

# Financial Innovation and the Great Moderation

## What Do the Household Data Say?

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Discussion by Christopher D. Carroll  
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at the San Francisco Fed

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I am very grateful to Stephen Shore of Wharton, many of whose insights on this paper I have stolen

## The Big Point

Friedman [1957]-Muth [1960] framework is reasonable for both micro and macro data:

$$\underbrace{\log P_{t+1}}^{p_{t+1}} = \underbrace{\log P_t}_{p_t} + \psi_{t+1} \quad (1)$$

$$\underbrace{\log Y_{t+1}}_{y_{t+1}} = p_{t+1} + \theta_{t+1} \quad (2)$$

Variances of quarterly shocks are *vastly* different:

	$\sigma_{\psi}^2$	$\sigma_{\theta}^2$
NIPA	0.00004	0.00001
PSID	0.00400	0.12

## So What?

If question is 'What effect has financial innovation had in helping individuals insulate spending against income shocks, ' then

- There is no “puzzle”
- Aggregate variation is essentially irrelevant
- Household data is only sensible way to answer this

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## Definitions and Facts

Define  $\underline{p}_i$  as permanent income for household  $i$  at age 25

- ‘Initial Heterogeneity’:  $\text{var}(\underline{p}_{t,i})$
- ‘Inequality’:  $\text{var}(y_{t,i})$ 
  - Has increased (Levy, Katz, Solon,  $\infty$  others)
- ‘Instability’:  $\text{var}(y_{t,i} - \underline{p}_{t,i})$ 
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# A Terminological Critique

- Word ‘volatility’ is used pervasively, even when one of the other terms should be used
- Table 3 is labeled as being about volatility of earnings *growth* at the household level, broken down by the contribution of permanent variance and transitory variance
- A table that uses these words ought to be about  $\sigma_{\psi}^2$  and  $\sigma_{\theta}^2$ ; it is actually about how the deviations of household income from average household income have changed over time.

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## Transitory vs Permanent Shock Sizes

- Suppose  $\sigma_{\psi}^2$  suddenly increases
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## An Example: Air Traffic Controllers

- Suppose wages were
  - Before Jan 1981: \$120,000 a year
  - After Jan 1981: \$60,000 a year
- Suppose average wages for everyone else remain constant at \$60,000
- Suppose PSID data were available from 1979-1982

How would the authors' method decompose this into 'transitory' and 'permanent' components?

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## Authors' Answer Depends on Split Year!

Split In:	Y	1981		1980		1982	
		Perm	Tran	Perm	Tran	Perm	Tran
1979	120	120	0	120	0	100	20
1980	120	120	0	80	40	100	20
1981	60	60	0	80	-20	100	-40
1982	60	60	0	80	-20	60	0

- Big literature finds strong evidence that  $\sigma_{\psi}^2 > 0$
- If  $\sigma_{\psi}^2 > 0$ , paper's measures of Tran and Perm variance depend on *number of periods* in each sample
- Unclear whether all, some, or none of the measured Tran and Perm components are predictable

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## Literature

Lillard and Willis [1981], MaCurdy [1982], Hall and Mishkin [1982], Abowd and Card [1987], Carroll [1992], Carroll and Samwick [1997], Gottschalk and Moffitt [1997, 2002], Pistaferri (several papers), Meghir, Low, Storesletten Telmer and Yaron, Cocco Gomes and Maenhout, Skyt Nielsen and Vissing-Jorgensen [2006], Shore [2006]

## Transitory/Permanent Decomposition

Define

$$\nabla_{t,i}^d = (y_{t+d,i} - y_{t,i})^2 \quad (3)$$

$$\bar{\nabla}_t^d = \text{Mean}(\nabla_{t,i}^d) \quad (4)$$

Then it is easy to show that for  $d > 2$

$$\bar{\nabla}_t^d = 2\sigma_\theta^2 + d\sigma_\psi^2 \quad (5)$$

so the estimated variances of the transitory and permanent shocks can be obtained from

$$\hat{\sigma}_\psi^2 = \hat{\alpha}_1 \quad (6)$$

$$\hat{\sigma}_\theta^2 = \hat{\alpha}_0/2 \quad (7)$$

# What Financial Innovation Can And Cannot Do

- Rise in  $\sigma_{\psi}^2$ 
  - Can do very little. If permanent income changes, you can't borrow your way out of the problem.
- Rise in heterogeneity
  - Can do even less, because this is *really* permanent
- Rise in  $\sigma_{\theta}^2$ 
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## What the Authors Show

In a regression of the form

$$\Delta c_{t+1} = \gamma_0 + \gamma_1 \Delta y_{t+1} \quad (8)$$

$\gamma_1$  changes from about 0.08 in the pre-1985 period to about 0.04 in the post-1985 period.

But unconstrained Friedman-Muth PIH says

$$\gamma_1 = \left( \frac{\sigma_\psi^2}{\sigma_\psi^2 + \sigma_\theta^2} \right) \quad (9)$$

and paper does not examine how  $\sigma_\psi^2$  and  $\sigma_\theta^2$  have changed.  
Connection to financial market innovation...?

## A Cool Fact

One finding that *is* inconsistent with the Friedman/Muth model is the difference between the MPC's out of increases in income and decreases in income.

IF the measured  $\Delta y_{t+1,i}$  terms were purely unpredictable transitory shocks to income, this difference *might* be interpretable as a measure of the 'concavity' of the consumption function.

- Whole-sample concavity is disappointingly small
  - $0.064 - 0.048 = 0.016$
- Comparing whole-sample concavity to post-85 yields
  - $0.046 - 0.040 = 0.006$  for later period
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## Covariances

One more collection of facts in the paper that seem to be novel (or at least were to me)

Group households by observable characteristics (e.g. sex)

- Aggregate shocks to subgroups are becoming weaker (e.g. fewer shocks to ‘women’ as a whole)
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