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Consumption Inequality and Partial Insurance

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This paper examines the link between income and consumption inequality. We create panel data on consumption for the Panel Study of Income Dynamics using an imputation procedure based on food demand estimates from the Consumer Expenditure Survey. We document a disjuncture between income and consumption inequality over the 1980s and show that it can be explained by changes in the persistence of income shocks. We find some partial insurance of permanent shocks, especially for the college educated and those near retirement. We find full insurance of transitory shocks except among poor households. Taxes, transfers, and family labor supply play an important role in insuring permanent shocks. (*JEL* D12, D31, D91, E21)

While there is extensive work documenting changes in the wage and household income distributions over the 1980s and 1990s, there is relatively little work on the corresponding changes in the consumption distribution. David Cutler and Lawrence Katz (1992) and David Johnson and Timothy Smeeding (1998) are notable exceptions. Both studies are primarily descriptive, however, and do not attempt to uncover the link between changes in income inequality and changes in consumption inequality. The goal of this paper is, instead, to analyze precisely such a link.[1] We create a new panel series of consumption that combines information from the Panel Study of Income Dynamics (PSID) and the Consumer Expenditure Survey (CEX), focusing on the period between the end of the 1970s and the early 1990s when some of the largest changes in income inequality occurred. We show that the empirical relationship between the evolution of the consumption distribution and the evolution of the income distribution over this period can be characterized by the degree of persistence of the underlying income shocks and the degree of consumption insurance with respect to shocks of different durability. We argue that this representation provides a compelling framework for understanding the shifts in the consumption and income distributions.

Our analysis shows that, during the sampling period we study, income and consumption inequality diverged. We find that this can be explained by the change in the durability of income shocks over this period. In particular, an initial growth in the variance of permanent shocks was then replaced by a continued growth in the variance of transitory income shocks in the late

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[1] Blundell and Preston (1998), Dirk Krueger and Fabrizio Perri (2006), and Jonathan Heathcote, Kjetil Storesletten, and Giovanni L. Violante (2004) have a similar goal. Below we discuss the relationship between these papers and ours.

1980s. We find little evidence that the degree of insurance with respect to shocks of different durability changes over this period. In other words, rather than greater insurance opportunities, it is the relative increase in the variability of more insurable shocks that explains the disjuncture between income and consumption inequality over this period. We find important differences in the degree of insurance by wealth, education, and birth cohort, but our interpretation of the relationship between consumption and income inequality is preserved.

The connection between consumption insurance and income shocks has a long history in economics. Two polar models have dominated the agenda. On the one hand, the complete markets hypothesis assumes that consumption is fully insured against idiosyncratic shocks to income, both transitory and permanent. This hypothesis is typically rejected in micro data (Orazio Attanasio and Steven Davis 1996). On the other hand, the textbook permanent income hypothesis assumes that personal saving is the only mechanism available to agents to smooth income shocks. If income is shifted by permanent and transitory shocks, self-insurance through borrowing and saving may allow intertemporal consumption smoothing against the latter but not against the former (Angus Deaton 1992). In both aggregate and micro data, however, consumption appears to be excessively smooth, i.e., it reacts too little to permanent income shocks to be consistent with the theory (John Campbell and Deaton 1989; Attanasio and Nicola Pavoni 2006). In other studies, consumption also exhibits excess sensitivity with respect to transitory shocks (Robert Hall and Frederic Mishkin 1982).[2] Models that feature complete markets and those that allow for just personal savings as a smoothing mechanism are clearly extreme characterizations of individual behavior and of the economic environment faced by the consumers. Deaton and Christina Paxson notice this and envision "the construction and testing of market models with partial insurance" (1994, 464), while Fumio Hayashi, Joseph Altonji, and Lawrence Kotlikoff call for future research to be "directed to estimating the extent of consumption insurance over and above self-insurance" (1996, 288).

In keeping with these remarks and empirical evidence, in this paper we start from the premise of some, but not necessarily full, insurance and consider the importance of distinguishing between transitory and permanent shocks. We use the term *partial insurance* to denote the degree of transmission of income shocks to consumption.[3] The paper makes three contributions to the existing literature. First, we address the issue of whether partial consumption insurance is available to agents and estimate the degree of partial insurance from the data, rather than imposing an a priori insurance configuration. Second, we estimate our model using panel data on income and (imputed) nondurable consumption. The use of panel data allows us to relax a number of constraints which limit identification in repeated cross-sectional data. The use of nondurable consumption data avoids the ambiguities derived from basing the analysis on food consumption, which, besides being a necessity, represents a declining part of the household's budget. Finally, while we do not take a precise stand on the mechanisms (other than savings) that are available to smooth idiosyncratic shocks to income, we analyze empirically the mechanism behind the

[2] Hall and Mishkin (1982) use panel data on food consumption and income from the PSID and consider the covariance restrictions imposed by the permanent income hypothesis (PIH) with quadratic utility. They impose the null of the PIH and do not study changes in inequality. See also Altonji, Ana P. Martins, and Aloysious Siow (2003).

[3] Beside household saving and borrowing, there is scattered evidence on the role played by various partial insurance mechanisms on household consumption. Theoretical and empirical research have analyzed the role of extended family networks (Kotlikoff and Avia Spivak 1981; Attanasio and José Víctor Ríos Rull 2000), added worker effects (Mel Stephens 2002), the timing of durable purchases (Martin Browning and Thomas Crossley 2003), progressive income taxation (Miles Kimball and N. Gregory Mankiw 1989; Alan Auerbach and Daniel Feenberg 2000; Thomas Kniesner and James Ziliak 2002), personal bankruptcy laws (Scott Fay, Erik Hurst, and Michelle White 2002), insurance within the firm (Luigi Guiso, Pistaferri, and Fabiano Schivardi 2005), and the role of government public policy programs, such as unemployment insurance (Eric Engen and Jonathan Gruber 2001), Medicaid (Gruber and Aaron Yelowitz 1999), AFDC (Gruber 2000), and food stamps (Blundell and Pistaferri 2003).

degree of insurance we find in the data, and in particular study the role of taxes and transfers, wealth, and family labor supply, as well as heterogeneity by education and cohort of birth. Our aim is to provide "structured facts" rather than a specific structural interpretation.[4]

Other papers have studied the joint evolution of the income and consumption distributions. Blundell and Preston (1998) use the growth in consumption inequality over the 1980s in the United Kingdom to identify growth in permanent (uninsured) income inequality. They use data on both income and consumption but lack a panel dimension. Our use of panel data on income *and* consumption allows us to identify the variance of the income shocks as well as the degree of insurance of consumption with respect to the two types of shocks. Krueger and Perri (2004) do not distinguish between transitory and permanent income shocks. As noted above, this is an important distinction, as we might expect to uncover less insurance for more persistent shocks. Moreover, this distinction plays an important role in separating changes in consumption inequality due to the changing nature of income processes from changing availability of insurance. Krueger and Perri (2004) also propose a specific mechanism underlying the differences between consumption and income inequality (limited commitment), while we take a more agnostic approach. Finally, while they provide ample evidence on trends in consumption and income inequality, their exercise is primarily one of calibration (ours is one of estimation). Heathcote, Storesletten, and Violante (2004) use the PSID to distinguish between less and more persistent shocks to male earnings. With this distinction, they show that a calibrated overlapping generations model with self-insurance and male labor supply is able to capture the broad pattern of consumption and wage inequality. These patterns are further examined in the recent study by Heathcote, Storesletten, and Violante (2007), who, allowing for insurance beyond that in a simple bond economy, estimate a similar level of "partial insurance" for persistent male earnings shocks as that recovered in our analysis. We derive the degree of insurance drawing a distinction between different measures of family income and earnings, using a new panel data series on consumption. Moreover, we offer an empirical evaluation of the mechanisms underlying the degree of insurance we find in the data. Nevertheless, our paper shares similar conclusions regarding the importance of insurance versus durability of shocks.

The paper continues with a discussion of the underlying trends in income and consumption inequality and the development of the new panel data consumption series for the PSID. In Section II the consumption model is formulated and the identification strategy for recovering the insurance parameters and the inequality decomposition is discussed. Section III presents the empirical results concerning the evolution of volatility in permanent and transitory income shocks and estimates of the insurance parameters. The overall trends in inequality are similar to those found by Moffitt and Gottschalk (1995), Cutler and Katz (1992), Daniel Slesnick (2001), and Johnson, Smeeding, and Barbara Boyle Torrey (2005), among others.[5] We disaggregate the data by different population groups to examine whether there are different changes in consumption inequality, and what mechanisms (institutions, labor market, credit market, etc.) are behind the estimated changes. Section IV concludes.

[4] Our empirical approach is related to other papers in the literature, particularly Hall and Mishkin (1982), Altonji, Martins, and Siow (2002), Deaton and Paxson (1994), and Robert Moffitt and Peter Gottschalk (1995). Hall and Mishkin (1982) use panel data on food consumption and income from the PSID and consider the covariance restrictions imposed by the PIH with quadratic utility. Altonji, Martins, and Siow (2002) improve on this by estimating a dynamic factor model of consumption, hours, wages, unemployment, and income, again using PSID data. Deaton and Paxson (1994) use repeated cross-section data from the United States, United Kingdom, and Taiwan to test the implications that the PIH imposes on consumption inequality. Moffitt and Gottschalk (1995) use PSID data on income to identify the variance of permanent and transitory income shocks.

[5] See Attanasio, Eric Battistin, and Hide Ichimura (2004) and Giorgio Primiceri and Thijs van Rens (2007) for other studies on consumption inequality in the United States.

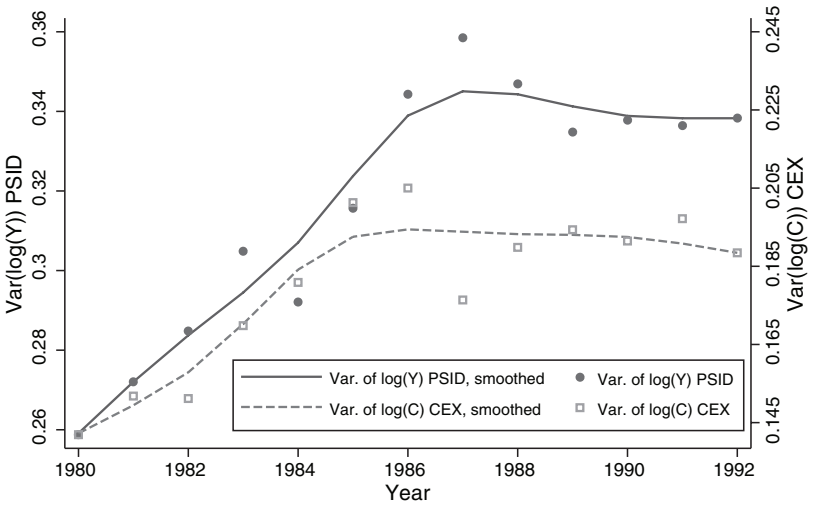

FIGURE 1. OVERALL PATTERN OF INEQUALITY

I. Characteristics of Consumption and Income Inequality

While there are large panel datasets that track the distribution of wages and incomes for households over time, the same is not true for broad measures of consumption. The PSID contains longitudinal income data, but the information on consumption is scanty (limited to food and a few more items). Indeed, one of the reasons why consumption inequality has not been studied as extensively as income and wage inequality is the nature of data availability. In this section we first document some basic features of the evolution of consumption and income inequality that motivate our study. Repeated cross-section data such as the CEX are not enough to uncover the degree of persistence in income shocks or to identify the partial insurance model. For that we need panel data, and in the second part of this section we describe our new panel data series.

A. *The Evolution of Income and Consumption Inequality*

There are two important features of the evolution of consumption and income inequality between the late 1970s and early 1990s which underpin our analysis. These are clearly evident from Figure 1, which uses PSID data on log income and CEX data on log consumption (see Section IB for details on sample selection and variable definitions). In this graph, we plot the actual estimates of the variances, as well as smoothing curves passing through the scatters (to ease legibility). In this figure the range of variation of the variance of PSID consumption is on the left-hand side; that of the variance of CEX consumption is on the right-hand side. The first distinct feature is that the slope of the income variance (the solid line) is greater than the slope of the consumption variance (the dashed line). The second feature of these inequality figures is that consumption inequality flattens out completely in the second part of the 1980s, whereas income inequality continues to rise, albeit at a much slower rate. Below we provide a framework for interpreting these changes. In particular, we show that the degree of detachment between consumption and income inequality depends on the persistence of income shocks and the availability of insurance to these shocks.

These overall patterns reflect what has also been found in previous analyses of inequality in income and consumption for this period, the most prominent study being that of Cutler and Katz (1992). See also the retrospective analysis in Johnson, Smeeding, and Boyle Torrey (2005),

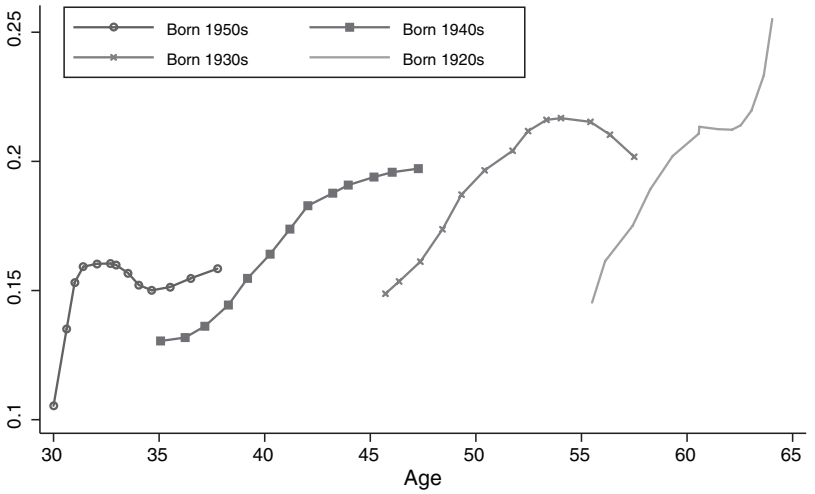

FIGURE 2. VARIANCE OF LOG CONSUMPTION OVER THE LIFE CYCLE

and Susan Dynarski and Gruber (1997). In the absence of panel data or a clear decomposition between low- and high-frequency shocks, none of these studies is able to relate the deviations in the two series to the durability of shocks (or the degree of insurance to shocks of different persistence), but the patterns they find do line up very closely with those in Figure 1. In particular, Johnson, Smeeding, and Torrey (2005) show the Gini for real equivalized disposable income rising from 0.34 to 0.40 in the period 1981 to 1985 and then up to 0.41 by 1992. The Gini for equivalized real nondurable consumption rises from 0.25 to 0.28 over the first period and then hardly at all in the second period.[6] Finally, Krueger and Perri (2006) document a rise in consumption inequality of a similar magnitude over this period with the variance of log consumption rising around 0.05 units over the 1980s. Their study uses data from the CEX exclusively and does not directly model the panel data dynamics of consumption and income jointly. In particular, they do not allow the degree of persistence in income shocks to vary over time.

In their ground-breaking study, Deaton and Paxson (1994) present some detailed evidence on consumption inequality and interpret this within a life-cycle model. They note that consumption inequality should be monotonically increasing with age. Figure 2 shows this is broadly true for the cohorts in our sample. It also shows the large differences in initial conditions across birth cohorts with more recent cohorts experiencing a higher level of inequality at any given age. Initial conditions for different date-of-birth cohorts are extremely important to control for in understanding inequality.

Although Figure 1, and the discussion surrounding it, identify two distinct episodes in the growth of income and consumption inequality, these overall trends do not help inform why these different episodes took place. Specifically, they do not tell us anything about the nature of the changes in the income process or the nature of insurance that may have driven a wedge between consumption and income inequality. Studies that have investigated the impact of insurance either assume some external process for income or assume a specific form of insurance, typically the

[6] It is worth noting that the Gini and the variance of the log measures of inequality do not necessarily move in the same direction. Log normality is an exception. It is also useful to note in making these comparisons that the variance of logs is most sensitive to transfers of income at the lowest end of the distribution, whereas the Gini coefficient is most sensitive to transfers around the mode of the distribution.

pure self-insurance model. Studies that have focused on the durability of income shocks have focused exclusively on earnings among male workers and have not investigated the implications for consumption. For example, Moffitt and Gottshalk (1995, 2002) document a similar rise in male labor earnings inequality over the 1980s and attribute approximately half of this rise to changes in transitory earnings inequality. As we will see, this is attributing rather more of the income inequality growth to transitory shocks than we find when combining family disposable income and consumption data. We explain the differences through labor supply reactions within the household.

B. *A New Panel Consumption Series*

To further investigate the link between the evolution of income and consumption inequality, and to estimate our partial insurance model, we require panel data. The new panel data consumption series for PSID households that we develop here is derived by combining existing PSID data with data from the repeated cross sections of the CEX. Previous studies have followed a similar approach. Jonathan Skinner (1987), for example, imputes total consumption in the PSID using the estimated coefficients of a regression of total consumption on a series of consumption items (food, utilities, vehicles, etc.) that are present in both the PSID and the CEX. The regression is estimated with CEX data. Ziliak (1998) imputes consumption on the basis of income and the first difference of wealth (i.e., as the difference between income and savings). We depart from these studies by starting from a standard demand function for food (a consumption item available in both surveys). One novelty of our approach is to allow demands to change with relative prices, as well as nondurable expenditure and a host of demographic and socioeconomic characteristics of the household. This demand function is estimated using CEX data. Food expenditure and total expenditure are modeled as jointly endogenous and, importantly, this relationship is allowed to change over time. Under monotonicity (normality) of food demand, this function can be inverted to obtain a measure of nondurable consumption in the PSID. We find it attractive to work directly with the demand equation. However, as we allow for endogeneity and measurement error in both the total expenditure and the food expenditure variables, working directly with the inverse equation would also produce consistent estimates. Since CEX data are available on a consistent basis since 1980, we construct an unbalanced PSID panel using data from 1978 to 1992 (the first two years are retained for initial conditions purposes).[7]

Before describing this procedure, we briefly describe the data and the sample selection. More details are provided in Data Appendix A. For the main part of our analysis, we choose to select a PSID sample of continuously married couples headed by a male (with or without children) age 30 to 65. We also eliminate households if the head or head's spouse changes. Our sample selection therefore focuses on income risk, and we do not model divorce, widowhood, or other household breaking-up factors. We recognize that these may be important omissions that limit the interpretation of our study. By focusing on stable households and the interaction of consumption and income, however, we are able to develop a complete identification strategy.[8] To the extent that it is possible, we replicate this sample selection in the CEX. Finally, we should note that the initial

[7] After 1992 (or the 1993 survey year), PSID data are available in "early release" form and the interviews change from a pencil-and-paper telephone format to a computer-assisted telephone format, so we do not use them in the main part of our analysis. We do, however, estimate the model using data up to 1996 as a sensitivity analysis, after which the panel became biennial.

[8] Whether stable families have access to more or less insurance than nonstable families is an open question. On the one hand, stable families often have more income and assets and therefore are less likely to be eligible for social insurance, which is typically means-tested. On the other hand, they can plausibly be more successful in securing access to credit, family networks, and other informal insurance devices, over and above self-insurance through saving.

TABLE 1—COMPARISON OF MEANS, PSID AND CEX

	1980		1983		1986		1989		1992	
	PSID	CEX	PSID	CEX	PSID	CEX	PSID	CEX	PSID	CEX
Age	42.94	43.71	43.43	45.01	43.86	46.03	44.03	45.26	45.95	46.88
Family size	3.61	3.95	3.52	3.74	3.48	3.64	3.44	3.61	3.42	3.56
No. of children	1.32	1.47	1.25	1.26	1.21	1.19	1.18	1.17	1.14	1.15
White	0.91	0.89	0.92	0.88	0.93	0.88	0.94	0.89	0.94	0.88
HS dropout	0.21	0.20	0.18	0.20	0.16	0.18	0.14	0.14	0.13	0.15
HS graduate	0.30	0.32	0.31	0.33	0.32	0.30	0.32	0.31	0.32	0.30
College dropout	0.49	0.48	0.51	0.48	0.53	0.52	0.54	0.55	0.55	0.55
Northeast	0.21	0.20	0.21	0.25	0.22	0.21	0.22	0.23	0.22	0.23
Midwest	0.33	0.28	0.31	0.26	0.30	0.27	0.30	0.28	0.31	0.29
South	0.31	0.28	0.31	0.28	0.30	0.27	0.30	0.27	0.30	0.25
West	0.15	0.24	0.17	0.21	0.18	0.25	0.18	0.23	0.18	0.23
Husband working	0.96	0.97	0.94	0.92	0.93	0.91	0.94	0.93	0.93	0.89
Wife working	0.69	0.68	0.71	0.67	0.74	0.71	0.78	0.73	0.77	0.74
Disposable income	29,333	25,083	35,427	31,628	42,374	39,204	50,684	45,382	58,841	49,609
Food expenditure	4,447	4,554	4,868	4,543	5,294	5,079	5,872	6,021	6,604	6,289

1967 PSID contains two groups of households. The first is representative of the US population (61 percent of the original sample); the second is a supplementary low-income subsample (also known as SEO subsample), representing 39 percent of the original 1967 sample. For the most part we exclude SEO households and their split-offs. We do, however, consider the robustness of our results in the low-income SEO subsample.

We make use of two consumption measures: food and nondurables. In both datasets, food is the sum of annual expenditure on food at home and food away from home (in the PSID, food data were not collected in 1987 and 1988).[9] The definition of nondurable consumption in the CEX is the same as in Attanasio and Guglielmo Weber (1995). It is the sum of food (defined above), alcohol, tobacco, and expenditure on other nondurable goods, such as services, heating fuel, public and private transport (including gasoline), personal care, and semidurables, defined as clothing and footwear. This definition excludes expenditure on various durables, housing (furniture, appliances, etc.), health, and education. In our empirical results we assess the sensitivity of our results to the inclusion of durables.[10]

Table 1 compares the two datasets in terms of average demographic and socioeconomic characteristics for selected years: 1980, 1983, 1986, 1989, and 1992. The PSID respondents are slightly younger than their CEX counterparts; there is, however, little difference in terms of family size and composition. The percentage of whites is slightly higher in the PSID. The distribution of the sample by schooling levels is quite similar, while the PSID tends to underrepresent the proportion of people living in the West. Both male and female participation rates in the PSID are comparable to those in the CEX. Due to slight differences in the definition of family income, PSID figures are higher than those in the CEX. It is possible that the definition of family income in the PSID is more comprehensive than that in the CEX, resulting in the underestimation of income in the CEX that appears in the Table. Total food expenditure (the sum of food at home and food away from home) is fairly similar in the two datasets.

[9] We are summing up expenditure on a luxury (food away from home) and on a necessity (food at home). Ideally, one could estimate a demand system and then work out a way to combine separate imputed values into one. We leave this to future work.

[10] We also experimented with a definition of nondurable consumption that includes services from some durables (housing and vehicles). We thank David Johnson at the Bureau of Labor Statistics (BLS) for providing data on the latter.

To implement the imputation procedure, we pool all the CEX data from 1980 to 1992, and for any individual i in period t we write the following demand equation for food:

$$f_{i,t} = \boldsymbol{W}'_{i,t}\boldsymbol{\mu} + \boldsymbol{p}'_t\boldsymbol{\theta} + \beta(D_{i,t})c_{i,t} + e_{i,t}, \tag{1}$$

where f is the log of real food expenditure (which is available in both surveys), W and p contain a set of, respectively, demographic variables and relative prices (also available in both datasets), c is the log of nondurable expenditure (available only in the CEX), and e captures unobserved heterogeneity in the demand for food and measurement error in food expenditure. We allow the elasticity $\beta(\cdot)$ (from now on, the budget elasticity) to vary with time and with observable household characteristics (D). The estimation results for our specification of (1) are reported in Table 2. To account for measurement error of total expenditure, we instrument the latter with the average (by cohort, year, and education) of the hourly wage of the husband and the average (also by cohort, year, and education) of the hourly wage of the wife. The budget elasticity is 0.85. The price elasticity is -0.98. We test the overidentifying restrictions and fail to reject the null hypothesis (p-value of 28 percent). We also report statistics for judging the power of excluded instruments. They are all acceptable. Finally, we test whether the budget elasticity has remained constant over this period, and reject the hypothesis (p-value 1 percent). Generally the demographics have the expected sign. Armed with these estimates, we invert the demand function and derive a series of imputed nondurable consumption for all households in the PSID.

But how good is the imputation? In an annex to this paper, we review the conditions that make the imputation procedure reliable.[11] Given that our preferred measure of inequality is the variance of the logs, we require that the evolution of the variance of the imputed log consumption series in the PSID mirrors that of the variance of the log consumption series in the CEX. A reliable imputation procedure requires that the variance of log consumption in the PSID differs from the CEX analog only by an additive factor (the variance of the error term of the demand equation scaled by the square of the budget elasticity); if this factor is constant over time, the *trends* in the two variances should be similar. Figure 3 shows that the variances line up extremely well. As in Figure 1, we eliminate the level effect by rescaling the PSID consumption axis (on the left) to match that for CEX consumption (on the right). Trends in the variance of consumption are remarkably similar in the two datasets. In fact, the reader can check that the variance of imputed PSID consumption is just an upward-translated version (by about 0.06 units) of the variance of CEX consumption. Both series suggest that between 1980 and 1986 consumption inequality grows quite substantially. Afterward, both graphs are flat. In the annex, we show that this result is robust to variation in equivalence scales; we also show that our imputation procedure is capable of replicating quite well the trends in mean spending as long as account is made for differences in the mean of the input variable (food spending) in the two datasets.

II. Consumption Inequality, Insurance, and the Durability of Income Shocks

To motivate the procedure for identifying the degree of transmission of income shocks to consumption, we propose a framework that focuses on the persistence of income shocks. We assume that the sole relevant source of idiosyncratic uncertainty faced by the consumer is net family income (defined as the sum of labor income and transfers, such as welfare payments, minus taxes paid). We also make the assumption of separability in preferences between consumption and leisure. This implies that all insurance provided through, say, an added worker effect will pass

[11] The annex is available on the *AER* Web site, (http://www.aeaweb.org/articles.php?doi=10.1257/aer.98.5.1887).

TABLE 2—THE DEMAND FOR FOOD IN THE CEX

Variable	Estimate	Variable	Estimate	Variable	Estimate
$\ln c$	0.8503	$\ln c \times 1992$	0.0037	Family size	0.0272
	(0.1511)		(0.0056)		(0.0090)
	[0.012]		[0.083]		
$\ln c \times$ high school dropout	0.0730	$\ln c \times$ one child	0.0202	$\ln p_{food}$	−0.9784
	(0.0718)		(0.0336)		(0.2160)
	[0.050]		[0.150]		
$\ln c \times$ high school graduate	0.0827	$\ln c \times$ two children	−0.0250	$\ln p_{transports}$	5.5376
	(0.0890)		(0.0383)		(8.0500)
	[0.027]		[0.120]		
$\ln c \times 1981$	0.1151	$\ln c \times$ three children+	0.0087	$\ln p_{fuel+utils}$	−0.6670
	(0.1123)		(0.0340)		(4.7351)
	[0.053]		[0.197]		
$\ln c \times 1982$	0.0630	One child	−0.1568	$\ln p_{alcohol+tobacco}$	−1.8684
	(0.0837)		(0.3215)		(4.1425)
	[0.052]				
$\ln c \times 1983$	0.0508	Two children	0.3214	Born 1955−59	−0.0385
	(0.0704)		(0.3650)		(0.0554)
	[0.048]				
$\ln c \times 1984$	0.0478	Three children+	0.0132	Born 1950−54	−0.0085
	(0.0662)		(0.3259)		(0.0477)
	[0.051]				
$\ln c \times 1985$	0.0304	High school dropout	−0.7030	Born 1945−49	−0.0060
	(0.0638)		(0.6741)		(0.0406)
	[0.064]				
$\ln c \times 1986$	0.0223	High school graduate	−0.8458	Born 1940−44	−0.0051
	(0.0587)		(0.8298)		(0.0348)
	[0.068]				
$\ln c \times 1987$	0.0528	Age	0.0122	Born 1935−39	−0.0044
	(0.0599)		(0.0085)		(0.0273)
	[0.065]				
$\ln c \times 1988$	0.0416	Age^2	−0.0001	Born 1930−34	0.0032
	(0.0458)		(0.0001)		(0.0193)
	[0.049]				
$\ln c \times 1989$	0.0370	Northeast	0.0087	Born 1925−29	−0.0051
	(0.0373)		(0.0065)		(0.0140)
	[0.046]				
$\ln c \times 1990$	0.0187	Midwest	−0.0213	White	0.0769
	(0.0295)		(0.0105)		(0.0129)
	[0.060]				
$\ln c \times 1991$	−0.0004	South	−0.0269	Constant	−0.6404
	(0.0318)		(0.0096)		(0.9266)
	[0.111]				

Test of overidentifying restrictions	20.92 (d.f. 18; χ^2 p-value 28%)
Test that income elasticity does not vary over time	27.69 (d.f. 12; χ^2 p-value 0.6%)

Notes: This table reports IV estimates of the demand equation for (the logarithm of) food spending in the CEX. We instrument the log of total nondurable expenditure (and its interaction with time, education, and kids dummies) with the cohort-education-year specific average of the log of the husband's hourly wage and the cohort-education-year specific average of the log of the wife's hourly wage (and their interactions with time, education, and kids dummies). Standard errors are in parentheses, the Shea's partial R^2 for the relevance of instruments in brackets. In all cases, the p-value of the F-test on the excluded instrument is < 0.01 percent.

through income. Similarly, insurance provided by taxes and transfers is accounted for in the net family income variable. In the discussion of the partial insurance results we will, however, examine the importance of taxes and transfers, as well as married women's labor market participation, as an insurance mechanism. Finally, it is possible that the wage component of family income may

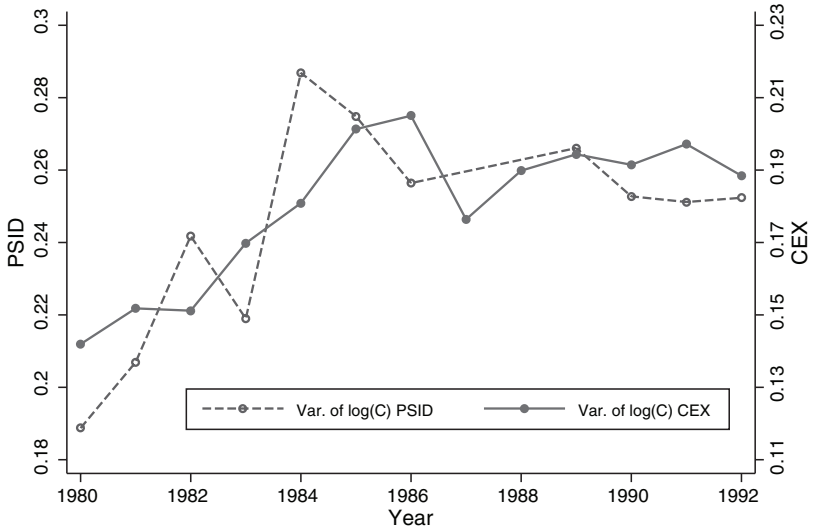

FIGURE 3. CEX AND NEW PSID COMPARED

have already been smoothed out relative to productivity by implicit agreements within the firm. If this insurance is present, it will be reflected in the variability of income.

A. *The Income Process*

Our aim here is to characterize changes in the persistence of shocks to income in a reasonably flexible but parsimonious way. For this we adopt a permanent-transitory model and allow the variances of the permanent and transitory factors to vary over time. In line with many previous empirical studies (Thomas MaCurdy 1982; John Abowd and David Card 1989; Moffitt and Gottschalk 1995; Costas Meghir and Pistaferri 2004), we assume that the permanent component follows a random walk.[12]

Suppose real (log) income, $\log Y$, can be decomposed into a permanent component P and a mean-reverting transitory component v. The income process for each household i is

$$\log Y_{i,t} = \boldsymbol{Z}'_{i,t}\boldsymbol{\varphi}_t + P_{i,t} + v_{i,t}, \tag{2}$$

where t indexes time and $\boldsymbol{Z}$ is a set of income characteristics observable and known by consumers at time t. As we note below, these will include demographic, education, ethnic, and other variables. We allow the effect of such characteristics to shift with calendar time and we also allow for cohort effects.

[12] For example, Moffitt (1997) writes, "In the micro-level literature on earnings dynamics, Thomas MaCurdy, Abowd and Card, and Gottschalk and I all find evidence—also from the PSID—for a random walk in individual earnings in the United States" (p. 289). Recent work on income dynamics, of which Fatih Guvenen (2006) is a leading example, has focused on models that allow less overall persistence and more general heterogeneous lifetime income profiles. It would be a very useful exercise to extend the model of partial insurance we develop here to such alternative income processes. The key result of the *changing* persistence of income shocks and their impact on consumption inequality, however, seems unlikely to change.

We assume that the permanent component $P_{i,t}$ follows a martingale process of the form

$$P_{i,t} = P_{i,t-1} + \zeta_{i,t}, \tag{3}$$

where $\zeta_{i,t}$ is serially uncorrelated, and the transitory component $v_{i,t}$ follows an MA(q) process, where the order q is to be established empirically:

$$v_{i,t} = \sum_{j=0}^{q} \theta_j \varepsilon_{i,t-j}$$

with $\theta_0 \equiv 1$. It follows that (unexplained) income growth is

$$\Delta y_{i,t} = \zeta_{i,t} + \Delta v_{i,t}, \tag{4}$$

where $y_{i,t} = \log Y_{i,t} - \mathbf{Z}'_{i,t}\boldsymbol{\varphi}_t$ denotes the log of real income net of predictable individual components.

B. *The Transmission of Income Shocks to Consumption*

We present a framework that allows us to study the degree of transmission of income shocks to consumption. We write (unexplained) change in log consumption as

$$\Delta c_{i,t} = \phi_{i,t}\zeta_{i,t} + \psi_{i,t}\varepsilon_{i,t} + \xi_{i,t}, \tag{5}$$

where $c_{i,t}$ is the log of real consumption net of its predictable components. We allow permanent income shocks $\zeta_{i,t}$ to have an impact on consumption with a loading factor of $\phi_{i,t}$, which may potentially vary across individuals and time; the impact of transitory income shocks $\varepsilon_{i,t}$ is measured by the loading factor $\psi_{i,t}$. The random term $\xi_{i,t}$ represents innovations in consumption that are independent of those in income. This may capture measurement error in consumption, preference shocks, innovation to higher moments of the income process, etc. We call $\phi_{i,t}$ and $\psi_{i,t}$ *partial insurance* parameters.

Equation (5) nests the two extreme cases of full insurance of income shocks ($\phi_{i,t} = \psi_{i,t} = 0$) as contemplated by the complete markets hypothesis, and no insurance ($\phi_{i,t} = \psi_{i,t} = 1$) as in autarky, as well as intermediate cases in which $0 < \phi_{i,t} < 1$ and $0 < \psi_{i,t} < 1$. The closer the coefficient to zero, the higher is the degree of insurance.

Self-Insurance.—The most prominent intermediate case is the PIH with self-insurance through precautionary savings. Appendix B considers a version of the PIH with CRRA preferences, and shows that in this case approximation of the Euler equation for consumption gives $\phi_{i,t} \simeq \pi_{i,t}$ and $\psi_{i,t} \simeq \gamma_{t,L}\pi_{i,t}$, where $\pi_{i,t}$ is the share of future labor income in current human and financial wealth and $\gamma_{t,L}$ is an age-increasing annuitization factor.[13] The random term $\xi_{i,t}$ can be

[13] See Appendix B. As far as we know, this is the first derivation of such an expression for the marginal propensity to consume with respect to permanent shocks in a model with CRRA preferences and transitory and permanent shocks. See Christopher Carroll (2001) for numerical simulations. Results from a simulation of a stochastic economy presented in Blundell, Hamish Low, and Preston (2004) show that the approximation (B5) can be used to accurately detect changes in the time series pattern of permanent and transitory variances to income shocks. These results are available upon request (by e-mail to: i.preston@ucl.ac.uk).

interpreted as the innovation to higher moments of the income process.[14] Meghir and Pistaferri (2004) find evidence of this using PSID data.

The interpretation of the impact of income shocks on consumption growth in the PIH model with CRRA preferences is straightforward. For individuals who are a long time from the end of their life with the value of current financial assets small relative to remaining future labor income, $\pi_{i,t} \simeq 1$, and permanent shocks pass through more or less completely into consumption, whereas transitory shocks are (almost) completely insured against through saving. Precautionary saving can provide effective self-insurance against permanent shocks only if the stock of assets built up is large relative to future labor income, which is to say $\pi_{i,t}$ is appreciably smaller than unity, in which case there will also be some smoothing of permanent shocks through self insurance. Carroll (2001) presents simulations that show, for a buffer stock model, the steady-state value of $\pi_{i,t}$ is between 0.85 and 0.95. Blundell, Low, and Preston (2007) simulate the model described in Appendix B using our estimates of the income process and find a value of $\pi_{i,t}$ of 0.8 or a little lower for individuals 20 years of age before retirement, which corresponds to the average age in our sample, finding that $\phi_{i,t} < \pi_{i,t}$ and/or $\psi_{i,t} < \gamma_{t,L}\pi_{i,t}$ represents evidence of partial insurance over and above self-insurance through savings.

Excess Smoothness and "Excess" Insurance.—A recent macroeconomic literature has explored a number of theoretical alternatives to the insurance configurations described above. These alternative models fall under two broad rubrics: those that assume public information but limited enforcement of contracts, and those that assume full commitment but private information. These models prove that the self-insurance case is Pareto-inefficient even conditioning on limited enforcement and private information issues. In both types of models, agents typically achieve more insurance than under a model with a single noncontingent bond, but less than under a complete markets environment. More importantly for our purposes, these models show that the relationship between income shocks and consumption depends on the degree of persistence of income shocks. Fernando Alvarez and Urban Jermann (2000), for example, explore the nature of income insurance schemes in economies where agents cannot be prevented from withdrawing participation if the loss from the accumulated future income gains they are asked to forgo becomes greater than the gains from continuing participation. Such schemes, if feasible, allow individuals to keep some of the positive shocks to their income and therefore offer only partial income insurance. If income shocks are persistent enough and agents are infinitely lived, then participation constraints become so severe that no insurance scheme is feasible. With finite lived agents, the future benefits from a positive permanent shock exceed those from a comparable transitory shock. This suggests that the degree of insurance should be allowed to differ between transitory and permanent shocks and should also be allowed to change over time and across different groups.

Another reason for partial insurance is moral hazard. This is the direction taken in Attanasio and Pavoni (2006). Here the economic environment is characterized by moral hazard and hidden asset accumulation, e.g., individuals have hidden access to a simple credit market. The authors show that, depending on the cost of shirking and the persistence of the income shock, some partial insurance is possible and a linear insurance rule can be obtained as an exact (closed form) solution in a dynamic Mirrlees model with CRRA utility. This provides a structural interpreta-

[14] This characterization follows Ricardo Caballero (1990), who presents a model with stochastic higher moments of the income distribution. He shows that there are two types of innovation affecting consumption growth: innovation to the mean (the term $\pi_{i,t}\zeta_{i,t} + \pi_{i,t}\gamma_{t,L}\varepsilon_{i,t}$), and "a term that takes into account revisions in variance forecast" ($\xi_{i,t}$). Note that this term is not capturing precautionary savings *per se*, but the innovation to the consumption component that generates it (i.e., consumption growth due to precautionary savings will change to accommodate changes in the forecast of the amount of uncertainty one expects in the future).

tion of the parameters in our estimated model. In particular, the response of consumption to permanent income shocks (what we call the partial insurance coefficient in our framework) could be interpreted as a measure of the severity of informational problems. Their empirical analysis finds evidence for "excess smoothness" of consumption with respect to permanent shocks.

Advance Information.—In the analysis presented thus far we have assumed that in the innovation process for income (4), the random variables $\zeta_{i,t}$ and $\varepsilon_{i,t}$ represent the arrival of new information to agent i in period t. If parts of these random terms were known in advance to the agent, then the intertemporal consumption model would argue that they should already be incorporated into current plans and would not directly effect consumption growth (5) (see Flavio Cunha, James Heckman, and Salvador Navarro 2005). Suppose, for example, that only a proportion κ of the permanent shock was unknown to the consumer. Then the consumption growth relationship (5) would become

$$\Delta c_{i,t} \simeq \tilde{\phi}_{i,t}\kappa\zeta_{i,t} + \psi_{i,t}\varepsilon_{i,t} + \xi_{i,t}, \tag{6}$$

where $\tilde{\phi}_{i,t}$ is the "true" insurance parameter. In this case, $\tilde{\phi}_{i,t}$ would be underestimated by the information factor κ (i.e., we would call insurance what is, in fact and in part, advance information).[15]

The econometrician will treat $\zeta_{i,t}$ as the permanent shock, whereas the individual may have already adapted to this change. Consequently, although transmission of income inequality to consumption inequality is correctly identified, the estimated $\phi_{i,t}$ has to be interpreted as reflecting a combination of insurance and information. In the absence of outside information (such as, say, subjective expectations), these two components cannot be separately identified. However, in our empirical analysis of the autocovariance structure of income and consumption, we provide some evidence that advance information is not a serious problem during our sample period. In particular, we show that current consumption growth is not significantly correlated with future "shocks" to income.

C. *Evolution of Income and Consumption Variances*

We assume that $\zeta_{i,t}$, $v_{i,t}$, and $\xi_{i,t}$ are mutually uncorrelated processes. As in Hall and Mishkin (1982) and others, one can impose covariance restrictions on the bivariate process (4) and (5) to identify the parameters of interest. In particular, equation (4) can be used to derive the following covariance restrictions in panel data:

$$\operatorname{cov}(\Delta y_t, \Delta y_{t+s}) = \begin{cases} \operatorname{var}(\zeta_t) + \operatorname{var}(\Delta v_t) & \text{for } s = 0 \\ \operatorname{cov}(\Delta v_t, \Delta v_{t+s}) & \text{for } s \neq 0 \end{cases}, \tag{7}$$

where $\operatorname{var}(\cdot)$ and $\operatorname{cov}(\cdot,\cdot)$ denote cross-sectional variances and covariances, respectively (the index i is consequently omitted). These moments can be computed for the whole sample or for individuals belonging to a homogeneous group (i.e., born in the same year, with the same level of schooling, etc.). The covariance term $\operatorname{cov}(\Delta v_t, \Delta v_{t+s})$ depends on the serial correlation properties of v. If v is an $\mathrm{MA}(q)$ serially correlated process, then $\operatorname{cov}(\Delta v_t, \Delta v_{t+s})$ is zero whenever

[15] Another source of downward bias would result if the permanent component were less persistent than a martingale. As the π parameter reflects the annuity value of the shock, if the ζ shock was less persistent than implied by a unit root, this would also lead to a value of ϕ less than unity.

$|s| > q + 1$. Note also that if v is serially uncorrelated ($v_{i,t} = \varepsilon_{i,t}$), then $\text{var}(\Delta v_t) = \text{var}(\varepsilon_t) + \text{var}(\varepsilon_{t-1})$. Identification of the serial correlation coefficients does not hinge on the order of the process q. Allowing for an MA(q) process, for example, adds $q - 1$ extra parameters (the $q - 1$ MA coefficients) but also $q - 1$ extra moments, so that identification is unaffected. Equation (7) shows that income inequality (obtained setting $s = 0$) may increase either because of increases in the variance of permanent shocks, or because of an increase in the variance of income growth due to transitory shocks.

The panel data restrictions on consumption growth from (5) are as follows: [16]

$$\text{cov}(\Delta c_t, \Delta c_{t+s}) = \phi_t^2 \text{var}(\zeta_t) + \psi_t^2 \text{var}(\varepsilon_t) + \text{var}(\xi_t) \tag{8}$$

for $s = 0$, and zero otherwise (due to the consumption martingale assumption). This equation shows that consumption growth inequality ($s = 0$) can rise for two reasons: a decline in the degree of insurance with respect to income shocks (for given variances), or an increase in the variances of income shocks (for given insurance). In other words (assuming $\xi_{i,t}$ is stationary), one can write the following decomposition for the time change in the variance of consumption growth:

$$\Delta \text{var}(\Delta c_t) = \text{var}(\zeta_t)\Delta\phi_t^2 + \phi_{t-1}^2 \Delta \text{var}(\zeta_t) + \text{var}(\varepsilon_t)\Delta\psi_t^2 + \psi_{t-1}^2 \Delta \text{var}(\varepsilon_t).$$

Our analysis below allows separation of the different forces at play visible in this equation. Finally, the covariance between income growth and consumption growth at various lags is

$$\text{cov}(\Delta c_t, \Delta y_{t+s}) = \begin{cases} \phi_t \text{var}(\zeta_t) + \psi_t \text{var}(\varepsilon_t) \\ \psi_t \text{cov}(\varepsilon_t, \Delta v_{t+s}) \end{cases}, \tag{9}$$

for $s = 0$ and $s > 0$, respectively. If v is an MA(q) serially correlated process, then $\text{cov}(\Delta c_t, \Delta y_{t+s})$ is zero whenever $|s| > q + 1$. Thus, if v is serially uncorrelated ($v_{i,t} = \varepsilon_{i,t}$), then $\text{cov}(\Delta c_t, \Delta y_{t+s}) = -\psi_t \text{var}(\varepsilon_t)$ for $s = 1$, and 0 otherwise.

Note, finally, that it is likely that measurement error will contaminate the observed income and consumption data. Assume that both consumption and income are measured with multiplicative independent errors, e.g.,

$$y_{i,t}^* = y_{i,t} + u_{i,t}^y, \tag{10}$$

$$c_{i,t}^* = c_{i,t} + u_{i,t}^c, \tag{11}$$

where x^* denotes a measured variable, x its true, unobservable value, and u^x the measurement error.

In Appendix C we discuss identification details of the model more in detail, and also show that the partial insurance parameter ϕ_t remains identified under measurement error, while only a lower bound for ψ_t is identifiable. A corollary of this is that the variance of measurement error in consumption can be identified (the theory suggests that consumption should be a martingale with drift, so any serial correlation in consumption growth can only be attributed to noise), but the variance of the measurement error in income can still not be identified separately from the

[16] The errors of approximation on these expressions are of the order of the expected values of the cubes of $|\zeta_t|$ and $|\varepsilon_t|$.

variance of the transitory shock.[17] The goal of the empirical analysis is to estimate features of the distribution of income shocks (variances of permanent and transitory shocks and the extent of serial correlation in the latter) and consumption growth (particularly the partial insurance parameters) using joint panel data on income and consumption growth on which the theoretical restrictions (7)–(9) have been imposed.

In the context of identifying sources of variation in household income and consumption, the availability of panel data presents several advantages over a repeated cross-sections analysis. With repeated cross sections the variances and covariances of differences in income and consumption cannot be observed, although it is possible to make assumptions under which variances of shocks can be identified from differences in variances and covariances of their levels (assuming one knows the degree of insurance with respect to income shocks). For example, under the assumption that shocks are cross-sectionally orthogonal to past consumption and income, that transitory shocks are serially uncorrelated, and that $\phi_t = 1$ and $\psi_t = 0$, Blundell and Preston (1998) use repeated cross-section moments to separate the growth in the variance of transitory shocks to log income from the variance of permanent shocks (see also Deaton and Paxson 1994). The assumed orthogonality assumption will be violated if aggregate consumption (or income) is not part of the consumer's information set (see Deaton and Paxson 1994). In panel data, identification does not require making such assumption and can allow for serial correlation in transitory shocks as well as measurement error in consumption and income data (see below). More crucially, with panel data one can estimate a richer model with the insurance parameter ϕ_t and ψ_t left free and thus test the validity of alternative explanations regarding the evolution of consumption inequality over time. In turn, knowledge of the extent of insurance is informative about the welfare effects of shifts in the income distribution. In our application we allow partial insurance parameters to differ by cohorts and interpret differences over time as year rather than age effects, although we appreciate that the choice is an arbitrary one made only for descriptive clarity.

Note, finally, that with panel data the identification of the variances of shocks to income requires only panel data on income, not consumption. In the simple case of serially uncorrelated transitory shock, for example,[18]

$$\text{var}(\zeta_t) = \text{cov}(\Delta y_t, \Delta y_{t-1} + \Delta y_t + \Delta y_{t+1}), \tag{12}$$

$$\text{var}(\varepsilon_t) = -\text{cov}(\Delta y_t, \Delta y_{t+1}). \tag{13}$$

Using panel data on both consumption and income improves efficiency of these estimates because it provides extra moments for identification.

III. The Evidence

The parameters of interest in this study are the insurance parameters, ϕ and ψ, and the evolution of inequality in the permanent and transitory components to income. They are derived from the variance-covariance structure of changes in consumption and income. We consequently begin with the empirical characterization of these autocovariances. We then evaluate the relative size and trends in the variance of permanent and transitory shocks to income and estimate

[17] Thus, the variance of measurement error in consumption is identified by $-\text{cov}(\Delta c_t, \Delta c_{t+1})$.

[18] See Meghir and Pistaferri (2004) for a generalization to serially correlated transitory shocks and measurement error in income. In their paper, they show that with an MA(q) process for the transitory shock, one needs $T = 4 + q$ years of data to identify the variances of interest. Given that we have access to a panel of 15 years, this condition is amply satisfied.

the degree of insurance to these shocks for the entire sample and for different subgroups of the population.

A. *The Autocovariance of Consumption and Income*

The impact of the deterministic effects $\mathbf{Z}_{it}$ on log income and (imputed) log consumption is removed by separate regressions of these variables on year and year-of-birth dummies, and on a set of observable family characteristics (dummies for education, race, family size, number of children, region, employment status, residence in a large city, outside dependent, and presence of income recipients other than husband and wife). We allow for the effect of most of these characteristics to vary with calendar time. We then work with the residuals of these regressions, labelled $c_{i,t}$ and $y_{i,t}$.[19]

To pave the way to the formal analysis of partial insurance, Table 3 reports unrestricted minimum distance estimates of several moments of the income process for the whole sample: the variance of unexplained income growth, $\text{var}(\Delta y_t)$, the first-order autocovariances, $(\text{cov}(\Delta y_{t+1}, \Delta y_t))$, and the second-order autocovariances, $(\text{cov}(\Delta y_{t+2}, \Delta y_t))$. Estimates are reported for each year. Table 4 repeats the exercise for our new panel data measure of consumption. Finally, Table 5 reports minimum distance estimates of contemporaneous and lagged consumption-income covariances. As noted above, some of the moments are missing because consumption data were not collected in the PSID in the 1987–1988 period.

Looking at Table 3, one can notice the strong increase in the variance of income growth, rising by more than 30 percent by 1985. Also notice the blip in the final year (in 1992 the PSID converted the questionnaire to electronic form and imputations of income were done by machine). The absolute value of the first-order autocovariance also increases until the mid-1980s and then is stable or even declines. Second- and higher-order autocovariances (which, from equation (7), are informative about the presence of serial correlation in the transitory income component) are small and only in few cases statistically significant. At least at face value, this evidence seems to tally quite well with a canonical MA(1) process in growth, as implied by an income process given by the sum of a martingale permanent component

Table 3—The Autocovariance Matrix of Income Growth

Year	$\text{var}(\Delta y_t)$	$\text{cov}(\Delta y_{t+1}, \Delta y_t)$	$\text{cov}(\Delta y_{t+2}, \Delta y_t)$
1980	0.0832	−0.0196	−0.0018
	(0.0089)	(0.0035)	(0.0032)
1981	0.0717	−0.0220	−0.0074
	(0.0075)	(0.0034)	(0.0037)
1982	0.0718	−0.0226	−0.0081
	(0.0051)	(0.0035)	(0.0026)
1983	0.0783	−0.0209	−0.0094
	(0.0066)	(0.0034)	(0.0042)
1984	0.0805	−0.0288	−0.0034
	(0.0055)	(0.0036)	(0.0032)
1985	0.1090	−0.0379	−0.0019
	(0.0180)	(0.0074)	(0.0038)
1986	0.1023	−0.0354	−0.0115
	(0.0077)	(0.0054)	(0.0038)
1987	0.1116	−0.0375	0.0016
	(0.0097)	(0.0051)	(0.0046)
1988	0.0925	−0.0313	−0.0021
	(0.0080)	(0.0042)	(0.0032)
1989	0.0883	−0.0280	−0.0035
	(0.0067)	(0.0059)	(0.0034)
1990	0.0924	−0.0296	−0.0067
	(0.0095)	(0.0049)	(0.0050)
1991	0.0818	−0.0299	NA
	(0.0059)	(0.0040)	
1992	0.1177	NA	NA
	(0.0079)		

[19] To the extent that these regressions remove changes that are unexpected by the individuals, we might expect this to change the relative degree of persistence in the remaining shocks, but not the insurance parameters. For example, by removing the effect of education-time on income and consumption, we are also removing the increase in inequality due to, say, changing education premiums (Attanasio and Davis 1996). If we omit the education variables from our first stage, we find that it makes only a small difference to the estimated insurance parameters (for example, the estimate of ϕ in Table 6 below is 0.71 instead of 0.64). The same qualitative comment applies to the other variables whose effect is removed in the first stage.

TABLE 4—THE AUTOCOVARIANCE MATRIX OF CONSUMPTION GROWTH

Year	$\text{var}(\Delta c_t)$	$\text{cov}(\Delta c_{t+1}, \Delta c_t)$	$\text{cov}(\Delta c_{t+2}, \Delta c_t)$
1980	0.1275	−0.0526	0.0022
	(0.0097)	(0.0076)	(0.0056)
1981	0.1197	−0.0573	0.0025
	(0.0116)	(0.0084)	(0.0043)
1982	0.1322	−0.0641	0.0006
	(0.0110)	(0.0087)	(0.0060)
1983	0.1532	−0.0691	−0.0056
	(0.0159)	(0.0100)	(0.0067)
1984	0.1869	−0.1003	−0.0131
	(0.0173)	(0.0163)	(0.0089)
1985	0.2019	−0.0872	NA
	(0.0244)	(0.0194)	
1986	0.1628	NA	NA
	(0.0184)		
1987	NA	NA	NA
1988	NA	NA	NA
1989	NA	NA	NA
1990	0.1751	−0.0602	−0.0057
	(0.0221)	(0.0062)	(0.0067)
1991	0.1646	−0.0696	NA
	(0.0142)	(0.0100)	
1992	0.1467	NA	NA
	(0.0130)		

and a serially uncorrelated transitory component. Since evidence on second-order autocovariances is mixed, however, in estimation we allow for MA(1) serial correlation in the transitory component $(v_{i,t} = \varepsilon_{i,t} + \theta\varepsilon_{i,t-1})$.[20]

While income moments are informative about shifts in the income distribution (and on the temporary or persistent nature of such shifts), they cannot be used to make conclusive inference about shifts in the consumption distribution. For this purpose, one needs to complement the analysis of income moments with that of consumption moments and of the joint income-consumption moments. This is done in Tables 4 and 5. Table 4 shows that the variance of imputed consumption growth also increases quite strongly in the early 1980s, peaks in 1985, and then it is essentially flat afterward. Note the high value of the level of the variance, which is clearly the result of our imputation procedure. The variance of consumption growth captures in fact the genuine association with shocks to income, but also the contribution of slope heterogeneity and measurement error.[21] The absolute value of the first-order autocovariance of consumption growth should be a good estimate of the variance of the imputation error. This is in fact quite high. Second-order and higher consumption growth autocovariances are mostly statistically insignificant and economically small.

Table 5 examines the association, at various lags, of unexplained income and consumption growth. The contemporaneous covariance should be informative about the effect of income shocks on consumption growth if measurement errors in consumption are orthogonal to measurement errors in income. This covariance increases in the early 1980s and then is flat or even declining afterward.

From (9), the covariance between current consumption growth and one-period-ahead income growth $\text{cov}(\Delta c_t, \Delta y_{t+1})$ should reflect the extent of insurance with respect to transitory shocks (i.e., $\text{cov}(\Delta c_t, \Delta y_{t+1}) = 0$ if there is full insurance of transitory shocks). We note that in the pure self-insurance case with infinite horizon and MA(1) transitory component, the impact of transitory shocks on consumption growth is given by the annuity value $r(1 + r - \theta)/(1 + r)^2$. With a small interest rate, this will be indistinguishable from zero, at least statistically. In fact, this covariance is hardly statistically significant and economically close to zero. At the foot of Table 5 we present the p-values for the joint significance tests of the autocovariances $E(\Delta c_t, \Delta y_{t+j})(j \geq 1)$. These p-values also detect advance information. If future income shocks were known to the consumer in earlier periods, then consumption should adjust before the observed shock occurs. This should show up in significant autocovariances between changes in consumption and future

[20] We also estimated the autocovariances of income growth at lags greater than two and find that none of them is statistically significant. These results are available from the authors upon request.

[21] To a first approximation, the variance of consumption growth that is not contaminated by error can be obtained by subtracting twice the (absolute value of) first-order autocovariance $\text{cov}(\Delta c_{t+1}, \Delta c_t)$ from the variance $\text{var}(\Delta c_t)$.

TABLE 5—THE CONSUMPTION-INCOME GROWTH COVARIANCE MATRIX

Year	$\text{cov}(\Delta y_t, \Delta c_t)$	$\text{cov}(\Delta y_{t+1}, \Delta c_t)$	$\text{cov}(\Delta y_t, \Delta c_{t+1})$
1980	0.0040	0.0013	0.0053
	(0.0041)	(0.0039)	(0.0037)
1981	0.0116	−0.0056	−0.0043
	(0.0036)	(0.0032)	(0.0036)
1982	0.0165	−0.0064	−0.0006
	(0.0036)	(0.0031)	(0.0039)
1983	0.0215	−0.0085	−0.0075
	(0.0045)	(0.0049)	(0.0043)
1984	0.0230	−0.0030	−0.0119
	(0.0052)	(0.0043)	(0.0050)
1985	0.0197	−0.0035	−0.0035
	(0.0068)	(0.0047)	(0.0065)
1986	0.0179	−0.0015	NA
	(0.0048)	(0.0052)	
1987	NA	NA	NA
1988	NA	NA	NA
1989	NA	NA	0.0030
			(0.0040)
1990	0.0077	0.0045	−0.0016
	(0.0045)	(0.0065)	(0.0042)
1991	0.0112	0.0011	−0.0071
	(0.0044)	(0.0049)	(0.0042)
1992	0.0082	NA	NA
	(0.0048)		
Test $\text{cov}(\Delta y_{t+1}, \Delta c_t) = 0$ for all t			p-value 25%
Test $\text{cov}(\Delta y_{t+2}, \Delta c_t) = 0$ for all t			p-value 27%
Test $\text{cov}(\Delta y_{t+3}, \Delta c_t) = 0$ for all t			p-value 74%
Test $\text{cov}(\Delta y_{t+4}, \Delta c_t) = 0$ for all t			p-value 68%

incomes. We find no statistical evidence, however, that this is the case.

The covariance between current consumption growth and past income growth $\text{cov}(\Delta c_{t+1}, \Delta y_t)$ plays no role in the PIH model with perfect capital markets, but may be important in alternative models where liquidity constraints are present (a standard excess sensitivity argument; see Marjorie Flavin 1981). The estimates of this covariance in Table 5 are also close to zero.

To sum up, the evidence suggests that a simple permanent-transitory framework for income shocks with time-varying second-order moments in these shocks provides a good representation of the income process for families in the PSID over this period. Overall we find only weak evidence that transitory shocks affect consumption growth. In the sensitivity results reported below, however, we find that there is evidence of significant responsiveness to transitory shocks for low-wealth families and for the low-income poverty sample of the PSID.

B. *Insurance*

Our focus here will be on the variances of the permanent and the transitory shock, σ_ξ^2 and σ_ε^2, on the partial insurance coefficients for the permanent shock (ϕ) and for the transitory shock (ψ), and the way these parameters vary over time, as well as among different groups in the population. Our estimates are based on a generalization of moments (7)–(9). In particular, to account for our imputation procedure, we allow consumption to be measured with error, and we allow the variance of the measurement error in consumption to vary with time. This is to capture the fact that the imputation error is scaled by a time-varying budget elasticity which induces nonstationarity. We also consider an MA(1) process for the transitory error component of income $(v_{i,a,t} = \varepsilon_{i,t} + \theta\varepsilon_{i,t-1})$, and estimate the MA(1) parameter θ. Finally, we allow for i.i.d. unobserved heterogeneity in the individual consumption gradient, and estimate its variance (σ_ξ^2).

We present the results of three specifications: one for the whole sample (the "baseline" specification), one where the parameters are estimated separately by education (college versus no college), and one where parameters are estimated separately by cohort (born 1930s versus born 1940s).[22] We also allow for some time nonstationarity. In particular, in all specifications we let the variances of the permanent and the transitory shock, σ_ξ^2 and σ_ε^2, respectively, vary with calendar time. As for the partial insurance coefficients for the permanent shock (ϕ) and for the transitory shock (ψ), we assume that they take on two different values, before and after 1985. This is consistent with the evidence in Figure 1, which divides the sample period into a period of rapid

[22] Results for the younger cohort (born in the 1950s) and the older cohort (born in the 1920s) are less reliable because these cohorts are not observed for the whole sample period. We thus omit them.

growth in the variance (up until 1985), and one of relative stability afterward. We test the null that the extent of insurance does not change over time, and with almost no exceptions we fail to reject the null. In the discussion of the results that follows we comment on the time variability of the insurance parameters where appropriate and present the results of the test in the tables.

The parameters are estimated by diagonally weighted minimum distance (DWMD). This estimation method is a simple generalization of equally weighted minimum distance (EWMD). Unlike EWMD, it allows for heteroskedasticity. Moreover, it avoids the pitfalls of optimal minimum distance (OMD) remarked by Altonji and Lewis Segal (1996), which are primarily related to the terms outside the main diagonal of the optimal weighting matrix. Technical details are in Appendix D.[23]

The first column of Table 6 shows the results for the whole sample. We defer the discussion of the estimated variances of the permanent shock and the estimated variances of the transitory shock to the next paragraph. The MA parameter for the transitory shock is small. The estimates of the variance of the imputation error (not reported) are always precisely measured and suggest that the imputation error absorbs a large amount of the cross-sectional variability in consumption (the estimates vary between 0.05 and 0.10). The variance of unobserved heterogeneity in the consumption gradient is small but significant. In the whole sample the estimate of ϕ, the partial insurance coefficient for the permanent shock, provides evidence in favor of some partial insurance.[24] In particular, a 10 percent permanent income shock induces a 6.4 percent permanent change in consumption.[25] The evidence on ψ accords with a simple PIH model with a long horizon.[26] If we allow the partial insurance parameters to vary across time, then we find a slightly lower estimate of ϕ—indicating more insurance—in the later part of the 1980s. This would be in line with the idea developed in Krueger and Perri (2006) that a higher variance provides additional incentives to insure. However, the differences in the partial insurance parameters over this time period are small and are not statistically significant. Hence we decided to restrict the coefficient to be constant over the whole period. The p-values for the test of constant insurance parameters over the two subperiods are given in the last two rows of the table.[27]

There is much discussion in the literature on the reasons for the increase in income inequality over the 1980s. In particular, there is much debate on whether the rise can be labeled permanent or transitory. In Figure 4 we plot the minimum distance estimate of the variance of the permanent shock, $\text{var}(\zeta_t)$, against time. There are two sets of estimates. One uses the full set of consumption and income moments for the baseline specification in Table 6, and another utilizes only the income data. There is a close accordance between the two series which provides a check on the validity of our specification. The figure points to strong growth in permanent income shocks during the early 1980s. The variance of permanent shocks levels off thereafter. It is also worth

[23] If we use EWMD, we obtain extremely downward biased estimates of $\text{var}(\zeta_t)$ and extremely upward biased estimates of $\text{var}(\varepsilon_t)$ (compared to those we obtain using income data only, as in (12) and (13)). With DWMD the two sets of estimates are similar because we are effectively putting more "identification weight" for the income shock variances on the income moments and less on the consumption moments (which display more sampling variability due to the imputation procedure).

[24] As shown in the Appendix, if income is measured with error, the estimate of $\sigma^2_\xi(\psi)$ is upward (downward) biased. However, the bias is likely negligible (see the Appendix for an example).

[25] This "excess smoothness" result has been replicated in recent papers by Attanasio and Pavoni (2006), Primiceri and Van Rens (2007), and Heathcote, Storesletten, and Violante (2007).

[26] If we assume that food in the PSID reported in survey year t refers to that year rather than to the previous calendar year, we obtain similar results. The estimate of ϕ is slightly higher, but the qualitative pattern of results (and sensitivity checks) is unchanged.

[27] We note that the overall results are maintained by extending the data forward until 1996. These results are available from the authors upon request.

Table 6—Minimum-Distance Partial Insurance and Variance Estimates

		Whole sample	No college	College	Born 1940s	Born 1930s
σ_ξ^2	1979–81	0.0102	0.0067	0.0099	0.0074	0.0057
(Variance perm. shock)		(0.0035)	(0.0037)	(0.0053)	(0.0035)	(0.0072)
	1982	0.0207	0.0154	0.0252	0.0210	0.0166
		(0.0041)	(0.0053)	(0.0060)	(0.0061)	(0.0075)
	1983	0.0301	0.0317	0.0233	0.0184	0.0246
		(0.0057)	(0.0075)	(0.0089)	(0.0058)	(0.0086)
	1984	0.0274	0.0333	0.0176	0.0219	0.0224
		(0.0049)	(0.0074)	(0.0060)	(0.0077)	(0.0102)
	1985	0.0293	0.0287	0.0204	0.0187	0.0333
		(0.0096)	(0.0073)	(0.0151)	(0.0066)	(0.0225)
	1986	0.0222	0.0173	0.0312	0.0222	0.0111
		(0.0060)	(0.0068)	(0.0101)	(0.0077)	(0.0114)
	1987	0.0289	0.0202	0.0354	0.0307	0.0079
		(0.0063)	(0.0073)	(0.0098)	(0.0080)	(0.0111)
	1988	0.0157	0.0117	0.0183	0.0155	0.0007
		(0.0069)	(0.0079)	(0.0110)	(0.0076)	(0.0099)
	1989	0.0185	0.0107	0.0274	0.0176	0.0217
		(0.0059)	(0.0101)	(0.0061)	(0.0082)	(0.0182)
	1990–92	0.0134	0.0092	0.0216	0.0081	0.0063
		(0.0042)	(0.0045)	(0.0065)	(0.0059)	(0.0091)
σ_ε^2	1979	0.0415	0.0465	0.0302	0.0314	0.0342
(Variance trans. shock)		(0.0059)	(0.0096)	(0.0056)	(0.0054)	(0.0070)
	1980	0.0318	0.0330	0.0284	0.0269	0.0306
		(0.0039)	(0.0053)	(0.0059)	(0.0056)	(0.0072)
	1981	0.0372	0.0364	0.0253	0.0319	0.0267
		(0.0035)	(0.0053)	(0.0046)	(0.0058)	(0.0064)
	1982	0.0286	0.0376	0.0214	0.0264	0.0342
		(0.0039)	(0.0063)	(0.0042)	(0.0049)	(0.0078)
	1983	0.0286	0.0372	0.0186	0.0190	0.0284
		(0.0037)	(0.0063)	(0.0037)	(0.0045)	(0.0077)
	1984	0.0351	0.0405	0.0305	0.0223	0.0453
		(0.0039)	(0.0059)	(0.0051)	(0.0047)	(0.0100)
	1985	0.0380	0.0356	0.0496	0.0280	0.0504
		(0.0075)	(0.0056)	(0.0130)	(0.0062)	(0.0115)
	1986	0.0544	0.0474	0.0452	0.0261	0.0672
		(0.0058)	(0.0076)	(0.0085)	(0.0060)	(0.0153)
	1987	0.0480	0.0520	0.0421	0.0440	0.0499
		(0.0054)	(0.0082)	(0.0071)	(0.0093)	(0.0095)
	1988	0.0383	0.0472	0.0343	0.0386	0.0543
		(0.0047)	(0.0074)	(0.0060)	(0.0068)	(0.0148)
	1989	0.0369	0.0539	0.0219	0.0360	0.0493
		(0.0068)	(0.0126)	(0.0051)	(0.0070)	(0.0132)
	1990–92	0.0506	0.0536	0.0345	0.0429	0.0753
		(0.0040)	(0.0062)	(0.0049)	(0.0060)	(0.0127)
θ		0.1132	0.1268	0.1086	0.1324	0.1706
(Serial correl. trans. shock)		(0.0247)	(0.0318)	(0.0341)	(0.0442)	(0.0470)
σ_ξ^2		0.0105	0.0074	0.0141	0.0122	0.0001
(Variance unobs. slope heterog.)		(0.0041)	(0.0079)	(0.0040)	(0.0064)	(0.0090)
ϕ		0.6423	0.9439	0.4194	0.7928	0.6889
(Partial insurance perm. shock)		(0.0945)	(0.1783)	(0.0924)	(0.1848)	(0.2393)
ψ		0.0533	0.0768	0.0273	0.0675	−0.0381
(Partial insurance trans. shock)		(0.0435)	(0.0602)	(0.0550)	(0.0705)	(0.0737)
p-value test of equal ϕ		23%	99%	8%	81%	18%
p-value test of equal ψ		75%	33%	29%	76%	4%

Notes: This table reports DWMD results of the parameters of interest. We also estimate time-varying variances of measurement error in consumption (results not reported for brevity). See the main text for details. Standard errors in parentheses.

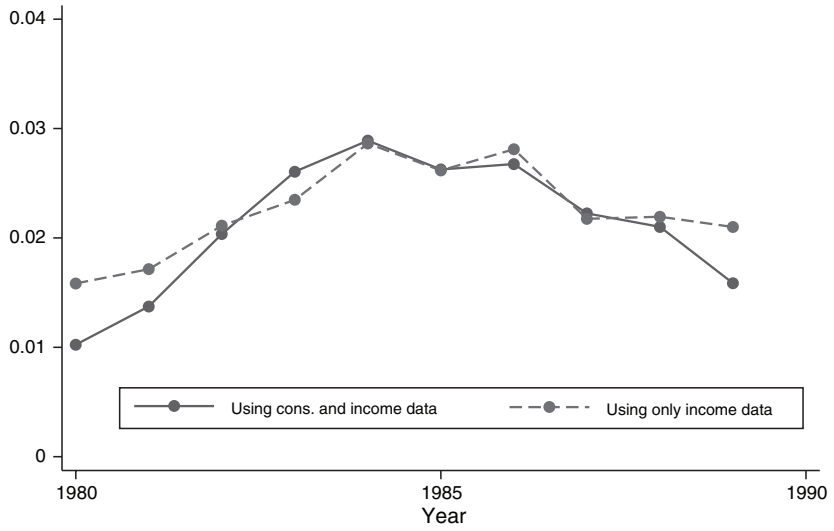

FIGURE 4. VARIANCE OF PERMANANT SHOCKS IN THE 1980S

noting that from trough to peak the variance of the permanent shock more than doubles.[28] This evidence on permanent shocks is similar to that reported by Moffitt and Gottschalk (1995) using PSID data on male earnings. As we will document below, however, the precise evolution of inequality in transitory shocks depends on the source of income under study. Male labor earnings data will be shown to display a higher transitory variance in the earlier part of this time period.

Table 6 also reports the results of the model for two education groups (with and without college education), and for two representative birth cohorts (born in the 1940s and born in the 1930s).[29] The partial insurance parameter estimates point to interesting differences in insurance by type of household. In particular, there appears to be less insurance in response to permanent shocks among the group with no college education (indeed, we would not statistically reject the null hypothesis that there is *no* insurance in this group). In contrast, the evidence on ψ accords with a simple PIH model and we cannot reject the null that there is full smoothing with respect to transitory shocks ($\psi = 0$) for both education groups, though for the less well educated the point estimate is higher.

When the sample is stratified by year of birth, we find qualitatively similar results: there is evidence for full insurance with respect to transitory shocks and differences in the extent of insurance with respect to the permanent shocks.[30] It is worth considering whether the presence of precautionary asset accumulation is an explanation for the pattern of results. Recall that the insurance coefficients may reflect differences in $\pi_{i,t}$ (the share of future labor income in the present value of lifetime wealth), which in our framework reflects how close an individual is to retirement age. Thus, $\pi_{i,t}$ is likely to be lower for older cohorts because they have both more accumulated financial wealth and lower prospective human capital wealth. Indeed, we find some evidence that

[28] An even more striking accordance between the two alternative estimates is found for the estimated variances of the transitory shock, which we omit here.

[29] Since we stratify the sample by exogenous characteristics and estimate different parameters for different groups, we are effectively considering the insurability of shocks within groups.

[30] We find qualitatively similar results if we relax the age requirement (including those between the age of 25 and 30). The estimate of ϕ is 0.70 (s.e. 0.10), indicating slightly less insurance to permanent shocks. This can be interpreted as reflecting a longer horizon among younger individuals. The estimate of ψ is 0.06 (s.e. 0.04).

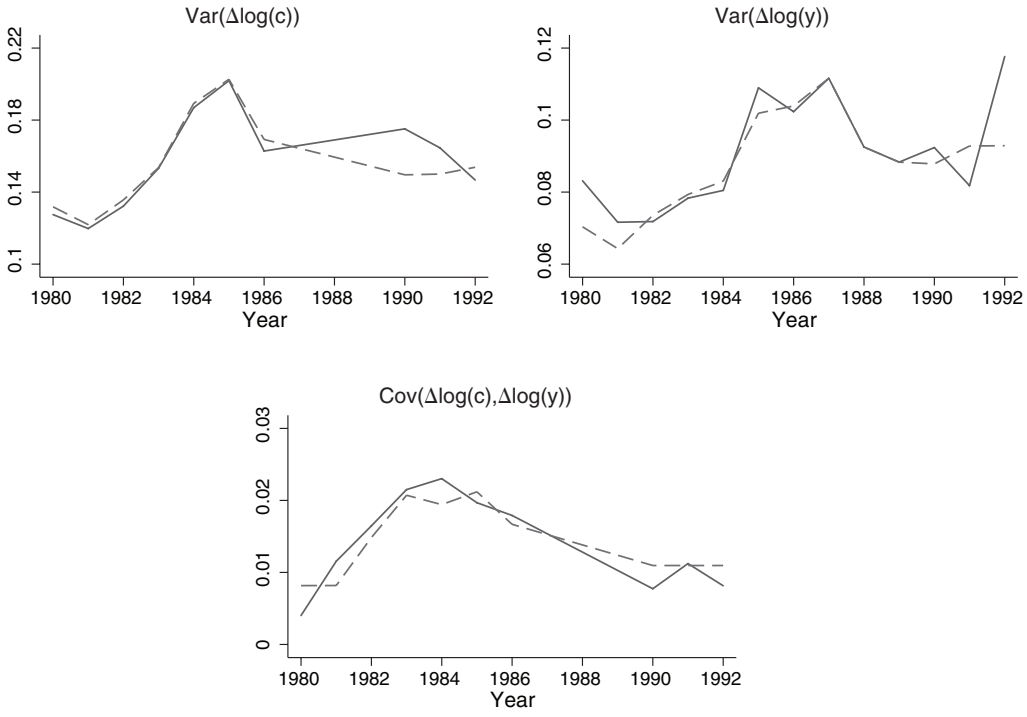

FIGURE 5. GOODNESS OF FIT OF THE MODEL

permanent shocks for the older cohort are smoothed to a greater extent than for younger cohorts, although these subgroup estimates are less precise. Whether this is due to the effect played by precautionary wealth accumulation remarked above or by greater availability of insurance (such as social security, disability insurance, or even insurance provided by adult children) in the group of persons born in the 1930s is something we cannot address in the absence of additional information, such as panel data on assets and age-specific estimates of human capital wealth. Later we provide some suggestive evidence that wealth accumulation is a potentially important explanation for the degree of insurance with respect to permanent income shocks.[31]

How good is the fit of our model? In Figure 5 we plot the actual variance of income growth and its predicted value (the dashed line) from our baseline model. We repeat the exercise for the variance of consumption growth and the covariance between income and consumption growth. Our model appears to fit the model quite well in all three dimensions.

Before delving into more detail concerning the underlying mechanisms at work in our results, we ask the question: could these baseline results have been obtained using food data alone? With almost no exceptions, all the papers in the literature (including Hall and Mishkin 1982; Hayashi, Altonji, and Kotlikoff 1996) use the PSID data on food, so it is worth asking what is the value added of using our imputed measure of consumption. A possible argument in favor of this simpler approach is that food is a constant fraction of nondurable expenditure, so that the

[31] In a separate experiment (not reported for brevity), we exploited variability across cohorts and allowed the insurance parameters ϕ and ψ to depend on age. We fit a linear age trend by minimum distance: $\phi_a = \phi_0 + \phi_1 age + e$, where e is an error. We find evidence of a decline in the value of ϕ by age (consistent with precautionary saving), but the estimates are not very precise. We also tried a quadratic age trend, but the fit worsened. A difference statistic would favor the linear trend specification.

Table 7—Minimum-Distance Partial Insurance and Variance Estimates

Consumption:	Nondurable	Nondurable	Nondurable
Income:	net income	earnings only	male earnings
Sample:	baseline	baseline	baseline
ϕ	0.6423	0.3100	0.2245
(Partial insurance perm. shock)	(0.0945)	(0.0574)	(0.0493)
ψ	0.0533	0.0633	0.0502
(Partial insurance trans. shock)	(0.0435)	(0.0309)	(0.0294)

Notes: This table reports DWMD results of the parameters of interest. We also estimate time-varying variances of measurement error in consumption (results not reported for brevity). See the main text for details. Standard errors in parentheses.

degree of insurance of food with respect to income shocks (transitory and permanent) reflects partly the true degree of insurance of nondurable consumption (i.e., ϕ and ψ) and partly the relationship between food and nondurable consumption (the budget elasticity). If the latter is known (for example, from demand studies), the former can be backed out easily. The pitfall here is that the assumption of a constant budget elasticity (β in (1)) is rejected (see Table 2). We reestimated the model using food consumption rather than our imputed measure of consumption. The results, not reported for brevity, show that using food would provide an estimate of insurance that is: (a) higher than with imputed consumption data, and (b) increasing over time (the value of ϕ falls from 0.57 to 0.29 and the p-value of the test of constant insurance is 1.6 percent). It is straightforward to prove that the insurance parameter we are identifying here is $\phi_t = \phi\beta_t$. Since β_t declines over time, there is evidence of increasing insurance. Thus, what is really a changing budget elasticity is interpreted as changing insurance (for which we do not find statistically significant evidence when using a measure of nondurable consumption). Of course, things would be even worse if insurance *were* also changing. A study using food data would be unable to separate changing insurance of income shocks from changing elasticity of food consumption. The conclusion is that using food may give misleading evidence on the size and the stability of the insurance parameters.

C. *Taxes and Transfers and Labor Supply*

To examine the role of alternative insurance mechanisms, Table 7 presents an analysis that replaces family net income with two alternative income measures: total family earnings and male earnings. Here we focus exclusively on the two insurance parameters ϕ and ψ. The reduction in the permanent insurance coefficient ϕ in the second column (a 50 percent reduction) indicates the important role of taxes and transfers in providing insurance to permanent shocks. This happens because consumption still incorporates any insurance value of taxes and transfers but the new measure of income no longer does. This insurance is also reflected through changes in the estimated variance of permanent and transitory shocks.[32] With taxes and transfers excluded, the variances of income shocks are indeed much higher. There is also a further decline in the estimated ϕ coefficient when we consider only male earnings.[33] This is indication that family labor supply may also have played an important insurance role during this period.

[32] The results for the variance estimates are not reported, but are available upon request.

[33] Heathcote, Storesletten, and Violante (2007) estimate a similar response of consumption to permanent shocks in male earnings. As they note, endogenous male labor supply drives a further wedge between the transmission from earnings and that from wages. Permanent shocks to earnings pass through much less than do shocks to wages due to the insurance value of labor supply.

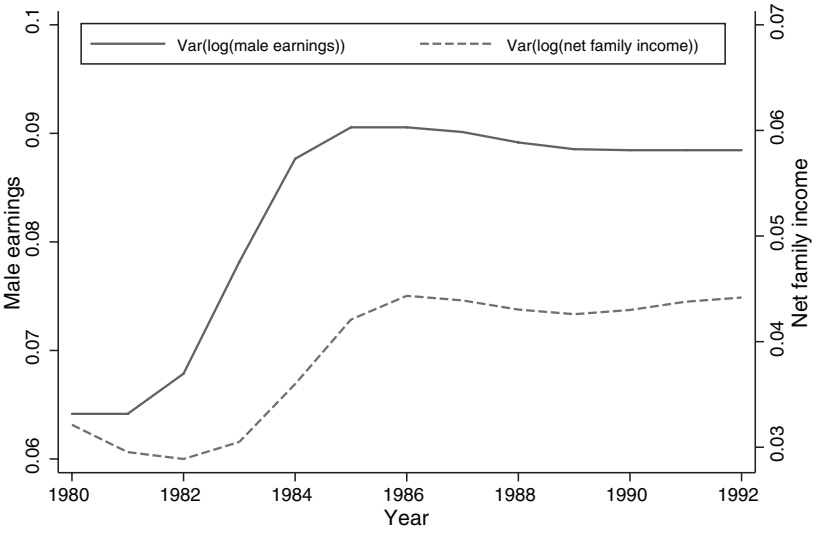

FIGURE 6. VARIANCE OF TRANSITORY SHOCKS

It is interesting to note at this point the different pattern of transitory income inequality recovered from the baseline model versus the male earnings only specification. This is presented in Figure 6, which plots the path of the two variances over this period. Once total net income is considered, rather than male labor earnings alone, there is a much shallower rise in transitory income uncertainty. This reconciles the results with the results from the male earnings literature, in particular Moffitt and Gottschalk (1995) who, using male earnings in the PSID, document a much steeper rise in transitory inequality earlier in the 1980s. As noted above, their pattern of permanent inequality is closely in accord with Figure 4. The most interesting aspect of Figure 6 is that in the early 1980s there is little or no growth in the variance of the transitory shock to net income. Most of the growth occurs in the second half of the sample. This is in sharp contrast with the trends in the variance of the permanent shock to net income, which rises in the early 1980s and flattens out afterward. Thus we may conclude that the increase in income inequality of the early 1980s is of a permanent nature, while the growth in the second half of the sample is more temporary.

D. *A Variance of Consumption Growth Decomposition*

At this point, we can go back to the decomposition of the variance of consumption growth proposed in Section IIC,

$$\Delta \mathrm{var}(\Delta c_t) \simeq \mathrm{var}(\zeta_t)\Delta\phi_t^2 + \phi_{t-1}^2 \Delta \mathrm{var}(\zeta_t) + \mathrm{var}(\varepsilon_t)\Delta\psi_t^2 + \psi_{t-1}^2 \Delta \mathrm{var}(\varepsilon_t),$$

and propose an explanation of our findings. We have argued that there is no evidence that insurance has changed over the sample period we examine. Thus $\Delta\phi_t^2 = \Delta\psi_t^2 = 0$. In the first half of our sample period there is a strong growth in the variance of permanent income shocks and little growth in the variance of transitory shocks, implying $\Delta \mathrm{var}(\Delta c_t) \simeq \phi^2 \Delta \mathrm{var}(\zeta_t)$. If there were no insurance with respect to permanent income shocks, $\Delta \mathrm{var}(\Delta c_t) = \Delta \mathrm{var}(\zeta_t)$, but in fact we find empirically that $\phi < 1$, and so there is some attenuation, although as we saw earlier consumption inequality rises substantially. In the second half of the sample, the variance of

permanent income shocks is stable while the variance of transitory shocks grows. This implies $\Delta \text{var}(\Delta c_t) \simeq \psi^2 \Delta \text{var}(\varepsilon_t)$. Since we find that $\psi \simeq 0$, there is little overall growth of consumption inequality in this period. This provides a simple explanation for the trends reported in Figures 1, 3, and 5, as well as those in Table 3 and 4.

These results show that the change in the degree of persistence in income shocks is a key characteristic of the income distribution in the United States over this period and an important link in the relationship with consumption inequality. Suppose that one ignores this change in persistence and simply specifies a single transmission parameter linking income shocks to consumption growth, as in Krueger and Perri (2006), for example. It is straightforward to show that with the weight of income variance shifting progressively toward more transitory shocks, one would have the impression that the degree of insurance is increasing over time, even though ϕ and ψ are both constant. The reason is that the single insurance coefficient ends up being a weighted average of ϕ and ψ, with weights given by the relative importance of permanent and transitory shocks in the overall income growth variance. If the weight on ψ rises, the fact that transitory shocks are easier to insure will provide misleading evidence regarding insurance. The disjunction between consumption inequality that we have documented occurs not because it has become easier to insure consumption against income shocks, but because the rise of income inequality over part of this period is of a temporary nature, and temporary shocks are generally easier to insure than permanent shocks.

One important question is what may have caused the shift in the persistence of the income process, i.e., a rise in what has been termed "income instability." Gottschalk and Moffitt (1995) conclude that part of the rise in instability they observe in longitudinal PSID data is due to compositional effects, i.e., employment shifts from a sector with less variable earnings (manufacturing) to a sector with more (services), or from unionized to nonunionized jobs. Another part is due to greater mobility between jobs and the increase in self-employment and part-time or temporary work. However, the bulk of the increase in transitory variance appears to have been idiosyncratic.

E. *Private Transfers, Low Wealth, and Total Expenditure*

Next we focus attention on help from relatives (private transfers) and on the degree of insurance among low-income families. The impact of measured help from friends and relatives is negligible, as the first two columns in Table 8 show. This result is reminiscent of Hayashi, Altonji, and Kotlikoff (1996), who find little evidence of insurance within the family.

Examining groups stratified by wealth provides more interesting deviations from the baseline specification. In the third column of Table 8, we consider low-wealth households. We define as "low wealth" households whose wealth, in the first year they are observed, is in the bottom 20 percent of the distribution of initial wealth. Wealth is given by $(\textit{asset income}_{i,t}/r_t + \textit{housing}_{i,t})$, where t corresponds to the first year when household i is observed in the sample. We assume r_t is equal to the T-bill return for that year. Given that the level of wealth in the initial period is predetermined (with respect to consumption growth decisions taken thereafter), the corresponding sample stratification we adopt does not suffer from endogeneity problems.[34] We now find that there is a significant impact of transitory shocks on consumption. Not surprisingly, this group has less ability to self-insure even transitory income fluctuations. This estimate is not far from the 0.2 benchmark found by other researchers, such as Hall and Mishkin (1982), who impute this excess sensitivity of consumption to transitory income shocks to binding liquidity constraints.

[34] A possible alternative is to use the actual wealth data available in the PSID in 1984 and 1989. Given that we want to stratify the sample on the basis of initial wealth, however, we would end up with much reduced sample sizes.

Table 8—Minimum-Distance Partial Insurance and Variance Estimates, Various Sensitivity Analyses

Consumption:	Nondurable	Nondurable	Nondurable	Nondurable	Total	Nondurable
Income:	net income	excluding help	net income	net income	net income	net income
Sample:	baseline	baseline	low wealth	high wealth	low wealth	baseline+SEO
ϕ	0.6423	0.6215	0.8489	0.6248	1.0342	0.7652
(Partial insurance perm. shock)	(0.0945)	(0.0895)	(0.2848)	(0.0999)	(0.3517)	(0.1031)
ψ	0.0533	0.0500	0.2877	0.0106	0.3683	0.1211
(Partial insurance trans. shock)	(0.0435)	(0.0434)	(0.1143)	(0.0414)	(0.1465)	(0.0354)

Notes: This table reports DWMD results of the parameters of interest. We also estimate time-varying variances of measurement error in consumption (results not reported for brevity). See the main text for details. Standard errors in parentheses.

We also find that there is no statistical evidence of insurance with respect to permanent shocks. In contrast, insurance to permanent shocks is much more important for the higher wealth group, again in accord with the modelling framework outlined above. Accumulated wealth can in fact be run down to smooth consumption against persistent income shocks.

For low-wealth households with limited access to credit markets, is it possible that durable purchase and the timing of durable replacement might act as some form of insurance to transitory shocks. This argument is developed in Browning and Crossley (2003), who show that with small costs of accessing the credit market (or small transaction costs in the second-hand market for durables), the replacement of not fully collateralized durables could be used to smooth nondurable consumption in the face of short-run income shocks. This would imply that with a measure of consumption that includes durables, we should find less evidence for insurance, i.e., the estimated ψ would rise. The penultimate column of Table 8, which uses a consumption measure including durable purchases and focuses on a low-wealth sample likely to face credit restrictions, provides some confirmation of that. It suggests that durables are particularly useful as a smoothing mechanism in response to transitory shocks for low-wealth individuals.[35]

Finally, in the last column of Table 8, we extend our sample to the families of the SEO (the low-income subsample in the PSID). In comparison with the baseline, we would again reject full insurance with respect to transitory shocks. This confirms the finding that in low-income or low-wealth samples, the evidence for insurance against transitory shocks is basically absent. Interestingly, the overall pattern of permanent income inequality is similar across various specifications and samples (with the exception of education, because the growth in the variance of permanent shocks does appear to have continued into the late 1980s for those with college education), as displayed in Figure 7. One possible interpretation of this is that the differences in the estimates of ϕ that we find reflect genuine economic differences in access to insurance rather than differences in the variance of permanent shocks.

IV. Conclusions

The aim of this paper has been to evaluate the link between consumption and income inequality through the degree of consumption insurance with respect to income shocks, both temporary and permanent. This was achieved by investigating the extent to which the distribution of income shocks is transmitted to the distribution of consumption. For this we created a new panel

[35] See Bruce Meyer and Daniel Sullivan (2004) for a detailed discussion of the measurement of durables in the CEX. Our measure of total consumption includes food, alcohol, tobacco, services, heating fuel, public and private transport (including gasoline), personal care, semidurables (clothing and footwear), and expenditure on durables, namely housing (mortgage interest, property tax, rent, other lodging, textiles, furniture, floor coverings, appliances), new and used cars, vehicle finance charges and insurance, car rentals and leases, health (insurance, prescription drugs, medical services), education, cash contributions, and personal insurance (life insurance and retirement).

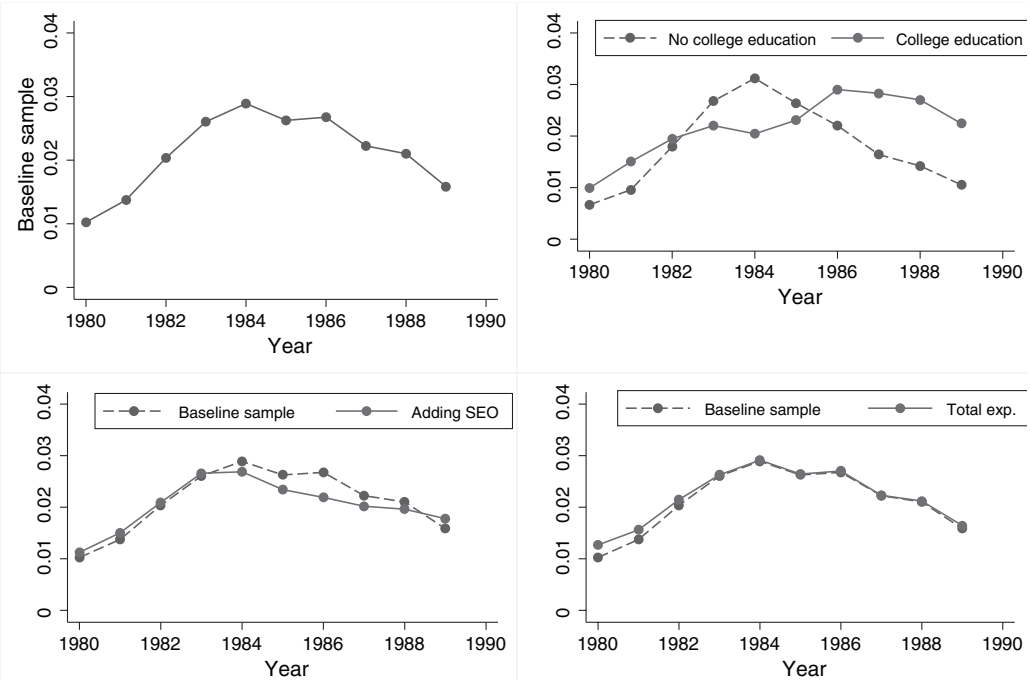

FIGURE 7. VARIANCE OF PERMANENT SHOCKS IN VARIOUS SPECIFICATIONS AND SAMPLES

consumption series for the PSID using an imputation procedure that maps food data into consumption data using the estimates of a demand equation for food, estimated from repeated CEX cross sections. We document a disjuncture between income and consumption inequality that occurred in the middle of the 1980s in the United States. We argue that this disjuncture can be explained by the change in the persistence of income shocks over this period, in particular, an initial growth in permanent shocks, which was then replaced by growth in transitory income shocks.

The analysis uncovers a strong growth in permanent income shocks in the United States during the early 1980s (the variance of transitory shock also increases, but at a later stage). From trough to peak the variance of the permanent shock doubles, while the variance of the transitory shock goes up by only about 50 percent. The variance of permanent shocks levels off in the second half of the 1980s. The variance of the transitory shock is only mildly increasing in the period where the variance of permanent shock is increasing, and it increases only when the variance of permanent shock slows down. Although we find important differences in the degree of insurance to these shocks by wealth, education, and birth cohort, the interpretation of the relationship between consumption and income inequality is maintained.

The economic framework in this paper allowed for self-insurance, in which consumers smooth idiosyncratic shocks through saving, and complete markets in which all idiosyncratic shocks are insured. Neither of these models was found to accord with the evidence. Instead, we find some partial insurance for permanent shocks and almost complete insurance of transitory shocks. Only for low-wealth households do we find significant sensitivity, and therefore only partial insurance, with respect to transitory income shocks. Interestingly, there appears to be a much greater degree of insurance of permanent shocks among the college educated. Not surprisingly, we also find more insurance of such shocks for older cohorts. Our model suggests that we should see more insurance, even for permanent shocks, among those nearing retirement, especially where they have built up sufficient precautionary savings. The tax and welfare system are also found to play

an important insurance role for permanent shocks. When we include durables in our measure of consumption, we find much less evidence of insurance of transitory shocks, suggesting that durables may be acting as an alternative smoothing mechanism for low-wealth families.

Recent work on income and consumption dynamics, building on the earlier studies of earnings dynamics by Lee Lillard and Yoram Weiss (1979) and Michael Baker (1997), focuses on models that allow general heterogeneous lifetime income profiles (Guvenen 2006). These studies also find lower overall persistence. As we have noted, the unit root assumption follows findings from many papers in the literature on labor earnings, but alternative processes with less persistence and individual trends are increasingly common. The introduction of heterogeneous income trends is an important development and it would be a very useful exercise to extend the model of partial insurance we develop here to such alternative income processes.[36] The main point in this study, however, is that it is the change in the degree of persistence of income shocks in the 1980s, rather than the level itself, that explains the observed disjuncture between the evolution of income and consumption inequality.

These results have implications for both macroeconomics and labor economics. The macroeconomics literature has long been concerned with explaining why modern economies depart from the complete markets benchmark. Recent work has examined the role of asymmetric information, moral hazard, heterogeneity, etc., and asked whether the complete markets model can be amended to include some form of imperfect insurance. This issue has not been subject to a systematic empirical investigation. Insofar as lack of smoothing opportunities implies a greater vulnerability to income shocks, our research can be relevant to issues of the incidence and permanence of poverty studied in the labor economics literature. Studying how well families smooth income shocks, how this changes over time in response to changes in the economic environment confronted, and how different household types differ in their smoothing opportunities is an important complement to understanding the effect of redistributive policies and antipoverty strategies.

Appendix A: Data

The PSID.—The PSID started in 1968 collecting information on a sample of roughly 5,000 households. Of these, about 3,000 were representative of the US population as a whole (the core sample), and about 2,000 were low-income families (the Census Bureau's Survey of Economic Opportunities, or SEO sample). Thereafter, both the original families and their split-offs (children of the original family forming a family of their own) have been followed. For most of the analysis we exclude SEO households and their split-offs. However, we do consider the robustness of our results in the low income SEO subsample.[37]

The PSID includes a variety of socioeconomic characteristics of the household, including education, food spending, and income of household members. Questions referring to income are retrospective; thus, those asked in 1993, say, refer to the 1992 calendar year. In contrast, the timing of the survey questions on food expenditure is much less clear (see Hall and Mishkin 1982, and Altonji and Siow 1987, for two alternative views). Typically, the PSID asks how much is spent on food in an average week. Since interviews are usually conducted around March, it has been argued that people report their food expenditure for an average week around that period, rather than for the previous calendar year as is the case for family income. We assume that food expenditure reported in survey year t refers to the previous calendar year, but check the effect of alternative assumptions.

[36] Baker and Gary Solon (2003) use a large Canadian tax administrative dataset to show that the random walk component remains of key importance even in the heterogeneous trends specification.

[37] See Martha Hill (1992) for more details about the PSID.

Households in the PSID report their taxable family income (which includes transfers and financial income). The measure of income used in the baseline analysis below excludes income from financial assets, subtracts federal taxes on nonfinancial income and deflates the corresponding value by the CPI. We assume that federal taxes on nonfinancial income are a proportion of total federal taxes given by the ratio between nonfinancial income and total income. We consider two education groups: with and without college education (corresponding to more than high school and high school or less, respectively).

Since CEX data are available on a consistent basis since 1980, we construct an unbalanced PSID panel using data from 1978 to 1992 (the first two years are retained for initial conditions purposes). Due to attrition, changes in family composition, and various other reasons, household heads in the 1978–1992 PSID may be present from a minimum of one year to a maximum of fifteen years. We thus create unbalanced panel datasets of various length. The longest panel includes individuals present from 1978 to 1992; the shortest, individuals present for two consecutive years only (1978–79, 1979–80, up to 1991–92).

The objective of our sample selection is to focus on a sample of continuously married couples headed by a male (with or without children). We eliminate households facing some dramatic family composition change over the sample period. In particular, we keep only those with no change, and those experiencing changes in members other than the head or the wife (children leaving parental home, say). We next eliminate households headed by a female and those with missing report on race, education, and region. We keep continuously married couples and drop some income outliers.[38] We then drop those born before 1920 or after 1959. Finally, we drop those under the age of 30 and older than 65. This is to avoid problems related to changes in family composition and education, in the first case, and retirement, in the second.[39] The final sample used in the minimum distance exercise below is composed of 17,604 observations and 1,765 households. Our income regressions do not use 36 observations with topcoded income, financial income, or federal taxes.

The CEX.—The Consumer Expenditure Survey provides a continuous and comprehensive flow of data on the buying habits of American consumers. The data are collected by the Bureau of Labor Statistics and used primarily for revising the CPI.[40] The definition of the head of the household in the CEX is the person or one of the persons who owns or rents the unit; this definition is slightly different from the one adopted in the PSID, where the head is always the husband in a couple. We make the two definitions compatible.

The CEX is based on two components, the Diary survey and the Interview survey. The Diary sample interviews households for two consecutive weeks, and it is designed to obtain detailed expenditures data on small and frequently purchased items. The Interview sample follows survey households for a maximum of five quarters, although only inventory and basic sample data are collected in the first quarter. The data base covers about 95 percent of all expenditure. Following most previous research, our analysis below uses only the Interview sample.[41]

[38] An income outlier is defined as a household with an income growth above 500 percent, below −80 percent, or with a level of income below $100 in a given year.

[39] More details on variable construction and step-by-step selection of our PSID and CEX samples is available in the full Web Appendix on the AER Web site.

[40] A description of the survey, including more details on sample design, interview procedures, etc., may be found in "Chapter 16: Consumer Expenditures and Income," from the BLS *Handbook of Methods*.

[41] There is some evidence that trends in consumption inequality measured in the two CEX surveys have diverged in the 1990s (Attanasio, Battistin, and Ichimura 2004). While research on the reasons for this divergence is clearly warranted, our analysis, which uses data up to 1992, will be only marginally affected.

As the PSID, the CEX collects information on a variety of sociodemographic variables, including income and consumer expenditure. Expenditure is reported in each quarter and refers to the previous quarter; income is reported in the second and fifth interview (with some exceptions), and refers to the previous 12 months. For consistency with the timing of consumption, fifth-quarter income data are used.

Our initial 1980–2004 CEX sample includes 1,848,348 monthly observations, corresponding to 192,564 households. We drop those with missing records on food and/or zero total nondurable expenditure, and those that completed fewer than 12 month interviews. This is to obtain a sample where a measure of annual consumption can be obtained. We then sum food at home, food away from home, and other nondurable expenditures over the 12 interview months. This gives annual expenditures. For consistency with the timing of the PSID data, we drop households interviewed after 1992. We also drop those with zero before-tax income, those with missing region or education records, single households, and those with changes in family composition. Finally, we eliminate households where the head is born before 1920 or after 1959, persons younger than 30 or older than 65, and those with outlier income (defined as a level of income below the amount spent on food) or incomplete income responses. The final sample used to estimate the food demand equation in Table 1 contains 14,430 households.

Appendix B: The Euler Equation Approximation

If preferences are quadratic (and interest rates are not subject to uncertainty), it is possible to obtain a closed-form solution for consumption. It is also straightforward to derive an exact mapping between the expectation error of the Euler equation for consumption and income shocks. See Hall and Mishkin (1982), for example. Quadratic preferences have well-known undesirable features, such as increasing risk aversion and lack of a precautionary motive for saving. More realistic preferences, such as the CRRA functional form used here, solve these problems but deliver no closed-form solution for consumption. The Euler equation in the CRRA case can be linearized to describe the behavior of consumption growth and to derive an approximation of the mapping between the expectation error of the Euler equation and the income shock. We refer the interested reader to the full Web Appendix (available on the AER Web site) for complete details on how we can obtain the approximated Euler equation (3) in the self-insurance case.

Appendix C: Identification

Here we show how the model can be identified with four years of data $(t+1, t, t-1, t-2)$. We start with the simplest model with no measurement error, serially uncorrelated transitory component, and stationarity. For simplicity we omit the individual subscripts.

The Simplest Model.—(Unexplained) consumption and income growth in period s ($s = t-1, t, t+1$) are, respectively:

$$\Delta c_s = \xi_s + \phi\zeta_s + \psi\varepsilon_s,$$

$$\Delta y_s = \zeta_s + \Delta\varepsilon_s,$$

(where, for simplicity, we have assumed that the transitory shock to income is i.i.d.).[42] The parameters to identify are: $\phi, \psi, \sigma^2_\xi, \sigma^2_\zeta$, and σ^2_ε.

[42] The proof mechanism can easily be extended to deal with MA(q) transitory shock processes as in Meghir and Pistaferri (2004).

As in Meghir and Pistaferri (2004), we can prove that

$$E(\Delta y_t(\Delta y_{t-1} + \Delta y_t + \Delta y_{t+1})) = \sigma_\xi^2 \tag{C1}$$

and that

$$E(\Delta y_t \Delta y_{t-1}) = E(\Delta y_{t+1}\, \Delta y_t) = -\sigma_\varepsilon^2. \tag{C2}$$

Identification of σ_ε^2 through (C2) rests on the idea that income growth rates are autocorrelated due to mean reversion caused by the transitory component (the permanent component is subject to i.i.d. shocks). Identification of σ_ξ^2 through (C1) rests on the idea that the variance of income growth ($E(\Delta y_t \Delta y_t)$) coincides with the variance of innovations to the permanent component, after removing the contribution of the mean reverting component ($E(\Delta y_t \Delta y_{t-1}) + E(\Delta y_t \Delta y_{t+1})$).

In general, if one has T years of data, only $T - 3$ variances of the permanent shock can be identified, and only $T - 2$ variances of the i.i.d. transitory shock can be identified. As said in the text, with panel data on income, the variances of permanent and transitory shock can be identified without recourse to consumption data.

One can also prove that

$$\frac{E(\Delta c_t(\Delta y_{t-1} + \Delta y_t + \Delta y_t))}{E(\Delta y_t(\Delta y_{t-1} + \Delta y_t + \Delta y_t))} = \phi, \tag{C3}$$

$$\frac{E(\Delta c_t \Delta y_{t+1})}{E(\Delta y_t \Delta y_{t+1})} = \psi, \tag{C4}$$

$$E(\Delta c_t(\Delta c_{t-1} + \Delta c_t + \Delta c_{t+1})) - \frac{[E(\Delta c_t(\Delta y_{t-1} + \Delta y_t + \Delta y_{t+1}))]^2}{E(\Delta y_t(\Delta y_{t-1} + \Delta y_t + \Delta y_{t+1}))} + \frac{[E(\Delta c_t \Delta y_{t+1})]^2}{E(\Delta y_t \Delta y_{t+1})} = \sigma_\xi^2. \tag{C5}$$

These moment conditions provide complete identification of the parameters of interest. Identification of ψ using (C4) uses the fact that income and lagged consumption may be correlated through the transitory component ($E(\Delta c_t \Delta y_{t+1}) = \psi \sigma_\varepsilon^2$). Scaling this by $E(\Delta y_t \Delta y_{t+1}) = \sigma_\varepsilon^2$ identifies the loading factor ψ. Note that there is a simple IV interpretation here: ψ is identified by a regression of Δc_t on Δy_t using Δy_{t+1} as an instrument. A similar reasoning applies to (C3): the current covariance between consumption and income growth ($E(\Delta c_t \Delta y_t)$), stripped of the contribution of the transitory component, reflects the arrival of permanent income shocks ($E(\Delta c_t(\Delta y_{t-1} + \Delta y_t + \Delta y_t)) = \phi \sigma_\xi^2$). Scaling this by the variance of permanent income shock, identified by using income moments alone, identifies the loading factor ϕ. Note that here, too, there is a simple IV interpretation: ϕ is identified by a regression of Δc_t on Δy_t using $(\Delta y_{t-1} + \Delta y_t + \Delta y_{t+1})$ as an instrument. Finally, (C5) identifies the variance of the component σ_ξ^2 using a residual variability idea: the variance of consumption growth, stripped of the contribution of permanent and transitory income shocks, reflects heterogeneity in the consumption gradient.

The full Web Appendix discusses identification under a number of alternative scenarios: (a) measurement error in consumption, (b) measurement error in income, (c) non-stationarity, and (d) more general models in which consumption depends on current and lagged income shocks.

Appendix D: Estimation Details

The two basic vectors of interest are

$$\Delta \mathbf{c}_i = \begin{pmatrix} \Delta c_{i,1} \\ \Delta c_{i,2} \\ \cdots \\ \Delta c_{i,T} \end{pmatrix} \text{and } \Delta \mathbf{y}_i = \begin{pmatrix} \Delta y_{i,1} \\ \Delta y_{i,2} \\ \cdots \\ \Delta y_{i,T} \end{pmatrix},$$

where, for simplicity, we indicate with 0 the first year in the panel (1978) and with T the last (1992), and the reference to age has been omitted. Since PSID consumption data were not collected in 1987 and 1988, the vector $\Delta \mathbf{c}_i$ is understood to have $dim(\Delta \mathbf{y}_i) - 3$, i.e., the rows with missing consumption data have already been sweeped out from $\Delta \mathbf{c}_i$. Moreover, if the individual was not interviewed in year t, we replace the unobservable $\Delta c_{i,t}$ and $\Delta y_{i,t}$ with zeros. Conformably with the vectors above, we define

$$\mathbf{d}_i^c = \begin{pmatrix} d_{i,1}^c \\ d_{i,2}^c \\ \cdots \\ d_{i,T}^c \end{pmatrix} \text{and } \mathbf{d}_i^y = \begin{pmatrix} d_{i,1}^y \\ d_{i,2}^y \\ \cdots \\ d_{i,T}^y \end{pmatrix},$$

where $d_{i,t}^c = 1\{\Delta c_{i,t} \textit{ is not missing}\}$ and $d_{i,t}^y = 1\{\Delta y_{i,t} \textit{ is not missing}\}$. Overall, this notation allows us to handle in a simple manner the problems of unbalanced panel data and of missing consumption data in 1987 and 1988.

Stacking observations on $\Delta \mathbf{y}$ and $\Delta \mathbf{c}$ (and on $\mathbf{d}^c$ and $\mathbf{d}^y$) for each individual, we obtain the vectors

$$\mathbf{x}_i = \begin{pmatrix} \Delta \mathbf{c}_i \\ \Delta \mathbf{y}_i \end{pmatrix} \text{and } \mathbf{d}_i = \begin{pmatrix} \mathbf{d}_i^c \\ \mathbf{d}_i^y \end{pmatrix}.$$

Now we can derive

$$\mathbf{m} = vech\left\{ \left(\sum_{i=1}^{N} \mathbf{x}_i \mathbf{x}_i' \right) \oslash \left(\sum_{i=1}^{N} \mathbf{d}_i \mathbf{d}_i' \right) \right\},$$

where $\oslash$ denotes an elementwise division. The vector $\mathbf{m}$ contains the estimates of $\text{cov}(\Delta y_t, \Delta y_{t+s})$, $\text{cov}(\Delta y_t, \Delta c_{t+s})$, and $\text{cov}(\Delta c_t, \Delta c_{t+s})$, a total of $T(2T+1)$ unique moments.[43] To obtain the variance-covariance matrix of $\mathbf{m}$, define conformably with $\mathbf{m}$ the individual vector, $\mathbf{m}_i = vech\{\mathbf{x}_i \mathbf{x}_i'\}$.

The variance-covariance matrix of $\mathbf{m}$ that can be used for inference is

$$\mathbf{V} = \left[\sum_{i=1}^{N} ((\mathbf{m}_i - \mathbf{m})(\mathbf{m}_i - \mathbf{m})') \circledast (\mathbf{D}_i \mathbf{D}_i') \right] \oslash \left(\sum_{i=1}^{N} \mathbf{D}_i \mathbf{D}_i' \right),$$

where $\mathbf{D}_i = vech\{\mathbf{d}_i \mathbf{d}_i'\}$ and $\circledast$ denotes an elementwise product. The square roots of the elements in the main diagonal of $\mathbf{V}$ provide the standard errors of the corresponding elements in $\mathbf{m}$.

What we do in the empirical analysis is to estimate models for $\mathbf{m}$:

[43] In practice there are fewer than $T(2T+1)$ moments because data on consumption are not available all years.

$$\mathbf{m} = f(\mathbf{\Lambda}) + \mathbf{\Upsilon},$$

where $\mathbf{\Upsilon}$ captures sampling variability and $\mathbf{\Lambda}$ is the vector of parameters we are interested in (the variances of the permanent shock and the transitory shock, the partial insurance parameters, etc.). We solve the problem of estimating $\mathbf{\Lambda}$ by minimizing

$$\min_{\mathbf{\Lambda}} (\mathbf{m} - f(\mathbf{\Lambda}))' \mathbf{A} (\mathbf{m} - f(\mathbf{\Lambda})),$$

where $\mathbf{A}$ is a weighting matrix. Optimal minimum distance (OMD) imposes $\mathbf{A} = \mathbf{V}^{-1}$, equally weighted minimum distance (EWMD) imposes $\mathbf{A} = \mathbf{I}$, and diagonally weighted minimum distance (DWMD) requires that $\mathbf{A}$ is a diagonal matrix with the elements in the main diagonal given by $diag(\mathbf{V}^{-1})$.

For inference purposes we require the computation of standard errors. Gary Chamberlain (1984) shows that these can be obtained as

$$\widehat{\text{var}(\hat{\mathbf{\Lambda}})} = (\mathbf{G}'\mathbf{A}\mathbf{G})^{-1}\mathbf{G}'\mathbf{A}\mathbf{V}\mathbf{A}\mathbf{G}(\mathbf{G}'\mathbf{A}\mathbf{G})^{-1},$$

where $\mathbf{G} = \partial f(\mathbf{\Lambda})/\partial \mathbf{\Lambda}|_{\mathbf{\Lambda}=\hat{\mathbf{\Lambda}}}$ is the Jacobian matrix evaluated at the estimated parameters $\hat{\mathbf{\Lambda}}$.

REFERENCES

Abowd, John M., and David Card. 1989. "On the Covariance Structure of Earnings and Hours Changes." *Econometrica*, 57(2): 411–45.

Altonji, Joseph G., Ana Paula Martins, and Aloysius Siow. 2002. "Dynamic Factor Models of Consumption, Hours and Income." *Research in Economics*, 56(1): 3–59.

Altonji, Joseph G., and Lewis M. Segal. 1996. "Small-Sample Bias in GMM Estimation of Covariance Structures." *Journal of Business and Economic Statistics*, 14(3): 353–66.

Altonji, Joseph G., and Aloysius Siow. 1987. "Testing the Response of Consumption to Income Changes with (Noisy) Panel Data." *Quarterly Journal of Economics*, 102(2): 293–328.

Alvarez, Fernando, and Urban J. Jermann. 2000. "Efficiency, Equilibrium, and Asset Pricing with Risk of Default." *Econometrica*, 68(4): 775–97.

Attanasio, Orazio, Erich Battistin, and Hidehiko Ichimura. 2004. "What Really Happened to Consumption Inequality in the US?" National Bureau of Economic Research Working Paper 10338.

Attanasio, Orazio, and Steven J. Davis. 1996. "Relative Wage Movements and the Distribution of Consumption." *Journal of Political Economy*, 104(6): 1227–62.

Attanasio, Orazio, and Nicola Pavoni. 2006. "Risk Sharing in Private Information Models with Asset Accumulation: Explaining the Excess Smoothness of Consumption." Unpublished.

Attanasio, Orazio, and José Víctor Ríos Rull. 2000. "Consumption Smoothing in Island Economies: Can Public Insurance Reduce Welfare?" *European Economic Review*, 44(7): 1225–58.

Attanasio, Orazio, and Guglielmo Weber. 1995. "Is Consumption Growth Consistent with Intertemporal Optimization? Evidence from the Consumer Expenditure Survey." *Journal of Political Economy*, 103(6): 1121–57.

Auerbach, Alan J., and Daniel Feenberg. 2000. "The Significance of Federal Taxes as Automatic Stabilizers." *Journal of Economic Perspectives*, 14(3): 37–56.

Baker, Michael. 1997. "Growth-Rate Heterogeneity and the Covariance Structure of Life-Cycle Earnings." *Journal of Labor Economics*, 15(2): 338–75.

Baker, Michael, and Gary Solon. 2003. "Earnings Dynamics and Inequality among Canadian Men, 1976–1992: Evidence from Longitudinal Income Tax Records." *Journal of Labor Economics*, 21(2): 289–321.

Blundell, Richard, Hamish Low, and Ian Preston. 2007. "Income Risk and Consumption Inequality: A Simulation Study." Institute for Fiscal Studies Working Paper 04/26 (revised November 2007).

Blundell, Richard, and Luigi Pistaferri. 2003. "Income Volatility and Household Consumption: The Impact of Food Assistance Programs." *Journal of Human Resources*, 38(S): 1032–50.

Blundell, Richard, Luigi Pistaferri, and Ian Preston. 2004. "Imputing Consumption in the PSID Using Food Demand Estimates from the CEX." Institute for Fiscal Studies Working Paper 04/27.

Blundell, Richard, and Ian Preston. 1998. "Consumption Inequality and Income Uncertainty." *Quarterly Journal of Economics*, 113(2): 603–40.

Browning, Martin, and Thomas Crossley. 2003. "Shocks, Stocks and Socks: Consumption Smoothing and the Replacement of Durables." Unpublished.

Caballero, Ricardo J. 1990. "Consumption Puzzles and Precautionary Savings." *Journal of Monetary Economics*, 25(1): 113–36.

Campbell, John Y., and Angus Deaton. 1989. "Why Is Consumption So Smooth?" *Review of Economic Studies*, 56(3): 357–73.

Carroll, Christopher D. 2001. "Precautionary Saving and the Marginal Propensity to Consume out of Permanent Income." National Bureau of Economic Research Working Paper 8233.

Chamberlain, Gary. 1984. "Panel Data." In *Handbook of Econometrics*, Vol. 2, ed. Zvi Griliches and Michael D. Intriligator, 1247–1318. Amsterdam: North-Holland.

Cunha, Flavio, James Heckman, and Salvador Navarro. 2005. "Separating Uncertainty from Heterogeneity in Life Cycle Earnings." *Oxford Economic Papers*, 57(2): 191–261.

Cutler, David M., and Lawrence F. Katz. 1992. "Rising Inequality? Changes in the Distribution of Income and Consumption in the 1980s." *American Economic Review*, 82(2): 546–51.

Deaton, Angus. 1992. *Understanding Consumption*. Oxford: Oxford University Press.

Deaton, Angus. 1997. *The Analysis of Household Surveys: A Microeconometric Approach to Development Policy*. Baltimore: Johns Hopkins University Press.

Deaton, Angus, and Christina Paxson. 1994. "Intertemporal Choice and Inequality." *Journal of Political Economy*, 102(3): 437–67.

Dynarski, Susan, and Jonathan Gruber. 1997. "Can Families Smooth Variable Earnings?" In *Brookings Papers on Economic Activity*, Vol. 1, ed. William C. Brainard and George L. Perry, 229–305. Washington, DC: Brookings Institution Press.

Engen, Eric M., and Jonathan Gruber. 2001. "Unemployment Insurance and Precautionary Saving." *Journal of Monetary Economics*, 47(3): 545–79.

Fay, Scott, Erik Hurst, and Michelle J. White. 2002. "The Household Bankruptcy Decision." *American Economic Review*, 92(3): 706–18.

Flavin, Marjorie A. 1981. "The Adjustment of Consumption to Changing Expectations about Future Income." *Journal of Political Economy*, 89(5): 974–1009.

Gruber, Jonathan. 2000. "Cash Welfare as a Consumption Smoothing Mechanism for Divorced Mothers." *Journal of Public Economics*, 75(2): 157–82.

Gruber, Jonathan, and Aaron Yelowitz. 1999. "Public Health Insurance and Private Savings." *Journal of Political Economy*, 107(6): 1249–74.

Guiso, Luigi, Luigi Pistaferri, and Fabiano Schivardi. 2005. "Insurance within the Firm." *Journal of Political Economy*, 113(5): 1054–87.

Guvenen, Fatih. 2007. "Learning Your Earning: Are Labor Income Shocks Really Very Persistent?" *American Economic Review*, 97(3): 687–712.

Hall, Robert E., and Frederic S. Mishkin. 1982. "The Sensitivity of Consumption to Transitory Income: Estimates from Panel Data on Households." *Econometrica*, 50(2): 461–81.

Hayashi, Fumio, Joseph Altonji, and Laurence Kotlikoff. 1996. "Risk-Sharing between and within Families." *Econometrica*, 64(2): 261–94.

Heathcote, Jonathan, Kjetil Storesletten, and Giovanni L. Violante. 2004. "The Macroeconomic Implications of Rising Wage Inequality in the United States." Centre for Economic Policy Research Discussion Paper 4296.

Heathcote, Jonathan, Kjetil Storesletten, and Giovanni L. Violante. 2007. "Consumption and Labour Supply with Partial Insurance: An Analytical Framework." Centre for Economic Policy Research Discussion Paper 6280.

Hill, Martha. 1992. *The Panel Study of Income Dynamics: A User's Guide*. Newbury Park, California: Sage Publications.

Johnson, David S., and Timothy M. Smeeding. 1998. "Measuring the Trends in Inequality of Individuals and Families: Income and Consumption." Unpublished.

Johnson, David S., Timothy M. Smeeding, and Barbara Boyle Torrey. 2005. "Economic Inequality through the Prisms of Income and Consumption." *Monthly Labor Review*, 128(4): 11–24.

Kimball, Miles S., and N. Gregory Mankiw. 1989. "Precautionary Saving and the Timing of Taxes." *Journal of Political Economy*, 97(4): 863–79.

Kniesner, Thomas J., and James P. Ziliak. 2002. "Tax Reform and Automatic Stabilization." *American Economic Review*, 92(3): 590–612.

Kotlikoff, Laurence J., and Avia Spivak. 1981. "The Family as an Incomplete Annuities Market." *Journal of Political Economy*, 89(2): 372–91.

Krueger, Dirk, and Fabrizio Perri. 2006. "Does Income Inequality Lead to Consumption Inequality? Evidence and Theory." *Review of Economic Studies*, 73(1): 163–93.

Lillard, Lee A., and Yoram Weiss. 1979. "Components of Variation in Panel Earnings Data: American Scientists, 1960–70." *Econometrica*, 47(2): 437–54.

MaCurdy, Thomas E. 1982. "The Use of Time Series Processes to Model the Error Structure of Earnings in a Longitudinal Data Analysis." *Journal of Econometrics*, 18(1): 83–114.

Meghir, Costas, and Luigi Pistaferri. 2004. "Income Variance Dynamics and Heterogeneity." *Econometrica*, 72(1): 1–32.

Meyer, Bruce D., and James X. Sullivan. 2004. "The Effects of Welfare and Tax Reform: The Material Well-Being of Single Mothers in the 1980s and 1990s." *Journal of Public Economics,* 88 (7–8): 1387–1420.

Moffitt, Robert A. 1997. "Comment on 'Can Families Smooth Variable Earnings.'" In *Brookings Papers on Economic Activity,* Vol. 1, ed. William C. Brainard and George L. Perry, 285–92. Washington, DC: Brookings Institution Press.

Moffitt, Robert A., and Peter Gottschalk. 1995. "Trends in the Covariance Structure of Earnings in the US: 1969–1987." University of Wisconsin Institute for Research on Poverty Discussion Paper 1001–93.

Moffitt, Robert A., and Peter Gottschalk. 2002. "Trends in the Transitory Variance of Earnings in the United States." *Economic Journal*, 112(478): C68–73.

Primiceri, Giorgio, and Thijs van Rens. Forthcoming. "Heterogeneous Life-Cycle Profiles, Income Risk and Consumption Inequality." *Journal of Monetary Economics*.

Skinner, Jonathan. 1987. "A Superior Measure of Consumption from the Panel Study of Income Dynamics." *Economic Letters*, 23(2): 213–16.

Slesnick, Daniel T. 2001. *Consumption and Social Welfare: Living Standards and Their Distribution in the United States*: Cambridge, UK: Cambridge University Press.

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

Stephens, Melvin, Jr. 2002. "Worker Displacement and the Added Worker Effect." *Journal of Labor Economics*, 20(3): 504–37.

Ziliak, James P. 1998. "Does the Choice of Consumption Measure Matter? An Application to the Permanent-Income Hypothesis." *Journal of Monetary Economics*, 41(1): 201–16.

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3. Edmund Crawley. 2020. In search of lost time aggregation. *Economics Letters* **189**, 108998. [Crossref]
4. Orazio Attanasio, Agnes Kovacs, Krisztina Molnar. 2020. Euler Equations, Subjective Expectations and Income Shocks. *Economica* **87**:346, 406-441. [Crossref]
5. Stefan Hohberger, Romanos Priftis, Lukas Vogel. 2020. The distributional effects of conventional monetary policy and quantitative easing: Evidence from an estimated DSGE model. *Journal of Banking & Finance* **113**, 105483. [Crossref]
6. Gianluca Violante, Greg Kaplan, Kurt Mitman. 2020. The Housing Boom and Bust: Model Meets Evidence. *Journal of Political Economy* . [Crossref]
7. Jiri Slacalek, Oreste Tristani, Giovanni L. Violante. 2020. Household balance sheet channels of monetary policy: A back of the envelope calculation for the euro area. *Journal of Economic Dynamics and Control* 103879. [Crossref]
8. Choonsung Park. 2020. Consumption, reservation wages, and aggregate labor supply. *Review of Economic Dynamics* . [Crossref]
9. Kohei Kubota. 2020. Partial insurance in Japan. *The Japanese Economic Review* **58**. . [Crossref]
10. Rita Ginja, Jenny Jans, Arizo Karimi. 2020. Parental Leave Benefits, Household Labor Supply, and Children's Long-Run Outcomes. *Journal of Labor Economics* **38**:1, 261-320. [Crossref]
11. Majid Einian, Masoud Nili. 2020. Excess sensitivity and borrowing constraints: Evidence from Iranian households. *Economics of Transition and Institutional Change* **28**:1, 137-160. [Crossref]
12. Kien Dao Bui, Ejindu S. Ume. 2020. CREDIT CONSTRAINTS AND LABOR SUPPLY: EVIDENCE FROM BANK BRANCHING DEREGULATION. *Economic Inquiry* **58**:1, 335-360. [Crossref]
13. Jennifer T. Lai, Isabel K. M. Yan, Xingjian Yi, Hao Zhang. 2020. Digital Financial Inclusion and Consumption Smoothing in China. *China & World Economy* **28**:1, 64-93. [Crossref]
14. Paula Cerutti, Elena Crivellaro, Germán Reyes, Liliana D. Sousa. 2019. Hit and Run? Income Shocks and School Dropouts in Latin America. *LABOUR* **33**:4, 533-566. [Crossref]
15. Nicholas Apergis. 2019. The Role of the Debt-Service Ratio as a Leading Indicator of Households Consumption. *The Manchester School* **87**:6, 821-847. [Crossref]
16. James Banks, Richard Blundell. 2019. Empirical Microeconomics in Changing Times: A Reflection on 50 Years of IFS Research. *Fiscal Studies* **40**:4, 451-484. [Crossref]
17. Ben Etheridge. 2019. HOUSE PRICES AND CONSUMPTION INEQUALITY. *International Economic Review* **60**:4, 1781-1822. [Crossref]
18. Jonas Kolsrud, Camille Landais, Johannes Spinnewijn. 2019. The value of registry data for consumption analysis: An application to health shocks. *Journal of Public Economics* 104088. [Crossref]
19. Christos Andreas Makridis. 2019. Do Right-to-Work Laws Work? Evidence on Individuals' Well-Being and Economic Sentiment. *The Journal of Law and Economics* **62**:4, 713-745. [Crossref]
20. Daesun Jung, Young Sik Kim. 2019. Income Volatility, Household Leverage, and Consumption in Korea. *Japan and the World Economy* 100994. [Crossref]
21. G. C. Lim, Sarantis Tsiaplias. 2019. Household income requirements and financial conditions. *Empirical Economics* **57**:5, 1705-1730. [Crossref]

22. Rodolfo G Campos, Iliana Reggio. 2019. Do the Unemployed Pay Lower Prices? A Reassessment of the Value of Unemployment Insurance. *Journal of the European Economic Association* **113**. . [Crossref]
23. Kartik Athreya, José Mustre-del-Río, Juan M Sánchez. 2019. The Persistence of Financial Distress. *The Review of Financial Studies* **32**:10, 3851-3883. [Crossref]
24. Liya Liu, Yingjie Niu, Yuanping Wang, Jinqiang Yang. 2019. Optimal consumption with time-inconsistent preferences. *Economic Theory* **17**. . [Crossref]
25. Judith M. Delaney. 2019. Risk-adjusted returns to education. *Education Economics* **27**:5, 472-487. [Crossref]
26. Giang Thi Hoang Nguyen, Ben White, Chunbo Ma. 2019. When Faced with Income and Asset Shocks, Do Poor Rural Households in Vietnam Smooth Food Consumption or Assets?. *The Journal of Development Studies* **55**:9, 2008-2023. [Crossref]
27. Albert Solé-Ollé, Elisabet Viladecans-Marsal. 2019. Housing booms and local spending. *Journal of Urban Economics* **113**, 103185. [Crossref]
28. Glenn W. Harrison. 2019. The behavioral welfare economics of insurance. *The Geneva Risk and Insurance Review* **44**:2, 137-175. [Crossref]
29. Zexing Chen, Bing Li, Tao Li. 2019. Exports and left-behind children : Empirical evidence from the China Migrants Dynamic Survey. *Review of International Economics* **27**:4, 1081-1107. [Crossref]
30. James Banks, Richard Blundell, Peter Levell, James P. Smith. 2019. Life-Cycle Consumption Patterns at Older Ages in the United States and the United Kingdom: Can Medical Expenditures Explain the Difference?. *American Economic Journal: Economic Policy* **11**:3, 27-54. [Abstract] [View PDF article] [PDF with links]
31. Petra Gerlach-Kristen, Rossana Merola. 2019. Consumption and credit constraints: a model and evidence from Ireland. *Empirical Economics* **57**:2, 475-503. [Crossref]
32. Dimitris Christelis, Dimitris Georgarakos, Tullio Jappelli, Luigi Pistaferri, Maarten van Rooij. 2019. Asymmetric Consumption Effects of Transitory Income Shocks*. *The Economic Journal* **129**:622, 2322-2341. [Crossref]
33. Ezelda Swanepoel. 2019. Auto-regressive Distributed Lag Model for long-run US household debt determinants. *Investment Management and Financial Innovations* **16**:3, 40-48. [Crossref]
34. Eric Mengus, Roberto Pancrazi. 2019. Endogenous Partial Insurance and Inequality. *Journal of the European Economic Association* **145**. . [Crossref]
35. David Autor, Andreas Kostøl, Magne Mogstad, Bradley Setzler. 2019. Disability Benefits, Consumption Insurance, and Household Labor Supply. *American Economic Review* **109**:7, 2613-2654. [Abstract] [View PDF article] [PDF with links]
36. Hai-Anh Dang, Dean Jolliffe, Calogero Carletto. 2019. DATA GAPS, DATA INCOMPARABILITY, AND DATA IMPUTATION: A REVIEW OF POVERTY MEASUREMENT METHODS FOR DATA-SCARCE ENVIRONMENTS. *Journal of Economic Surveys* **33**:3, 757-797. [Crossref]
37. Adrien Auclert. 2019. Monetary Policy and the Redistribution Channel. *American Economic Review* **109**:6, 2333-2367. [Abstract] [View PDF article] [PDF with links]
38. E. Glen Weyl. 2019. Price Theory. *Journal of Economic Literature* **57**:2, 329-384. [Abstract] [View PDF article] [PDF with links]
39. Jawad M Addoum, Stefanos Delikouras, George M Korniotis. 2019. Consumption-Income Sensitivity and Portfolio Choice. *The Review of Asset Pricing Studies* **9**:1, 91-136. [Crossref]
40. Tom Krebs, Pravin Krishna, William F Maloney. 2019. Income Mobility, Income Risk, and Welfare. *The World Bank Economic Review* **33**:2, 375-393. [Crossref]

41. Jay H. Hong, Byoung Hoon Seok, Hye Mi You. 2019. WAGE VOLATILITY AND CHANGING PATTERNS OF LABOR SUPPLY. *International Economic Review* **60**:2, 595-630. [Crossref]
42. Alexander M. Danzer. 2019. Can Secondary Jobs Smooth Consumption? Evidence from Unanticipated Wage Arrears. *Economic Development and Cultural Change* **67**:3, 571-594. [Crossref]
43. Alba Lugilde, Roberto Bande, Dolores Riveiro. 2019. PRECAUTIONARY SAVING: A REVIEW OF THE EMPIRICAL LITERATURE. *Journal of Economic Surveys* **33**:2, 481-515. [Crossref]
44. Mariacristina De Nardi, Giulio Fella, Gonzalo Paz-Pardo. 2019. Nonlinear Household Earnings Dynamics, Self-Insurance, and Welfare. *Journal of the European Economic Association* **57**. . [Crossref]
45. Lei Yu, Yuxuan Dai, Keguang Zheng, Yongjie Zhang. 2019. Empirical research on the correlation between Real Earnings Management of state-owned enterprises and executive compensation — from the perspective of executive structural power. *International Journal of Financial Engineering* **06**:01, 1950008. [Crossref]
46. Sara AYLLÓN, Xavier RAMOS. 2019. Youth earnings and labour market volatility in Europe. *International Labour Review* **158**:1, 83-113. [Crossref]
47. Sara AYLLÓN, Xavier RAMOS. 2019. Volatilité des revenus salariaux et volatilité de l'emploi chez les jeunes en Europe. *Revue internationale du Travail* **158**:1, 87-120. [Crossref]
48. Sara AYLLÓN, Xavier RAMOS. 2019. Volatilidad en los ingresos y en el mercado de trabajo de los jóvenes en Europa. *Revista Internacional del Trabajo* **138**:1, 89-122. [Crossref]
49. Ryan Michaels, T Beau Page, Toni M Whited. 2019. Labor and Capital Dynamics under Financing Frictions*. *Review of Finance* **23**:2, 279-323. [Crossref]
50. Yuri Ostrovsky. 2019. Testing functional forms of the lifetime income process in the presence of factor loadings. *Empirical Economics* **14**. . [Crossref]
51. Valerio Ercolani, Nicola Pavoni. 2019. The Precautionary Saving Effect of Government Consumption. *The B.E. Journal of Macroeconomics* **19**:1. . [Crossref]
52. Judith M. Delaney, Paul J. Devereux. 2019. More Education, Less Volatility? The Effect of Education on Earnings Volatility over the Life Cycle. *Journal of Labor Economics* **37**:1, 101-137. [Crossref]
53. Kai Liu. 2019. Wage Risk and the Value of Job Mobility in Early Employment Careers. *Journal of Labor Economics* **37**:1, 139-185. [Crossref]
54. Luc Arrondel, Pierre Lamarche, Frédérique Savignac. 2019. Does inequality matter for the consumption-wealth channel? Empirical evidence. *European Economic Review* **111**, 139-165. [Crossref]
55. Katrin Huber, Erwin Winkler. 2019. All you need is love? Trade shocks, inequality, and risk sharing between partners. *European Economic Review* **111**, 305-335. [Crossref]
56. Christos Makridis, Stephen Strosko. 2019. Refined by Fire: The Great Depression and Entrepreneurship. *SSRN Electronic Journal* . [Crossref]
57. Claudio Michelacci, Luigi Paciello, Andrea Pozzi. 2019. The Extensive Margin of Aggregate Consumption Demand. *SSRN Electronic Journal* . [Crossref]
58. Florian Hoffmann. 2019. HIP, RIP, and the robustness of empirical earnings processes. *Quantitative Economics* **10**:3, 1279-1315. [Crossref]
59. Yingyao Hu, Robert Moffitt, Yuya Sasaki. 2019. Semiparametric estimation of the canonical permanent-transitory model of earnings dynamics. *Quantitative Economics* **10**:4, 1495-1536. [Crossref]
60. Terézia Vančová. 2019. The Excess Smoothness and Sensitivity of Consumption in the V4 Countries. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis* **67**:6, 1653-1663. [Crossref]

61. Feng Dong, Jianfeng Liu, Zhiwei Xu, Bo Zhao. 2019. Flight to Housing in China. *SSRN Electronic Journal* . [Crossref]
62. David Cashin, Jamie Lenney, Byron Lutz, William Peterman. 2018. Fiscal policy and aggregate demand in the USA before, during, and following the Great Recession. *International Tax and Public Finance* **25**:6, 1519-1558. [Crossref]
63. Lasse Eika. 2018. Income dynamics when shocks occur during the year. *Economics Letters* **173**, 27-29. [Crossref]
64. John Gathergood, Daniel Wylie. 2018. Why are some households so poorly insured?. *Journal of Economic Behavior & Organization* **156**, 1-12. [Crossref]
65. Cristian Alonso. 2018. Hard vs. soft financial constraints: Implications for the effects of a credit crunch. *Journal of Macroeconomics* **58**, 198-223. [Crossref]
66. Owen Freestone. 2018. The Drivers of Life-Cycle Wage Inequality in Australia. *Economic Record* **94**:307, 424-444. [Crossref]
67. Brindusa Anghel, Henrique Basso, Olympia Bover, José María Casado, Laura Hospido, Mario Izquierdo, Ivan A. Kataryniuk, Aitor Lacuesta, José Manuel Montero, Elena Vozmediano. 2018. Income, consumption and wealth inequality in Spain. *SERIEs* **9**:4, 351-387. [Crossref]
68. Jeremy Bertomeu, Edwige Cheynel, Michelle Liu-Watts. 2018. Are the Fama French factors treated as risk? Evidence from CEO compensation. *European Financial Management* **24**:5, 728-774. [Crossref]
69. Raül Santaeulàlia-Llopis, Yu Zheng. 2018. The Price of Growth: Consumption Insurance in China 1989–2009. *American Economic Journal: Macroeconomics* **10**:4, 1-35. [Abstract] [View PDF article] [PDF with links]
70. Alessia De Stefani. 2018. Debt, inequality and house prices: Explaining the dynamics of household borrowing prior to the great recession. *Journal of Housing Economics* 101601. [Crossref]
71. Greg Kaplan, Giovanni L. Violante. 2018. Microeconomic Heterogeneity and Macroeconomic Shocks. *Journal of Economic Perspectives* **32**:3, 167-194. [Abstract] [View PDF article] [PDF with links]
72. Xudong Chen, Bihong Huang, Shaoshuai Li. 2018. Population ageing and inequality: Evidence from China. *The World Economy* **41**:8, 1976-2000. [Crossref]
73. Mark Borgschulte, Paco Martorell. 2018. Paying to Avoid Recession: Using Reenlistment to Estimate the Cost of Unemployment. *American Economic Journal: Applied Economics* **10**:3, 101-127. [Abstract] [View PDF article] [PDF with links]
74. Peter Hangoma, Arild Aakvik, Bjarne Robberstad. 2018. Health Shocks and Household Welfare in Zambia: An Assessment of Changing Risk. *Journal of International Development* **30**:5, 790-817. [Crossref]
75. Angus C. Chu, Guido Cozzi. 2018. Effects of patents versus R&D subsidies on income inequality. *Review of Economic Dynamics* **29**, 68-84. [Crossref]
76. Haiyan Ding, Hui He. 2018. A tale of transition: An empirical analysis of economic inequality in urban China, 1986–2009. *Review of Economic Dynamics* **29**, 106-137. [Crossref]
77. Robin Jessen, Davud Rostam-Afschar, Sebastian Schmitz. 2018. How important is precautionary labour supply?. *Oxford Economic Papers* **70**:3, 868-891. [Crossref]
78. David Berger, Veronica Guerrieri, Guido Lorenzoni, Joseph Vavra. 2018. House Prices and Consumer Spending. *The Review of Economic Studies* **85**:3, 1502-1542. [Crossref]
79. Gustaf Bruze. 2018. Intergenerational mobility: New evidence from consumption data. *Journal of Applied Econometrics* **33**:4, 580-593. [Crossref]
80. Philip Bunn, Jeanne Le Roux, Kate Reinold, Paolo Surico. 2018. The consumption response to positive and negative income shocks. *Journal of Monetary Economics* **96**, 1-15. [Crossref]

81. Roland Vaubel. 2018. JUSTIFICATIONS FOR REDISTRIBUTION: A CRITIQUE. *Economic Affairs* **38**:2, 166-184. [Crossref]
82. H. Dawid, P. Harting, M. Neugart. 2018. Cohesion policy and inequality dynamics: Insights from a heterogeneous agents macroeconomic model. *Journal of Economic Behavior & Organization* **150**, 220-255. [Crossref]
83. Manuel Arellano, Richard Blundell, Stephane Bonhomme. 2018. Nonlinear Persistence and Partial Insurance: Income and Consumption Dynamics in the PSID. *AEA Papers and Proceedings* **108**, 281-286. [Abstract] [View PDF article] [PDF with links]
84. Carlos E. da Costa, Marcelo R. Santos. 2018. AGE-DEPENDENT TAXES WITH ENDOGENOUS HUMAN CAPITAL FORMATION. *International Economic Review* **59**:2, 785-823. [Crossref]
85. Marc A.C. Hafstead, Roberton C. Williams. 2018. Unemployment and environmental regulation in general equilibrium. *Journal of Public Economics* **160**, 50-65. [Crossref]
86. Tullio Jappelli, Annalisa Scognamiglio. 2018. Interest rate changes, mortgages, and consumption: evidence from Italy. *Economic Policy* **33**:94, 183-224. [Crossref]
87. Oscar Barriga Cabanillas, Jeffrey D. Michler, Aleksandr Michuda, Emilia Tjernström. 2018. Fitting and Interpreting Correlated Random-coefficient Models Using Stata. *The Stata Journal: Promoting communications on statistics and Stata* **18**:1, 159-173. [Crossref]
88. Sumit Agarwal, Souphala Chomsisengphet, Neale Mahoney, Johannes Stroebel. 2018. Do Banks Pass through Credit Expansions to Consumers Who want to Borrow?*. *The Quarterly Journal of Economics* **133**:1, 129-190. [Crossref]
89. Jeppe Druedahl, Thomas JJrgensen. 2018. Can Consumers Distinguish Persistent from Transitory Income Shocks?. *SSRN Electronic Journal* . [Crossref]
90. Jennifer Te Lai, Isabel KittMing Yan, Xingjian Yi. 2018. Heterogeneous Preferences and Risk Sharing at Household Level in China. *SSRN Electronic Journal* . [Crossref]
91. Andreas Fuster, Greg Kaplan, Basit Zafar. 2018. What Would You Do With $500? Spending Responses to Gains, Losses, News, and Loans. *SSRN Electronic Journal* . [Crossref]
92. Greg Kaplan, Giovanni Violante. 2018. Microeconomic Heterogeneity and Macroeconomic Shocks. *SSRN Electronic Journal* . [Crossref]
93. Orazio Attanasio, Costas Meghir, Corina Mommaerts. 2018. Insurance in Extended Family Networks. *SSRN Electronic Journal* . [Crossref]
94. Agnes Kovacs, Concetta Rondinelli, Serena Trucchi. 2018. Permanent versus Transitory Income Shocks over the Business Cycle. *SSRN Electronic Journal* . [Crossref]
95. Orazio Attanasio, Agnes Kovacs, Krisztina Molnar. 2018. Euler Equations, Subjective Expectations and Income Shocks. *SSRN Electronic Journal* . [Crossref]
96. Chenjie Xu. 2018. Idiosyncratic Tail Risk and the Credit Spread Puzzle. *SSRN Electronic Journal* . [Crossref]
97. Yosef Bonaparte, Frank J Fabozzi. 2017. A flexible approach to estimate the equity premium. *Applied Economics* **49**:59, 5940-5950. [Crossref]
98. Da Zhao, Tianhao Wu, Qiwei He. 2017. Consumption inequality and its evolution in urban China. *China Economic Review* **46**, 208-228. [Crossref]
99. Sara Ayllón, Xavier Ramos. 2017. Youth earnings and labour market volatility in Europe. *International Labour Review* **44**. . [Crossref]
100. Marco Di Maggio, Amir Kermani, Benjamin J. Keys, Tomasz Piskorski, Rodney Ramcharan, Amit Seru, Vincent Yao. 2017. Interest Rate Pass-Through: Mortgage Rates, Household Consumption,

and Voluntary Deleveraging. *American Economic Review* **107**:11, 3550-3588. [Abstract] [View PDF article] [PDF with links]

101. Alexis Akira Toda. 2017. Huggett economies with multiple stationary equilibria. *Journal of Economic Dynamics and Control* **84**, 77-90. [Crossref]
102. Yulei Luo, Jun Nie, Gaowang Wang, Eric R. Young. 2017. Rational inattention and the dynamics of consumption and wealth in general equilibrium. *Journal of Economic Theory* **172**, 55-87. [Crossref]
103. Christopher Carroll, Jiri Slacalek, Kiichi Tokuoka, Matthew N. White. 2017. The distribution of wealth and the marginal propensity to consume. *Quantitative Economics* **8**:3, 977-1020. [Crossref]
104. Jonathan Heathcote, Kjetil Storesletten, Giovanni L. Violante. 2017. Optimal Tax Progressivity: An Analytical Framework*. *The Quarterly Journal of Economics* **132**:4, 1693-1754. [Crossref]
105. Dmytro Hryshko, Chinhui Juhn, Kristin McCue. 2017. Trends in earnings inequality and earnings instability among U.S. couples: How important is assortative matching?. *Labour Economics* **48**, 168-182. [Crossref]
106. Mariacristina De Nardi, Giulio Fella. 2017. Saving and wealth inequality. *Review of Economic Dynamics* **26**, 280-300. [Crossref]
107. Thomas H. Jørgensen. 2017. Life-Cycle Consumption and Children: Evidence from a Structural Estimation. *Oxford Bulletin of Economics and Statistics* **79**:5, 717-746. [Crossref]
108. Michael R. Strain. 2017. Do volatile firms pay volatile earnings? Evidence from linked worker-firm data. *Applied Economics* **49**:43, 4299-4309. [Crossref]
109. Krzysztof Karbownik, Michal Myck. 2017. Who gets to look nice and who gets to play? Effects of child gender on household expenditures. *Review of Economics of the Household* **15**:3, 925-944. [Crossref]
110. Zhen Cui, Yalan Feng. 2017. Wealthy Hand-to-Mouth Households in China. *Asian Economic Journal* **31**:3, 275-297. [Crossref]
111. Stephanie von Hinke, George Leckie. 2017. Protecting energy intakes against income shocks. *Journal of Economic Behavior & Organization* **141**, 210-232. [Crossref]
112. Manuel Arellano, Stéphane Bonhomme. 2017. Nonlinear Panel Data Methods for Dynamic Heterogeneous Agent Models. *Annual Review of Economics* **9**:1, 471-496. [Crossref]
113. Pier Luigi Conti, Daniela Marella, Andrea Neri. 2017. Statistical matching and uncertainty analysis in combining household income and expenditure data. *Statistical Methods & Applications* **26**:3, 485-505. [Crossref]
114. Ki Young Park. 2017. The Wealthy Hand-to-Mouth Households in South Korea. *Global Economic Review* **46**:3, 299-324. [Crossref]
115. Nathaniel Hendren. 2017. Knowledge of Future Job Loss and Implications for Unemployment Insurance. *American Economic Review* **107**:7, 1778-1823. [Abstract] [View PDF article] [PDF with links]
116. Xinhua Gu, Yang Zhang, Xiao Chang. 2017. The role of financial systems for cross-country differences in the link between income and consumption inequality. *Applied Economics* **49**:24, 2365-2378. [Crossref]
117. Richard Blundell. 2017. What Have We Learned from Structural Models?. *American Economic Review* **107**:5, 287-292. [Abstract] [View PDF article] [PDF with links]
118. Michael Dalton, Daniel LaFave. 2017. Mitigating the consequences of a health condition: The role of intra- and interhousehold assistance. *Journal of Health Economics* **53**, 38-52. [Crossref]
119. Siddhartha Biswas, Indraneel Chakraborty, Rong Hai. 2017. Income Inequality, Tax Policy, and Economic Growth*. *The Economic Journal* **127**:601, 688-727. [Crossref]

120. Kazuhiko Hayakawa. 2017. Unit root test for short panels with serially correlated errors. *Communications in Statistics - Theory and Methods* **46**:8, 3891-3900. [Crossref]
121. Christian Schoder. 2017. A Critical Review of the Rationale Approach to the Microfoundation of Post-Keynesian Theory. *Review of Political Economy* **29**:2, 171-189. [Crossref]
122. Antoine Bozio, Guy Laroque, Cormac O'Dea. 2017. Discount rate heterogeneity among older households: a puzzle?. *Journal of Population Economics* **30**:2, 647-680. [Crossref]
123. Salvador Navarro, Jin Zhou. 2017. Identifying agent's information sets: An application to a lifecycle model of schooling, consumption and labor supply. *Review of Economic Dynamics* **25**, 58-92. [Crossref]
124. Tom Krebs, Moritz Kuhn, Mark Wright. 2017. Under-insurance in human capital models with limited enforcement. *Review of Economic Dynamics* **25**, 121-150. [Crossref]
125. Bradley L. Hardy. 2017. INCOME INSTABILITY AND THE RESPONSE OF THE SAFETY NET. *Contemporary Economic Policy* **35**:2, 312-330. [Crossref]
126. Chris Belfield, Richard Blundell, Jonathan Cribb, Andrew Hood, Robert Joyce. 2017. Two Decades of Income Inequality in Britain: The Role of Wages, Household Earnings and Redistribution. *Economica* **84**:334, 157-179. [Crossref]
127. Sung-Hee Jeon, R. Vincent Pohl. 2017. Health and work in the family: Evidence from spouses' cancer diagnoses. *Journal of Health Economics* **52**, 1-18. [Crossref]
128. Johan Blomquist, Martin Nordin. 2017. Do the CAP subsidies increase employment in Sweden? estimating the effects of government transfers using an exogenous change in the CAP. *Regional Science and Urban Economics* **63**, 13-24. [Crossref]
129. Christian Schoder. 2017. Are Dynamic Stochastic Disequilibrium models Keynesian or neoclassical?. *Structural Change and Economic Dynamics* **40**, 46-63. [Crossref]
130. GEORGE M. CONSTANTINIDES, ANISHA GHOSH. 2017. Asset Pricing with Countercyclical Household Consumption Risk. *The Journal of Finance* **72**:1, 415-460. [Crossref]
131. Nayoung Lee, Geert Ridder, John Strauss. 2017. Estimation of Poverty Transition Matrices with Noisy Data. *Journal of Applied Econometrics* **32**:1, 37-55. [Crossref]
132. Emilio Barucci, Claudio Fontana. Uncertainty, Rationality and Heterogeneity 479-581. [Crossref]
133. Scott R. Baker, Constantine Yannelis. 2017. Income changes and consumption: Evidence from the 2013 federal government shutdown. *Review of Economic Dynamics* **23**, 99-124. [Crossref]
134. Jean-Paul Décamps, Sebastian Gryglewicz, Erwan Morellec, Stéphane Villeneuve. 2017. Corporate Policies with Permanent and Transitory Shocks. *Review of Financial Studies* **30**:1, 162-210. [Crossref]
135. Marco Leonardi. 2017. JOB MOBILITY AND EARNINGS INSTABILITY. *Economic Inquiry* **55**:1, 260-280. [Crossref]
136. John Gathergood, Daniel Wylie. 2017. Why Are Some Households So Poorly Insured?. *SSRN Electronic Journal* . [Crossref]
137. Philip Bunn, Jeanne Le Roux, Paolo Surico. 2017. The Consumption Response to Positive and Negative Income Changes. *SSRN Electronic Journal* . [Crossref]
138. Jeremy Bertomeu, Edwige Cheynel, Michelle Liu. 2017. Are the Fama French Factors Treated as Risk? Evidence from CEO Compensation. *SSRN Electronic Journal* . [Crossref]
139. Alexis Akira Toda. 2017. Huggett Economies with Multiple Stationary Equilibria. *SSRN Electronic Journal* . [Crossref]
140. Arpita Chatterjee, James Morley, Aarti Singh. 2017. Full Information Estimation of Household Income Risk and Consumption Insurance. *SSRN Electronic Journal* . [Crossref]

141. Dimitris Christelis, Dimitris Georgarakos, Tullio Jappelli, Luigi Pistaferri, Maarten <!>van Rooij. 2017. Asymmetric Consumption Effects of Transitory Income Shocks. *SSRN Electronic Journal* . [Crossref]
142. Ki Young Park, Soohyon Kim. 2017. Inequality of Debt and its Macroeconomic Implications: Evidence from South Korea. *SSRN Electronic Journal* . [Crossref]
143. Giulio Fella, Serafin Frache, Winfried Koeniger. 2017. Buffer-Stock Saving and Households' Response to Income Shocks. *SSRN Electronic Journal* . [Crossref]
144. Orazio Attanasio, Agnes Kovacs, Krisztina Molnar. 2017. Euler Equations, Subjective Expectations and Income Shocks. *SSRN Electronic Journal* . [Crossref]
145. Gordon D. A. Brown, John Gathergood. 2017. Consumption and Life Satisfaction: A Micro Panel Data Study. *SSRN Electronic Journal* . [Crossref]
146. Christos Andreas Makridis, Michael Ohlrogge. 2017. Well-Being and Large Financial Shocks: Evidence from Foreclosures between 2008-2014. *SSRN Electronic Journal* . [Crossref]
147. Yulei Luo, Jun Nie, Haijun Wang. 2017. Ignorance, Uncertainty, and Strategic Consumption-Portfolio Decisions. *SSRN Electronic Journal* . [Crossref]
148. Sarantis Tsiaplias. 2017. The Welfare Implications of Unobserved Heterogeneity. *SSRN Electronic Journal* . [Crossref]
149. Da Zhao, Tianhao Wu, Qiwei He. 2017. Consumption Inequality and Its Evolution in Urban China. *SSRN Electronic Journal* . [Crossref]
150. Bruce D. Meyer, James X. Sullivan. 2017. Consumption and Income Inequality in the U.S. Since the 1960s. *SSRN Electronic Journal* . [Crossref]
151. Greg Kaplan, Kurt Mitman, Giovanni L. Violante. 2017. The Housing Boom and Bust: Model Meets Evidence. *SSRN Electronic Journal* . [Crossref]
152. David H. Autor, Andreas Kostol, Magne Mogstad, Bradley J. Setzler. 2017. Disability Benefits, Consumption Insurance, and Household Labor Supply. *SSRN Electronic Journal* . [Crossref]
153. Maxime Liegey. 2017. Search Frictions, the Use of Knowledge, and Dispersion in Firm Dynamics. *SSRN Electronic Journal* . [Crossref]
154. Kartik Athreya, Jose Mustre-del-Rio, Juan M. SSnchez. 2017. The Persistence of Financial Distress. *SSRN Electronic Journal* . [Crossref]
155. Ctirad Slavvk, Hakki Yazici. 2017. Wage Risk and the Skill Premium. *SSRN Electronic Journal* . [Crossref]
156. Alexandros Theloudis. 2017. Consumption Inequality Across Heterogeneous Families. *SSRN Electronic Journal* . [Crossref]
157. Tom Krebs, Martin Scheffel. 2017. Labor Market Institutions and the Cost of Recessions. *IMF Working Papers* **17**:87, 1. [Crossref]
158. Ali Alichi, Rodrigo Mariscal, Daniela Muhaj. 2017. Hollowing Out: The Channels of Income Polarization in the United States. *IMF Working Papers* **17**:244, 1. [Crossref]
159. Sebastian Gryglewicz, Loriano Mancini, Erwan Morellec, Enrique J. Schroth, Philip Valta. 2017. Transitory Versus Permanent Shocks: Explaining Corporate Savings and Investment. *SSRN Electronic Journal* . [Crossref]
160. Sanghamitra Bandyopadhyay. The Vulnerable Are Not (Necessarily) the Poor 29-57. [Crossref]
161. Manasi Deshpande. 2016. Does Welfare Inhibit Success? The Long-Term Effects of Removing Low-Income Youth from the Disability Rolls. *American Economic Review* **106**:11, 3300-3330. [Abstract] [View PDF article] [PDF with links]

162. Kazuhiko Hayakawa. 2016. On the effect of weighting matrix in GMM specification test. *Journal of Statistical Planning and Inference* **178**, 84-98. [Crossref]
163. Keshav Dogra, Olga Gorbachev. 2016. Consumption Volatility, Liquidity Constraints and Household Welfare. *The Economic Journal* **126**:597, 2012-2037. [Crossref]
164. Thomas H. Jørgensen. 2016. Euler equation estimation: Children and credit constraints. *Quantitative Economics* **7**:3, 935-968. [Crossref]
165. Shu Cai, Albert Park. 2016. Permanent income and subjective well-being. *Journal of Economic Behavior & Organization* **130**, 298-319. [Crossref]
166. Nicolas Roys. 2016. Persistence of shocks and the reallocation of labor. *Review of Economic Dynamics* **22**, 109-130. [Crossref]
167. Yaniv Yedid-Levi. 2016. Why does employment in all major sectors move together over the business cycle?. *Review of Economic Dynamics* **22**, 131-156. [Crossref]
168. Pedro Carneiro, Rita Ginja. 2016. Partial Insurance and Investments in Children. *The Economic Journal* **126**:596, F66-F95. [Crossref]
169. Kyong Hyun Koo. 2016. The Evolution of Earnings Volatility During and After the Great Recession. *Industrial Relations: A Journal of Economy and Society* **55**:4, 705-732. [Crossref]
170. Climent Quintana-Domeque, Johannes Wohlfart. 2016. "Relative concerns for consumption at the top": An intertemporal analysis for the UK. *Journal of Economic Behavior & Organization* **129**, 172-194. [Crossref]
171. Sean D. Campbell, Stefanos Delikouras, Danling Jiang, George M. Korniotis. 2016. The Human Capital That Matters: Expected Returns and High-Income Households. *Review of Financial Studies* **29**:9, 2523-2563. [Crossref]
172. Arpita Chatterjee, Aarti Singh, Tahlee Stone. 2016. Understanding Wage Inequality in Australia. *Economic Record* **92**:298, 348-360. [Crossref]
173. Zahonogo Pam. 2016. Migration, marital arrangements and consumption smoothing among Burkinab farm households. *Journal of Development and Agricultural Economics* **8**:8, 186-192. [Crossref]
174. Dejing Kong, David Dickinson. 2016. Investigating the Impact of Income on Savings Using a Chinese Household Level Dataset. *Emerging Markets Finance and Trade* **52**:8, 1775-1796. [Crossref]
175. Emma Tominey. 2016. Female labour supply and household employment shocks: Maternity leave as an insurance mechanism. *European Economic Review* **87**, 256-271. [Crossref]
176. Mariacristina Rossi, Serena Trucchi. 2016. Liquidity constraints and labor supply. *European Economic Review* **87**, 176-193. [Crossref]
177. Ken Yamada. 2016. Tracing the impact of large minimum wage changes on household welfare in Indonesia. *European Economic Review* **87**, 287-303. [Crossref]
178. Joaquín Alegre, Llorenç Pou. 2016. Consumption, unemployment and the Great Recession. *International Journal of Manpower* **37**:4, 724-743. [Crossref]
179. Michio Suzuki. 2016. UNDERSTANDING THE COSTS OF CONSUMER DURABLE ADJUSTMENTS. *Economic Inquiry* **54**:3, 1561-1573. [Crossref]
180. Hyojung Lee, Gary D. Painter. 2016. Consumption inequality in the Great Recession. *Journal of Economic and Social Measurement* **41**:2, 145-166. [Crossref]
181. Merike Kukk, Dmitry Kulikov, Karsten Staehr. 2016. Estimating Consumption Responses to Income Shocks of Different Persistence Using Self-Reported Income Measures. *Review of Income and Wealth* **62**:2, 311-333. [Crossref]
182. Orazio P. Attanasio, Luigi Pistaferri. 2016. Consumption Inequality. *Journal of Economic Perspectives* **30**:2, 3-28. [Abstract] [View PDF article] [PDF with links]

183. Jan Hogrefe, Yao Yao. 2016. Offshoring and labor income risk: an empirical investigation. *Empirical Economics* **50**:3, 1045-1063. [Crossref]

184. Yulei Luo, Eric R. Young. 2016. Induced uncertainty, market price of risk, and the dynamics of consumption and wealth. *Journal of Economic Theory* **163**, 1-41. [Crossref]

185. Tullio Jappelli, Mario Padula. 2016. The Consumption and Wealth Effects of an Unanticipated Change in Lifetime Resources. *Management Science* **62**:5, 1458-1471. [Crossref]

186. Árpád Ábrahám, Sebastian Koehne, Nicola Pavoni. 2016. Optimal income taxation when asset taxation is limited. *Journal of Public Economics* **136**, 14-29. [Crossref]

187. Flávio Cunha, James Heckman. 2016. Decomposing Trends in Inequality in Earnings into Forecastable and Uncertain Components. *Journal of Labor Economics* **34**:S2, S31-S65. [Crossref]

188. Rachel Griffith, Martin O'Connell, Kate Smith. 2016. Shopping Around: How Households Adjusted Food Spending Over the Great Recession. *Economica* **83**:330, 247-280. [Crossref]

189. Kathleen Beegle, Luc Christiaensen, Andrew Dabalen, Isis Gaddis. Inequality in Africa 117-145. [Crossref]

190. Johannes Ludwig. Income Shocks or Insurance – What Determines Consumption Inequality? 131-166. [Crossref]

191. Richard Blundell, Luigi Pistaferri, Itay Saporta-Eksten. 2016. Consumption Inequality and Family Labor Supply. *American Economic Review* **106**:2, 387-435. [Abstract] [View PDF article] [PDF with links]

192. Bernard Herskovic, Bryan Kelly, Hanno Lustig, Stijn Van Nieuwerburgh. 2016. The common factor in idiosyncratic volatility: Quantitative asset pricing implications. *Journal of Financial Economics* **119**:2, 249-283. [Crossref]

193. Erich Battistin, Mario Padula. 2016. Survey instruments and the reports of consumption expenditures: evidence from the consumer expenditure surveys. *Journal of the Royal Statistical Society: Series A (Statistics in Society)* **179**:2, 559-581. [Crossref]

194. R.E. Hall. Macroeconomics of Persistent Slumps 2131-2181. [Crossref]

195. D. Krueger, K. Mitman, F. Perri. Macroeconomics and Household Heterogeneity 843-921. [Crossref]

196. M. Doepke, M. Tertilt. Families in Macroeconomics 1789-1891. [Crossref]

197. Daniel Gutknecht. 2016. Testing for monotonicity under endogeneity. *Journal of Econometrics* **190**:1, 100-114. [Crossref]

198. Miguel Ampudia, Akmaral Pavlickova, Jiri Slacalek, Edgar Vogel. 2016. Household heterogeneity in the euro area since the onset of the Great Recession. *Journal of Policy Modeling* **38**:1, 181-197. [Crossref]

199. Arnab Chatterjee, Anindya S. Chakrabarti, Asim Ghosh, Anirban Chakraborti, Tushar K. Nandi. 2016. Invariant features of spatial inequality in consumption: The case of India. *Physica A: Statistical Mechanics and its Applications* **442**, 169-181. [Crossref]

200. Cristiano Perugini, Jens Hölscher, Simon Collie. 2016. Inequality, credit and financial crises. *Cambridge Journal of Economics* **40**:1, 227-257. [Crossref]

201. Eric Mengus, Roberto Pancrazi. 2016. Endogenous Partial Insurance and Inequality. *SSRN Electronic Journal* . [Crossref]

202. Kazuhiko Hayakawa. 2016. On the Effect of Weighting Matrix in GMM Specification Test. *SSRN Electronic Journal* . [Crossref]

203. Ki Young Park. 2016. The Wealthy Hand-to-Mouth Households in South Korea. *SSRN Electronic Journal* . [Crossref]

204. Sung-Hee Jeon, R. Vincent Pohl. 2016. Health and Work in the Family: Evidence from Spouses' Cancer Diagnoses. *SSRN Electronic Journal* . [Crossref]

205. Jean-Paul Decamps, Sebastian Gryglewicz, Erwan Morellec, Stephane Villeneuve. 2016. Corporate Policies with Permanent and Transitory Shocks. *SSRN Electronic Journal* . [Crossref]

206. Lorenz Kueng. 2016. Tax News: The Response of Household Spending to Changes in Expected Taxes. *SSRN Electronic Journal* . [Crossref]

207. Yulei Luo, Jun Nie, Gaowang Wang, Eric R. Young. 2016. Rational Inattention and Dynamics of Consumption and Wealth in General Equilibriumm. *SSRN Electronic Journal* . [Crossref]

208. Marc A. C. Hafstead, Roberton C. Williams. 2016. Unemployment and Environmental Regulation in General Equilibrium. *SSRN Electronic Journal* . [Crossref]

209. Jeppe Druedahl, Thomas JJrgensen. 2016. Persistent vs. Permanent Income Shocks in the Buffer-Stock Model. *SSRN Electronic Journal* . [Crossref]

210. Domenico Ferraro, Giuseppe Fiori. 2016. The Aging of the Baby Boomers: Demographics and Propagation of Tax Shocks. *SSRN Electronic Journal* . [Crossref]

211. Ryan Michaels, Beau Page. 2016. Labor and Capital Dynamics Under Financing Frictions. *SSRN Electronic Journal* . [Crossref]

212. Zhen Cui, Yalan Feng. 2016. The Wealthy Hand-To-Mouth in China. *SSRN Electronic Journal* . [Crossref]

213. Greg Kaplan, Kurt Mitman, Giovanni L. Violante. 2016. Non-Durable Consumption and Housing Net Worth in the Great Recession: Evidence from Easily Accessible Data. *SSRN Electronic Journal* . [Crossref]

214. Yavuz Arslan, Bulent Guler, Temel Taskin. 2016. Price Search, Consumption Inequality, and Expenditure Inequality Over the Life Cycle. *SSRN Electronic Journal* . [Crossref]

215. Ali Alichi, Kory Kantenga, Juan Sole. 2016. Income Polarization in the United States. *IMF Working Papers* **16**:121, 1. [Crossref]

216. Haiyan Ding, Hui He. 2016. A Tale of Transition: An Empirical Analysis of Economic Inequality in Urban China, 1986-2009. *IMF Working Papers* **16**:239, 1. [Crossref]

217. Johannes Ludwig. 2015. The role of education and household composition for transitory and permanent income inequality–evidence from PSID data. *Journal of Macroeconomics* **46**, 129-146. [Crossref]

218. Chloe N. East, Elira Kuka. 2015. Reexamining the consumption smoothing benefits of Unemployment Insurance. *Journal of Public Economics* **132**, 32-50. [Crossref]

219. Jonathan Fisher, David S. Johnson, Timothy M. Smeeding. 2015. Inequality of Income and Consumption in the U.S.: Measuring the Trends in Inequality from 1984 to 2011 for the Same Individuals. *Review of Income and Wealth* **61**:4, 630-650. [Crossref]

220. Tom Krebs, Moritz Kuhn, Mark L. J. Wright. 2015. Human Capital Risk, Contract Enforcement, and the Macroeconomy. *American Economic Review* **105**:11, 3223-3272. [Abstract] [View PDF article] [PDF with links]

221. Juan Carlos Hatchondo, Leonardo Martinez, Juan M. Sánchez. 2015. Mortgage defaults. *Journal of Monetary Economics* **76**, 173-190. [Crossref]

222. Grey Gordon. 2015. Evaluating default policy: The business cycle matters. *Quantitative Economics* **6**:3, 795-823. [Crossref]

223. Samuel Bazzi, Sudarno Sumarto, Asep Suryahadi. 2015. It's all in the timing: Cash transfers and consumption smoothing in a developing country. *Journal of Economic Behavior & Organization* **119**, 267-288. [Crossref]

224. Christian Bayer, Falko Juessen. 2015. Happiness and the Persistence of Income Shocks. *American Economic Journal: Macroeconomics* **7**:4, 160-187. [Abstract] [View PDF article] [PDF with links]

225. Gang Sun. 2015. Complete markets strikes back: Is the reduced-form measure of consumption insurance reliable?. *Review of Economic Dynamics* **18**:4, 921-930. [Crossref]

226. James Feigenbaum, Geng Li. 2015. Household income uncertainties over three decades. *Oxford Economic Papers* **67**:4, 963-986. [Crossref]

227. Mark Aguiar, Mark Bils. 2015. Has Consumption Inequality Mirrored Income Inequality?. *American Economic Review* **105**:9, 2725-2756. [Abstract] [View PDF article] [PDF with links]

228. Alessandra Voena. 2015. Yours, Mine, and Ours: Do Divorce Laws Affect the Intertemporal Behavior of Married Couples?. *American Economic Review* **105**:8, 2295-2332. [Abstract] [View PDF article] [PDF with links]

229. Rodolfo G. Campos, Iliana Reggio. 2015. Consumption in the shadow of unemployment. *European Economic Review* **78**, 39-54. [Crossref]

230. Ben Etheridge. 2015. A test of the household income process using consumption and wealth data. *European Economic Review* **78**, 129-157. [Crossref]

231. Mikhail Golosov, Aleh Tsyvinski. 2015. Policy Implications of Dynamic Public Finance. *Annual Review of Economics* **7**:1, 147-171. [Crossref]

232. Richard Blundell, Michael Graber, Magne Mogstad. 2015. Labor income dynamics and the insurance from taxes, transfers, and the family. *Journal of Public Economics* **127**, 58-73. [Crossref]

233. LORENZO POZZI. 2015. The Time-Varying Volatility of Earnings and Aggregate Consumption Growth. *Journal of Money, Credit and Banking* **47**:4, 551-580. [Crossref]

234. Taisuke Nakata, Christopher Tonetti. 2015. Small Sample Properties of Bayesian Estimators of Labor Income Processes. *Journal of Applied Economics* **18**:1, 121-148. [Crossref]

235. Dimitris Christelis, Dimitris Georgarakos, Tullio Jappelli. 2015. Wealth shocks, unemployment shocks and consumption in the wake of the Great Recession. *Journal of Monetary Economics* **72**, 21-41. [Crossref]

236. Martin Ellison, Thomas J. Sargent. 2015. Welfare Cost of Business Cycles with Idiosyncratic Consumption Risk and a Preference for Robustness. *American Economic Journal: Macroeconomics* **7**:2, 40-57. [Abstract] [View PDF article] [PDF with links]

237. Stefano Eusepi, Bruce Preston. 2015. Consumption heterogeneity, employment dynamics and macroeconomic co-movement. *Journal of Monetary Economics* **71**, 13-32. [Crossref]

238. Sarolta Laczó. 2015. RISK SHARING WITH LIMITED COMMITMENT AND PREFERENCE HETEROGENEITY: STRUCTURAL ESTIMATION AND TESTING. *Journal of the European Economic Association* **13**:2, 265-292. [Crossref]

239. Masakatsu Okubo. 2015. Earnings Dynamics and Profile Heterogeneity: Estimates from Japanese Panel Data. *Japanese Economic Review* **66**:1, 112-146. [Crossref]

240. Claudio Michelacci, Hernán Ruffo. 2015. Optimal Life Cycle Unemployment Insurance. *American Economic Review* **105**:2, 816-859. [Abstract] [View PDF article] [PDF with links]

241. Rolf Aaberge, Magne Mogstad. 2015. Inequality in current and lifetime income. *Social Choice and Welfare* **44**:2, 217-230. [Crossref]

242. Donald O. Parsons. Job Displacement Insurance 819-832. [Crossref]

243. Markus Jäntti, Stephen P. Jenkins. Income Mobility 807-935. [Crossref]

244. Scott R. Baker. 2015. Debt and the Consumption Response to Household Income Shocks. *SSRN Electronic Journal* . [Crossref]

245. Dmytro Hryshko, Chinhui Juhn, Kristin McCue. 2015. Trends in Earnings Inequality and Earnings Instability Among U.S. Couples: How Important is Assortative Matching?. *SSRN Electronic Journal* . [Crossref]
246. Scott R. Baker, Constantine Yannelis. 2015. Income Changes and Consumption: Evidence from the 2013 Federal Government Shutdown. *SSRN Electronic Journal* . [Crossref]
247. Guay C. Lim, Sarantis Tsiaplias. 2015. Financial Stress Thresholds and Household Equivalence Scales. *SSRN Electronic Journal* . [Crossref]
248. Orazio Attanasio, Costas Meghir, Corina Mommaerts. 2015. Insurance in Extended Family Networks. *SSRN Electronic Journal* . [Crossref]
249. Siddhartha Biswas, Indraneel Chakraborty, Rong Hai. 2015. Income Inequality, Tax Policy, and Economic Growth. *SSRN Electronic Journal* . [Crossref]
250. Estelle P. Dauchy, Nathan Seegert. 2015. Decomposing Consumption Inequality: The Contribution of Income Dispersion and Taxation. *SSRN Electronic Journal* . [Crossref]
251. Leandro de Magalhaes, Raul Santaeulalia-Llopis. 2015. The Consumption, Income, and Wealth of the Poorest: Cross-Sectional Facts of Rural and Urban Sub-Saharan Africa for Macroeconomists. *SSRN Electronic Journal* . [Crossref]
252. Shu Cai, Albert Park. 2015. Permanent Income and Subjective Well-Being. *SSRN Electronic Journal* . [Crossref]
253. Luc Arrondel, Pierre Lamarche, Frederique Savignac. 2015. Wealth Effects on Consumption Across the Wealth Distribution: Empirical Evidence. *SSRN Electronic Journal* . [Crossref]
254. Thomas HHgholm JJrgensen. 2015. Life-Cycle Consumption and Children: Evidence from a Structural Estimation. *SSRN Electronic Journal* . [Crossref]
255. Tullio Jappelli, Mario Padula. 2015. The Consumption and Wealth Effects of an Unanticipated Change in Lifetime Resources. *SSRN Electronic Journal* . [Crossref]
256. HwaJung Choi, Kathleen M. McGarry, Robert F. Schoeni. 2015. Liquidity Constraints, the Extended Family, and Consumption. *SSRN Electronic Journal* . [Crossref]
257. Hai-Anh Dang, Peter F. Lanjouw, Umar Serajuddin. 2015. Updating Poverty Estimates in the Absence of Regular and Comparable Consumption Data: Methods and Illustration with Reference to a Middle-Income Country. *SSRN Electronic Journal* . [Crossref]
258. Juan Carlos Hatchondo, Leonardo Martinez, Juan M. Sanchez. 2015. Mortgage Defaults. *SSRN Electronic Journal* . [Crossref]
259. Pedro Manuel Carneiro, Italo Lopez Garcia, Kjell G. Salvanes, Emma Tominey. 2015. Intergenerational Mobility and the Timing of Parental Income. *SSRN Electronic Journal* . [Crossref]
260. Jun Nie, Yulei Luo, Eric Young. 2015. Robust Permanent Income in General Equilibrium. *SSRN Electronic Journal* . [Crossref]
261. Mariacristina De Nardi. 2015. Quantitative Models of Wealth Inequality. *SSRN Electronic Journal* . [Crossref]
262. Kadir Atalay, Fayzan Bakhtiar, Stephen Cheung, Robert Slonim. 2014. Savings and prize-linked savings accounts. *Journal of Economic Behavior & Organization* **107**, 86-106. [Crossref]
263. Dmytro Hryshko. 2014. Correlated income shocks and excess smoothness of consumption. *Journal of Economic Dynamics and Control* **48**, 41-62. [Crossref]
264. Orazio P. Attanasio, Margherita Borella. 2014. MODELING MOVEMENTS IN INDIVIDUAL CONSUMPTION: A TIME-SERIES ANALYSIS OF GROUPED DATA. *International Economic Review* **55**:4, 959-991. [Crossref]

265. Fatih Guvenen, Anthony A. Smith. 2014. Inferring Labor Income Risk and Partial Insurance From Economic Choices. *Econometrica* **82**:6, 2085-2129. [Crossref]

266. Mette Ejrnaes, Martin Browning. 2014. The persistent-transitory representation for earnings processes. *Quantitative Economics* **5**:3, 555-581. [Crossref]

267. Michael Amior, Jonathan Halket. 2014. Do households use home-ownership to insure themselves? Evidence across U.S. cities. *Quantitative Economics* **5**:3, 631-674. [Crossref]

268. Daniel Barczyk, Matthias Kredler. 2014. Altruistically motivated transfers under uncertainty. *Quantitative Economics* **5**:3, 705-749. [Crossref]

269. Tullio Jappelli, Luigi Pistaferri. 2014. Fiscal Policy and MPC Heterogeneity. *American Economic Journal: Macroeconomics* **6**:4, 107-136. [Abstract] [View PDF article] [PDF with links]

270. Lorenzo Cappellari, Stephen P. Jenkins. 2014. Earnings and labour market volatility in Britain, with a transatlantic comparison. *Labour Economics* **30**, 201-211. [Crossref]

271. Manuel Arellano. 2014. UNCERTAINTY, PERSISTENCE, AND HETEROGENEITY: A PANEL DATA PERSPECTIVE. *Journal of the European Economic Association* **12**:5, 1127-1153. [Crossref]

272. Kenneth S. Chan, Jennifer T. Lai, Isabel K.M. Yan. 2014. Consumption risk sharing and self-insurance across provinces in China: 1952–2008. *China Economic Review* **30**, 66-85. [Crossref]

273. Keshab Bhattarai, Huw Dixon. 2014. Equilibrium Unemployment in a General Equilibrium Model with Taxes. *The Manchester School* **82**, 90-128. [Crossref]

274. Marina Azzimonti, Eva de Francisco, Vincenzo Quadrini. 2014. Financial Globalization, Inequality, and the Rising Public Debt. *American Economic Review* **104**:8, 2267-2302. [Abstract] [View PDF article] [PDF with links]

275. Huiyu Li, John Stachurski. 2014. Solving the income fluctuation problem with unbounded rewards. *Journal of Economic Dynamics and Control* **45**, 353-365. [Crossref]

276. Martin Browning, Thomas F. Crossley, Joachim Winter. 2014. The Measurement of Household Consumption Expenditures. *Annual Review of Economics* **6**:1, 475-501. [Crossref]

277. Jonathan Heathcote, Kjetil Storesletten, Giovanni L. Violante. 2014. Consumption and Labor Supply with Partial Insurance: An Analytical Framework. *American Economic Review* **104**:7, 2075-2126. [Abstract] [View PDF article] [PDF with links]

278. Sisi Zhang. 2014. Wage shocks, household labor supply, and income instability. *Journal of Population Economics* **27**:3, 767-796. [Crossref]

279. Till van Treeck. 2014. DID INEQUALITY CAUSE THE U.S. FINANCIAL CRISIS?. *Journal of Economic Surveys* **28**:3, 421-448. [Crossref]

280. François Gourio, Nicolas Roys. 2014. Size-dependent regulations, firm size distribution, and reallocation. *Quantitative Economics* **5**:2, 377-416. [Crossref]

281. Orazio Attanasio, Luigi Pistaferri. 2014. Consumption Inequality over the Last Half Century: Some Evidence Using the New PSID Consumption Measure. *American Economic Review* **104**:5, 122-126. [Abstract] [View PDF article] [PDF with links]

282. Richard Blundell. 2014. Income Dynamics and Life-cycle Inequality: Mechanisms and Controversies. *The Economic Journal* **124**:576, 289-318. [Crossref]

283. Otto Kässi. 2014. Earnings dynamics of men and women in Finland: permanent inequality versus earnings instability. *Empirical Economics* **46**:2, 451-477. [Crossref]

284. Rodolfo G. Campos, Iliana Reggio. 2014. Measurement error in imputation procedures. *Economics Letters* **122**:2, 197-202. [Crossref]

285. William Jack, Tavneet Suri. 2014. Risk Sharing and Transactions Costs: Evidence from Kenya's Mobile Money Revolution. *American Economic Review* **104**:1, 183-223. [Abstract] [View PDF article] [PDF with links]

286. Paul Beaudry, Franck Portier. 2014. Understanding Noninflationary Demand-Driven Business Cycles. *NBER Macroeconomics Annual* **28**:1, 69-130. [Crossref]

287. BRADLEY HARDY, JAMES P. ZILIAK. 2014. DECOMPOSING TRENDS IN INCOME VOLATILITY: THE "WILD RIDE" AT THE TOP AND BOTTOM. *Economic Inquiry* **52**:1, 459-476. [Crossref]

288. Sebnem Kalemli-Ozcan, Emiliano Luttini, Bent Sørensen. 2014. Debt Crises and Risk-Sharing: The Role of Markets versus Sovereigns. *The Scandinavian Journal of Economics* **116**:1, 253-276. [Crossref]

289. George M. Constantinides, Anisha Ghosh. 2014. Asset Pricing with Countercyclical Household Consumption Risk. *SSRN Electronic Journal* . [Crossref]

290. Jawad M. Addoum, Stefanos Delikouras, George M. Korniotis. 2014. License to Spend: Consumption-Income Sensitivity and Household Portfolio Choice. *SSRN Electronic Journal* . [Crossref]

291. Adriano A. Rampini, S. Viswanathan. 2014. Household Risk Management. *SSRN Electronic Journal* . [Crossref]

292. Rodolfo G Campos, Iliana G. Reggio. 2014. Consumption in the Shadow of Unemployment. *SSRN Electronic Journal* . [Crossref]

293. Mariacristina Rossi, Serena Trucchi. 2014. Liquidity Constraints and Labor Supply. *SSRN Electronic Journal* . [Crossref]

294. Dimitris Christelis, Dimitris Georgarakos, Tullio Jappelli. 2014. Wealth Shocks, Unemployment Shocks and Consumption in the Wake of the Great Recession. *SSRN Electronic Journal* . [Crossref]

295. Raul Santaeulalia, Yu Zheng. 2014. Partial Insurance and Aggregate Welfare in China, 1989-2009. *SSRN Electronic Journal* . [Crossref]

296. Thomas HHgholm JJrgensen. 2014. Euler Equation Estimation: Children and Credit Constraints. *SSRN Electronic Journal* . [Crossref]

297. Thomas HHgholm JJrgensen. 2014. Life-Cycle Consumption and Children. *SSRN Electronic Journal* . [Crossref]

298. Tom Krebs, Moritz Kuhn, Mark L. J. Wright. 2014. Human Capital Risk, Contract Enforcement, and the Macroeconomy. *SSRN Electronic Journal* . [Crossref]

299. Dongweon Lee. 2014. Elasticity of Intertemporal Substitution and Unemployment Volatility. *SSRN Electronic Journal* . [Crossref]

300. Jun Nie, Yulei Luo, Gaowang Wang, Eric R. Young. 2014. What We Don't Know Doesn't Hurt Us: Rational Inattention and the Permanent Income Hypothesis in General Equilibrium. *SSRN Electronic Journal* . [Crossref]

301. Charles Chuan He. 2014. Innovating to Equality: The Egalitarian Distribution of Welfare from the Rise of Consumer Electronics. *SSRN Electronic Journal* . [Crossref]

302. Nayoung Lee, Hyungsik Roger Moon. 2014. Heterogeneous Income Profiles Model with Fixed Effects: Incorporating Health Shocks as an Application. *SSRN Electronic Journal* . [Crossref]

303. Ethan Cohen-Cole, Burcu Duygan-Bump, Judit Montoriol-Garriga. 2013. Who gets credit after bankruptcy and why? An information channel. *Journal of Banking & Finance* **37**:12, 5101-5117. [Crossref]

304. Alexander Bick, Sekyu Choi. 2013. Revisiting the effect of household size on consumption over the life-cycle. *Journal of Economic Dynamics and Control* **37**:12, 2998-3011. [Crossref]

305. Natalia Khorunzhina. 2013. Structural estimation of stock market participation costs. *Journal of Economic Dynamics and Control* **37**:12, 2928-2942. [Crossref]

306. Marcos Chamon, Kai Liu, Eswar Prasad. 2013. Income uncertainty and household savings in China. *Journal of Development Economics* **105**, 164-177. [Crossref]

307. Tobias Broer. 2013. The Wrong Shape of Insurance? What Cross-Sectional Distributions Tell Us about Models of Consumption Smoothing. *American Economic Journal: Macroeconomics* **5**:4, 107-140. [Abstract] [View PDF article] [PDF with links]

308. Salvador Ortigueira, Nawid Siassi. 2013. How important is intra-household risk sharing for savings and labor supply?. *Journal of Monetary Economics* **60**:6, 650-666. [Crossref]

309. Rodolfo G. Campos, Iliana Reggio, Dionisio García-Píriz. 2013. Micro versus macro consumption data: the cyclical properties of the consumer expenditure survey. *Applied Economics* **45**:26, 3778-3785. [Crossref]

310. Vadym Lepetyuk, Christian A. Stoltenberg. 2013. Policy Announcements and Welfare. *The Economic Journal* **123**:571, 962-997. [Crossref]

311. Tuomas Malinen. 2013. Inequality, Savings, and Consumption: A Reassessment of the Relationships in Cointegrated Panels. *Applied Economics Quarterly* **59**:3, 235-251. [Crossref]

312. MORITZ KUHN. 2013. RECURSIVE EQUILIBRIA IN AN AIYAGARI-STYLE ECONOMY WITH PERMANENT INCOME SHOCKS. *International Economic Review* **54**:3, 807-835. [Crossref]

313. Fatih Karahan, Serdar Ozkan. 2013. On the persistence of income shocks over the life cycle: Evidence, theory, and implications. *Review of Economic Dynamics* **16**:3, 452-476. [Crossref]

314. Emil P. Iantchev. 2013. Asset-pricing implications of biologically based non-expected utility. *Review of Economic Dynamics* **16**:3, 497-510. [Crossref]

315. Paul Bingley, Lorenzo Cappellari, Niels Westergård-Nielsen. 2013. Unemployment Insurance, Wage Dynamics and Inequality Over the Life Cycle. *The Economic Journal* **123**:568, 341-372. [Crossref]

316. Michael D. Gillespie. 2013. The Economic Deterioration of the Family: Historical Contingencies Preceding the Great Recession. *American Journal of Economics and Sociology* **72**:2, 329-360. [Crossref]

317. Richard Herd. 2013. The evolution of China's social policies. *Economic Change and Restructuring* **46**:1, 109-141. [Crossref]

318. Jingkui Zhou. 2013. Uncertainty, inequality and consumption preferences in urban China. *Economic Modelling* **31**, 308-322. [Crossref]

319. Paul Klein, Irina A. Telyukova. 2013. Measuring high-frequency income risk from low-frequency data. *Journal of Economic Dynamics and Control* **37**:3, 535-542. [Crossref]

320. Richard Blundell, Hamish Low, Ian Preston. 2013. Decomposing changes in income risk using consumption data. *Quantitative Economics* **4**:1, 1-37. [Crossref]

321. Enrico Moretti. 2013. Real Wage Inequality. *American Economic Journal: Applied Economics* **5**:1, 65-103. [Abstract] [View PDF article] [PDF with links]

322. Raj Chetty, Amy Finkelstein. Social Insurance: Connecting Theory to Data 111-193. [Crossref]

323. Mikhail Golosov, Maxim Troshkin, Aleh Tsyvinski, Matthew Weinzierl. 2013. Preference heterogeneity and optimal capital income taxation. *Journal of Public Economics* **97**, 160-175. [Crossref]

324. Simon Sturn, Till van Treeck. The Role of Income Inequality as a Cause of the Great Recession and Global Imbalances 125-152. [Crossref]

325. Keshav Dogra, Olga Gorbachev. 2013. Consumption Volatility, Liquidity Constraints and Household Welfare. *SSRN Electronic Journal* . [Crossref]

326. Yuyu Chen, Yana Huang, Hui Wang. 2013. How do Households Respond to Income Shocks: Evidence from Urban China from 1992 to 2003. *SSRN Electronic Journal* . [Crossref]

327. Vadym Lepetyuk, Christian A. Stoltenberg. 2013. Reconciling Consumption Inequality with Income Inequality. *SSRN Electronic Journal* . [Crossref]

328. Francois Gourio, Nicolas Roys. 2013. Size-Dependent Regulations, Firm Size Distribution, and Reallocation. *SSRN Electronic Journal* . [Crossref]

329. Markus Jantti, Stephen P. Jenkins. 2013. Income Mobility. *SSRN Electronic Journal* . [Crossref]

330. Jonathan E. Goldberg. 2013. Idiosyncratic Investment Risk and Business Cycles. *SSRN Electronic Journal* . [Crossref]

331. Michael Kumhof, Romain Ranciere, Pablo Winant. 2013. Inequality, Leverage and Crises: The Case of Endogenous Default. *IMF Working Papers* **13**:249, 1. [Crossref]

332. Hilary W. Hoynes, Erzo F.P. Luttmer. 2012. Reprint of: The insurance value of state tax-and-transfer programs. *Journal of Public Economics* **96**:11-12, 1110-1128. [Crossref]

333. Greg Kaplan. 2012. Inequality and the life cycle. *Quantitative Economics* **3**:3, 471-525. [Crossref]

334. Francesco Figari. 2012. Cross-national differences in determinants of multiple deprivation in Europe. *The Journal of Economic Inequality* **10**:3, 397-418. [Crossref]

335. Hung-Hao Chang. 2012. Consumption inequality between farm and nonfarm households in Taiwan: a decomposition analysis of differences in distribution. *Agricultural Economics* **43**:5, 487-498. [Crossref]

336. Dmytro Hryshko. 2012. Labor income profiles are not heterogeneous: Evidence from income growth rates. *Quantitative Economics* **3**:2, 177-209. [Crossref]

337. Claudia M. Buch. 2012. Has Labor Income Become More Volatile? Evidence from International Industry-Level Data. *German Economic Review* **10**, n/a-n/a. [Crossref]

338. Joachim K. Winter, Kathrin Schlafmann, Ralf Rodepeter. 2012. Rules of Thumb in Life-Cycle Saving Decisions. *The Economic Journal* **122**:560, 479-501. [Crossref]

339. Bradley L. Hardy. 2012. Black Female Earnings and Income Volatility. *The Review of Black Political Economy* **39**:4, 465-475. [Crossref]

340. Tomoaki Yamada. 2012. Income risk, macroeconomic and demographic change, and economic inequality in Japan. *Journal of Economic Dynamics and Control* **36**:1, 63-84. [Crossref]

341. Orazio P. Attanasio, Renata Bottazzi, Hamish W. Low, Lars Nesheim, Matthew Wakefield. 2012. Modelling the demand for housing over the life cycle. *Review of Economic Dynamics* **15**:1, 1-18. [Crossref]

342. Jason Matthew DeBacker, Bradley T. Heim, Vasia Panousi, Ivan Vidangos. 2012. Rising Inequality: Transitory or Permanent? New Evidence from a Panel of U.S. Tax Returns 1987-2006. *SSRN Electronic Journal* . [Crossref]

343. Francesco Giavazzi, Michael F. McMahon. 2012. The Household E ffects of Government Spending. *SSRN Electronic Journal* . [Crossref]

344. Ralph S. J. Koijen, Stijn Van Nieuwerburgh, Roine Vestman. 2012. Judging the Quality of Survey Data by Comparison with 'Truth' as Measured by Administrative Records: Evidence from Sweden. *SSRN Electronic Journal* . [Crossref]

345. Alessandra Voena. 2012. Yours, Mine and Ours: Do Divorce Laws Affect the Intertemporal Behavior of Married Couples?. *SSRN Electronic Journal* . [Crossref]

346. Jose Maria Casado. 2012. Consumption Partial Insurance of Spanish Households. *SSRN Electronic Journal* . [Crossref]

347. Dimitris Christelis, Dimitris Georgarakos, Tullio Jappelli. 2012. Wealth Shocks, Unemployment Shocks and Consumption in the Wake of the Great Recession. *SSRN Electronic Journal* . [Crossref]

348. Martin Beznoska, Richard R. Ochmann. 2012. Liquidity Constraints and the Permanent Income Hypothesis: Pseudo Panel Estimation with German Consumption Survey Data. *SSRN Electronic Journal* . [Crossref]

349. Leonardo Martinez, Juan Carlos Hatchondo, Juan M. Sanchez. 2012. Mortgage Defaults. *IMF Working Papers* **12**:26, 1. [Crossref]

350. Hilary W. Hoynes, Erzo F.P. Luttmer. 2011. The insurance value of state tax-and-transfer programs. *Journal of Public Economics* **95**:11-12, 1466-1484. [Crossref]

351. Shane T. Jensen, Stephen H. Shore. 2011. Semiparametric Bayesian Modeling of Income Volatility Heterogeneity. *Journal of the American Statistical Association* **106**:496, 1280-1290. [Crossref]

352. Andreas Fuster, Paul S. Willen. 2011. Insuring Consumption Using Income-Linked Assets*. *Review of Finance* **15**:4, 835-873. [Crossref]

353. David Lagakos, Guillermo L. Ordoñez. 2011. Which workers get insurance within the firm?. *Journal of Monetary Economics* **58**:6-8, 632-645. [Crossref]

354. Olga Gorbachev. 2011. Did Household Consumption Become More Volatile?. *American Economic Review* **101**:5, 2248-2270. [Abstract] [View PDF article] [PDF with links]

355. Donggyun Shin, Gary Solon. 2011. Trends in men's earnings volatility: What does the Panel Study of Income Dynamics show?. *Journal of Public Economics* **95**:7-8, 973-982. [Crossref]

356. Jonas D. M. Fisher, Martin Gervais. 2011. WHY HAS HOME OWNERSHIP FALLEN AMONG THE YOUNG?*. *International Economic Review* **52**:3, 883-912. [Crossref]

357. Tullio Jappelli, Luigi Pistaferri. 2011. Financial Integration and Consumption Smoothing. *The Economic Journal* **121**:553, 678-706. [Crossref]

358. Robert E. Hall. 2011. The Long Slump. *American Economic Review* **101**:2, 431-469. [Abstract] [View PDF article] [PDF with links]

359. José María Casado. 2011. From income to consumption: measuring households partial insurance. *Empirical Economics* **40**:2, 471-495. [Crossref]

360. Pilar García-Gómez, Hans-Martin von Gaudecker, Maarten Lindeboom. 2011. Health, disability and work: patterns for the working age population. *International Tax and Public Finance* **18**:2, 146-165. [Crossref]

361. Costas Meghir, Luigi Pistaferri. Earnings, Consumption and Life Cycle Choices 773-854. [Crossref]

362. Sean D. Campbell, Danling Jiang, George M. Korniotis. 2011. The Human Capital That Matters: Expected Returns and High-Income Households. *SSRN Electronic Journal* . [Crossref]

363. Alexander Bick, Sekyu Choi. 2011. Life-Cycle Consumption: Can Single Agent Models Get it Right?. *SSRN Electronic Journal* . [Crossref]

364. Dimitris Christelis, Dimitris Georgarakos, Tullio Jappelli. 2011. Wealth Shocks, Unemployment Shocks and Consumption in the Wake of the Great Recession. *SSRN Electronic Journal* . [Crossref]

365. Mohammad Hassan Fotros, Reza Maaboudi. 2011. Impact of Income Inequality on Consumption Expenditures Inequality: A Case Study of Iranian Households, 1966-2008. *SSRN Electronic Journal* . [Crossref]

366. James J. Feigenbaum, Geng Li. 2011. Household Income Uncertainties Over Three Decades. *SSRN Electronic Journal* . [Crossref]

367. Greg Kaplan. 2011. Inequality and the Lifecycle. *SSRN Electronic Journal* . [Crossref]

368. Andrew Figura. 2011. Have Cyclical Movements in the Unemployment Rate Become More Persistent?. *SSRN Electronic Journal* . [Crossref]

369. Natalia Khorunzhina. 2011. Dynamic Stock Market Participation of Households. *SSRN Electronic Journal* . [Crossref]

370. Jason Matthew DeBacker, Bradley T. Heim, Ivan Vidangos, Vasia Panousi. 2011. Rising Inequality: Transitory or Permanent? New Evidence from a U.S. Panel of Household Income 1987-2006. *SSRN Electronic Journal* . [Crossref]

371. David Lagakos, Guillermo L. Ordonez. 2011. Which Workers Get Insurance within the Firm?. *SSRN Electronic Journal* . [Crossref]

372. Paul Beaudry, Franck Portier. 2011. A Gains from Trade Perspective on Macroeconomic Fluctuations. *SSRN Electronic Journal* . [Crossref]

373. Juan Carlos Hatchondo, Leonardo Martinez, Juan M. Sanchez. 2011. Mortgage Defaults. *SSRN Electronic Journal* . [Crossref]

374. Martin Gervais, Paul Klein. 2010. Measuring consumption smoothing in CEX data. *Journal of Monetary Economics* **57**:8, 988-999. [Crossref]

375. Dmytro Hryshko, María José Luengo-Prado, Bent E. Sørensen. 2010. House prices and risk sharing. *Journal of Monetary Economics* **57**:8, 975-987. [Crossref]

376. Greg Kaplan,, Giovanni L. Violante. 2010. How Much Consumption Insurance Beyond Self-Insurance?. *American Economic Journal: Macroeconomics* **2**:4, 53-87. [Abstract] [View PDF article] [PDF with links]

377. MARTIN BROWNING, METTE EJRNAES, JAVIER ALVAREZ. 2010. Modelling Income Processes with Lots of Heterogeneity. *Review of Economic Studies* **77**:4, 1353-1381. [Crossref]

378. Angus C. Chu. 2010. Effects of Patent Policy on Income and Consumption Inequality in a R&D Growth Model. *Southern Economic Journal* **77**:2, 336-350. [Crossref]

379. Tullio Jappelli, Luigi Pistaferri. 2010. The Consumption Response to Income Changes. *Annual Review of Economics* **2**:1, 479-506. [Crossref]

380. Orazio P. Attanasio,, Guglielmo Weber. 2010. Consumption and Saving: Models of Intertemporal Allocation and Their Implications for Public Policy. *Journal of Economic Literature* **48**:3, 693-751. [Abstract] [View PDF article] [PDF with links]

381. Charles Grant. 2010. Evidence on the insurance effect of bankruptcy exemptions. *Journal of Banking & Finance* **34**:9, 2247-2254. [Crossref]

382. Ki Seong Park, Donggyun Shin. 2010. How Do Families Smooth Household Heads' Earnings Volatility?. *Journal of Economic Research (JER)* **15**:1, 79-97. [Crossref]

383. Igor Livshits,, James MacGee,, Michèle Tertilt. 2010. Accounting for the Rise in Consumer Bankruptcies. *American Economic Journal: Macroeconomics* **2**:2, 165-193. [Abstract] [View PDF article] [PDF with links]

384. Hanno Lustig, Stijn Van Nieuwerburgh. 2010. How much does household collateral constrain regional risk sharing?. *Review of Economic Dynamics* **13**:2, 265-294. [Crossref]

385. Yuriy Gorodnichenko, Klara Sabirianova Peter, Dmitriy Stolyarov. 2010. Inequality and volatility moderation in Russia: Evidence from micro-level panel data on consumption and income. *Review of Economic Dynamics* **13**:1, 209-237. [Crossref]

386. Josep Pijoan-Mas, Virginia Sánchez-Marcos. 2010. Spain is different: Falling trends of inequality. *Review of Economic Dynamics* **13**:1, 154-178. [Crossref]

387. Richard Blundell, Ben Etheridge. 2010. Consumption, income and earnings inequality in Britain. *Review of Economic Dynamics* **13**:1, 76-102. [Crossref]

388. David Domeij, Martin Flodén. 2010. Inequality trends in Sweden 1978–2004. *Review of Economic Dynamics* **13**:1, 179-208. [Crossref]

389. Jonathan Heathcote, Fabrizio Perri, Giovanni L. Violante. 2010. Unequal we stand: An empirical analysis of economic inequality in the United States, 1967–2006. *Review of Economic Dynamics* **13**:1, 15-51. [Crossref]

390. Tullio Jappelli, Luigi Pistaferri. 2010. Does consumption inequality track income inequality in Italy?. *Review of Economic Dynamics* **13**:1, 133-153. [Crossref]

391. Kazuhiko Hayakawa. 2010. A Unit Root Test for Micro Panels with Serially Correlated Errors. *SSRN Electronic Journal* . [Crossref]

392. Andreas Fuster, Paul Willen. 2010. Insuring Consumption Using Income-Linked Assets. *SSRN Electronic Journal* . [Crossref]

393. Yasar Fatih Karahan, Serdar Ozkan. 2010. On the Persistence of Income Shocks Over the Life Cycle: Evidence and Implications, Second Version. *SSRN Electronic Journal* . [Crossref]

394. Monica Ospina. 2010. CCT Programs for Consumption Insurance: Evidence from Colombia. *SSRN Electronic Journal* . [Crossref]

395. Kai Liu, Marcos Chamon, Eswar Prasad. 2010. Income Uncertainty and Household Savings in China. *IMF Working Papers* **10**:289, 1. [Crossref]

396. Gottschalk Peter, Moffitt Robert. 2009. The Rising Instability of U.S. Earnings. *Journal of Economic Perspectives* **23**:4, 3-24. [Abstract] [View PDF article] [PDF with links]

397. Raj Chetty. 2009. Sufficient Statistics for Welfare Analysis: A Bridge Between Structural and Reduced-Form Methods. *Annual Review of Economics* **1**:1, 451-488. [Crossref]

398. Jonathan Heathcote, Kjetil Storesletten, Giovanni L. Violante. 2009. Quantitative Macroeconomics with Heterogeneous Households. *Annual Review of Economics* **1**:1, 319-354. [Crossref]

399. Charles Grant, Winfried Koeniger. 2009. Redistributive Taxation and Personal Bankruptcy in U.S. States. *The Journal of Law and Economics* **52**:3, 445-467. [Crossref]

400. Pedro Albarran, Raquel Carrasco, Maite Martinez-Granado. 2009. Inequality for Wage Earners and Self-Employed: Evidence from Panel Data. *Oxford Bulletin of Economics and Statistics* **71**:4, 491-518. [Crossref]

401. Katja Kaufmann,, Luigi Pistaferri. 2009. Disentangling Insurance and Information in Intertemporal Consumption Choices. *American Economic Review* **99**:2, 387-392. [Citation] [View PDF article] [PDF with links]

402. Richard Blundell. 2009. Assessing the Temporary VAT Cut Policy in the UK. *Fiscal Studies* **30**:1, 31-38. [Crossref]

403. Kartik Athreya, Xuan S. Tam, Eric R. Young. 2009. Unsecured credit markets are not insurance markets. *Journal of Monetary Economics* **56**:1, 83-103. [Crossref]

404. Fabrizio Perri. 2009. Comment on: "Unsecured credit markets are not insurance markets" by Kartik Athreya, Xuan S. Tam and Eric R. Young. *Journal of Monetary Economics* **56**:1, 104-108. [Crossref]

405. Jonas D. M. Fisher, Martin Gervais. 2009. Why Has Home Ownership Fallen among the Young?. *SSRN Electronic Journal* . [Crossref]

406. Joseph G. Altonji, Anthony A. Smith, Ivan Vidangos. 2009. Modeling Earnings Dynamics. *SSRN Electronic Journal* . [Crossref]

407. Yuriy Gorodnichenko, Klara Sabirianova Peter, Dmitriy Stolyarov. 2009. Inequality and Volatility Moderation in Russia: Evidence from Micro-Level Panel Data on Consumption and Income. *SSRN Electronic Journal* . [Crossref]

408. Stefano Eusepi, Bruce J. Preston. 2009. Labor Supply Heterogeneity and Macroeconomic Comovement. *SSRN Electronic Journal* . [Crossref]

409. Yasar Fatih Karahan, Serdar Ozkan. 2009. On the Persistence of Income Shocks Over the Life Cycle: Evidence and Implications. *SSRN Electronic Journal* . [Crossref]

410. Jonathan Heathcote, Kjetil Storesletten, Giovanni L. Violante. 2008. Insurance and opportunities: A welfare analysis of labor market risk. *Journal of Monetary Economics* **55**:3, 501-525. [Crossref]

411. Mario Tirelli, Sergio Turner. 2008. Quantifying Inefficiency in Incomplete Asset Markets. *SSRN Electronic Journal* . [Crossref]

412. James W. Banks, Peter A. Diamond. 2008. The Base for Direct Taxation. *SSRN Electronic Journal* . [Crossref]

413. Yosef Bonaparte. 2008. The Equity Premium Puzzle: A Reconciliation. *SSRN Electronic Journal* . [Crossref]

414. Gang Sun. 2008. Insure the Uninsurable by Yourself: Accounting for Consumption Insurance in a Life-Cycle Model. *SSRN Electronic Journal* . [Crossref]

415. Michael J. Artis, Mathias Hoffmann. 2007. Financial Globalization, International Business Cycles, and Consumption Risk Sharing. *SSRN Electronic Journal* . [Crossref]