Discussion of “Housing Collateral and Consumption Insurance Across US Regions”

by

Hanno Lustig and Stijn van Nieuwerburgh

Dirk Krueger

UPenn, University of Frankfurt, CEPR and NBER

Econometric Society Winter Meetings in Philadelphia
January 8, 2005
Introduction

- Fact 1: Households’ consumption is not perfectly insured against idiosyncratic income shocks. Degree of insurance varies over time.

- Fact 2: Value of U.S. housing stock varies substantially over time.

- Question: Causality?

- Mechanism: Households borrow to smooth nondurable consumption. How much they can borrow is determined by the value of their housing collateral. Changes in the value of the housing stock over time thus determines time variation in households’ ability to insure income risk.
a household chooses not to honor its debt repayments, it loses all housing collateral but its labor income is protected from creditors. Defaulting households regain immediate access to credit markets. The lack of commitment gives rise to collateral constraints whose tightness depends on the relative abundance of housing collateral. Most other authors in this literature take the outside option upon default to be exclusion from future participation in financial markets (e.g. Kehoe and Levine (1993), Krueger (2000), Krueger and Perri (2003), and Kehoe and Perri (2002)). In these models there is no similar mechanism that generates shocks to the risk sharing technology, unless the statistical properties of the labor income process itself change over time, as in Krueger and Perri (2003).

The housing collateral ratio shifts the conditional distribution of household consumption growth between two benchmark economies. If the ratio is zero, all households. In the limit, when there is no collateral, no risk sharing is possible and the economy is in autarky. In contrast, when collateralizable housing wealth is sufficiently high relative to non-collateralizable human wealth, the collateral constraints never bind and the economy achieves full insurance, like an economy without commitment problems.

To prevent a household from defaulting today, its current and future consumption must increase as a share of aggregate consumption when it enters a state with a binding constraint. These increases are larger when there is a shortage of housing collateral. In a first pass at the
The Model

- Continuum of regions. Representative household within each region

- Endowments of nondurable, tradeable consumption good $\eta_t(y^t, z^t)$ and nontradable houses $h_t(y^t, z^t)$. Law of large numbers applies.

- Preferences representable by

\[
U(c, h) = \sum_{y^t, z^t} \beta^t \pi(y^t, z^t) \left[ \frac{c_t(y^t, z^t)^{1-\gamma} + \psi r_e_t(y^t, z^t)^{1-\gamma}}{1 - \gamma} \right]
\]
• Budget constraint of agent $j$

\[
ct + \rho_t(j)rt + \sum_{(y', z')} q_t(y', s') a_t(y', s') + \int p_t(i) h_{t+1}(i) di \\
= \eta_t + a_{t-1}(y, z) + \int h_t(i) [p_t(i) + \rho_t(i)]
\]

• Collateral constraint

\[
-a_t(y', z') \leq \int h_{t+1}(i) [p_{t+1}(i) + \rho_{t+1}(i)]
\]
The Mechanism

- Consumption smoothing across dates/states is achieved via purchase of state-contingent Arrow securities \( a_t(y', z') \). Degree of consumption smoothing depends on tightness of constraints. Determined by

\[
my_{t+1} = \frac{\int \tilde{h}_{t+1}(i) \left[ p_{t+1}(i) + \rho_{t+1}(i) \right]}{\eta_{t+1}^a}
\]

- If \( \psi = 0 \), then \( \rho \equiv 0 \), thus \( p \equiv 0 \) and the collateral constraints become

\[
a_t(y', z') \geq 0
\]

Since Arrow securities are in zero net supply and there are no other assets by assumption, \( c_t \equiv \eta_t \) (autarky).
• On other extreme, perfect consumption insurance implies
\[ c^j_t(y^t, z^t) = \chi^j \eta^a_t \]

• Use budget constraints to back out \( \hat{a}_t(y^{t+1}, z^{t+1}) \) that support the full-risk sharing allocation. Note: currently low (idiosyncratic) \( \eta_t \) induces \( \hat{a}_t < 0 \). Higher variance of (the idiosyncratic part of) \( \eta_t \), requires more negative \( \hat{a}_t \) to support perfect consumption insurance.

• If
\[ -\hat{a}_t(y', z') < \int h_{t+1}(i) \left[ p_{t+1}(i) + \rho_{t+1}(i) \right] \]

for all \((y^{t+1}, z^{t+1})\), full insurance can be supported as an equilibrium.

• For large enough \( m_y \) this will happen. For intermediate values of \( m_y \) some, but not perfect consumption insurance.
Degree of Consumption Inurance

Degree of Consumption Insurance

Collateral Ratio my
The Quantitative Results

- Estimate (augmented) consumption insurance equation (e.g. Mace, 1991)

\[ \Delta \log(\hat{c}_{t+1}^i) = \beta_0^i + \beta_1 \Delta \log(\hat{y}_{t+1}^i) + \beta_2 m y_{t+1} \Delta \log(\hat{y}_{t+1}^i) + \nu_{t+1}^i \]

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>OLS (Row 1)</th>
<th>IV (Row 7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta_1 )</td>
<td>0.35 (0.03)</td>
<td>0.31 (0.04)</td>
</tr>
<tr>
<td>( \beta_2 )</td>
<td>-0.30 (0.26)</td>
<td>-0.32 (0.38)</td>
</tr>
</tbody>
</table>

- But: how much collateral is there in the U.S.?
How much Collateral is there?

Table 2: Fixed Assets and Consumer Durables, 2002 (Current Cost)

<table>
<thead>
<tr>
<th>Type of Asset</th>
<th>2002</th>
<th>% of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment and Software</td>
<td>4,350.8</td>
<td>41.5%</td>
</tr>
<tr>
<td>Structures</td>
<td>7,035.1</td>
<td>67.1%</td>
</tr>
<tr>
<td>Total Private Nonresidential Fixed Assets</td>
<td>11,386.0</td>
<td>108.6%</td>
</tr>
<tr>
<td>Residential Fixed Assets</td>
<td>12,195.9</td>
<td>116.4%</td>
</tr>
<tr>
<td>Consumer Durable Goods</td>
<td>3,268.5</td>
<td>31.2%</td>
</tr>
<tr>
<td>Total Private Fixed Assets and Durable Goods</td>
<td>26,850.4</td>
<td>256.2%</td>
</tr>
<tr>
<td>Government Fixed Assets</td>
<td>6,247.9</td>
<td>59.6%</td>
</tr>
<tr>
<td>Total Fixed Assets and Durable Goods</td>
<td>33,098.4</td>
<td>315.8%</td>
</tr>
</tbody>
</table>
So what?

- Model misses some collateral. What if added (or alternatively, if assets besides housing are not in zero net supply)? Do we obtain perfect consumption insurance (see Cordoba, 2004)?

- If so, what can be done?
  - Change punishment from default? Already seems as weak as can be. More severe punishments lead to more consumption insurance.
  - Add truly idiosyncratic income shocks. This increases variance of income shocks, makes required $\hat{a}_t$ more negative in certain states. Thus perfect consumption insurance less likely to occur.
Conclusion

- Paper makes a theoretical contribution: it endogenizes borrowing constraints.

- Paper makes an empirical contribution: shows that it can, at least in principle, explain the deviation from perfect consumption risk sharing in regional data.

- Big question: is the theory quantitatively successful? Conjecture: it implies too much (perfect?) consumption smoothing once all collateral in the economy is taken into account.