Table 1
 Microeconomic Model Calibration

Calibrated Parameters			
Description	Parameter	Value	Source
Permanent Income Growth Factor	Φ	1.03	PSID: Carroll (1992)
Interest Factor	R	1.04	Conventional
Time Preference Factor	β	0.96	Conventional
Coefficient of Relative Risk Aversion	ρ	2	Conventional
Probability of Zero Income	\wp	0.005	PSID: Carroll (1992)
Std Dev of Log Permanent Shock	$\sigma_{f \Psi}$	0.1	PSID: Carroll (1992)
Std Dev of Log Transitory Shock	$\sigma_{ heta}$	0.1	PSID: Carroll (1992)

 Table 2
 Model Characteristics Calculated from Parameters

				Approximate
				Calculated
Description	Syı	nbol	and Formula	Value
Finite Human Wealth Factor	\mathcal{R}^{-1}	=	Φ/R	0.990
PF Value of Autarky Factor	コ	\equiv	$eta oldsymbol{\Phi}^{1- ho}$	0.932
Growth Compensated Permanent Shock	$\underline{\Psi}$	=	$(\mathbb{E}[\mathbf{\Psi}^{-1}])^{-1}$	0.990
Uncertainty-Adjusted Growth	$\underline{\Phi}$	=	$\Phi \underline{\Psi}$	1.020
Utility Compensated Permanent Shock	$\underline{\underline{\Psi}}$	=	$(\mathbb{E}[\mathbf{\Psi}^{1- ho}])^{1/(1- ho)}$	0.990
Utility Compensated Growth	$\underline{\Phi}$	=	$\Phi \underline{\Psi}$	1.020
Absolute Patience Factor	Þ	=	$(Reta)^{1/ ho}$	0.999
Return Patience Factor	\mathbf{p}_{R}	\equiv	\mathbf{P}/R	0.961
Growth Patience Factor	${\bf b}_\Phi$	\equiv	$\mathbf{P}/\mathbf{\Phi}$	0.970
Normalized Growth Patience Factor	$\Phi_{\underline{\Phi}}$	\equiv	$\mathbf{b}/\underline{\mathbf{\Phi}}$	0.980
Value of Autarky Factor	⊒	=	$\beta \mathbf{\Phi}^{1- ho} \underline{\underline{\Psi}}^{1- ho}$	0.941
Weak Return Impatience Factor	$\wp^{1/ ho}\mathbf{p}$	≡	$(\wp \beta R)^{1/ ho}$	0.071

 Table 3
 Definitions and Comparisons of Conditions

Perfect Foresight Versions	Uncertainty Versions			
Finite Human Wealth Condition (FHWC)				
$\mathbf{\Phi}/R < 1$	$\Phi/R < 1$			
The growth factor for permanent income Φ must be smaller than the discounting factor R for human wealth to be finite.	The model's risks are mean-preserving spreads, so the PDV of future income is unchanged by their introduction.			
Absolute Impatience	ce Condition (AIC)			
$\mathbf{p} < 1$	D < 1			
The unconstrained consumer is sufficiently impatient that the level of consumption will be declining over time: $\mathbf{c}_{t+1} < \mathbf{c}_t$	If wealth is large enough, the expectation of consumption next period will be smaller than this period's consumption:			
$C_{t+1} < C_t$	$\lim_{m_t o \infty} \mathbb{E}_t[\mathbf{c}_{t+1}] < \mathbf{c}_t$			
Return Impatience Conditions				
Return Impatience Condition (RIC)	Weak RIC (WRIC)			
P /R < 1	$\wp^{1/\rho}\mathbf{P}/R < 1$			
The growth factor for consumption \mathbf{p} must be smaller than the discounting factor R, so that the PDV of current and future consumption will be finite: $\mathbf{c}'(m) = 1 - \mathbf{p}/R < 1$	If the probability of the zero-income event is $\wp=1$ then income is always zero and the condition becomes identical to the RIC. Otherwise, weaker. $\mathbf{c}'(m)<1-\wp^{1/\rho}\mathbf{P}/R<1$			
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Growth Impatie				
GIC	GIC-Nrm			
$\mathbf{p}/\mathbf{\Phi} < 1$	$\mathbf{P}\mathbb{E}[\mathbf{\Psi}^{-1}]/\mathbf{\Phi} < 1$			
For an unconstrained PF consumer, the ratio of \mathbf{c} to \mathbf{p} will fall over time. For constrained, guarantees the constraint eventually binds. Guarantees $\lim_{m_t \uparrow \infty} \mathbb{E}_t[\Psi_{t+1} m_{t+1}/m_t] = \mathbf{p}_{\mathbf{\Phi}}$	By Jensen's inequality stronger than GIC. Ensures consumers will not expect to accumulate m unboundedly. $\lim_{m_t \to \infty} \mathbb{E}_t[m_{t+1}/m_t] = \mathbf{p}_{\underline{\Phi}}$			
Finite Value of Autarky Conditions				
PF-FVAC	FVAC			
$eta oldsymbol{\Phi}^{1- ho} < 1$ equivalently $oldsymbol{\Phi} < R^{1/ ho} oldsymbol{\Phi}^{1-1/ ho}$	$\beta \mathbf{\Phi}^{1-\rho} \mathbb{E}[\mathbf{\Psi}^{1-\rho}] < 1$			
The discounted utility of constrained consumers who spend their permanent income each period should be finite.	By Jensen's inequality, stronger than the PF-FVAC because for $\rho > 1$ and nondegenerate Ψ , $\mathbb{E}[\Psi^{1-\rho}] > 1$.			

Table 4 Sufficient Conditions for Nondegenerate[‡] Solution

Consumption Model(s)	Conditions	Comments
$\bar{\mathbf{c}}(m)$: PF Unconstrained	RIC, FHWC°	$RIC \Rightarrow v(m) < \infty; FHWC \Rightarrow 0 < v(m) $
$\underline{c}(m) = \underline{\kappa}m$		PF model with no human wealth $(h = 0)$
Section 2.5.3:		RIC prevents $\bar{\mathbf{c}}(m) = \underline{\mathbf{c}}(m) = 0$
Section 2.5.3:		FHWC prevents $\bar{\mathbf{c}}(m) = \infty$
Eq (21) :		$PF-FVAC+FHWC \Rightarrow RIC$
Eq (22):		$GIC+FHWC \Rightarrow PF-FVAC$
$\grave{c}(m)$: PF Constrained	GIC, RIC	FHWC holds ($\Phi < \Phi < R \Rightarrow \Phi < R$)
Section 2.5.6:		$\grave{\mathbf{c}}(m) = \bar{\mathbf{c}}(m) \text{ for } m > m_{\#} < 1$
		(RHC would yield $m_{\#} = 0$ so $\grave{c}(m) = 0$)
Appendix E:	GIC,RIC	$\lim_{m\to\infty} \dot{c}(m) = \bar{c}(m), \lim_{m\to\infty} \dot{\boldsymbol{k}}(m) = \underline{\kappa}$
		kinks where horizon to $b = 0$ changes*
Appendix E:	GIC,RIC	$\lim_{m\to\infty} \dot{\mathbf{k}}(m) = 0$
		kinks where horizon to $b = 0$ changes*
c(m): Friedman/Muth	Section 3.1,	$\underline{\mathbf{c}}(m) < \mathbf{c}(m) < \overline{\mathbf{c}}(m)$
	Section 3.2	$\underline{\mathbf{v}}(m) < \mathbf{v}(m) < \bar{\mathbf{v}}(m)$
Section 2.10:	FVAC, WRIC	Sufficient for Contraction
Section 2.12:		WRIC is weaker than RIC
Figure 3:		FVAC is stronger than PF-FVAC
Section 2.12.2:		EHWC+RIC \Rightarrow GIC, $\lim_{m\to\infty} \kappa(m) = \underline{\kappa}$
Section 2.12.1:		RHC \Rightarrow EHWC, $\lim_{m\to\infty} \kappa(m) = 0$
Section 3.3:		"Buffer Stock Saving" Conditions
Section 3.3.2:		GIC $\Rightarrow \exists \ \check{m} \text{ s.t. } 0 < \check{m} < \infty$
Section 3.3.1:		GIC-Nrm $\Rightarrow \exists \hat{m} \text{ s.t. } 0 < \hat{m} < \infty$

[‡]For feasible m satisfying $0 < m < \infty$, a nondegenerate limiting consumption function defines a unique optimal value of c satisfying $0 < c(m) < \infty$; a nondegenerate limiting value function defines a corresponding unique value of $-\infty < \mathrm{v}(m) < 0$.

[°]RIC, FHWC are necessary as well as sufficient for the perfect foresight case. *That is, the first kink point in c(m) is $m_{\#}$ s.t. for $m < m_{\#}$ the constraint will bind now, while for $m > m_{\#}$ the constraint will bind one period in the future. The second kink point corresponds to the m where the constraint will bind two periods in the future, etc.

^{**}In the Friedman/Muth model, the RIC+FHWC are sufficient, but not necessary for nondegeneracy

 Table 5
 Taxonomy of Perfect Foresight Liquidity Constrained Model Outcomes

 For constrained \grave{c} and unconstrained \bar{c} consumption functions

Main Condition				
Subcondition		Math		Outcome, Comments or Results
SIC		1 <	$\mathbf{P}/\mathbf{\Phi}$	Constraint never binds for $m \geq 1$
and RIC	⊅ /R	< 1		FHWC holds $(R > \Phi)$;
				$\grave{\mathbf{c}}(m) = \bar{\mathbf{c}}(m) \text{ for } m \ge 1$
and RIC		1 <	\mathbf{P}/R	$\grave{c}(m)$ is degenerate: $\grave{c}(m) = 0$
GIC	$\mathbf{p}/\mathbf{\Phi}$	< 1	•	Constraint binds in finite time $\forall m$
and RIC	Þ /R	< 1		FHWC may or may not hold
	,			$\lim_{m\uparrow\infty} \bar{\mathbf{c}}(m) - \grave{\mathbf{c}}(m) = 0$
				$\lim_{m\uparrow\infty} \hat{\boldsymbol{\kappa}}(m) = \underline{\kappa}$
and RHC		1 <	\mathbf{P}/R	EHWC
			•	$\lim_{m\uparrow\infty} \dot{\boldsymbol{\kappa}}(m) = 0$

Conditions are applied from left to right; for example, the second row indicates conclusions in the case where GIC and RIC both hold, while the third row indicates that when the GIC and the RIC both fail, the consumption function is degenerate; the next row indicates that whenever the GICholds, the constraint will bind in finite time.