

On Zombie Banks and Recessions after Systemic Banking Crises: Government Intervention Matters

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Abstract: What costs do zombie banks impose on society? We analyze the effects of government and central bank interventions in 68 systemic banking crises since 1980, of which 28 are part of the recent global financial crisis. Our estimation approach controls for the correlation between intervention measures and the time-invariant component of unobservable crisis severity. We find that timely bank recapitalization substantially reduces the duration of recessions, underscoring the distortions caused by zombie banks and the costs of regulatory forbearance.

MAIN RESULT

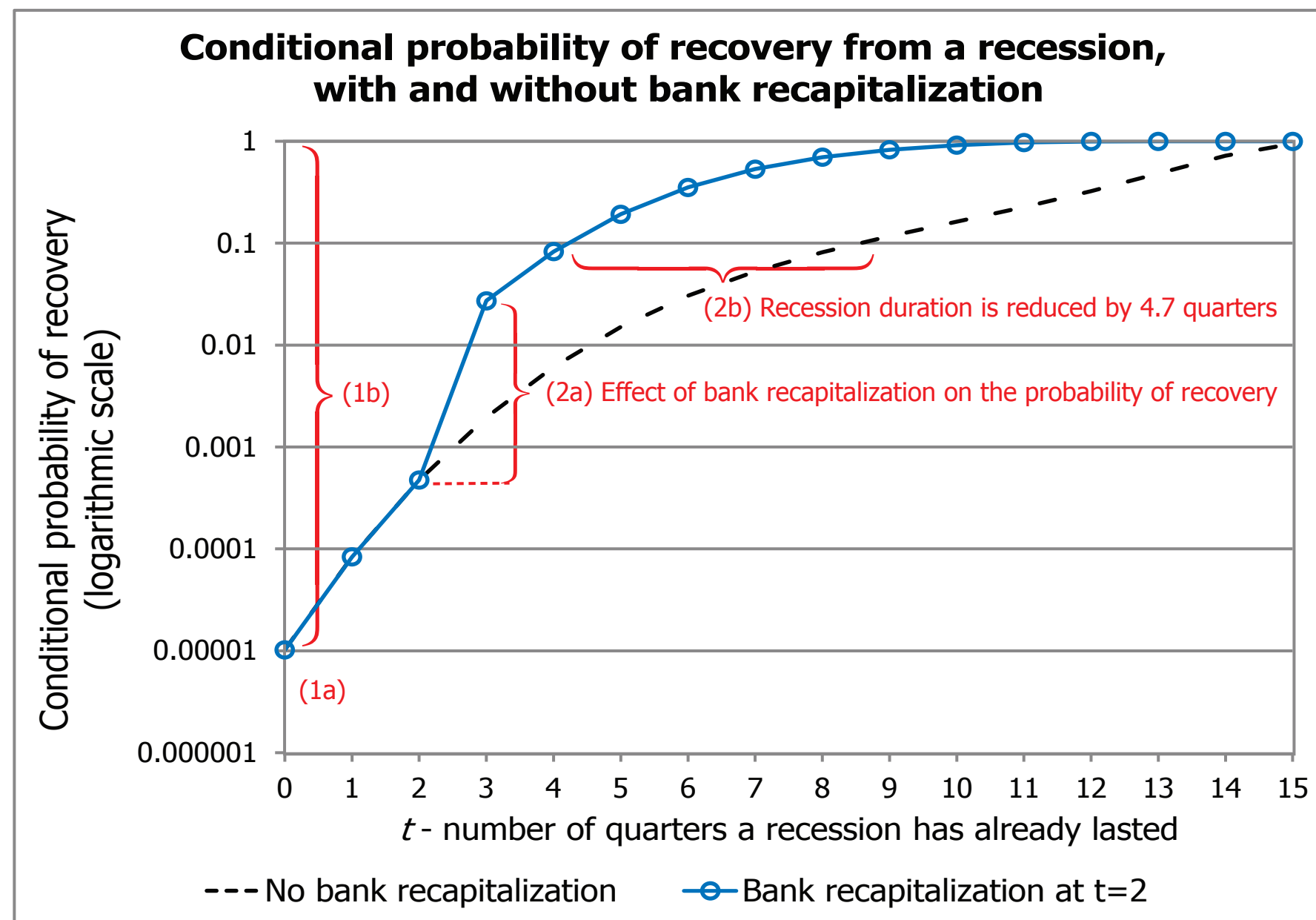


Figure 1: Predicted conditional probabilities of recovery from a recession, computed for the representative systemic banking crises from the 2007-2013 sample.

Figure 1: Explanation

We compute predicted conditional probabilities of recovery if banks are recapitalized at $t=2$ (blue line) or if no bank recapitalizations are done (black dashed line).

The recession starts at the $t=0$. Initially the probability of recession ending is very low (1a). The distance (1b) can be interpreted as the shock that has caused the recession.

Over time the probability of recovery gradually increases even if there is no intervention. Effective government intervention can shift the probability curve upwards and reduce recession duration.

When bank recapitalizations are implemented at $t=2$ (the end of the second recession quarter) the increase in probability of recovery is substantial (2a).

The expected recession duration is 6.3 quarters if banks are recapitalized and 11 quarters if there is no recapitalization.

The reduction in the expected recession duration roughly corresponds to the gain in time needed for the probability of recovery to raise above 10% (2b).

Our estimation approach controls for the correlation between crisis severity and intervention. Intervention can be correlated to the time invariant component of crisis severity (the initial shock), while the time-varying component (the shape of the curve without intervention) is exogenous.

EMPIRICAL METHODOLOGY

Our dataset is a panel of recessions related to systemic banking crises. For each crisis i , it includes quarters $t = 0, \dots, T_i$. A recession starts at $t = 0$ and ends at $t = T_i$. We estimate a discrete duration model with complementary log-log distribution $G(z) = 1 - \exp(-\exp(-z))$. Crisis severity (which is unobservable) is captured by the crisis specific fixed effects, which we estimate using the approach of Mundlak (Econometrica, 1978).

Dependent variable: recession indicator

$$y_{it} = \begin{cases} 1 & \text{recession ends} \\ 0 & \text{recession is ongoing} \end{cases}$$

The estimation equation can be written using y_{it}^* as the latent probability of recovery, (with $y_{it} = 1[y_{it}^* > 0]$), intervention variables x_{it} , time dependence γ_t and unobservable crisis severity c_i .

$$y_{it}^* = x_{it}\beta + \gamma_t + c_i + e_{it} \quad (1)$$

To allow for the correlation between crisis severity and intervention, we specify c_i as a function of the average intervention \bar{x}_i over the quarters of a recession:

$$c_i = \psi + \bar{x}_i\delta + v_i \quad (2)$$

We combine (1) and (2) and use a cubic function for time dependence to get the estimation equation:

$$y_{it}^* = \underbrace{x_{it}\beta}_{\text{Intervention}} + \underbrace{\gamma_0 + \gamma_1 t + \gamma_2 t^2 + \gamma_3 t^3}_{\text{Time dependence}} + \underbrace{\bar{x}_i\delta + v_i + e_{it}}_{\text{Crisis severity}} \quad (3)$$

This specification captures correlation between crisis severity and intervention when some measures are more likely to be used in severe than in mild crisis or when the quantity of intervention depends on the severity. Our identification is based on the deviations of intervention from its average over the whole recession period.

We compute the predicted conditional probability of recovery in quarter t as:

$$\hat{P}(y_{it} = 1 | y_{it-1} = 0, \dots, y_{i1} = 0, x_{it}, c_i) = 1 - \exp(-\exp(x_{it}\hat{\beta} + \bar{x}_i\hat{\delta} + \hat{\gamma}_t))$$

The probabilities of recovery that are not conditioned on recession lasting until $t-1$ are computed from the conditional probabilities:

$$\hat{P}(y_{it} = 1 | x_{i[1, \dots, t]}, c_i) = \hat{P}(y_{it} = 1 | y_{it-1} = 0, \dots, y_{i1} = 0, x_{it}, c_i) \cdot (1 - \hat{P}(y_{it-1} = 1 | y_{it-2} = 0, \dots, y_{i1} = 0, x_{it-1}, c_i)) \cdot \dots \cdot (1 - \hat{P}(y_{i1} = 1 | x_{i1}, c_i))$$

Finally, we compute the expected recession duration:

$$E[T_i] = \sum_{t=1}^{t_{\max}} [t \cdot \hat{P}(y_{it} = 1 | x_{i[1, \dots, t]}, c_i)]$$

ESTIMATION RESULTS

Table 1: The effect of intervention variables on the probability of recession ending for the full sample of systemic banking crises and the subsamples from the period 1980 to 2006 and 2007 to 2013.

Recession indicator	Full sample 1980-2013 (1)	Past crises 1980-2006 (2)	Recent crises 2007-2013 (4)
Bank recapitalizations	0.6637*** (3.26)	1.2636*** (2.72)	1.5126** (2.01)
Guarantees on bank liabilities	0.0133 (0.02)	-2.4110 (-1.61)	0.2769 (0.22)
Liquidity support	2.6676* (1.76)	4.2064 (1.47)	-3.6067 (-0.80)
Growth of reserve money	-0.7330 (-1.56)	-1.1811 (-1.39)	
Real interest rate reduction			0.2528* (1.89)
Fiscal deficit, cyclically adj.			0.2077 (0.97)
Average of bank recapitalizations	-1.2208*** (-2.96)	-2.0501*** (-2.63)	-3.2815** (-1.97)
Average of guarantees on bank	-0.2616 (-0.29)	3.8550* (1.94)	-2.3825 (-1.19)
Average liquidity support	-3.1950 (-1.46)	-2.1699 (-0.69)	2.3497 (0.42)
Average reserve money growth	0.2569 (0.48)	0.1703 (0.27)	
Average real interest rate			-0.7642*** (-2.90)
Average cyclically adj. fisc. def.			-0.2598 (-0.97)
Duration	2.9566*** (2.97)	10.5926** (2.56)	1.5191 (0.79)
Duration ²	-0.3936** (-2.35)	-2.1770** (-2.46)	-0.0479 (-0.14)
Duration ³	0.0147* (1.76)	0.1419** (2.39)	-0.0044 (-0.22)
Constant	-7.1750*** (-3.96)	-17.5565*** (-2.84)	-5.1440 (-1.58)
Observations	317	147	170
Crises	51	26	25
Log likelihood	-89.7512	-37.4357	-35.8520

RECESSION INDICATOR is the dependent variable having value 1 if a country has just recovered from a recession and 0 if it is in a recession in a particular quarter. A positive regression coefficient means that a higher value of the explanatory variable increases the probability of recovery. BANK RECAPITALIZATIONS are the cumulative amount of recapitalizations since the start of the banking crises, weighted by total banking assets. GUARANTEES ON BANK LIABILITIES are an indicator variable for the presence of guarantees. LIQUIDITY SUPPORT is the ratio of central bank claims on other depository corporations divided by total deposits at other depository corporations. GROWTH OF RESERVE MONEY and REAL INTEREST RATE REDUCTION are measures of monetary policy. CYCLICALLY ADJUSTED FISCAL DEFICIT is a measure of discretionary fiscal policy. All intervention variables except for fiscal deficit are lagged one quarter. The averages of intervention variables are included to control for the correlation between intervention and unobservable crisis severity. DURATION is the number of quarters a recession has already been ongoing until the period for which the probability of recovery is estimated. The specifications are estimated using complementary log-log random effects procedure. The parentheses are z-values of the tests for significance of coefficients. Significance levels of 10%, 5%, and 1% are denoted by *, **, ***, respectively.