

# How Large Is the Housing Wealth Effect?

## A New Approach<sup>†</sup>

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# Self-Defense

- ▶ Not Clear What “The Housing Wealth Effect” Means
- ▶ Purism Not An Option For Central Bankers
- ▶ Operational Definition:
  - ▶ If  $B$  Goes Down By \$1 trillion, What Should I Forecast for  $C$ ?
  - ▶ Might Reflect Credit Channel, Other Transmission Mechanisms

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## 50s–70s Keynesians Regressed $C$ on $Y$ and $B$

1978 (DAVIDSON, HENDRY, SRBA, & YEO, 1978) Rigorized

- ▶ (Hall, 1978) Killed It

2001– Return of The Undead Zombie Estimation Method!

- ▶ (Lettau & Ludvigson, 2001), (Davis & Palumbo, 2001), (Bertaut, 2002), (Byrne & Davis, 2003), (Fernandez-Corugedo, Price, & Blake, 2003), (Pichette & Tremblay, 2003), (Catte, Girouard, Price, & Andre, 2004), (Lettau & Ludvigson, 2004), (Fisher, Otto, & Voss, 2005), (Hamburg, Hoffmann, & Keller, 2005), (Muellbauer, 2007)

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- ▶ Drive A Stake Through the Zombie's Heart!
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## Example Of When It *Would* Work?

- ▶ Small Open Economy, Everything Exogenous
- ▶ Consumption Determined By Perfect Foresight formula:

$$C_t = \underbrace{(1 - R^{-1}(R\beta)^{1/\rho})}_{\equiv \kappa} B_t$$

- ▶ Unanticipated Shocks to  $B_t$

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# When Would It Go Wrong?

If any aspect of the economy changes:

- ▶ Growth, Demographics, Taxes, Social Security Generosity, Interest Rates, . . .

# Expected Long-Run Productivity Growth Has Changed

Source	Date	Horizon	Prediction
DRI <sup>‡</sup>	1976	25 Years	2.5
SSA <sup>†</sup>	1981	65 Years	2.2
SSA <sup>†</sup>	1986	65 Years	2.1
SSA <sup>†</sup>	1991	65 Years	1.5
SPF	1996	10 Years	1.5
SPF	2001	10 Years	2.5
SPF	2006	10 Years	2.4

<sup>†</sup>: Cited by Viard (1993)

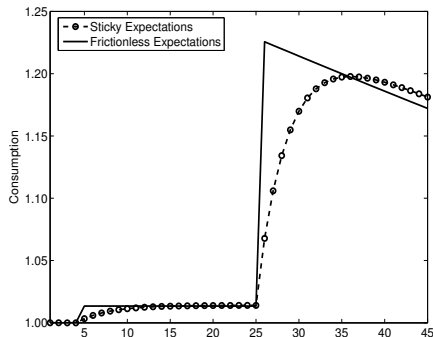
<sup>‡</sup>: Interpolated between 1974 and 1978-79 forecasts



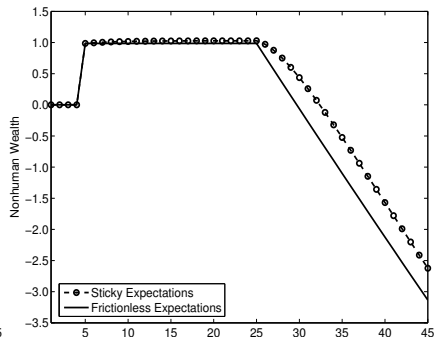
# Example: How Cointegration Can Go Horribly Wrong

Shock to  $b$  of 1 followed by shock to  $g$  (from 1.5% to 2.5%)

Consumption



Market Wealth



# MPC Estimated with Cointegration

$$c_t = \kappa b_t + \varepsilon_t$$

True $\kappa$	Estimated $\kappa$		
	$n = 20$	$n = 40$	$n = 60$
0.0137	-0.0486	-0.0185	-0.0082

# Our Alternative: Exploit Sluggishness in $\Delta C_t$

(Campbell & Deaton, 1989), (Constantinides, 1990), (Rotemberg & Woodford, 1997), (Fuhrer, 2000), (Sommer, 2002), (Carroll, Sommer, & Slacalek, 2011)

$$\Delta C_t = \chi \mathbb{E}_{t-2} \Delta C_{t-1} + \varepsilon_t \quad (1)$$

Interpretations of  $\chi$ :

- ▶ Habit formation
- ▶ Sticky Expectations

$\varepsilon_t$  still captures shocks

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# Immediate and Eventual MPCs

$$\Delta C_t = \chi \mathbb{E}_{t-2} \Delta C_{t-1} + \alpha \Delta B_{t-1} + \varepsilon_t$$

$$\text{Immediate MPC} : \frac{\alpha}{\chi}$$

$$\text{Eventual MPC} : \bar{\kappa} = \frac{\alpha}{\chi(1-\chi)}$$

# MPC Estimated with COS Method

$$\Delta C_t = \chi \mathbb{E}_{t-2} \Delta C_{t-1} + \alpha \Delta B_{t-1} + \varepsilon_t$$

True		Estimated					
		$n = 20$		$n = 40$		$n = 60$	
$\chi$	$\bar{\kappa}$	$\chi$	$\alpha/\chi(1-\chi)$	$\chi$	$\alpha/\chi(1-\chi)$	$\chi$	$\alpha/\chi(1-\chi)$
0.75		0.694		0.724		0.734	
0.75	0.0137	0.698	0.0117	0.741	0.0136	0.751	0.0067

# Estimating Aggregate Consumption Dynamics

- ▶ Following (Sommer, 2002), estimate  $\chi$  using IV
  - ▶ OLS biased down due to measurement error, transitory  $C$ , time aggregation
- ▶ Instruments: Lagged wealth growth, unemployment expectations, Fed funds rate



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# Estimating MPC out of Wealth

- ▶ The first-stage regression:

$$\partial C_t = \alpha_0 + \alpha_b \partial B_{t-1}$$

$$\partial C_t \equiv (C_t - C_{t-1})/C_{t-5}$$

$$\partial B_{t-1} \equiv (B_{t-1} - B_{t-2})/C_{t-5}$$

- ▶  $\alpha_b$  estimates MPC in  $t$  out of a change in wealth in  $t-1$ .
- ▶ Similarly  $\alpha_F$  and  $\alpha_H$  in

$$\partial C_t = \alpha_0 + \alpha_F \partial B_{t-1}^F + \alpha_H \partial B_{t-1}^H$$

- ▶ Calculate the “eventual” MPC as

$$MPC^{LR} = \frac{\alpha}{\chi(1-\chi)}$$

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## A Digression

- ▶ To increase precision, estimate MPCW  $\alpha_b$  in

$$\partial C_t = \alpha_b \bar{\partial} B_{t-1} + \alpha_z^\top Z_{t-1} + \varepsilon_t,$$

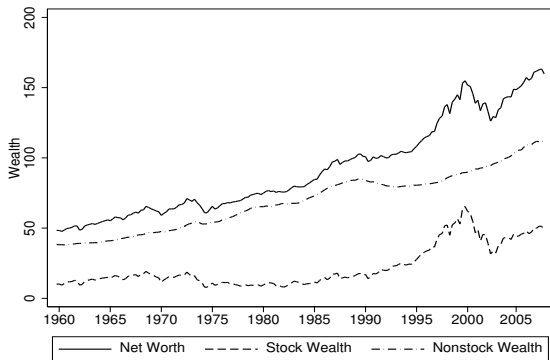
where

$\bar{\partial} B_{t-1} \equiv (\Delta B_{t-1} + \chi \Delta B_{t-2} + \chi^2 \Delta B_{t-3} + \chi^3 \Delta B_{t-4}) / C_{t-5}$   
and  $Z_t$  are control variables (Fed funds rate and Michigan unemployment expectations)

# Data

Full sample 1960Q1–2007Q4

Wealth and consumption in per capita real terms (2000 \$)



Household Wealth: source Flow of Funds

Consumption: total PCE; source BEA



# Immediate Effect of Wealth on Consumption

Full Sample (1960Q1–2007Q4)

$$\partial C_t = \alpha_0 + \alpha_1 \bar{\partial} B_{t-1} + \alpha_2 \bar{\partial} B_{t-1}^F + \alpha_3 \bar{\partial} B_{t-1}^H + \alpha_4 MU_{t-1} + \alpha_5 FF_{t-1}$$

Next-Quarter Effect of \$1 Change in Wealth			Extra Variables		Test of $\bar{\partial} B^F = \bar{\partial} B^H$	$\bar{R}^2$
Total $\bar{\partial} B_{t-1}$	Financial $\bar{\partial} B_{t-1}^F$	Housing $\bar{\partial} B_{t-1}^H$	Unemp Exp $MU_{t-1}$	Fed Fund $FF_{t-1}$		
0.017*** (0.004)						0.130
0.011*** (0.003)			0.089*** (0.031)	-0.385* (0.205)		0.228
	0.016*** (0.004)	0.039*** (0.011)			0.066	0.138
	0.008*** (0.003)	0.018** (0.008)	0.082** (0.034)	-0.411* (0.211)	0.271	0.225

# Consumption Growth Momentum and the Eventual MPC

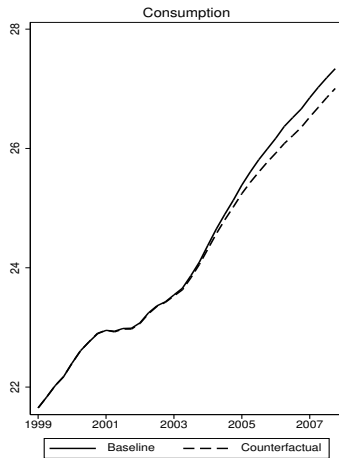
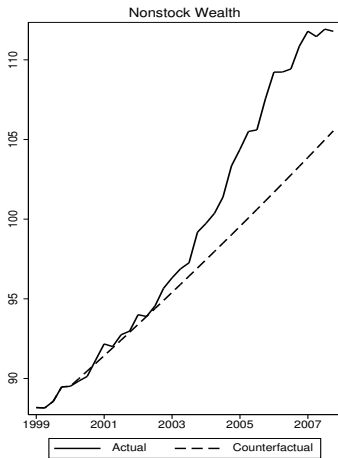
Full Sample (1960Q1–2007Q4)

$$\partial C_{t+1} = c_0 + \chi \mathbb{E}_{t-1} \partial C_t + \varepsilon_{t+1}$$

Variables used to forecast	Consumption Growth Momentum Coefficient	Implied Eventual MPC out of		
		Total $B$	Financial $B^F$	Housing $B^H$
$\mathbb{E}_{t-1} \partial C_t$	$\chi$			
$B$	0.58** (0.23)	0.070		
$B,$ $MU, FF$	0.76*** (0.14)	0.048		
$B^F, B^H$	0.45** (0.20)		0.064	0.159
$B^F, B^H,$ $MU, FF$	0.71*** (0.13)		0.041	0.087

# Counterfactual Simulation: No Housing Bubble

Consumption Lower by 1.5 Percent by 2007Q4



Note: 000's of 2000 \$, per capita

# Recent Increase in Housing WE, Fall in Stock WE

Recent Sample (1985Q1–2007Q4)

$$\partial C_{t+1} = c_0 + \chi \mathbb{E}_{t-1} \partial C_t + \varepsilon_{t+1}$$

Variables used to forecast	Consumption Growth Momentum Coefficient	Implied Eventual MPC out of		
		Total $B$	Financial $B^F$	Housing $B^H$
$\mathbb{E}_{t-1} \partial C_t$	$\chi$			
$B$	0.58** (0.23)	0.044		
$B,$ $MU, FF$	0.76*** (0.14)	0.032		
$B^F, B^H$	0.45** (0.20)		0.035	0.164
$B^F, B^H,$ $MU, FF$	0.71*** (0.13)		0.028	0.121

## International Evidence—Country Groups (Long-Run MPCs)

Country	Wealth		
	Total	Financial	Housing
All Countries	1.97***	2.77***	1.19***
Anglo-Saxon	5.86***	6.40***	5.30***
Non Anglo-Saxon	0.84**	1.74**	0.16
p val: AS = Non AS	0.000	0.001	0.000
Market-Based	3.70***	3.79***	3.76***
Bank-Based	0.74*	2.02**	0.08
p val: MB = BB	0.000	0.101	0.000
Euro Area	0.78**	1.83**	0.12
Non Euro Area	4.21***	4.60***	3.88***
p val: EA = Non EA	0.000	0.014	0.000

# International Evidence—Pre- and Post-1989

Country Group	Full Sample			Pre-1989			1989 And Later		
	Total	Financial	Housing	Total	Financial	Housing	Total	Financial	Housing
All Countries	1.97***	2.77***	1.19***	1.36***	4.10***	-0.05	2.97***	3.08***	2.72***
Anglo-Saxon	5.86***	6.40***	5.30***	6.29***	8.66***	4.29**	6.18***	6.66***	5.75***
Non Anglo-Saxon	0.84**	1.74**	0.16	0.31	2.66***	-0.70	1.95***	1.96**	1.84***
Market-Based	3.70***	3.79***	3.76***	4.11***	5.23***	2.93***	4.28***	3.98***	4.68***
Bank-Based	0.74*	2.02**	0.08	-0.44	1.71	-1.09	2.20***	3.44***	1.63***
Euro Area	0.78**	1.83**	0.12	-0.74	1.04	-1.31	2.65***	3.80***	1.95***
Non Euro Area	4.21***	4.60***	3.88***	5.77***	7.62***	4.04***	3.94***	3.73***	4.20***

# Conclusions

## Housing wealth effect

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