Motivation

• Recent crisis was characterised by a disruption in financial intermediation:
  
  – High leverage made banks vulnerable to variations in asset prices
  
  – Initial losses in the subprime market led to prolonged recession

• Policy intervention during the crisis has involved various unconventional measures

• Such measures have been highly controversial: redistribution of resources; moral hazard
Objectives

• Address two weaknesses of (most) existing models of financial intermediation:

  – Failure to explain differences in the response of the economy to shocks in normal times and in crisis periods (local behavior)

  – No theoretic framework to evaluate the welfare implications of redistributive policies like the ones observed
This Paper

- I compute the global solution of a DSGE model with two types of agents, i.e. depositors and bankers, in which an agency problem (occasionally) limits the ability of bankers to raise deposits
  - I demonstrate the model’s ability to replicate some salient features of financial crises
- Investigate the welfare implications of bailouts
  - Welfare costs to depositors of unexpected one time bailouts are significantly lower in crises periods
  - If crises are severe enough both depositors and bankers benefit from bailouts
  - These results are qualitatively not affected by moral hazard considerations
- Optimal policy: incomplete markets and pecuniary externalities
The Model

- RBC backbone
- Heterogenous agents:
  - Depositors: consume, supply labor and hold banks’ liabilities; GHH preferences
  - Bankers: consume, invest in capital and raise deposits; log preferences
  - Bankers’ are relatively impatient
- Limited Market participation: only bankers con invest in capital
- Incomplete markets: bankers con only issue risk-free short-term debt
- Capital quality shock

\[ y_t = a (\xi_t k_t)^\alpha l_t^{1-\alpha} \]

\[ k_{t+1} = (1 - \delta) \xi_t k_t + i_t \]

\[ \psi (i_t) = i_t (1 + f(i_t)) \]
Agency Problem

- After raising deposits the banker can divert a fraction $\theta$ of the total funds available to invest in capital.

- If the banker decides to divert funds at time $t$ he will be excluded from the asset market in subsequent periods.

- In autarky the banker has only access to a storage technology yielding $r = 1$. 
Banker's Problem

- Let $\bar{n}_t$ banker's wealth; $q_t$ the price of capital; $R_t$ the deposit rate; $R_{t+1}^k$ the return on capital
- The banker's value function solves

$$V_t(\bar{n}_t) = \max_{c_t^b, n_t, d_t, k_{t+1}, \bar{n}_{t+1}} \log(c_t^b) + \sigma E_t V_{t+1}(\bar{n}_{t+1})$$

$$c_t^b + n_t \leq \bar{n}_t \quad (1)$$

$$q_t k_{t+1} \leq n_t + \frac{d_t}{R_t} \quad (2)$$

$$\bar{n}_{t+1} \leq q_t k_{t+1} R_{t+1}^k - d_t \quad (3)$$

$$\sigma E_t V_{t+1}(\bar{n}_{t+1}) \geq \sigma V^{aut}(\theta q_t k_{t+1}) \quad (4)$$
Financial crises
Crises

(Incentive constraint binds at $t = 0$
probability of occurrence 2.32%)
A simple bailout policy is a one time unanticipated transfer from depositors to bankers.

I denote by $B$ the size of the bailout measured in terms of the percentage reduction in banks’ indebtedness associated with the transfers.

A simple bailout of size $B$ from a given state $s_t = (k_t, d_t, \xi_t)$ just moves the system to a new state $s_t' = (k_t, d_t (1 - B), \xi_t)$.
Impulse responses

(Dashed line impulse from threshold level of debt, \( (E_k(t), \bar{d}(E_k(t), \xi^l), \xi^l) \))

Solid line impulses with bailout size 5% \( (E_k(t), \bar{d}(E_k(t), \xi^l)(1 - 5%), \xi^l) \)
Welfare impact

- The increase in investment and output resulting from improved bankers’ balance sheets is typically not big enough to offset the direct wealth effect of transfers.

- However, the welfare costs of a bailout are much smaller during a crisis and can potentially become negative.

<table>
<thead>
<tr>
<th></th>
<th>Depositors</th>
<th>Bankers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unconditional welfare impact</td>
<td>-.31%</td>
<td>16.1%</td>
</tr>
<tr>
<td>Welfare impact constraint binding</td>
<td>-.13%</td>
<td>16.5%</td>
</tr>
<tr>
<td>Welfare impact worst crisis realization</td>
<td>.05%</td>
<td>16.8%</td>
</tr>
</tbody>
</table>
Anticipated Bailout

- In the anticipated bailout experiment, whenever the system reaches a given region $C$ in the state space the government intervenes with a bailout of size $B$.

- I compute the new equilibrium associated with a given policy $(C, B)$.

- I then ask what are the welfare implications of a bailout if after the bailout the economy switches to the new equilibrium.
Anticipated Bailout

- The table below reports the results when $C$ is the region in which the equilibrium without government intervention is constrained and $B = 5\%$

<table>
<thead>
<tr>
<th></th>
<th>Depositors</th>
<th>Bankers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welfare impact of unanticipated bailout</td>
<td>-0.13%</td>
<td>16.5%</td>
</tr>
<tr>
<td>Welfare impact bailout inducing moral hazard</td>
<td>-0.15%</td>
<td>13.4%</td>
</tr>
<tr>
<td>Worst crisis realization</td>
<td>0.012%</td>
<td>14%</td>
</tr>
</tbody>
</table>

- The anticipation of future bailouts has two effects: it increases leverage in unconstrained regions and the probability of a crisis but it makes typical crises less severe:

<table>
<thead>
<tr>
<th></th>
<th>No Bailout</th>
<th>Bailout</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability of a crisis</td>
<td>2.32%</td>
<td>2.81%</td>
</tr>
<tr>
<td>Average Leverage in unconstrained region</td>
<td>9.02</td>
<td>9.55</td>
</tr>
<tr>
<td>Average Leverage un constrained region</td>
<td>24.2</td>
<td>20.8</td>
</tr>
</tbody>
</table>
Conclusions

- I develop a framework to evaluate the welfare implications of redistributive policies.
- The model can replicate some salient features of financial crises.
- Unanticipated non-systematic bailout policies are typically not Pareto improving in the model but can become so depending on the severity of the crisis.
- Anticipation of future bailouts does induce moral hazard but also reduces the severity of crises and therefore has small impacts on welfare.