | 0.002 | −0.006 |
| | | | | | (0.002) | (0.008) |
| Δ voluntary private social expenditure | | | | | 0.003* | 0.001 |
| | | | | | (0.002) | (0.003) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 887 | 887 | 882 | 882 | 859 | 859 |
| Countries | 30 | 30 | 30 | 30 | 30 | 30 |
| *R*-squared | 0.039 | 0.039 | 0.048 | 0.049 | 0.053 | 0.053 |

*Note*: Standard errors (clustered at the country level) in parentheses.
***$p < .01$, **$p < .05$, and *$p < .1$.

imply that in addition to formal unemployment insurance, households also use precautionary savings as an informal insurance mechanism to smooth consumption in case of unemployment.

Finally, it could be expected that also informal networks may provide a safety net. In case of job loss, households may be supported by family and friends Such informal sources of support can be expected to be stronger when social networks are stronger and when UI benefits are less generous (Bentolila & Ichino, 2008). Grasping the concept of informal networks empirically is difficult, especially for a large number of countries and years. We construct four indicators based on data from the World Values Survey. Two indicators measure the importance of family and friends[23]; the other two indicators measure the percentage of the population who is a member of a church or a religious organization and a sports or recreational organization.[24] For these two indicators, we have cross-sectional data for several countries throughout the period 1989–2020 (Waves 2–7), but the number of observations is too low to include these measures in the regression analysis.[25] Instead, we explore the cross-country variation in informal

[23]For these indicators, we use two survey questions which ask for (1) the importance of family and (2) the importance of friends. Values were recoded into 0 to 3 referring from not at all important to very important. Individual scores on both variables have been aggregated at the country level.
[24]Individuals are scored 1 if they responded to be either an active or inactive member of (1) a church or religious organization and (2) a sports or recreational organization. The scores are aggregated at the country level and multiplied by 100.
[25]For the importance of family and friends the maximum number of observations is 92; for the membership of church or religious organizations and sports or recreational organizations it is 68 (Waves 2 and 4 are not included because of different questioning). These numbers are relatively low for a regression and, moreover, cannot be used in our models because we use a first-difference specification.

**TABLE 9** The importance of formal (i.e., unemployment benefits) and informal (i.e., savings, liquidity) insurance mechanisms.

| | (1) Δ ln (kcal) | (2) Δ ln (proteins) | (3) Δ ln (kcal) | (4) Δ ln (proteins) | (5) Δ ln (kcal) | (6) Δ ln (proteins) |
|---|---|---|---|---|---|---|
| Δ ln (unemployment) | −0.025*** | −0.046*** | −0.019*** | −0.033*** | −0.027*** | −0.043*** |
| | (0.004) | (0.007) | (0.004) | (0.007) | (0.005) | (0.008) |
| Δ ln (unemployment) × Δ unemployment benefits | −0.003 | 0.083** | 0.010 | 0.104*** | −0.008 | 0.074* |
| | (0.012) | (0.034) | (0.009) | (0.035) | (0.010) | (0.037) |
| Δ ln (unemployment) × Δ households' savings | 0.002** | 0.004** | | | 0.003*** | 0.004* |
| | (0.001) | (0.002) | | | (0.001) | (0.002) |
| Δ ln (unemployment) × Δ households' debt | | | 0.000 | −0.001 | 0.001 | 0.000 |
| | | | (0.001) | (0.001) | (0.001) | (0.001) |
| Δ unemployment benefits | 0.013 | −0.009 | 0.024** | 0.005 | 0.022** | −0.001 |
| | (0.012) | (0.022) | (0.009) | (0.021) | (0.009) | (0.022) |
| Δ households' savings | 0.000 | 0.001* | | | 0.000 | 0.001* |
| | (0.000) | (0.000) | | | (0.000) | (0.000) |
| Δ households' debt | | | −0.000* | −0.000 | −0.000 | 0.000 |
| | | | (0.000) | (0.000) | (0.000) | (0.000) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 739 | 739 | 683 | 683 | 646 | 646 |
| Countries | 29 | 29 | 30 | 30 | 29 | 29 |
| *R*-squared | 0.056 | 0.061 | 0.048 | 0.045 | 0.064 | 0.055 |

*Note*: Standard errors (clustered at the country level) in parentheses.
***$p < .01$, **$p < .05$, and *$p < .1$.

networks descriptively. Appendix F suggests that, if anything, family cannot be considered as substitute of formal unemployment insurance across the 30 countries we study (correlation 0.260; $p < .05$). Interestingly, such a relationship seems to be more the case for the other three informal networks, but these correlations are not statistically significant. Waves 6 and 7 of the WVS additionally asked respondents how often they had gone without enough food to eat in the last 12 months. While we cannot control for confounding factors or the role of unemployment shocks, we obtain negative and statistically significant correlations between not having enough food to eat and the importance of family (−0.419; $p < .1$) and membership rates of sports or recreations organizations (−0.532; $p < .05$). The data should be interpreted very cautiously, but this would be in line with the idea that these elements of civil society represent informal mechanisms that enable households to insure against a lack of food.

## 5 | CONCLUSION

Much of the empirical evidence on the effect of unemployment on consumption relies on US data. Studies typically find spending drops of about 15%–20% among American households. The few studies that use data from other countries, such as the Netherlands, find smaller effects of about 5%. So far, it remained largely unknown to what extent such differences exist among a wider variety of countries and the extent to which heterogeneity in formal and informal unemployment insurance tend to explain potential differences observed within different countries.

In this paper we use macro-level information on unemployment and consumption and go beyond using micro data to shed more light on the heterogeneity of consumption responses to unemployment and potential drivers of this heterogeneity. To do so, we use a sample of all 38 OECD countries from 1980 to 2020 and exploit the panel nature of the data to estimate the elasticity between the unemployment rate and daily average food consumption measured by calorie and protein intake.

Our preferred estimation results suggest a statistically significant elasticity of 0.017 and 0.031 for calories and protein intake, respectively. Even though the estimated elasticities appear to be small, we argue that these estimates are economically significant as well. Especially, since these consumption responses are most likely strongest among households that actually lose their job in times of high unemployment. We show that the estimates are robust to a variety of consumption definitions, function form specifications and definitions of measuring potential income shocks at the macro level, such as hours worked and house prices.

Moreover, we show that the results are not driven by a particular set of countries meaning that the macro elasticity is fairly homogeneous across countries. This implies that the consumption drop found in micro studies of the United States may not be particular for the United States, but can likely be extrapolated to a wider variety of countries. Additional analyses suggest that heterogeneity in institutions, in particular the generosity of UI benefits, can explain heterogeneity in households' consumption responses to recessions. We find that abovementioned elasticities are smaller for relatively higher unemployment benefits replacement rates. In addition, we find similar results for government consumption expenditures and public social expenditures. These findings imply that higher UI benefits and other public expenditures cushion the consequences of recessions for households' consumption. In this way, they function as automatic stabilizers. Finally, our findings suggest that also the informal insurance mechanism of households' savings attributes to smaller elasticities. In all likelihood, informal networks may also provide a safety net, but because of the limited availability of data, it remains challenging to account for the role of informal networks in a cross-country analysis. Future research should shed more light on this.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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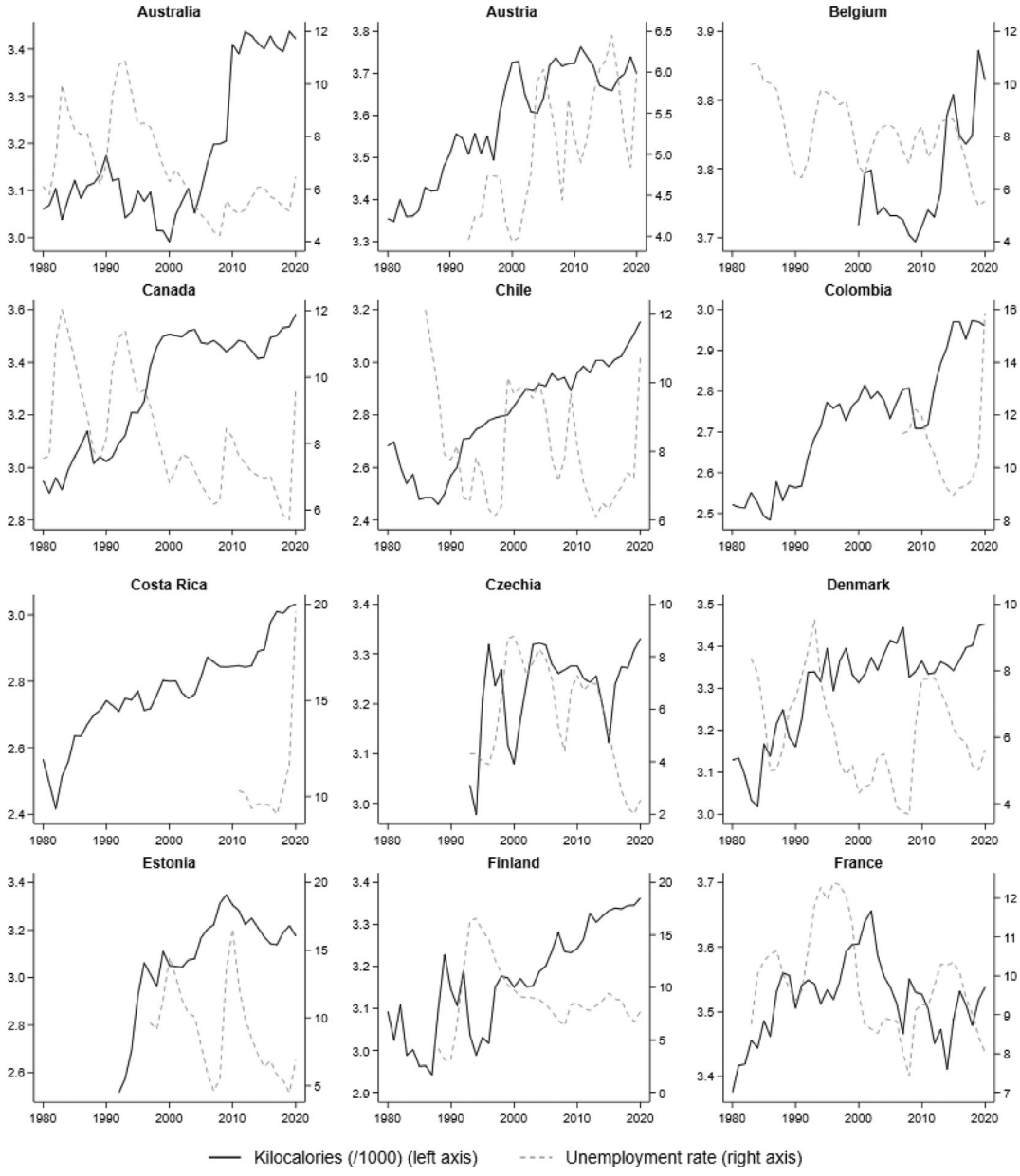
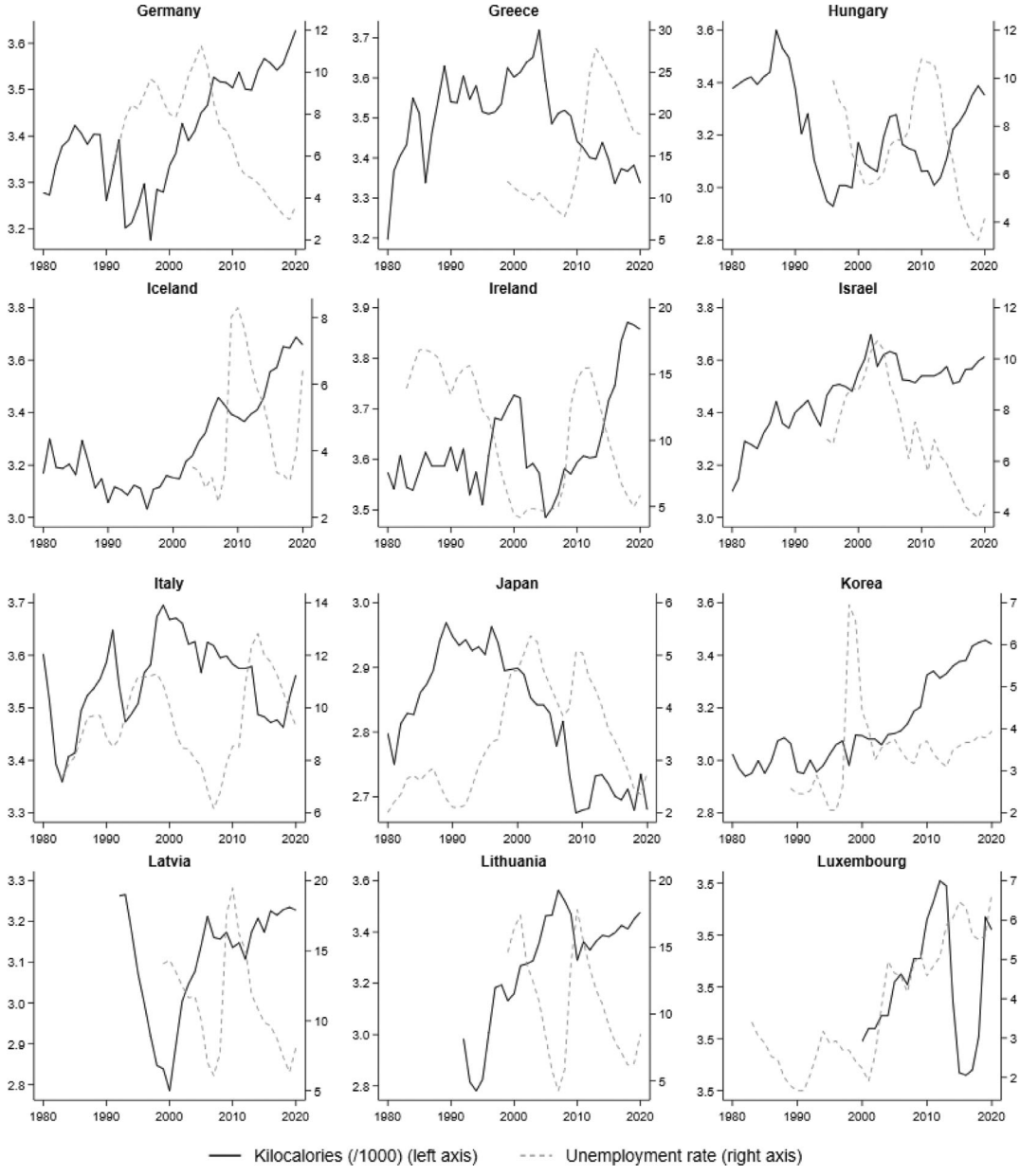
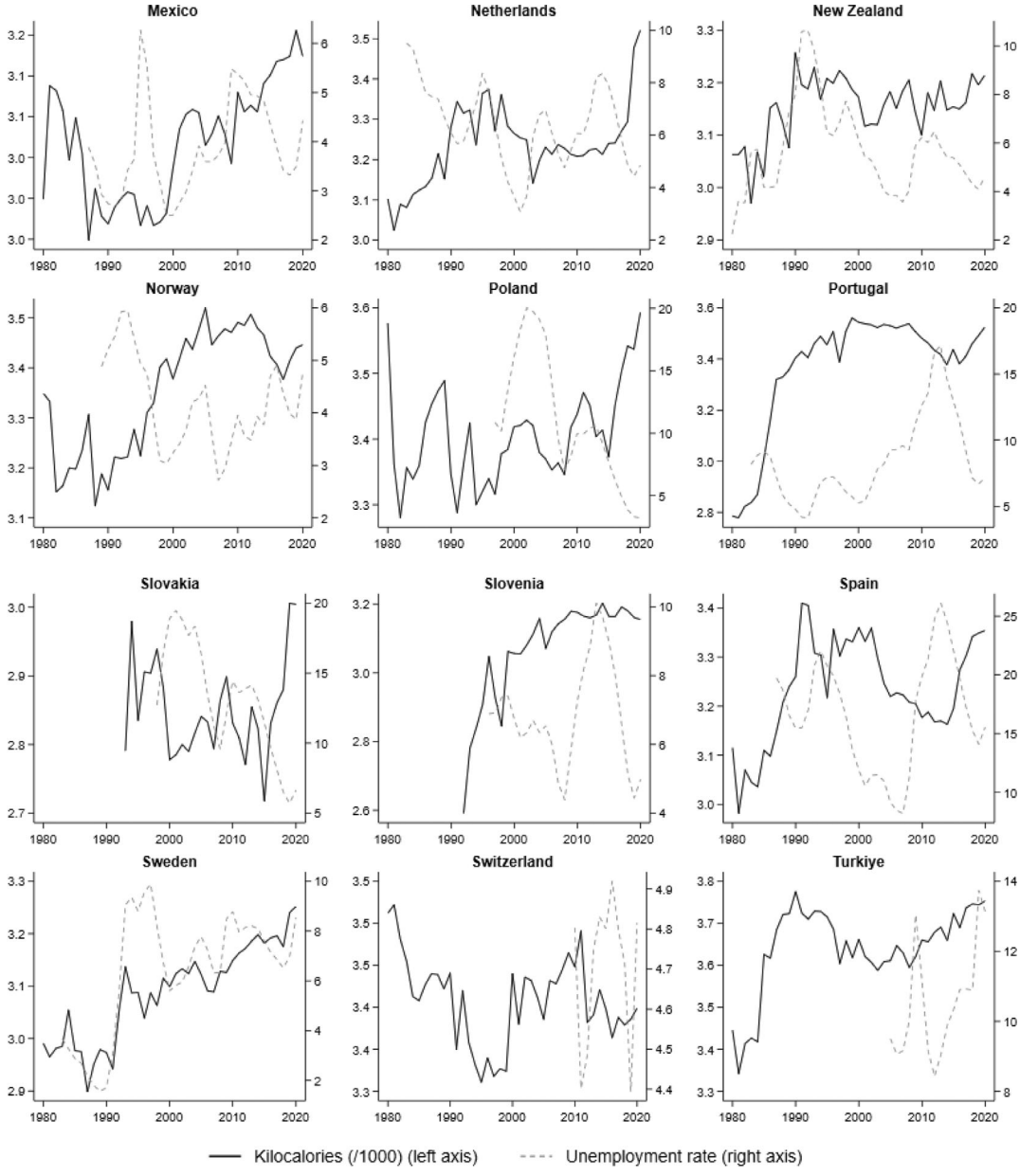
## APPENDIX A: SUMMARY STATISTICS OF THE 38 OECD COUNTRIES, 1980–2020

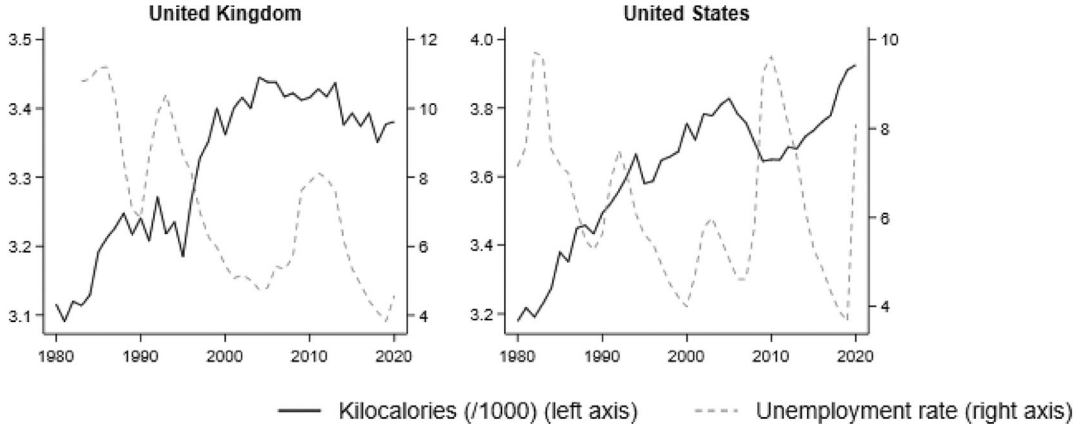
| Variable | Obs. | Mean | Std. dev. | Min. | Max. |
|---|---|---|---|---|---|
| **Dependent variables** | | | | | |
| Calorie intake (calories per capita per day) | 1444 | 3265.5 | 283.7 | 2417.0 | 3926.0 |
| Protein intake (grams per capita per day) | 1444 | 99.7 | 14.5 | 51.8 | 145.3 |
| Households' consumption expenditure on food and non-alcoholic beverages deflated by PPP for household final consumption (millions of USD) | 1075 | 69,125.6 | 122,769.4 | 541.6 | 1,008,017.0 |
| Households' consumption expenditure on food and non-alcoholic beverages (% household consumption expenditures) | 1045 | 14.9 | 5.0 | 6.6 | 39.5 |
| Households' consumption expenditure on food and non-alcoholic beverages (% GDP) | 1076 | 8.4 | 3.7 | 2.4 | 25.2 |
| Fat-intake (grams per capita per day) | 1444 | 124.4 | 27.9 | 37.4 | 183.9 |
| Self-reported bad/really bad health (%) | 542 | 9.7 | 5.0 | 1.3 | 23.2 |
| **Independent variables** | | | | | |
| Unemployment rate (%) | 1153 | 7.7 | 4.0 | 1.6 | 27.8 |
| Average annual hours worked (hours per year) | 1365 | 1771.6 | 244.6 | 1319.1 | 2502.5 |
| House price index (HPI, 2015 = 100) | 1110 | 87.0 | 30.4 | 24.4 | 169.2 |
| Share of economic short-time workers (STW) in employment (all ages, % of employment) | 674 | 0.9 | 1.3 | 0.0 | 9.4 |
| **Control variables** | | | | | |
| Female labor force participation (%) | 1308 | 61.7 | 12.0 | 25.2 | 84.0 |
| Consumer price index (CPI) for food and non-alcoholic beverages (yearly % change) | 1384 | 7.2 | 28.0 | −13.8 | 774.0 |
| Total dependency ratio (population aged <20 and 65+/ population aged 20–64, %) | 1558 | 70.8 | 12.4 | 48.1 | 149.2 |
| **Labor market institutions** | | | | | |
| Net unemployment benefit replacement rate (single person previously earnings 100% of the average production worker's [APW] wage, income in work/income out of work) | 1161 | 0.6 | 0.2 | 0.0 | 1.0 |
| Employment protection legislation (individual dismissals, regular contracts, version 1) | 1032 | 2.2 | 0.9 | 0.1 | 5.0 |
| **Government (social) spending** | | | | | |
| Government consumption expenditure (% GDP) | 1432 | 18.6 | 4.4 | 6.4 | 37.6 |
| Government expenditure on social protection (% GDP) | 854 | 14.9 | 5.2 | 1.4 | 27.5 |
| Government expenditure on social benefits and social transfers in kind (% GDP) | 977 | 23.2 | 6.8 | 4.9 | 38.6 |
| Total public social expenditure (% GDP) | 1312 | 18.6 | 6.2 | 1.6 | 34.9 |
| Total mandatory private social expenditure (% GDP) | 1290 | 0.8 | 1.7 | 0.0 | 10.6 |
| Total voluntary private social expenditure (% GPD) | 1292 | 1.6 | 2.0 | 0.0 | 11.2 |
| **Savings and liquidity** | | | | | |
| Net household savings (% households' net disposable income) | 901 | 5.3 | 6.1 | −39.8 | 22.0 |
| Household debt (% households' net disposable income) | 818 | 108.8 | 65.4 | 2.9 | 339.8 |

## APPENDIX B: TRENDS IN KILOCALORIES AND UNEMPLOYMENT RATE

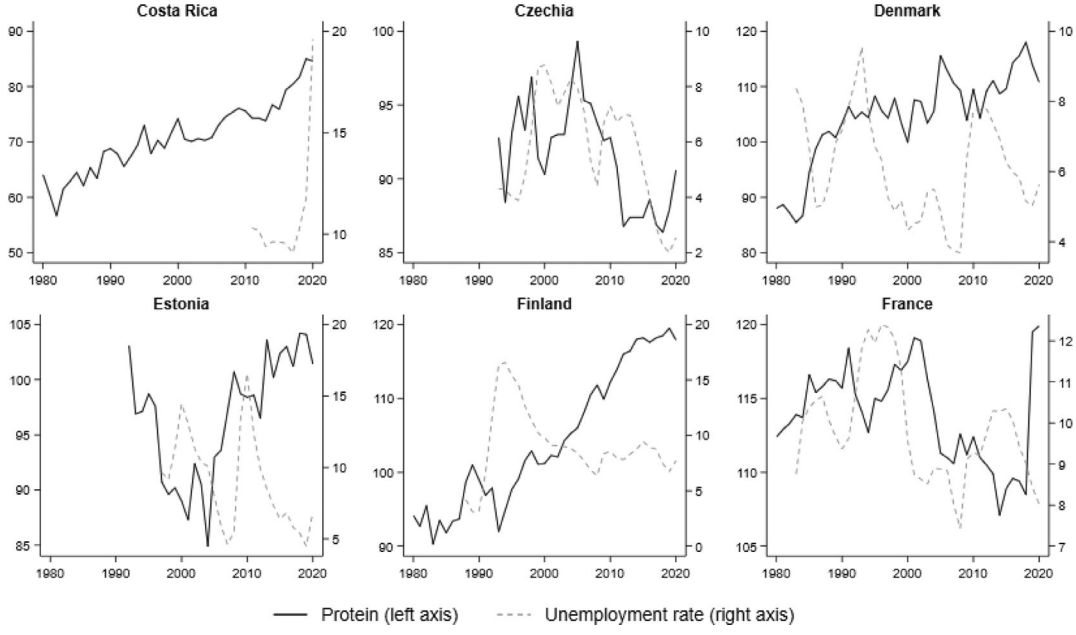


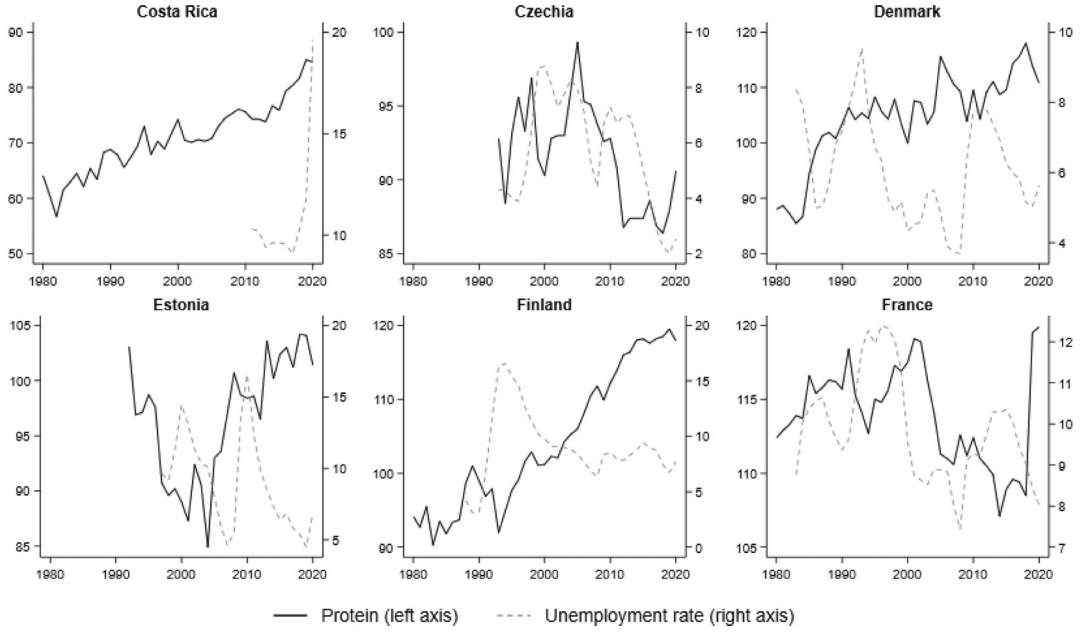


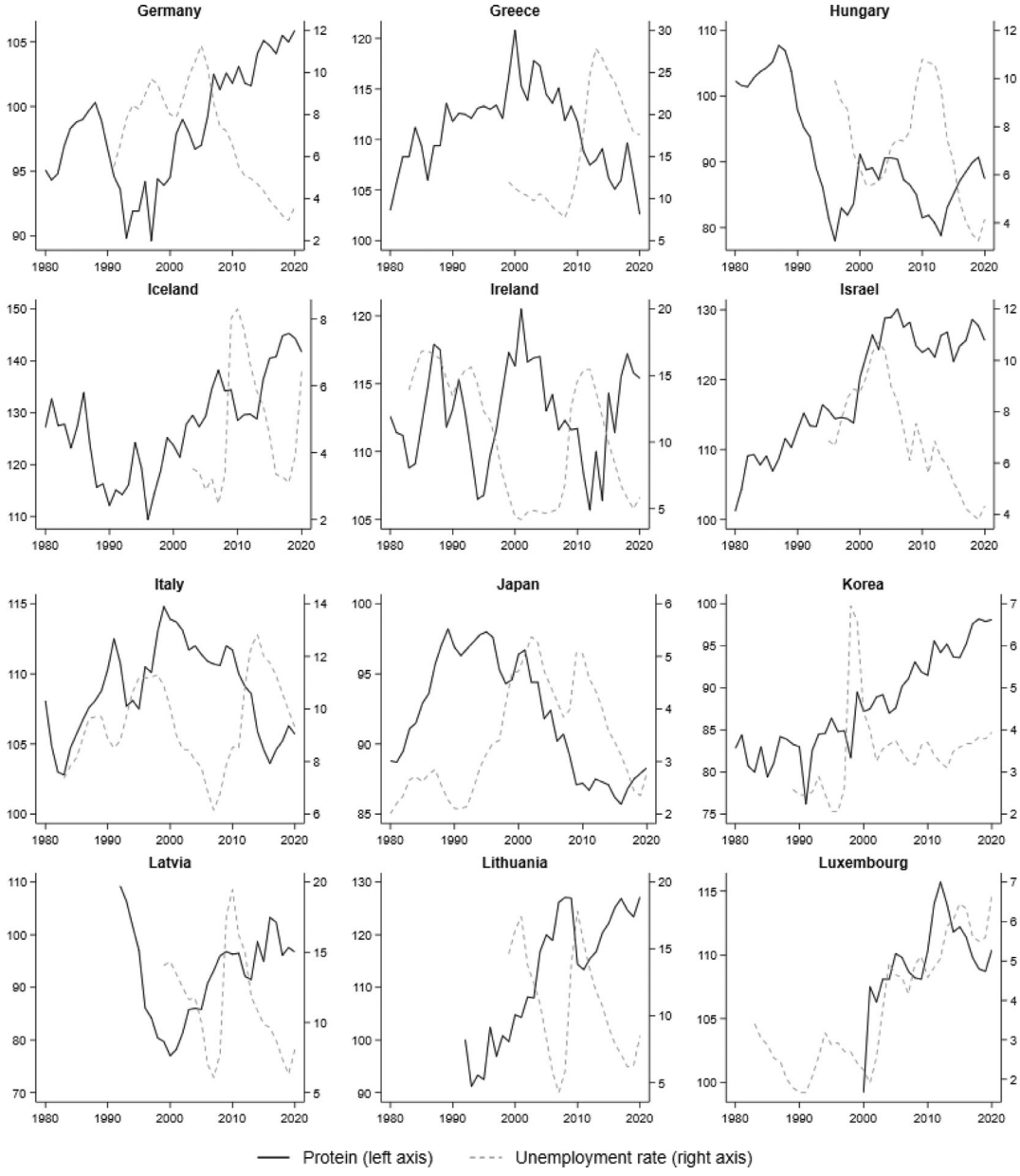


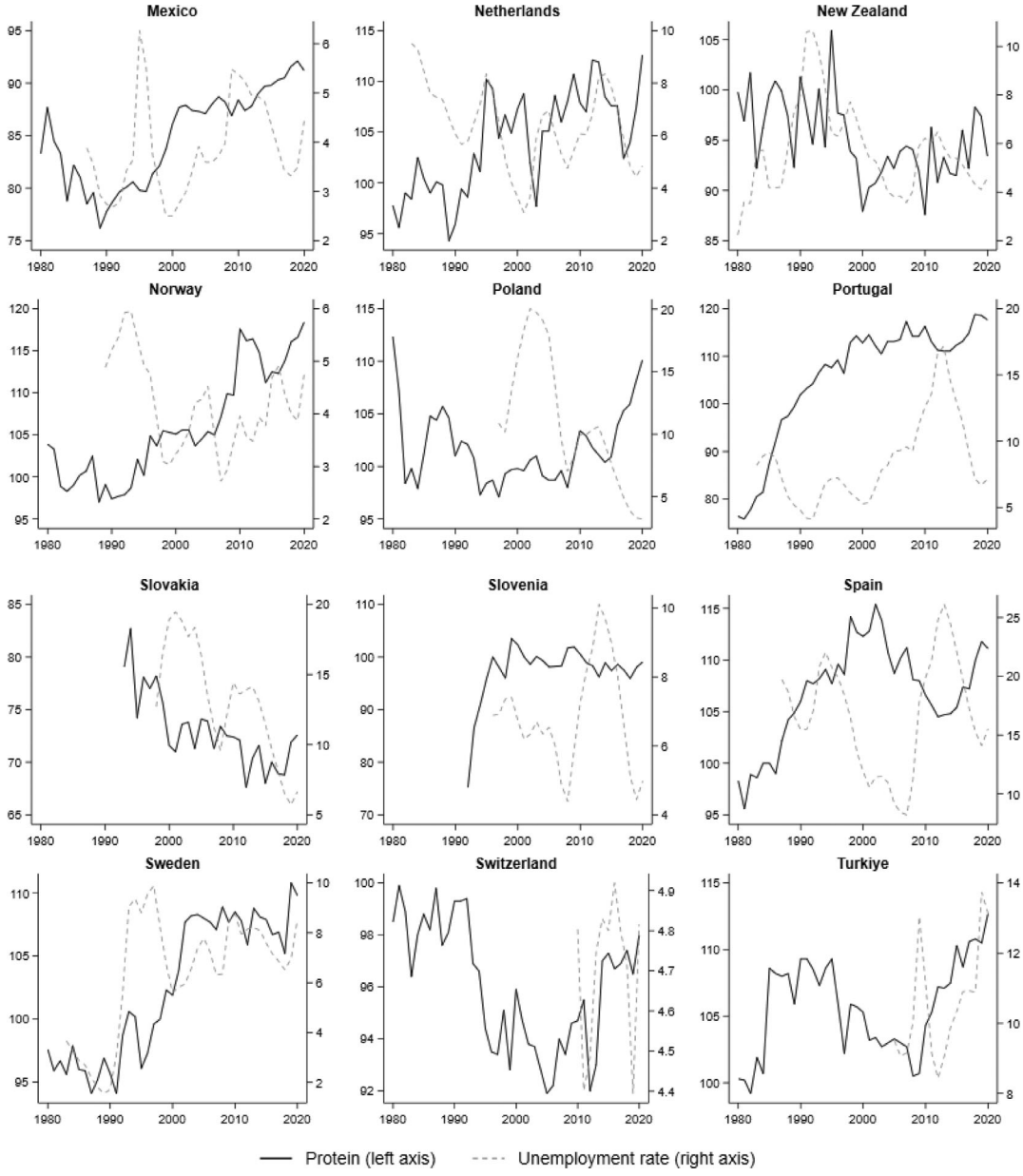


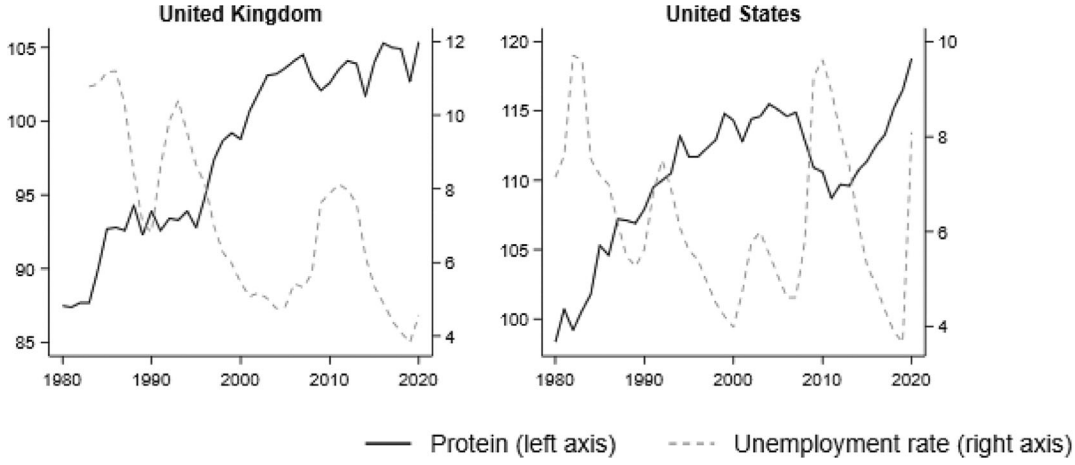

## APPENDIX C: TRENDS IN PROTEIN-INTAKE AND UNEMPLOYMENT RATE











## APPENDIX D: LEVELS AND CHANGES IN UNEMPLOYMENT BENEFITS AND GOVERNMENT AND SOCIAL EXPENDITURES

| | Net UB replacement rate | | | | Gov. cons. Exp. (% GPD) | | | | Public social exp. (% GDP) | | | | Man. priv. Soc. exp. (% GDP) | | | | Vol. priv. Soc. exp. (% GDP) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Levels | First difference | | | Levels | First difference | | | Levels | First difference | | | Levels | First difference | | | Levels | First difference | | |
| Country | Mean | Min | Mean | Max | Mean | Min | Mean | Max | Mean | Min | Mean | Max | Mean | Min | Mean | Max | Mean | Min | Mean | *Max* |
| Australia | 0.27 | −0.02 | 0.00 | 0.14 | 18.89 | −0.91 | 0.11 | 1.52 | 15.47 | −0.96 | 0.26 | 3.81 | 3.20 | −0.74 | 0.10 | 2.30 | 3.20 | −0.74 | 0.10 | 2.30 |
| Austria | 0.56 | −0.02 | 0.00 | 0.03 | 19.17 | −0.62 | 0.09 | 1.66 | 26.49 | −0.82 | 0.26 | 3.40 | 2.13 | −0.07 | 0.00 | 0.10 | 2.13 | −0.07 | 0.00 | 0.10 |
| Belgium | 0.66 | −0.04 | 0.00 | 0.10 | 22.46 | −1.38 | 0.04 | 1.53 | 25.96 | −1.08 | 0.23 | 4.06 | 1.73 | −0.29 | 0.02 | 0.71 | 1.73 | −0.29 | 0.02 | 0.71 |
| Canada | 0.63 | −0.03 | 0.00 | 0.03 | 21.12 | −1.21 | 0.03 | 2.25 | 17.10 | −1.09 | 0.29 | 6.13 | 4.55 | −0.43 | 0.15 | 0.90 | 4.55 | −0.43 | 0.15 | 0.90 |
| Czechia | 0.46 | −0.05 | 0.00 | 0.03 | 20.08 | −1.27 | 0.00 | 2.18 | 18.01 | −0.84 | 0.29 | 3.16 | 0.43 | −0.22 | 0.02 | 0.18 | 0.43 | −0.22 | 0.02 | 0.18 |
| Denmark | 0.62 | −0.10 | −0.01 | 0.04 | 25.03 | −1.85 | −0.04 | 2.83 | 24.90 | −0.83 | 0.23 | 2.96 | 4.55 | −0.71 | −0.03 | 1.25 | 4.55 | −0.71 | −0.03 | 1.25 |
| Estonia | 0.34 | −0.12 | 0.02 | 0.40 | 19.45 | −2.36 | 0.01 | 2.68 | 15.55 | −1.96 | 0.22 | 4.28 | 0.12 | −0.15 | −0.01 | 0.06 | 0.12 | −0.15 | −0.01 | 0.06 |
| Finland | 0.58 | −0.07 | 0.01 | 0.32 | 21.59 | −0.97 | 0.16 | 3.04 | 25.50 | −2.67 | 0.33 | 4.92 | 1.28 | −0.18 | 0.01 | 0.51 | 1.28 | −0.18 | 0.01 | 0.51 |
| France | 0.78 | −0.17 | 0.00 | 0.02 | 22.86 | −0.79 | 0.09 | 1.86 | 26.65 | −6.15 | 0.37 | 8.96 | 2.31 | −0.55 | 0.08 | 1.74 | 2.31 | −0.55 | 0.08 | 1.74 |
| Germany | 0.60 | −0.05 | 0.00 | 0.02 | 19.67 | −0.96 | 0.03 | 1.77 | 24.47 | −1.31 | 0.15 | 2.45 | 3.19 | −1.27 | 0.01 | 0.89 | 3.19 | −1.27 | 0.01 | 0.89 |
| Greece | 0.39 | −0.09 | 0.00 | 0.10 | 19.02 | −2.24 | 0.19 | 2.90 | 19.14 | −1.98 | 0.45 | 2.78 | 0.84 | −1.81 | 0.03 | 1.98 | 0.84 | −1.81 | 0.03 | 1.98 |
| Hungary | 0.40 | −0.25 | 0.01 | 0.77 | 21.73 | −2.60 | −0.12 | 1.98 | 21.01 | −0.98 | −0.11 | 1.03 | 0.33 | −0.05 | 0.01 | 0.08 | 0.33 | −0.05 | 0.01 | 0.08 |
| Ireland | 0.41 | −0.20 | −0.01 | 0.07 | 17.21 | −3.89 | −0.23 | 1.81 | 17.30 | −4.90 | 0.00 | 4.23 | 1.99 | −1.53 | 0.02 | 2.06 | 1.99 | −1.53 | 0.02 | 2.06 |
| Italy | 0.38 | −0.03 | 0.01 | 0.11 | 18.84 | −1.26 | 0.10 | 2.06 | 23.45 | −0.93 | 0.38 | 4.90 | 1.58 | −0.20 | 0.03 | 0.93 | 1.58 | −0.20 | 0.03 | 0.93 |
| Japan | 0.60 | −0.10 | 0.00 | 0.03 | 16.66 | −0.39 | 0.17 | 1.31 | 15.69 | −0.29 | 0.38 | 2.19 | 1.94 | −0.69 | 0.07 | 2.96 | 1.94 | −0.69 | 0.07 | 2.96 |
| Latvia | 0.63 | −0.11 | 0.02 | 0.43 | 19.51 | −1.95 | −0.13 | 2.09 | 6.51 | −1.21 | 0.39 | 2.13 | 2.13 | −0.49 | 0.11 | 1.68 | 2.13 | −0.49 | 0.11 | 1.68 |
| Lithuania | 0.41 | −0.15 | 0.02 | 0.36 | 19.65 | −2.22 | −0.22 | 2.59 | 15.08 | −2.21 | 0.18 | 5.00 | 0.11 | −0.08 | 0.01 | 0.18 | 0.11 | −0.08 | 0.01 | 0.18 |
| Luxembourg | 0.85 | −0.02 | 0.00 | 0.00 | 15.91 | −1.41 | 0.04 | 1.59 | 15.83 | −2.44 | 0.33 | 5.28 | 0.24 | −0.17 | 0.03 | 0.29 | 0.24 | −0.17 | 0.03 | 0.29 |
| Netherlands | 0.74 | −0.06 | 0.00 | 0.02 | 23.19 | −1.37 | 0.08 | 2.50 | 5.14 | −0.43 | 0.16 | 0.68 | 0.19 | −0.01 | 0.01 | 0.10 | 0.19 | −0.01 | 0.01 | 0.10 |
| N. Zealand | 0.28 | −0.04 | 0.00 | 0.05 | 18.16 | −1.10 | 0.02 | 1.65 | 20.30 | −3.49 | −0.10 | 2.60 | 8.44 | −0.22 | 0.24 | 3.22 | 8.44 | −0.22 | 0.24 | 3.22 |
| Norway | 0.66 | −0.02 | 0.00 | 0.00 | 20.74 | −2.15 | 0.19 | 3.10 | 19.30 | −1.66 | 0.14 | 4.19 | 0.43 | −0.48 | 0.02 | 0.50 | 0.43 | −0.48 | 0.02 | 0.50 |

| | Net UB replacement rate | | | | Gov. cons. Exp. (% GPD) | | | | Public social exp. (% GDP) | | | | Man. priv. Soc. exp. (% GDP) | | | | Vol. priv. Soc. exp. (% GDP) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Levels | First difference | | | Levels | First difference | | | Levels | First difference | | | Levels | First difference | | | Levels | First difference | | |
| Country | Mean | Min | Mean | Max | Mean | Min | Mean | Max | Mean | Min | Mean | Max | Mean | Min | Mean | Max | Mean | Min | Mean | *Max* |
| Poland | 0.24 | −0.26 | 0.01 | 0.42 | 18.93 | −3.04 | −0.07 | 3.55 | 22.10 | −2.14 | 0.26 | 3.24 | 2.00 | −0.29 | 0.05 | 0.80 | 2.00 | −0.29 | 0.05 | 0.80 |
| Portugal | 0.72 | −0.03 | 0.01 | 0.22 | 17.25 | −1.37 | 0.16 | 1.97 | 20.95 | −1.15 | 0.30 | 6.29 | 0.21 | −0.03 | 0.03 | 0.31 | 0.21 | −0.03 | 0.03 | 0.31 |
| Slovakia | 0.62 | −0.12 | 0.00 | 0.14 | 20.98 | −4.09 | −0.18 | 5.59 | 17.79 | −1.06 | 0.39 | 2.77 | 1.57 | −0.34 | 0.04 | 0.51 | 1.57 | −0.34 | 0.04 | 0.51 |
| Slovenia | 0.73 | −0.13 | 0.01 | 0.47 | 18.74 | −1.20 | 0.14 | 2.30 | 17.17 | −0.77 | 0.06 | 2.84 | 1.04 | −0.29 | 0.01 | 0.29 | 1.04 | −0.29 | 0.01 | 0.29 |
| Spain | 0.77 | −0.10 | −0.01 | 0.06 | 17.46 | −0.69 | 0.21 | 3.15 | 20.92 | −0.99 | 0.41 | 6.54 | 0.56 | −0.22 | 0.03 | 0.69 | 0.56 | −0.22 | 0.03 | 0.69 |
| Sweden | 0.70 | −0.11 | −0.01 | 0.14 | 25.64 | −0.99 | −0.02 | 1.36 | 27.08 | −2.33 | 0.03 | 3.55 | 2.42 | −0.30 | 0.06 | 1.50 | 2.42 | −0.30 | 0.06 | 1.50 |
| Switzerland | 0.74 | −0.10 | 0.00 | 0.10 | 11.06 | −0.51 | 0.07 | 0.81 | 14.72 | −1.68 | 0.17 | 3.17 | 7.26 | −0.29 | 0.25 | 3.04 | 7.26 | −0.29 | 0.25 | 3.04 |
| United Kingdom | 0.21 | −0.15 | −0.01 | 0.01 | 19.38 | −1.79 | 0.03 | 3.51 | 18.73 | −1.26 | 0.17 | 2.98 | 5.57 | −0.69 | 0.07 | 0.90 | 5.57 | −0.69 | 0.07 | 0.90 |
| United States | 0.57 | −0.12 | 0.01 | 0.58 | 15.25 | −0.66 | −0.02 | 0.90 | 15.66 | −0.89 | 0.28 | 5.68 | 9.26 | −0.57 | 0.20 | 0.96 | 9.26 | −0.57 | 0.20 | 0.96 |

## APPENDIX E: LEVELS AND CHANGES IN UNEMPLOYMENT BENEFITS AND HOUSEHOLDS' SAVINGS AND LIQUIDITY

| | Net UB replacement rate | | | | Hh savings (% hh disp. inc.) | | | | Hh debt (hh disp. inc.) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Levels | First difference | | | Levels | First difference | | | Levels | First difference | | |
| Country | Mean | Min | Mean | Max | Mean | Min | Mean | Max | Mean | Min | Mean | Max |
| Australia | 0.27 | −0.02 | 0.00 | 0.14 | 6.40 | −4.06 | 0.01 | 6.72 | 172.61 | −6.76 | 4.34 | 19.00 |
| Austria | 0.56 | −0.02 | 0.00 | 0.03 | 9.93 | −2.71 | −0.06 | 5.35 | 84.44 | −2.23 | 1.18 | 5.99 |
| Belgium | 0.66 | −0.04 | 0.00 | 0.10 | 10.10 | −2.91 | −0.07 | 8.52 | 90.20 | −4.12 | 2.13 | 5.23 |
| Canada | 0.63 | −0.03 | 0.00 | 0.03 | 7.23 | −3.50 | −0.05 | 12.08 | 151.30 | −7.78 | 2.81 | 9.20 |
| Czechia | 0.46 | −0.05 | 0.00 | 0.03 | 7.29 | −1.39 | 0.34 | 6.19 | 49.50 | −7.32 | 1.93 | 9.73 |
| Denmark | 0.62 | −0.10 | −0.01 | 0.04 | −0.05 | −5.24 | 0.26 | 6.81 | 269.64 | −30.59 | 2.56 | 25.30 |
| Estonia | 0.34 | −0.12 | 0.02 | 0.40 | 1.06 | −8.25 | −0.11 | 10.06 | 62.39 | −10.57 | 2.94 | 20.38 |
| Finland | 0.58 | −0.07 | 0.01 | 0.32 | 1.60 | −6.10 | 0.05 | 5.07 | 103.76 | −5.82 | 3.23 | 10.35 |
| France | 0.78 | −0.17 | 0.00 | 0.02 | 9.05 | −1.57 | 0.08 | 6.02 | 98.20 | −5.19 | 2.30 | 6.58 |
| Germany | 0.60 | −0.05 | 0.00 | 0.02 | 10.60 | −0.58 | 0.21 | 5.66 | 103.88 | −3.66 | 0.01 | 4.84 |
| Greece | 0.39 | −0.09 | 0.00 | 0.10 | −11.55 | −6.12 | −0.21 | 4.73 | 75.09 | −10.67 | 3.25 | 19.02 |
| Hungary | 0.40 | −0.25 | 0.01 | 0.77 | 7.33 | −4.27 | −0.09 | 4.25 | 44.90 | −10.33 | 1.06 | 13.03 |
| Ireland | 0.41 | −0.20 | −0.01 | 0.07 | 4.39 | −3.77 | 0.58 | 14.85 | 157.81 | −19.80 | 2.66 | 30.23 |
| Italy | 0.38 | −0.03 | 0.01 | 0.11 | 7.24 | −3.79 | −0.24 | 7.83 | 71.97 | −1.51 | 2.09 | 5.14 |
| Japan | 0.60 | −0.10 | 0.00 | 0.03 | 4.85 | −3.93 | −0.06 | 7.92 | 113.46 | −3.18 | 0.22 | 4.72 |
| Latvia | 0.63 | −0.11 | 0.02 | 0.43 | −9.24 | −8.28 | 1.81 | 17.76 | 42.11 | −11.62 | 1.39 | 22.31 |
| Lithuania | 0.41 | −0.15 | 0.02 | 0.36 | −0.50 | −9.75 | 0.42 | 10.32 | 30.98 | −4.88 | 1.39 | 15.38 |
| Luxembourg | 0.85 | −0.02 | 0.00 | 0.00 | 7.03 | −3.90 | 0.49 | 11.84 | 131.47 | −3.53 | 4.18 | 20.12 |
| Netherlands | 0.74 | −0.06 | 0.00 | 0.02 | 7.54 | −2.24 | 0.34 | 6.81 | 230.87 | −13.93 | 3.01 | 16.70 |

| | Net UB replacement rate | | | | Hh savings (% hh disp. inc.) | | | | Hh debt (hh disp. inc.) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Levels | First difference | | | Levels | First difference | | | Levels | First difference | | |
| Country | Mean | Min | Mean | Max | Mean | Min | Mean | Max | Mean | Min | Mean | Max |
| N. Zealand | 0.28 | −0.04 | 0.00 | 0.05 | 0.58 | −5.58 | 0.13 | 6.21 | 118.21 | −5.58 | 0.10 | 10.55 |
| Norway | 0.66 | −0.02 | 0.00 | 0.00 | 4.36 | −10.21 | 0.25 | 5.82 | 188.16 | −3.36 | 5.05 | 32.02 |
| Poland | 0.24 | −0.26 | 0.01 | 0.42 | 4.25 | −4.52 | −0.02 | 6.93 | 37.78 | −2.66 | 2.16 | 12.13 |
| Portugal | 0.72 | −0.03 | 0.01 | 0.22 | 2.57 | −3.06 | −0.22 | 4.94 | 124.99 | −6.93 | 2.70 | 14.58 |
| Slovakia | 0.62 | −0.12 | 0.00 | 0.14 | 2.88 | −2.14 | 0.10 | 3.74 | 52.43 | −7.27 | 1.05 | 8.86 |
| Slovenia | 0.73 | −0.13 | 0.01 | 0.47 | | | | | 45.72 | −2.13 | 1.11 | 7.59 |
| Spain | 0.77 | −0.10 | −0.01 | 0.06 | 4.86 | −3.68 | 0.35 | 9.50 | 110.86 | −9.61 | 1.55 | 15.22 |
| Sweden | 0.70 | −0.11 | −0.01 | 0.14 | 7.76 | −3.84 | 0.48 | 4.39 | 148.59 | −2.09 | 4.33 | 11.01 |
| Switzerland | 0.74 | −0.10 | 0.00 | 0.10 | 15.86 | −1.30 | 0.37 | 4.74 | 193.69 | −5.46 | 2.43 | 9.16 |
| United Kingdom | 0.21 | −0.15 | −0.01 | 0.01 | 3.79 | −3.67 | 0.04 | 11.73 | 144.27 | −4.81 | 2.13 | 13.35 |
| United States | 0.57 | −0.12 | 0.01 | 0.58 | 7.77 | −2.54 | 0.15 | 8.36 | 115.19 | −7.80 | 0.22 | 8.26 |

## APPENDIX F: UNEMPLOYMENT BENEFITS AND INFORMAL NETWORKS