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SHOCK TRANSMISSION THROUGH INTERNATIONAL BANKS: THE ITALIAN CASE

by Marianna Caccavaio*, Luisa Carpinelli*, Giuseppe Marinelli* and Enrico Sette*

Abstract

This paper studies what impact liquidity shocks have on liquid assets and domestic and cross-border lending. In particular, we look for differences across banks depending on their international exposure and we account for the effects of the sovereign debt crisis and the ECB's non-conventional monetary policy measures. Our main findings are that liquid assets are important drivers of lending adjustment to liquidity risk and that this effect is significant for domestic lending but not for foreign lending even considering the characteristics of the destination market. Differences in banks' international exposure play a limited role in the way liquidity shocks are transmitted.

JEL Classification: G20, G21.
Keywords: liquidity shock, cross-border lending, international banks.

Contents

* Bank of Italy, Economics, Statistics and Research DG.

1 Introduction

This paper examines the extent to which liquidity shocks affect banks' decision to hold liquid assets and their domestic and cross-border lending. In particular, we look for differences between banks according to their international exposure. The case of Italy is particularly interesting as Italian banks have been hit by two major liquidity shocks: a global one following the 2007-08 financial crisis and a more country specific one following the European sovereign debt crisis in the summer of 2011. Moreover, liquidity risk was mitigated by the ECB's liquidity injections, which cushioned banks' funding difficulties. We first study what bank characteristics affect the decision to hold liquid assets when liquidity shocks hit. Next, we explore the impact of liquidity shocks on loans, distinguishing between loans to domestic and to foreign counterparties and exploiting lending variations across countries. We find that liquid assets are important drivers of lending adjustment to liquidity risk and that this effect is significant for domestic lending but not for foreign lending even controlling for the characteristics of the destination market. Finally, we show that differences between banks' international exposure play a limited role in the pattern of liquidity shock transmission.

2 Data

Our data span the period 2006Q1-2013Q2 and are taken from the supervisory reports submitted to the Bank of Italy, the country's supervisory authority. When banks belong to banking groups, we use data consolidated at the group level, based on the generally accepted idea that in Italy decision-making regarding general loan policies and liquidity management takes place at the level of the head office for all the members of the same banking group. Importantly, using banking group consolidated data still allows us to separate cross-border lending from lending by foreign affiliates. Our dataset contains a breakdown of banks' activities between domestic units and foreign affiliates, making it possible to isolate the two different channels of cross-country transmission. Until the end of 2008, information on the country of the counterparty was available only on an unconsolidated basis. Therefore, from 2006 to the third quarter of 2008 we aggregate unconsolidated data at the banking group level, netting out intragroup positions where necessary so as to reproduce consolidated data. From end-2008 onwards we use consolidated data with a breakdown of domestic versus international exposure. For stand-alone banks we always use unconsolidated data.

Our sample includes all banks submitting Supervisory Reports to the Bank of Italy.[1] These include branches and subsidiaries of foreign banks operating in Italy. We label banks that have either a branch or a subsidiary abroad banks with foreign affiliates. We divide banks that do not have foreign affiliates into two categories: "Banks without foreign affiliates" and "Domestic banks", the latter being those whose share of assets vis-à-vis foreign counterparties is smaller than 2 per cent. Table 1 shows the distribution of the banks included in our sample. At end-

[1] Data on the international exposure of non-bank financial intermediaries are available only starting from 2008 and therefore we prefer to restrict our analysis to banks. Furthermore we exclude the *Bancoposta* division of *Poste Italiane SpA* and *Cassa Depositi e Prestiti*, because they are companies under public control.

2012 about 70 per cent of the sample consisted of domestic banks, 11 per cent of banks without foreign affiliates, just 3 per cent of banks with foreign affiliates and the rest were foreign banks operating in Italy.

Table 1: Banks - Break-down by internationalization level

Year (1)	Domestic banks (2)	Banks without foreign affiliates (3)	Banks with foreign affiliates (3)	Foreign banks (5)	Total
2006	459	77	19	88	643
2007	467	77	19	96	659
2008	458	78	19	98	653
2009	450	76	19	98	643
2010	443	75	19	94	631
2011	443	73	19	96	631
2012	425	70	19	96	610

(1) End-of-period data. - (2) Banks with no foreign affiliates and share of cross-border claims smaller than 2%. - (3) Banks with no foreign affiliates and share of cross-border claims greater than 2%. - (4) Banks with foreign affiliates. - (5) Branches and subsidiaries of foreign banks.

The dependent variables that we use are the quarterly changes in liquid assets and loans, all scaled by total assets. Control variables are bank-level balance sheet characteristics that are likely to influence changes on the asset side. The perimeter of consolidation of these variables encompasses both domestic and foreign intermediaries belonging to the group. Specifically, we include the log of total real assets[2], to capture the effect of banks' size (business model, possible implicit bailout guarantees for bigger banks, etc). We also include the share of liquid assets[3] and tthe ratio of commitments to grant loans to the private non-financial sector, scaled by total assets, to capture the availability of liquidity buffers and collateralizable assets and the extent to which banks already have loan commitments in place that must be funded. Additionally, all regressions include the ratio of deposits to total liabilities to capture the degree of access to stable sources of funding, and the share of funding obtained from central banks, which banks made more use of when access to wholesale funding became impaired. The inclusion of the latter variable also allows us to isolate unconventional measures of liquidity provisions such as the two Long-Term Refinancing Operations (LTRO) undertaken by the ECB in December 2011 and February 2012. A detailed description of the variables is contained in Table A.2.

Figures 1 and 2 dshow the average values of the dependent variables and controls over the sample period, broken down by the degree of internationalization of the banks.[4] Summary statistics are reported in Table A.1. A few features stand out: banks with foreign affiliates are the largest banks in the country. They hold almost three-quarters of total banking system assets. These large international banks have a smaller share of loans to the private non-financial sector over total assets and a smaller share of liquid assets than other banks. This pattern became

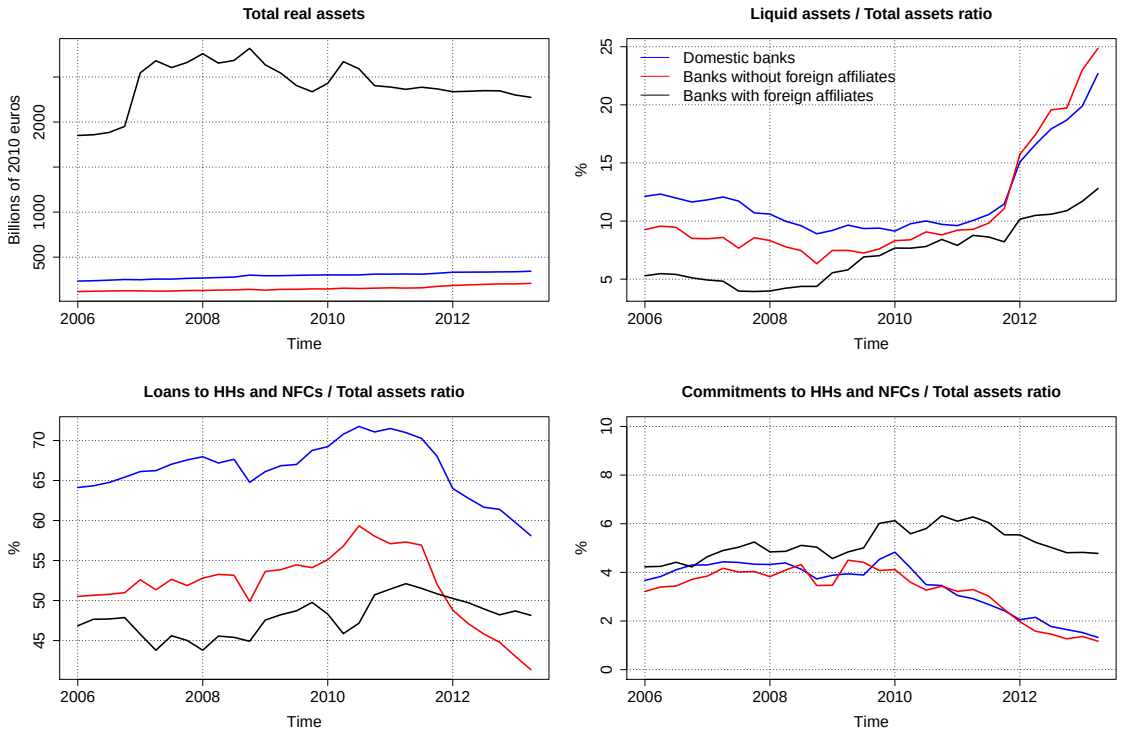
[2]Nominal assets are adjusted for inflation using the Italian consumer price index for the whole nation (NIC) published by Istat (National Institute of Statistics).

[3]We use liquid assets instead of illiquid assets due to data constraints.

[4]Figure 2 shows the median values for the Tier 1 Ratio.

especially pronounced from the beginning of 2012, when liquid assets for both domestic banks and banks without foreign affiliates started to build up rapidly.

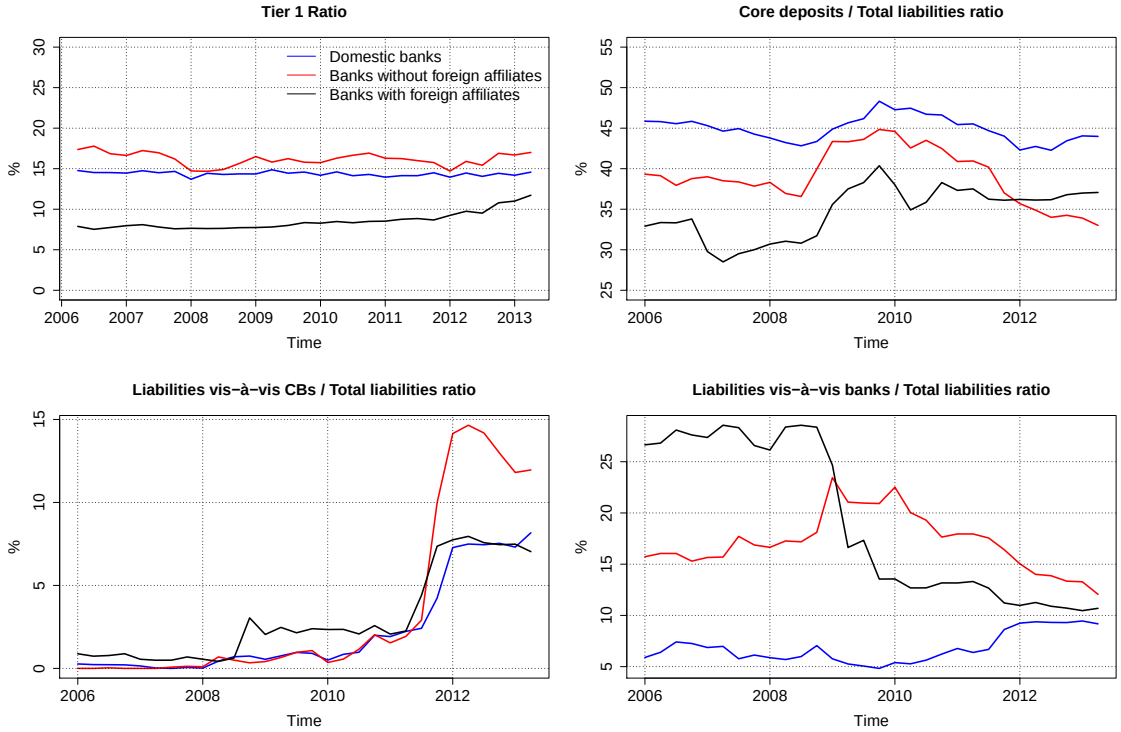
Figure 1: Bank balance sheet variables: asset side



We note some sizeable differences on the liability side as well. Large international banks capital ratios continued to rise in the first half of 2013, whereas those of other banks were stable in aggregate [5] Large international banks tend to rely more on wholesale funding and have a smaller share of liabilities consisting of core deposits, which tend to be a more stable source of funding. At the same time, compared with banks without foreign affiliates, their recourse to refinancing with central banks was more limited during the second liquidity shock that overtook Italy during the sovereign debt crisis in the second half of 2011.

[5] Bank of Italy, *Financial Stability Report*, November 2013.

Figure 2: Bank balance sheet variables: liabilities side



3 Effect of liquidity risk on banks' balance sheets

The first part of our empirical analysis aims to examine how liquidity risk has affected the asset side of bank balance sheets, in particular the portfolio allocation between liquid and illiquid assets, and lending supply. The empirical specification follows Cornett et al. (2011):

$$y_{i,t} = \sum_{k=1}^{K} (\beta_1^k * X_{i,t-1}^k + \beta_2^k * X_{i,t-1}^k * LOIS_t + \beta_3^k * X_{i,t-1}^k * LOIS_t * SOV_t + \\ + \beta_4^k * X_{i,t-1}^k * LOIS_t * LTRO_t) + \gamma_i + \gamma_t + \epsilon_{i,t} \quad (1)$$

where the dependent variable is alternatively equal to the quarterly change in liquid assets normalized by the lagged assets or to the change in loans to the private non-financial sector, again normalized by the lagged assets: that is $y_{i,t}$= ($\Delta Liquidassets_{i,t}/Assets_{i,t-1}$, $\Delta Loans_{i,t}/Assets_{i,t-1}$). The K independent variables X^k have been described in section 2 above; they are liquid assets, commitments, log of total real assets, deposits, reliance on CB refinancing as defined in Table A.2, all measured at the beginning to period. We also include time γ_t and bank γ_i fixed effects in all regressions. We interact each of the beginning-of-period balance

sheet variables with a measure of liquidity shock so as to assess the channels of transmission of the shocks to patterns of accumulation of liquid and illiquid assets and to loan supply.

The measure of liquidity shock we use is the Libor-Ois spread, i.e. the premium on overnight LIBOR, the unsecured rate at which banks lend to each other, over comparable overnight index swap (OIS) rates. After the summer of 2011 Italian banks were hit by the European sovereign debt crisis and their liquidity risk became higher than signalled by the euro-area based LIBOR-OIS spread. To account for the influence of this country-wide shock we introduce a dummy sovereign debt crisis (SOV) taking the value 1 for the last two quarters of 2011 and we add a triple interaction between bank balance sheet variables, the LOIS spread and the dummy SOV.[6] This allows us to test whether the sovereign debt crisis magnified or reduced the impact of changes in the LOIS spread relative to other times. Finally, we also add a triple interaction between bank balance sheet controls, the LOIS spread and a time dummy for the period following the two three-year LTROs. This allows us to test whether the effect of liquidity risk was altered by the ECB liquidity injections. Indeed, the abundant recourse to central bank liquidity mitigated the growing difficulty of raising funds in international markets.[7]

Table A.3 rreports the coefficients of the interactions between bank balance sheet controls (listed on each row) and liquidity risk conditions (column LOIS), liquidity risk conditions and sovereign debt crisis (column SOV) and liquidity risk conditions and long-term refinancing operations (column LTRO). Results are also broken down by banks international exposure (Panels A, B, C, D). The underlying regressions are presented in the the final Tables A.4 to A.8.[8]

3.1 Liquid assets

Estimates of equation (1) where the dependent variable is the change in liquid assets are summarized in the first section of Table A.3 (the full regression is shown in Table A.4).). When we estimate the model on all banks, we find that the liquidity shock generally has an effect on liquid assets only for larger banks. Yet during the sovereign debt crisis we also see banks with smaller commitments and greater recourse to central bank refinancing, accumulating liquid assets when hit by a liquidity shock (the LOIS spread widens). The first effect might be due to banks reducing assets if they have greater commitments during the crisis, starting with liquid assets that are easier to liquidate; the second effect to a portfolio rebalancing towards assets that attract lower capital charges and have high yields. In particular, the impact of central bank liquidity is found in the sub-sample of purely domestic banks and of banks with foreign affiliates. The latter banks also reduce their liquid assets if they have larger commitments during the sovereign debt crisis and post-LTRO period. When we estimate the model on international banks (with

[6] In the interest of robustness we also used a continuous measure of the sovereign shock, given by the spread between the yield on 10-year Italian government bonds and German Bunds of corresponding maturity.

[7] In the two LTROs the Bank of Italys counterparties obtained 255 billion (30 billion of which was assigned to banks belonging to foreign groups); both domestic and international Italian banks obtained central bank credit. See, Bank of Italy, *Financial Stability Report*, April 2012.

[8] We also ran regressions weighted by bank size (logarithm of total real assets) so as take into account the magnitude of the behaviour of each bank within our sample. Results are not reported here but are available from the authors upon request.

foreign affiliates), we find a negligible effect of liquidity shocks through bank heterogeneity on the accumulation of liquid assets: none of the controls is significant, except total assets when LOIS is wider and only after the LTRO period.

3.2 Loans

As a second step, we estimate equation (1) when the dependent variable is the change in loans (normalized by total assets). Results are summarized in the second section of Table A.3 (Table A.5 shows the full regression). In normal times liquid assets have a positive effect on loans and the effect is driven by domestic banks (Table A.5). Overall, higher liquidity risk does not seem to have an impact on loans through bank characteristics. Yet during the sovereign debt crisis we find some significant effects looking at the cross-sectional differences between banks. Banks with more liquid assets were able to keep higher growth rates of credit. This result is common to all three categories, irrespective of international exposure. The impact of the shock through recourse to central bank refinancing is significant only for domestic banks and specifically during the sovereign debt crisis and the post-LTRO period: banks relying more on liquidity from central banks displayed lower credit growth following the country-specific shock.

For robustness we estimated equation (1) including a measure of capitalization as an additional independent variable. We used the Tier 1 capital ratio defined as core equity capital over risk-weighted assets [9]. TableA.6 shows that results are qualitatively unchanged. We find that higher capitalization has a positive effect on loan growth when liquidity risk is greater, but not when the LOIS spread is very small, suggesting that higher capitalization allows banks to support credit growth in the presence of liquidity shocks.

To summarize, our results indicate limited differences between domestic and international banks (Bofondi et al. 2012). Moreover, liquid assets have a positive effect on loan supply during the sovereign debt crisis (see also Albertazzi et al. 2012).

4 Effect of liquidity risk on lending to domestic versus foreign residents

In this section we distinguish between loans to domestic and foreign residents to study whether there was a differential response to liquidity shocks between the two types of loans. In this way we are able to assess the degree to which the liquidity shock was transmitted internationally. Moreover, we break up the data on lending to foreign residents by country of destination, thus better controlling for demand factors and assessing whether country specific features of the credit market affect lending.

First we estimate equation (1), breaking down the dependent variable (the change in loans) between foreign and domestic lending. Results are summarized in Table A.3 (Table A.7 shows

[9] We had to restrict our analysis to a subset of banks in order to exclude the breaks in the tier 1 ratio statistics caused by acquisitions and internal reorganizations of large banking groups.

the full regression). We find very little impact of the shock on loans through bank balance sheet variables, except for one feature, liquid assets. Banks holding a larger share of liquid assets display a higher growth rate of loans during the sovereign debt crisis. During the post-LTRO quarters the behaviour of the two differs. Whereas banks without foreign affiliates boost credit growth if they hold more liquid assets, the effect for banks with foreign affiliates is negative, actually reversing the credit growth recorded in the sovereign crisis. This may be because banks with foreign affiliates are more diversified and possibly better able to transfer liquidity from abroad, making them less dependent on liquid assets for lending. Interestingly, liquid assets affect only the growth of domestic loans, with no effect on cross-border credit. This may be due to the fact that the domestic economy in Italy was badly hit by the crisis and that loans to foreign residents may have been perceived as less risky.

Results so far suggest that foreign lending by Italian banks did not depend on specific bank characteristics. Yet, there may be differences in the conditions of foreign borrowers driving this result. We study this possibility further by breaking down our dataset by country of destination of foreign loans. In this case we include an additional dimension to loan growth, which now has a time, bank and country dimension. All regressions include time-varying country fixed effects that control for observed and unobserved country level factors, capturing the business cycle of each country and purging our estimates of demand-side effects. We also include bank fixed effects. Results are summarized in the last section of Table A.3 (Table A.8 shows the full regression).

We first look at the subset of banks without foreign affiliates. When controlling for time-varying country level factors we find little effect of liquidity shock transmission on loan growth through bank balance sheet variables. Only central bank refinancing has some effect: positive in periods of wider LOIS, but then negative during the sovereign debt crisis and after the LTRO. This effect seems to be driven by banks with foreign affiliates. Banks without foreign affiliates show little heterogeneity in the transmission of liquidity shocks to loan growth. Foreign affiliates typically raise funds in the countries where they lend, so we can exploit the country level heterogeneity in access to funding for each given country to check if lending patterns differ according to whether a country is mainly a funding source or an investment destination for the bank. We define a core funding variable given by the ratio of deposits to loans following Cetorelli and Goldberg (2012). This is included as a control variable and estimates are shown in column 4 of Table A.8. Results suggests that "core funding" does not seem to affect the rate of change of lending.

Overall, these results confirm that loans by Italian banks to foreign borrowers do not seem to be driven by specific bank balance sheet characteristics when banks are hit by liquidity shocks. This result may seem surprising in the light of the findings for other countries (see, among others, De Haas and Van Horen 2011) and it deserves further study. For example, it may be that bank characteristics, in particular liquidity, affect the reaction of banks to shocks when interacted with characteristics of the borrowing country.

5 Conclusions

This paper provides evidence on the international transmission of liquidity shocks by banks. We use data on Italian banks covering two crises - the 2007-08 subprime/Lehman shocks and the sovereign debt crisis of 2011-12 - and to the two LTROs. We first examine what bank balance sheet characteristics lead to an increase in holdings of liquid assets, especially in times of liquidity shocks. Next, we explore loan supply, providing evidence on differences in the bank lending channel across banks depending on their international exposure. Our results indicate that liquid assets play a key role in lending adjustment when liquidity risk is higher. Furthermore, we examine whether the impact is different for lending to domestic borrowers versus foreign borrowers and we find that bank heterogeneity appears to be more important in explaining the supply of loans to domestic residents whereas there is little evidence of heterogeneous transmission of the shocks across banks in the supply of loans to foreign residents. Moreover, we find no evidence that banks with foreign affiliates adjusted lending towards a country depending on the share of deposit-taking activity in that market. In general, the degree of internationalization of the intermediaries does not seem to be relevant in explaining the pattern of transmission of liquidity shocks to lending.

A Tables

Table A.1: Summary Statistics for Italian Banks over January 2006 to June 2013

	All Banks			Banks with foreign affiliates			Banks without foreign affiliates		
Variable	Mean	Median	St. dev.	Mean	Median	St. dev.	Mean	Median	St. dev.
Panel A: Balance sheet data (for each bank *i* and time *t*)									
Dependent variables (1)									
ΔLiquid Assets	0.34	0.09	2.40	0.36	0.16	1.45	0.42	0.12	2.56
ΔLoans	1.37	1.06	2.51	0.72	0.58	1.77	1.29	1.02	2.19
ΔDomestic Loans	1.36	1.05	2.49	0.70	0.53	1.72	1.29	1.01	2.18
ΔForeign Loans	0.01	0.00	0.12	0.03	0.00	0.28	0.01	0.00	0.14
Independent variables (2)									
Commitments	0.02	0.01	0.04	0.03	0.03	0.02	0.03	0.01	0.07
Liquid Assets	0.15	0.10	0.89	0.08	0.07	0.04	0.18	0.07	1.86
(Log) Real Assets	1.74	1.55	2.35	6.14	6.00	1.61	2.11	2.08	1.77
Deposits	0.57	0.50	5.13	0.45	0.42	0.12	0.49	0.53	0.16
Tier 1 Ratio (3)	22.45	13.05	36.95	8.35	7.86	1.70	22.26	11.60	30.35
Liabilities vis-á-vis CBs	0.01	0.00	0.04	0.03	0.01	0.04	0.02	0.00	0.05
Panel B: Locational data (for each bank *i*, time *t* and counterparty country *c*)									
ΔLoans	0.03	0.00	0.24	0.04	0.00	0.25	0.01	0.00	0.09
Panel C: Other (3)									
Libor-OIS spread	0.41	0.30	0.34						

(1) Quarterly changes divided by the lagged total assets and expressed in percentage values. The dependent vaiables were winsorised at 1st and 99th percentiles. - (2) Ratio of the outstanding amounts over total assets unless otherwise specified. - (3) Percentage values.

Table A.2: Definition of the variables

Variable	Definition
Liquid Assets	Cash and government bonds over total assets
Commitments	Irrevocable commitments to grant loans to private non-financial sector (households and non-financial corporations)
Loans	Loans to private non-financial sector (households and non-financial corporations)
Tier 1 ratio	Core equity capital over risk-weighted assets
Core deposits	Deposits of households and non-financial corporations over total liabilities
Central Bank refinancing	Liabilities vis-à-vis Central Banks over total liabilities
Libor-OIS spread (1)	Spread between the Libor and the Overnight indexed swap rates

Source: based on consolidated and individual supervisory report. - (1) Based on ECB "Statistical Datawarehouse".

Table A.3: Results summary

		ΔLiquid Assets			ΔLoans			ΔDomestic Loans			ΔCross-border Loans			ΔCross-border Loans (by country of destination)		
		LOIS	SOV	LTRO	LOIS	SOV	LTRO	LOIS	SOV	LTRO	LOIS	SOV	LTRO	LOIS	SOV	LTRO
PANEL A: All banks	Liquid Assets				-1.349	7.882***	6.110*	-2.014	11.073***	10.096***	-0.19	0.248	-0.194	0.009	0.010	-0.048
	Commitment Ratio	-0.884	-12.501**	-1.896	1.728	1.509	4.943	16.509**	-13.343*	-1.134	1.42	-1.152	-1.166*	0.077	-0.074	0.093
	Log Real Assets	0.167***	-0.144	-0.014	-0.173*	0.288**	0.394***	-0.043	0.004	0.457**	-0.01	0.007	-0.053*	-0.000	0.001	-0.005
	Deposits	0.716	0.053	0.046	-2.028	1.135	3.830	1.355	-0.548	5.577	0.04	-0.022	-0.225	-0.002	0.001	-0.028
	CB refinincing	-10.222	30.660***	8.276	-0.733	-10.209	-8.321	0.642	2.867	6.309	-2.34	2.201	3.093	0.081*	-0.120**	-0.120**
	Observations	3529	(187 banks)		3529	(187 banks)		1153	(59 banks)		1153.00	(59 banks)		37314	(54 banks)	
	R-squared	0.155			0.338			0.371			0.23			0.090		
PANEL B: Domestic banks	Liquid Assets				-1.362	9.022***	4.910									
	Commitment Ratio	0.156	24.257	13.844	-4.129	24.515	-12.431									
	Log Real Assets	0.145	-0.187	0.639*	-0.226	0.234	0.454									
	Deposits	-0.122	-0.376	1.466	-1.584	-0.577	3.110									
	CB refinincing	-15.048*	21.033*	6.214	6.043	-19.948*	-24.490**									
	Observations	2376	(128 banks)		2376	(128 banks)										
	R-squared	0.153			0.345											
PANEL C: Banks without foreign affiliates	Liquid Assets				-1.975	12.977**	11.904***	-1.690	12.650**	12.004***	-0.24	0.286	-0.167	0.005	0.094	-0.068
	Commitment Ratio	2.625	-18.792*	-15.018**	13.979	-11.032	1.546	12.937	-10.224	2.290	1.19	-0.905	-0.779	0.140	-0.280	2.563
	Log Real Assets	0.270	-0.125	-0.139	0.078	0.361	0.737**	0.103	0.335	0.762**	-0.02	0.023	-0.027	-0.003	0.009**	-0.018
	Deposits	1.495	-1.784	-6.128	0.497	-2.129	4.250	0.452	-1.845	4.592	0.03	-0.248*	-0.271	-0.001	-0.027	-0.049
	CB refinincing	8.980	47.139***	-6.005	3.492	-3.632	4.658	0.226	-0.717	6.163	2.21	-1.765	-0.338	0.370	-0.463	-0.149
	Observations	767	(44 banks)		767	(44 banks)		767	(44 banks)		767.00	(44 banks)		5713	(39 banks)	
	R-squared	0.232			0.380			0.371			0.31			0.268		
PANEL D: Banks with foreign affiliates	Liquid Assets				-4.899	22.367**	-16.842	-6.556	21.344**	-23.334*	1.29	1.316	6.623	-0.006	0.035	0.019
	Commitment Ratio	15.985	-7.535	52.284	27.566	-12.047	-4.087	21.873	-8.314	-0.263	4.28	-2.585	-2.955	0.134	-0.084	-0.087
	Log Real Assets	0.047	0.158	-1.981*	-0.365	0.408	-0.226	-0.353	0.410	-0.196	0.01	-0.015	-0.034	-0.001	-0.000	-0.000
	Deposits	-2.296	8.408	-17.207	1.846	-0.904	-2.622	2.251	-0.971	-1.714	-0.22	0.005	-0.851	0.005	-0.011	-0.002
	CB refinincing	11.027	8.482	-55.810	-4.555	-15.904	1.074	7.583	-21.815	-2.418	-12.05	5.762	3.626	0.078	-0.160**	-0.070
	Observations	386	(15 banks)		386	(15 banks)		386	(15 banks)		386.00	(15 banks)		31601	(15 banks)	
	R-squared	0.226			0.423			0.412			0.28			0.118		

This table reports the marginal effects of liquidity risk conditions, sovereign debt crisis (SOV) and long-term refinancing operations (LTRO) on bank characteristics' effect on growth in liquid assets, loans, domestic loans, cross border loans. The underlying fixed effects regressions are presented in Appendix. Beginning of quarter assets are used to standardize growth in liquid assets, loans, domestic loans, cross border loans. The data are observed quarterly from 2006Q1 to 2013Q2 for a panel of Italian banks that not includes cooperative banks. To mitigate the effect of bank mergers on the dependent variable, banks are excluded in a particular quarter when asset growth exceeds 10%. Data are from Bank of Italy Supervisory Reports. Banks are judged to be domestic banks if they report foreign loans smaller than 2% of total assets. The Libor-OIS (LOIS) is the quarterly average of the daily difference between the London Interbank Offered Rate and the effective federal funds rate. Growth variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by bank. ***, **, and * respectively indicate significance at the 1%, 5%, and 10% level. Time and bank fixed effects are included; country of destination fixed effects are also included in the regression on growth in foreign loans by country of destination.

Table A.4: Liquid assets

VARIABLES	(1) All banks	(2) Domestic	(3) without foreign affiliates	(4) with foreign affiliates
Commitments	-1.031	-3.158	0.962	-3.645
	(2.189)	(3.993)	(3.148)	(4.810)
Commitments*LOIS	-0.884	0.156	2.625	15.985
	(4.635)	(6.587)	(12.433)	(12.566)
Commitments*LOIS*SOV	-12.501**	24.257	-18.792*	-7.535
	(6.050)	(18.127)	(10.740)	(14.931)
Commitments*LOIS*LTRO	-1.896	13.844	-15.018**	52.284
	(5.364)	(29.273)	(6.905)	(33.994)
Total assets	-0.395	-0.219	-1.314*	0.361
	(0.304)	(0.368)	(0.697)	(0.390)
Total assets*LOIS	0.167***	0.145	0.270	0.047
	(0.063)	(0.122)	(0.217)	(0.213)
Total assets*LOIS*SOV	-0.144	-0.187	-0.125	0.158
	(0.095)	(0.230)	(0.318)	(0.239)
Total assets*LOIS*LTRO	-0.014	0.639*	-0.139	-1.981*
	(0.182)	(0.334)	(0.579)	(1.017)
Deposits	-0.710	-0.588	-1.479	1.351
	(0.842)	(1.206)	(1.780)	(2.151)
Deposits*LOIS	0.716	-0.122	1.495	-2.296
	(0.874)	(1.159)	(1.849)	(3.803)
Deposits*LOIS*SOV	0.053	-0.376	-1.784	8.408
	(1.617)	(1.822)	(4.571)	(4.912)
Deposits*LOIS*LTRO	0.046	1.466	-6.128	-17.207
	(2.455)	(2.612)	(7.583)	(13.669)
CB refinancing	4.518	6.267*	0.884	-5.436
	(2.770)	(3.492)	(6.526)	(5.715)
CB refinancing*LOIS	-10.222	-15.048*	8.980	11.027
	(6.694)	(8.479)	(16.928)	(21.521)
CB refinancing*LOIS*SOV	30.660***	21.033*	47.139***	8.482
	(10.550)	(11.924)	(17.054)	(15.040)
CB refinancing*LOIS*LTRO	8.276	6.214	-6.005	-55.810
	(10.750)	(13.481)	(24.065)	(32.617)
Constant	3.169	0.497	1.285	-2.766
	(2.324)	(0.654)	(1.138)	(3.408)
Observations	3529	2376	767	386
R^2	0.155	0.153	0.232	0.226

Standard errors clustered at the bank-level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A.5: Loans

VARIABLES	(1) All banks	(2) Domestic	(3) without foreign affiliates	(4) with foreign affiliates
Liquid assets	4.341***	6.664***	1.267	5.042
	(1.210)	(1.992)	(1.475)	(4.551)
Liquid assets*LOIS	-1.349	-1.362	-1.975	-4.899
	(1.729)	(2.358)	(2.691)	(10.398)
Liquid assets*LOIS*SOV	7.882***	9.022***	12.977**	22.367**
	(2.324)	(2.994)	(4.862)	(8.291)
Liquid assets*LOIS*LTRO	6.110*	4.910	11.904***	-16.842
	(3.242)	(4.622)	(3.679)	(10.739)
Commitments	0.852	1.574	-0.332	-0.434
	(2.999)	(8.296)	(2.894)	(7.542)
Commitments*LOIS	1.728	-4.129	13.979	27.566
	(6.896)	(10.125)	(10.135)	(18.230)
Commitments*LOIS*SOV	1.509	24.515	-11.032	-12.047
	(5.498)	(19.811)	(8.708)	(16.505)
Commitments*LOIS*LTRO	4.943	-12.431	1.546	-4.087
	(5.743)	(23.284)	(7.871)	(16.260)
Total assets	-2.103***	-2.529***	-0.889	-0.842**
	(0.563)	(0.726)	(1.129)	(0.308)
Total assets*LOIS	-0.173*	-0.226	0.078	-0.365
	(0.091)	(0.190)	(0.231)	(0.266)
Total assets*LOIS*SOV	0.288**	0.234	0.361	0.408
	(0.114)	(0.256)	(0.371)	(0.284)
Total assets*LOIS*LTRO	0.394***	0.454	0.737**	-0.226
	(0.140)	(0.322)	(0.352)	(0.574)
Deposits	1.343	4.757*	-0.442	-0.228
	(1.348)	(2.762)	(1.335)	(2.337)
Deposits*LOIS	-2.028	-1.584	0.497	1.846
	(1.426)	(2.042)	(1.395)	(4.067)
Deposits*LOIS*SOV	1.135	-0.577	-2.129	-0.904
	(1.589)	(2.328)	(4.040)	(4.410)
Deposits*LOIS*LTRO	3.830	3.110	4.250	-2.622
	(2.557)	(3.261)	(5.566)	(6.671)
CB refinancing	2.458	3.859	-3.716	1.228
	(2.164)	(3.192)	(3.701)	(4.786)
CB refinancing*LOIS	-0.733	6.043	3.492	-4.555
	(7.123)	(7.639)	(19.318)	(18.202)
CB refinancing*LOIS*SOV	-10.209	-19.948*	-3.632	-15.904
	(9.668)	(11.956)	(19.919)	(27.021)
CB refinancing*LOIS*LTRO	-8.321	-24.490**	4.658	1.074
	(7.696)	(10.038)	(15.691)	(18.857)
Constant	15.931***	-3.322*	0.976	7.283***
	(4.395)	(1.744)	(1.105)	(2.435)
Observations	3529	2376	767	386
R^2	0.338	0.345	0.380	0.423

Standard errors clustered at the bank-level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A.6: Loans (with Tier 1 ratio included as independent variable)

VARIABLES	(1) All banks	(2) Domestic banks	(3) without foreign affiliates	(4) with foreign affiliates
Liquid assets	4.920***	6.489***	1.708	2.059
	(1.273)	(1.918)	(1.653)	(4.992)
Liquid assets*LOIS	-2.343	-2.895	-1.507	-0.234
	(1.920)	(2.446)	(2.988)	(11.673)
Liquid assets*LOIS*SOV	8.433***	9.919***	15.358**	23.242*
	(2.543)	(3.196)	(6.791)	(10.911)
Liquid assets*LOIS*LTRO	7.525**	5.149	15.258***	-17.977
	(3.751)	(5.302)	(3.909)	(14.059)
Commitments	-1.623	-0.669	-2.697	-10.525
	(3.194)	(9.248)	(2.617)	(7.345)
Commitments*LOIS	9.985	5.030	14.298	38.472**
	(6.555)	(10.792)	(11.076)	(15.551)
Commitments*LOIS*SOV	-4.314	24.293	-5.536	-12.881
	(5.079)	(21.476)	(9.387)	(17.469)
Commitments*LOIS*LTRO	1.693	-15.339	11.779	-3.402
	(5.990)	(23.475)	(8.212)	(15.145)
Total assets	-2.466***	-2.663***	-2.472**	-0.761
	(0.516)	(0.610)	(1.021)	(0.585)
Total assets*LOIS	-0.070	-0.046	0.086	-0.029
	(0.089)	(0.182)	(0.256)	(0.313)
Total assets*LOIS*SOV	0.240**	0.148	0.413	0.191
	(0.120)	(0.252)	(0.399)	(0.253)
Total assets*LOIS*LTRO	0.314**	0.380	0.690*	-0.275
	(0.149)	(0.320)	(0.404)	(0.519)
Deposits	1.891	3.655	-0.775	-1.642
	(2.045)	(3.002)	(1.819)	(2.805)
Deposits*LOIS	0.431	0.773	-0.582	1.051
	(1.375)	(2.038)	(2.131)	(5.590)
Deposits*LOIS*SOV	-0.949	-2.360	-1.752	-1.762
	(1.681)	(2.249)	(4.295)	(5.453)
Deposits*LOIS*LTRO	1.833	2.110	3.232	-2.847
	(2.606)	(3.081)	(5.732)	(5.322)
CB refinancing	2.204	3.408	0.150	3.205
	(2.268)	(3.285)	(4.192)	(5.893)
CB refinancing*LOIS	7.804	9.057	1.902	32.271
	(6.031)	(6.718)	(19.984)	(69.096)
CB refinancing*LOIS*SOV	-20.062**	-24.079**	-10.189	-66.155
	(8.275)	(10.767)	(20.371)	(70.301)
CB refinancing*LOIS*LTRO	-16.540**	-24.029***	-4.766	-44.066
	(6.557)	(9.014)	(16.298)	(60.088)
Tier 1 ratio	-0.008	-0.005	-0.027	0.037
	(0.006)	(0.008)	(0.016)	(0.111)
Tier 1 ratio*LOIS	0.020*	0.029***	-0.013	0.359*
	(0.011)	(0.011)	(0.028)	(0.200)
Tier 1 ratio*LOIS*SOV	-0.008	-0.007	-0.043	-0.431*
	(0.019)	(0.020)	(0.061)	(0.215)
Tier 1 ratio*LOIS*LTRO	-0.027	0.009	-0.117	-0.387*
	(0.038)	(0.045)	(0.100)	(0.212)
Constant	18.349***	-2.451	2.229*	6.666
	(3.972)	(1.711)	(1.148)	(4.556)
Observations	3287	2269	706	312
R^2	0.362	0.368	0.400	0.489

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A.7: Loans to domestic and foreign residents

	All international banks		Banks without foreign affiliates		Banks with foreign affiliates	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Domestic loan	Cross-border Loan	Domestic loan	Cross-border Loan	Domestic loan	Cross-border Loan
Liquid assets	1.351	0.052	1.125	0.090	5.883	-0.769
	(1.265)	(0.077)	(1.485)	(0.070)	(4.464)	(0.897)
Liquid assets*LOIS	-2.014	-0.192	-1.690	-0.243	-6.556	1.295
	(2.120)	(0.185)	(2.620)	(0.183)	(10.898)	(2.467)
Liquid assets*LOIS*SOV	11.073***	0.248	12.650**	0.286	21.344**	1.316
	(4.013)	(0.204)	(4.818)	(0.227)	(8.459)	(1.353)
Liquid assets*LOIS*LTRO	10.096***	-0.194	12.004***	-0.167	-23.334*	6.623
	(3.780)	(0.349)	(3.746)	(0.348)	(11.892)	(5.607)
Commitments	-0.980	-0.143	-0.118	-0.243	0.898	-1.097
	(2.390)	(0.244)	(2.833)	(0.268)	(7.541)	(1.373)
Commitments*LOIS	16.509**	1.419	12.937	1.191	21.873	4.279
	(8.157)	(0.989)	(9.585)	(1.171)	(19.136)	(3.308)
Commitments*LOIS*SOV	-13.343*	-1.152	-10.224	-0.905	-8.314	-2.585
	(7.509)	(0.714)	(8.325)	(0.821)	(17.940)	(2.991)
Commitments*LOIS*LTRO	-1.134	-1.166*	2.290	-0.779	-0.263	-2.955
	(7.027)	(0.608)	(7.681)	(0.622)	(18.759)	(4.368)
Total assets	-0.945	0.008	-0.856	-0.042*	-0.919*	0.058
	(0.752)	(0.060)	(1.111)	(0.023)	(0.439)	(0.186)
Total assets*LOIS	-0.043	-0.014	0.103	-0.023	-0.353	0.015
	(0.126)	(0.020)	(0.224)	(0.016)	(0.307)	(0.077)
Total assets*LOIS*SOV	0.004	0.007	0.335	0.023	0.410	-0.015
	(0.169)	(0.011)	(0.365)	(0.014)	(0.291)	(0.043)
Total assets*LOIS*LTRO	0.457**	-0.053*	0.762**	-0.027	-0.196	-0.034
	(0.180)	(0.029)	(0.361)	(0.048)	(0.585)	(0.154)
Deposits	-1.278	-0.019	-0.418	-0.016	-0.471	0.202
	(1.158)	(0.073)	(1.345)	(0.080)	(2.445)	(0.514)
Deposits*LOIS	1.355	0.036	0.452	0.034	2.251	-0.220
	(1.206)	(0.072)	(1.417)	(0.080)	(4.428)	(1.166)
Deposits*LOIS*SOV	-0.548	-0.022	-1.845	-0.248*	-0.971	0.005
	(2.375)	(0.118)	(4.041)	(0.128)	(4.402)	(0.847)
Deposits*LOIS*LTRO	5.577	-0.225	4.592	-0.271	-1.714	-0.851
	(3.341)	(0.541)	(5.612)	(0.227)	(6.424)	(2.158)
CB refinancing	-3.040	0.175	-3.543	-0.187	-1.661	2.895**
	(2.615)	(0.359)	(3.572)	(0.424)	(4.838)	(1.226)
CB refinancing*LOIS	0.642	-2.343	0.226	2.206	7.583	-12.049
	(14.813)	(4.615)	(20.207)	(1.671)	(21.650)	(8.818)
CB refinancing*LOIS*SOV	2.867	2.201	-0.717	-1.765	-21.815	5.762
	(18.817)	(4.273)	(20.825)	(1.306)	(26.656)	(8.502)
CB refinancing*LOIS*LTRO	6.309	3.093	6.163	-0.338	-2.418	3.626
	(14.124)	(4.411)	(16.873)	(1.986)	(19.461)	(9.406)
Constant	8.305	-0.020	0.946	0.034	7.844**	-0.434
	(5.907)	(0.442)	(1.099)	(0.028)	(3.441)	(1.450)
Observations	1153	1153	767	767	386	386
R^2	0.371	0.232	0.371	0.314	0.412	0.278

Standard errors clustered at the bank-level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A.8: Loans by country of destination

VARIABLES	(1) international banks	(2) without foreign affiliates	(3) with foreign affiliates	(4) with foreign affiliates
Liquid assets	-0.007	0.002	-0.009	-0.009
	(0.012)	(0.027)	(0.016)	(0.016)
Liquid assets*LOIS	0.009	0.005	-0.006	-0.006
	(0.020)	(0.038)	(0.043)	(0.043)
Liquid assets*LOIS*SOV	0.010	0.094	0.035	0.035
	(0.019)	(0.057)	(0.030)	(0.030)
Liquid assets*LOIS*LTRO	-0.048	-0.068	0.019	0.018
	(0.048)	(0.095)	(0.048)	(0.048)
Commitments	-0.021	-0.047	-0.030	-0.030
	(0.021)	(0.067)	(0.037)	(0.037)
Commitments*LOIS	0.077	0.140	0.134	0.134
	(0.050)	(0.201)	(0.104)	(0.104)
Commitments*LOIS*SOV	-0.074	-0.280	-0.084	-0.084
	(0.052)	(0.283)	(0.079)	(0.079)
Commitments*LOIS*LTRO	0.093	2.563	-0.087	-0.087
	(0.150)	(2.518)	(0.067)	(0.067)
Total assets	0.000	-0.011	0.001	0.001
	(0.002)	(0.007)	(0.003)	(0.003)
Total assets*LOIS	-0.000	-0.003	-0.001	-0.001
	(0.001)	(0.005)	(0.002)	(0.002)
Total assets*LOIS*SOV	0.001	0.009**	-0.000	-0.000
	(0.001)	(0.004)	(0.001)	(0.001)
Total assets*LOIS*LTRO	-0.005	-0.018	-0.000	-0.000
	(0.004)	(0.020)	(0.002)	(0.002)
Deposits	-0.001	-0.029	-0.001	-0.001
	(0.006)	(0.018)	(0.009)	(0.009)
Deposits*LOIS	-0.002	-0.001	0.005	0.005
	(0.013)	(0.012)	(0.026)	(0.026)
Deposits*LOIS*SOV	0.001	-0.027	-0.011	-0.011
	(0.010)	(0.033)	(0.019)	(0.019)
Deposits*LOIS*LTRO	-0.028	-0.049	-0.002	-0.002
	(0.032)	(0.067)	(0.021)	(0.021)
CB refinancing	0.020	0.083	0.012	0.012
	(0.021)	(0.065)	(0.014)	(0.014)
CB refinancing*LOIS	0.081*	0.370	0.078	0.078
	(0.046)	(0.375)	(0.053)	(0.053)
CB refinancing*LOIS*SOV	-0.120**	-0.463	-0.160**	-0.160**
	(0.046)	(0.317)	(0.055)	(0.055)
CB refinancing*LOIS*LTRO	-0.120**	-0.149	-0.070	-0.070
	(0.050)	(0.476)	(0.054)	(0.055)
Core funding				-0.005
				(0.011)
Core funding*LOIS				0.010
				(0.028)
Core funding*LOIS*SOV				-0.136
				(0.286)
Core funding*LOIS*LTRO				-0.143
				(0.140)
Constant	0.000	0.021	-0.009	-0.009
	(0.018)	(0.013)	(0.018)	(0.018)
Observations	37314	5713	31601	31601
R^2	0.090	0.268	0.118	0.118

Standard errors clustered at the bank-level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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