ONLINE APPENDIX FOR: DO THE UNEMPLOYED PAY LOWER PRICES? A REASSESSMENT OF THE VALUE OF UNEMPLOYMENT INSURANCE

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Journal of the European Economic Association
Preprint prepared on 15 October 2019 using jeea.cls *v1.0.*

E.1 Quantity information in the dataset

Our household data are obtained from the EPF (*Encuesta de Presupuestos Familiares. Base 2006*). This yearly survey provides detailed information on consumption, unemployment, and socioeconomic characteristics at the household level. In this section of the appendix we present in detail the categories for which the survey provides quantity information.

Each household, each year "participates for a period of 14 days during which the household writes down its expenses..." The survey asks for total quantities, total expenditure, and unit price of all consumed food, drinks, tobacco, fuels and other sources of energy. It also asks for the amount obtained in cases in which the good or service comes from the household own consumption, own supply or if it is salary in kind. The data available for researchers are the aggregated categories we include in Table E1. There are 80 consumption categories in the survey with quantity information. Amounts are expressed in kilos for solids, liters for liquids, and units for eggs and cigarettes. For the different sources of energy amounts are expressed in: m^3 for water, town gas and natural gas, kilos for liquid gas and solid fuels, liters for liquid fuels, and kwh for electricity.

E.2 Additional analyses

E.2.1 The inclusion of lagged variables

The fixed effects estimation controls for omitted variables that stay constant over the two years during which a household is observed. With a longer panel it would be possible to estimate a dynamic panel model and control for potential endogeneity in other ways, for example by including lags of consumption expenditure. As a robustness exercise we include the lag of consumption expenditure in the equations for consumption expenditure and prices, and we show our results in Table E2. This exercise is only possible in the OLS specification, and including this additional regressor implies using only one observation per household, reducing sample size by half. As expected, the coefficient on lagged consumption expenditure is positive and highly significant. The coefficient on the unemployed dummy is lower but still highly significant. The lag in consumption expenditure captures part of the unobserved heterogeneity, but there are

Table E1: *Categories of items with quantity information.*

COICOP	Units	Items
01.1.1.1	K	Rice
01.1.1.2	K	Bread
01.1.1.3	K	Other bakery products
01.1.1.4	K	Noodles
01.1.1.6	K	Sandwiches
01.1.2.1	K	Beef
01.1.2.2	K	Pork
01.1.2.3	K	Lamb
01.1.2.4	K	Chicken
01.1.2.5	K	Cold cuts
01.1.2.6	K	Processed meat
01.1.2.7	K	Other meat
01.1.2.8	K	Giblets
01.1.3.1	K	Fish
01.1.3.2	K	Frozen fish
01.1.3.3	K	Seafood
01.1.3.4	K	Cured fish
01.1.3.5	K	Other fish
01.1.4.1	L	Whole milk
01.1.4.2	L	Skim milk
01.1.4.3	K	Powdered milk
01.1.4.4	K	Yogurt
01.1.4.5	K	Cheese
01.1.4.6	K	Other dairy products
01.1.4.7	U	Eggs
01.1.5.1	K	Butter
01.1.5.2	K	Margarine
01.1.5.3	L	Olive oil
01.1.5.4	L	Other oils
01.1.5.5	K	Other fats
01.1.6.1	K	Citrus fruits
01.1.6.2	K	Bananas
01.1.6.3	K	Apples
01.1.6.4	K	Pears
01.1.6.5	K	Stone fruits
01.1.6.6	K	Olives
01.1.6.7	K	Berries

Source: INE, EPF documentation.

Table E1: *Categories of items with quantity information* (cont.).

COICOP	Units	Items
01.1.6.8	K	Other fruit
01.1.6.9	K	Nuts
01.1.6.0	K	Canned fruit
01.1.7.1	K	Green vegetables
01.1.7.2	K	Cole crops
01.1.7.3	K	Fruit vegetables
01.1.7.4	K	Bulb and root vegetables, and mushrooms
01.1.7.5	K	Legumes
01.1.7.6	K	Frozen vegetables
01.1.7.7	K	Canned legumes
01.1.7.8	K	Potatoes
01.1.7.9	K	Tuber vegetables
01.1.8.1	K	Sugar
01.1.8.2	K	Jam
01.1.8.3	K	Chocolate
01.1.8.5	K	Ice cream
01.1.8.6	K	Other sweets
01.2.1.1	K	Coffee
01.2.1.2	K	Tea
01.2.1.3	K	Cocoa
01.2.2.1	L	Mineral water
01.2.2.2	L	Soft drinks
01.2.2.3	L	Fruit juice
01.2.2.4	L	Vegetable juice
02.1.1.1	L	Liquor
02.1.2.1	L	Wine
02.1.2.2	L	Other wines
02.1.3.1	L	Beer
02.2.1.1	U	Cigarettes
02.2.1.2	U	Cigars

Source: INE, EPF documentation.

Table E1: *Categories of items with quantity information* (cont.).

COICOP	Units	Items
04.4.1.1	m	Water, main home
04.4.1.2	m	Water, other house
04.5.1.1	K	Electricity, main home
04.5.1.2	K	Electricity, other house
04.5.2.1	m	Town gas, main home
04.5.2.2	m	Town gas, other house
04.5.2.3	K	Liquid gas, main home
04.5.2.4	K	Liquid gas, other house
04.5.3.1	L	Liquid fuel, main home
04.5.3.2	L	Liquid fuel, other house
04.5.4.1	K	Solid fuel, main home
04.5.4.2	K	Solid fuel, other house
07.2.2.1	L	Motor fuel

Source: INE, EPF documentation.

still other factors left and the estimated response to unemployment is still larger than the one obtained with a fixed-effects estimator.

Another robustness check consists in including a lag of the unemployment dummy variable. We show our results in Table E3. As was the case with lagged consumption expenditure, it is possible to include lagged unemployment only in the OLS specification. Lagged unemployment helps to reduce unobserved heterogeneity, as was the case with lagged consumption expenditure. Again as expected, the coefficient on current unemployment decreases, although it is still negative and largely significant. Note the great similarity between the coefficient for U_{it} when we include lagged unemployment and when we include lagged consumption expenditure. In this case, they seem to be similarly useful as proxies for unobserved heterogeneity.

E.2.2 Transitions between employment and unemployment

In our identification strategy it is crucial to have households with heads transitioning between employment and unemployment. We include a more detailed description of transitions in the data. In Table E4 we compare households with one transition with households who remain in the same unemployment state in both periods. There are 4,938 observations in which there is a transition between employment and unemployment. The

Table E2: *Consumption expenditure and price response to unemployment and lagged consumption expenditure.*

	(1)	(2)	(3)	(4)
	Expenditure		Prices	
VARIABLES	Baseline	with lag	Baseline	with lag
U_{it}	-0.313***	-0.187***	-0.038***	-0.023***
	(0.009)	(0.009)	(0.003)	(0.003)
Lag of Consumption		0.560***		0.058***
		(0.007)		(0.002)
Observations	63,394	31,697	63,158	31,579
R-squared	0.335	0.564	0.164	0.196

All the coefficients are obtained from pooled OLS estimations. We include lagged consumption expenditure for expenditure and prices. Robust standard errors in parenthesis. *** represents 1% significance level.

Table E3: *Consumption expenditure and price response to unemployment and lagged unemployment.*

	(1)	(2)	(3)	(4)
	Expenditure		Prices	
VARIABLES	Baseline	with lag	Baseline	with lag
U_{it}	-0.313***	-0.212***	-0.038***	-0.025***
	(0.009)	(0.013)	(0.003)	(0.004)
$U_{i,t-1}$		-0.209***		-0.022***
		(0.014)		(0.004)
Observations	63,394	31,697	63,158	31,579
R-squared	0.335	0.358	0.164	0.166

All the coefficients are obtained from pooled OLS estimations. We include lagged unemployment for expenditure and prices. Robust standard errors in parenthesis. *** represents 1% significance level.

two groups are similar in terms of many demographic variables, like gender of the head, age, household size, and number of kids. They are different in terms of education levels, the number of employed members, and, as expected, in their consumption level. Households with transitions have suffered one period of unemployment, while among the group of households with no changes in employment status about 96% are always employed.

Table E4: *Households with and without changes in employment status in the sample.*

	Transitions		No Transitions	
	Mean	SD	Mean	SD
Individual Characteristics				
Female	0.24	(0.42)	0.25	(0.43)
Age	44.27	(9.38)	45.17	(8.98)
No education	0.19	(0.40)	0.10	(0.30)
Primary Education	0.45	(0.50)	0.30	(0.46)
Secondary Education	0.19	(0.39)	0.21	(0.41)
Tertiary Education	0.17	(0.37)	0.39	(0.49)
Household Characteristics				
Household size	3.14	(1.28)	3.13	(1.21)
Num. of kids	0.97	(0.99)	0.97	(0.96)
Num. of employed members	0.47	(0.67)	0.62	(0.65)
Consumption expenditure	6,689.00	(4,226.40)	8,828.94	(4,868.08)
Obs.	4,938		58,220	

E.2.3 Consumption on different categories

Expenditure on nondurable goods is the most comprehensive measure of household consumption, and which conforms to what is called consumption at the aggregate level and in the national accounts. However, in practice, expenditure on food items is often used as a measure of consumption because it is often the only category available. In other cases, the use of food is predicated on the fact that it is comparable across different household surveys. In this section we study how food and other categories of consumption

expenditure respond to unemployment. This disaggregated analysis is useful not only to allow a comparison with previous results but also to better understand a household's reaction to experiencing unemployment.

Table E5: *Consumption expenditure response to unemployment for different categories.*

	(1)	(2)	(3)	(4)
	Pooled OLS		Fixed Effects	
VARIABLES	Food out	Work-related	Food out	Work-related
U_{it}	-1.291***	-0.801***	-0.594***	-0.321***
	(0.046)	(0.030)	(0.065)	(0.040)
Observations	63,394	63,394	63,394	63,394
R-squared	0.163	0.180	0.763	0.772

Of the different expenditure categories we decided to focus on two: food outside of the home, and work-related expenditures. This last category includes transport, food outside of the home, and clothes. Table E5 shows the results of regressing log-expenditure on each of these categories on the unemployment dummy in the baseline specification. Expenditure in all categories falls with unemployment, although the size of the drop is very heterogeneous. Food outside of the home and other work-related expenditures decrease by a much larger amount (Table E5, Columns 3 and 4). A household with a primary earner who faces unemployment spends 59% less in food outside the home and 32% less in work-related expenditures. These important drops contrast with the 6.3% change in food at home.[1]

Despite the different estimated coefficients for these categories, we still find disparities between the pooled OLS and the fixed effects estimations. Those disparities go in the same direction: relying on cross-sectional variation overestimates the true effect of unemployment on expenditure.

[1]These numbers are in line with results for the US and the UK. They are similar in magnitude to those in Aguiar and Hurst (2005) for the US: they find that food expenditure falls 9% and food away from home 42%. Also using US data Stephens (2001) reports a fall of about 10% in food expenditure the year after the household head experiences an involuntary job loss. For the UK, Banks, Blundell, and Tanner (1998) report that food at home and domestic energy fall by roughly 8% for unemployed households.

E.3 Approximations for the value of unemployment insurance

We perform a simulation exercise to analyze how good the approximations in Proposition 2 are in practice. We compute the exact values for the expressions in Proposition 1, and compare them to the approximations derived in Proposition 2. We present our results in Table E6 and in Figure E1.

We apply the following paremeterization in our simulation exercise: constant consumption profile in the employed state, consumption in unemployed state follows a quadratic form until reaching a minimum consumption level of 70% of consumption in the employed state, and relative risk aversion $\gamma = 2$. We compare the approximations with the exact value for μ for different cases. The different cases refer to different assumptions regarding prices paid in the unemployed state relative to prices paid in the employed state. We choose prices that are consistent with our empirical findings.

We start with a case (Case 0) in which prices in the employed and unemployed states are the same. This case is comparable to Chetty's exercise, who also uses approximations. Both approximations are very close to the exact value even if high levels of risk-aversion are assumed. Then, in Case 1, we assume that prices drop by 1.5% (the drop estimated from the data) in the first month upon unemployment, and stay constant afterwards. This case yields the same results as the case with constant prices, implying that if prices paid by the unemployed only change once, our approximations will be equal to the case of no change in prices. Case 2 assumes that the price in the unemployment state decreases gradually (linearly) in the first year of unemployment, averaging an annual 1.5% drop, and stays constant afterwards. In this case both approximations become less precise but still close to the exact value: the error using the first order approximation is 0.40% and 0.13% using the second order approximation. Finally, in Case 3 we assume a larger drop in price in the unemployed state: the price decreases linearly in the first two years, accumulating a total drop of 6%, and stays constant afterwards. Even in this case, in which we allow households to pay much lower prices when unemployed, the first order approximation is only 0.48% lower than the exact value, and the second order approximation 0.23% lower.

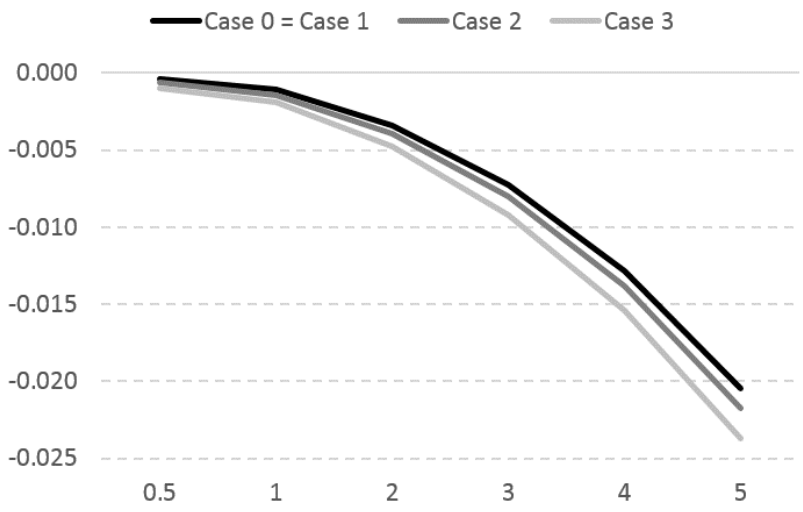
We also perform the exercise using different values for γ. As expected, we find that for lower levels of risk-aversion first and second order approximations are better, and

conclude that they provide in general a good approximation unless very high levels of risk-aversion are assumed.

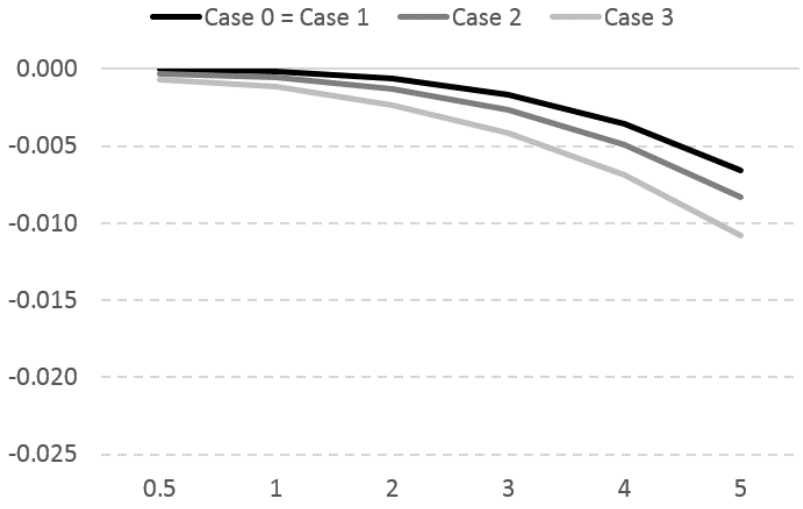
Table E6: *Comparing the exact value for μ from Proposition 1 with first and second order approximations from Proposition 2*

	Case 0	Case 1	Case 2	Case 3
1st order approximation	-0.0034	-0.0034	-0.0040	-0.0048
2nd order approximation	-0.0006	-0.0006	-0.0013	-0.0023

The table summarizes the results from the exercise of comparing the exact computation of the ratio in Proposition 1, and the approximations derived in Proposition 2. We include the difference between each approximation and the exact value. Assumptions: constant consumption profile in the employed state, consumption in unemployed state quadratic form until reaching a minimum consumption level of 70% of consumption in the employed state, $\gamma = 2$. All cases refer to different assumptions regarding prices paid in the unemployed state relative to prices paid in the employed state. Case 0 assumes no change in prices. Case 1 assumes a one time drop of 1.5% in the first month upon unemployment. Case 2 assumes that price decreases linearly in the first year, averaging a 1.5% drop, and stays constant afterwards. Case 3 assumes that price decreases linearly in the first two years, accumulating a total drop of 6%, and stays constant afterwards.



First order approximation.



Second order approximation.

Figure E1: *Differences between exact value for μ and the first and the second order approximation.*
The figure shows the differences between the exact computation of the ratio in Proposition 1, and the approximations derived in Proposition 2. The different cases refer to different assumptions regarding prices paid in the unemployed state relative to prices paid in the employed state. Case 0 assumes no change in prices. Case 1 assumes a one time drop of 1.5% in the first month upon unemployment. Case 2 assumes that price decreases linearly in the first year, averaging a 1.5% drop, and stays constant afterwards. Case 3 assumes that price decreases linearly in the first two years, accumulating a total drop of 6%, and stays constant afterwards.

References

Aguiar, M., and E. Hurst (2005): "Consumption versus Expenditure," *Journal of Political Economy*, 113(5), 919–948.

Banks, J., R. Blundell, and S. Tanner (1998): "Is There a Retirement-Savings Puzzle?," *American Economic Review*, 88(4), 769–88.

Stephens, M. (2001): "The Long-Run Consumption Effects Of Earnings Shocks," *The Review of Economics and Statistics*, 83(1), 28–36.