How Do Persistent Earnings Affect the Response of Consumption to Transitory Shocks? Replicating the Results of Arellano et al (2021)

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Although my sample is in the US while they study Spain, my results are not inconsistent with the finding of Felgueroso, García-Pérez, Jansen, and Troncoso-Ponce 2018 and Arellano, Bonhomme, De Vera, Hospido, and Wei 2021 that 'inequality in income risk is related to the prevalence of high unemployment, but also to the large share of short-term temporary employment'.[1] I do two things: first, I show that I can reproduce the result of Arellano, Bonhomme, De Vera, Hospido, and Wei 2021 that the coefficient of variation of future income is decreasing in current income; second, I show that I can also reproduce their result that that this is driven by people with low or zero earnings (not employed or with low attachment to the labor market) and that, among people who declare themselves as employed in the survey, the coefficient of variation of future earnings is not significantly related to current earnings, as would be the case with the specification that I rely on. Indeed, the income specification I assume implies the following coefficient of variation:

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\begin{aligned}
CV_t^i &= \frac{\sqrt{var_t^i(y_{t+1}^i)}}{E_t^i[y_{t+1}^i]} \\
&= \frac{(e^{p_t^i})^\rho e^{\bar{\varepsilon}} e^{\alpha^i} e^{g(t+1)} sd_t^i(e^{\eta_{t+1}^i}) sd_t^i(e^{\varepsilon_{t+1}^i - \bar{\varepsilon}})(1 - p_{v_t^i})}{(e^{p_t^i})^\rho e^{\bar{\varepsilon}} e^{\alpha^i} e^{g(t+1)} E_t^i[e^{\eta_{t+1}^i}] E_t^i[e^{\varepsilon_{t+1}^i - \bar{\varepsilon}}](1 - p_{v_t^i})} \\
&= \frac{sd_t^i(e^{\eta_{t+1}^i}) sd_t^i(e^{\varepsilon_{t+1}^i - \bar{\varepsilon}})}{E_t^i[e^{\eta_{t+1}^i}] E_t^i[e^{\varepsilon_{t+1}^i - \bar{\varepsilon}}]}
\end{aligned}
$$

By assumption, these standard deviations and expected values are independent of earnings because, conditional on demographics and period dummies and on the unemployment status, people draw shocks from the same distributions. Importantly, the probability of non-employment $p_{v_t^i}$ cancels out from the expression of the coefficient of variation. Therefore, the negative effect of persistent earnings on the probability of non-employment cannot explain the negative

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[1] See p.8 in Arellano, Bonhomme, De Vera, Hospido, and Wei 2021.

relation between the coefficient and persistent earnings that Arellano, Bonhomme, De Vera, Hospido, and Wei 2021 document. However, what can explain it is that, my specification only implies the coefficient of variation is independent of earnings among employed people, while Arellano, Bonhomme, De Vera, Hospido, and Wei 2021 include unemployed people and people with low attachment to the labor market, with low earnings and presumably a high coefficient of variation, in their exercise.

Method. I use two different methods to compute the effect of income (or earnings) on the coefficient of variation of future income (or earnings). With the first one, which I refer to as the 'group-level' method, I compute the coefficients of variations within a group of respondents that have the same set of predictors. This gives a sense of the risks faced by people with these characteristics. This is close to what Arellano, Bonhomme, De Vera, Hospido, and Wei 2021 do. More precisely I measure the mean absolute deviation and mean of income (or earnings) among groups of individuals with the same demographic characteristics (the ones I use to build persistent earnings), same type of job (public, private for profit, non-profit, family business or other) and same job sector—either in which they are or were employed—at each period. For individuals within a group with the same characteristics, the coefficient of variation is the ratio of the mean absolute deviation of income (or earnings) within their group over the mean of income (or earnings) within their group. I regress people's coefficient of variation over their mean income (or earnings) at the previous quarter, that is, the mean income (or earnings) at the previous quarter within the group they belonged to at the previous quarter. The first column reports the coefficient of this regression. The sample is the people in the selected group for whom I observe current income (or earnings), current wealth, and at one least one current MPC.

With the second method, which I refer to as the 'individual-level' method, I use my individual-level measure of variance and of the expected value of future income (or earnings), based on questions about the probability that respondents attribute to different possible states of the world. I build the individual-level coefficient of variation of future income (or earnings) as the square-root of the individual-level variance of future income (or earnings) over the individual-level expected value of future income (or earnings). At the same time, I observe the current annual income (or earnings) of the respondents. I thus regress this current annual income (or earnings) over the individual-level coefficient of variation, controlling for the demographics I use to build persistent earnings and for period dummies. The second column reports the coefficient of this regression. The sample selection is the same as with the first method, but there are more missing observations.

Results. Table 1 presents these results. The first column of the first line shows that the finding of Arellano, Bonhomme, De Vera, Hospido, and Wei 2021 is true in my survey data: the coefficients of variations built within groups are decreasing with the past income within groups.

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CV	Group-level variance	Individual variance
Income, all	-2.83e-07**	-5.53e-07
	(1.37e-07)	(4.61e-07)
Observations	528	461
R^2	0.0081	0.0322
Earnings, all	-5.84e-07***	-3.81e-06***
	(2.04e-07)	(1.26e-06)
Observations	484	445
R^2	0.0167	0.0495
Earnings, employed	-3.99e-07	8.32e-08
	(2.53e-07)	(8.95e-08)
Observations	1,239	5,298
R^2	0.0167	0.0053

Robust standard errors in parentheses. * at 10%, ** at 5%, *** at 1%.

Table 1: Effect of persistent earnings on the variance of future earnings

Incidentally, I also regress the coefficients of variation within groups over the current income within groups and the relation is negative as well. In the second column of the first line, the effect of income on the coefficient of variation of future income is still negative with the individual-level measures, but no longer significant.

The second line shows that this relation is even stronger for earnings when I still include both employed and non-employed people. This is not surprising since non-employed people have zero earnings, so their current earnings are presumably lower than their current income, while the coefficient of variation of their future earnings is larger.

The third line shows that the negative relationship disappears when the regressions are run only among employed people. This confirms the validity of my assumption that among employed people the coefficient of variation is independent of persistent earnings. However, the first two lines do suggest that unemployed people do not draw their shocks from the same distributions as others because their coefficient of variation is higher. This is the main reason why I focus on employed respondents, and select out the non-employed.