Household Wealth and Resilience to Financial Shocks in Italy*

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Financial shocks in a sector of the economy transmit to other sectors via financial linkages. This paper constructs the matrix of bilateral financial sectoral exposures in Italy over the last two decades. Using this information, it develops a method to simulate how each sector absorbs plausible financial shocks. A fall in the value of government bonds directly affects banks and indirectly affects households via equity holdings in banks. A bank bail-in is absorbed by foreigners and by households, particularly those at the top of the wealth distribution. Conversely, in a bank bailout these two groups benefit from a government transfer.

JEL Codes: G11, G32, G33.

1. Introduction

Italian household wealth is high by international standards. Total net household wealth at end-2013 was estimated at over €9 trillion, or 5½ times gross domestic product (GDP). Average wealth per household exceeds €350,000 and per capita is about €150,000 (Bank of Italy 2014). As a percent of disposable income, it is higher than in most euro-area peers, including Austria, Finland, France, Germany,

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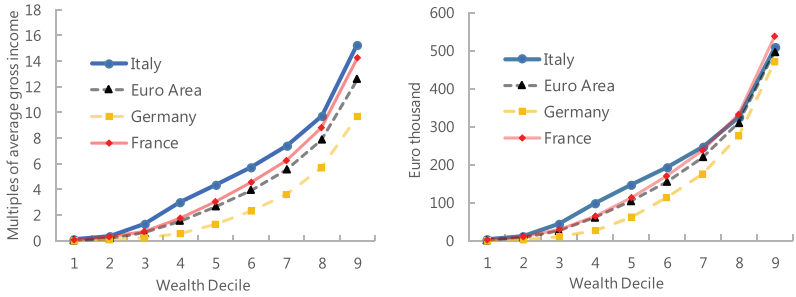
Figure 1. Average Net Wealth per Household by Wealth Decile, 2014



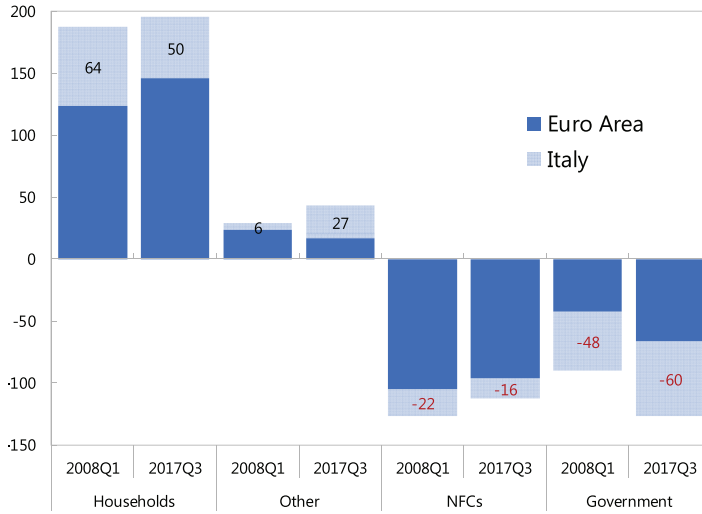
Notes: The left panel shows net wealth per decile divided by the average gross income across deciles. The dats are from the ECB Household Finance and Consumption Survey.

or Luxembourg. The middle and upper segments of the distribution are particularly wealthy compared with the euro-area average, both as a share of income and in absolute terms (figure 1). Real assets—principally dwellings—constitute almost two-thirds of total net wealth, while financial assets are mostly concentrated in cash and deposits, shares, and insurance reserves.

High net wealth of the household sector contrasts with weaker financial positions of other sectors. Sectoral net financial positions—defined as financial assets minus financial liabilities—in Italy display much larger imbalances than the euro-area aggregate (figure 2). Households stand out for their large positive balances, but the government features very negative financial wealth. The position of nonfinancial corporations is also strongly negative but more in line with the euro-area aggregate. Although real net household wealth has declined since the onset of the Global Financial Crisis (GFC), sectoral imbalances have tended to widen.

While high household net wealth or savings are a key strength of the Italian economy, negative financial wealth positions in other sectors could signal financial vulnerabilities. As a general matter, deeply indebted sectors may face difficulties raising further funding and experience higher default rates, thus turning into a source of contagion to other sectors. Indeed, the literature on sectoral fund flows has long emphasized the financial non-neutrality of sectoral

Figure 2. Net Financial Assets by Sector (percent of GDP)



Notes: "NFCs" denotes nonfinancial corporations, "Government" is the general government, and "Other" includes the rest of the world and the financial sector: monetary and financial institutions, other financial institutions, insurance companies, and pension funds. The combined height of the bars shows the position in Italy. The figures on the bars indicate the difference between Italy and the euro area. The data are from the Bank of Italy.

limits (e.g., Poterba 1987 documents the lack of a "corporate veil"). Understanding the transmission of shocks across sectors and their ultimate impact on households requires information about the intersectoral bilateral financial linkages. Shocks to the value of a given instrument issued by a given sector transmit to other sectors via direct asset exposures and via equity interlinkages. For example, a fall in the value of corporate debt can directly affect financial institutions holding that debt, and in turn transmit to households with claims on those financial institutions.

This paper constructs the matrix of bilateral financial sectoral exposures and simulates the impact of a series of illustrative financial shocks. Instrument-level intersectoral financial positions are inferred from the Bank of Italy's flow-of-funds data. The information on financial exposures is then illustratively used to infer the net

financial impact across sectors of a 10 percent fall in the value of government bonds, equivalent to a two-standard-deviation change in sovereign spreads, and of a 10 percent fall in the value of bank liabilities (i.e., the assets held by other sectors in banks), equivalent to the combined liabilities of the third and fourth Italian banks. The shock to bank liabilities is successively modeled as leading to either a bail-in or a bailout. Household wealth survey data allow us to pin down the impact of these shocks across the household wealth distribution.

The matrix of bilateral exposures reveals that, since 1995, household wealth has been increasingly kept in insurance and pension fund assets and abroad. Households' direct exposure to the government has declined, although it is now intermediated by financial institutions. Government liabilities have been increasingly funded by the rest of the world and financial institutions, with an important contribution from the Bank of Italy in recent years, reflecting the ECB's quantitative easing. However, international financial diversification of Italian residents has slowed down. Since the GFC, nonfinancial corporate balance sheets have shrunk, with households being the sector that has reduced more its investment.

Within the household sector, the distribution of financial exposures is related to wealth levels. According to the Survey on Household Income and Wealth of the Bank of Italy, financial wealth and, in particular, risky assets are concentrated at the upper end of the distribution. The top two household wealth deciles accumulate more than two-thirds of financial wealth and an even larger proportion of equity and nonsecured debt. Less wealthy households own almost all their financial wealth in the form of insured bank deposits.

Given the bilateral instrument-level exposures, a fall in the value of government bonds is estimated to directly affect the financial sector and indirectly households. The Bank of Italy, private monetary financial institutions (MFIs, mostly banks), insurance and pension funds, and the rest of the world bear sizable balance sheet losses. However, as private financial institutions are ultimately owned by other sectors, primarily domestic and foreign households, these households—especially at the upper end of the wealth distribution—bear the brunt of the losses. Given the healthy financial position of households, together with the concentration of financial assets in

wealthy households, the impact of the shock on the real economy should be small.

A bank bail-in is more able than a bailout to transmit to the rest of the world part of the shock to the value of bank liabilities. In a bail-in scenario, the burden of bank debt restructuring is shared by domestic and foreign households, as those are the ultimate holders of MFI equity and bonds. Here too, the burden falls mostly on the top wealth deciles.

On the contrary, in a bailout, the government would transfer resources to the wealthiest households and to the rest of the world. After a bailout, the top decile is less affected as a share of its financial wealth than the upper-middle range of the wealth distribution. From a simple arithmetic consideration, bailout interventions add to public debt, in turn imposing costs via taxes on labor income, which fall more evenly across the distribution than the wealth effects. Their countercyclical implications too are weak—as wealthier households have a lower marginal propensity to consume. Raising bank capital levels could help alleviate the need for, and cost of, a bailout. A progressive wealth tax could also undo the regressive distributional effects of the fiscal transfer implicit in a bailout.

In Italy, interest rates of bank and real-sector debt liabilities have been historically quite sensitive to changes in sovereign spreads (see Albertazzi et al. 2014). To capture the response to sovereign debt prices of the price of other *debt* securities, a correlated debt shock is simulated next. Note that this goes beyond the *equity* interlinkages already modeled above. Compared with an individual shock to government bonds, a correlated debt shock has a worse ultimate impact on the rest of the world and the central bank, while households' net financial position is less affected as their debt liabilities also depreciate.

Through these accounting exercises based on balance sheet exposures, the paper makes transparent some of the tradeoffs involved in the absorption of financial shocks. The paper simply calculates how changes in the prices of particular assets are absorbed in the balance sheets across sectors, regardless of what caused the price changes. This exercise abstracts from factors such as the real effects of shocks—which Bofondi, Carpinelli, and Sette (2018) and Cingano, Manaresi, and Sette (2016) estimate to be significant in Italy—portfolio reallocation in response to shocks, financial instability

channels such as contagion across individual banks, or adjustment dynamics. On the other hand, policy decisions, particularly regarding bail-ins and bailouts, must take a comprehensive view and consider all transmission channels. Yet, the balance sheet analysis is sufficient to unambiguously show that the Italian household sector, and particularly households at the upper end of the distribution, have ample capacity to absorb plausible financial shocks. Government intervention aimed at preventing this absorption would be fiscally costly and ultimately of a regressive nature.

The literature has explored sectoral financial linkages in various contexts. Doepke and Schneider (2006) study the financial impact of inflation shocks across U.S. sectors and over the income distribution. Castrén and Kavonius (2009) construct the financial exposures matrix for the euro area with a similar method as this paper. Heipertz, Ranciere, and Valla (2017) estimate sectoral valuation linkages with security-level French data. Koijen et al. (2018) focus on the impact of quantitative easing (QE) by the European Central Bank (ECB) on sectoral portfolios. Lindner and Redak (2017) document the holdings of bail-in-able instruments across the wealth distribution of European households. Cortes et al. (2018) develop a method to estimate contagion across sectors within the financial system. The International Monetary Fund (2015) reviews the use of balance sheet analysis in the context of policy evaluation.

This paper contributes to the literature by developing a method to estimate the direct, indirect, and distributional impact of specific valuation shocks. Castrén and Kavonius (2009) use data with coarser sectoral information. More importantly, they only consider a (small) finite number of equity impact rounds, while the methodological contribution of this paper is to simulate the full equity impact. Estimating the full equity impact is necessary given sizable bidirectional equity holdings between sectors. It is also crucial when calculating distributional effects, as wealthier households invest disproportionately more in equity than in bonds. Heipertz, Ranciere, and Valla (2017) have access to more disaggregated data for France, but they do not focus on bank restructuring scenarios.[1]

[1]Hüser et al. (2018) study the implications of a bail-in for different types of creditors of the largest euro-area banks. Gourinchas, Martin, and Messer (2017) model wealth transfers among monetary union members in a bailout.

The rest of the paper is organized as follows. Section 2 describes the data and the accounting method. Section 3 documents financial exposures in Italy. Section 4 describes the method to simulate the impact of financial shocks. Section 5 presents the results of the simulation. Section 6 analyzes the distributional impact of financial shocks. Section 7 concludes.

2. Data and Accounting Method

Flow-of-funds data provide information on sectoral financial exposures. The Bank of Italy publishes quarterly flow-of-funds data (sourced via Haver) covering the period 1995:Q1–2017:Q3. This data set contains information, for each economic sector, on the stock positions in different financial instruments (assets and liabilities).[2] Table 1 lists the disaggregation of sectors in the data as well as the simplified grouping applied in this paper.

The data are used to construct a matrix of cross-sectoral bilateral financial exposures. A given entry (i, j) in the matrix contains the financial asset holdings of sector i invested in sector j, or equivalently the liabilities of sector j with respect to sector i. Appendix A describes the steps and necessary assumptions to infer bilateral sectoral exposures from the Italian flow-of-funds data. The data set only includes financial assets. A sector can have a nonzero net financial asset balance, which should be matched by an opposite net balance of real assets or by own-sector net worth (in the case of BOI, GOV, HH, and RoW).

Survey data allow us to zoom in to household financial exposures as a function of household wealth. The Bank of Italy's Survey on Household Income and Wealth (2016 release) contains financial information (and sample weights) for a representative sample of about 7,000 households. These data are used to calculate the distribution of stock positions and the impact of financial shocks across household wealth deciles. The ECB's Household Finance and Consumption Survey (2014 release) allows us to compare with the distribution in other euro-area economies.

[2]The classification follows the European System of Accounts (ESA) for 2010.

Table 1. Grouping of Sectors

Original Sectors in the Data	Coding
Nonfinancial Corporations	NFC
Monetary Financial Institutions Excluding Central Bank	MFI
Bank of Italy	BOI
Other Financial Intermediaries Excluding Non-MMF Investment Funds Non-MMF Investment Funds Financial Auxiliaries	OFI
Insurance Companies Pension Funds	INP
Central Government Local Government Social Security Funds	GOV
Households and Nonprofit Institutions Serving Households	HH
Rest of the World	RoW

3. Sectoral Financial Exposures in Italy

Table 2 contains the matrix of sectoral financial exposures in Italy in 2017:Q3, expressed as a percent of GDP. For example, nonfinancial corporates (NFCs) own financial assets of monetary financial institutions (MFIs) worth 14 percent of GDP, and equivalently MFIs have financial liabilities of 14 percent of GDP with respect to NFCs. The rightmost column shows the net financial asset (NFA) position of each sector, equal to total assets minus total liabilities.[3]

The distribution of sectoral financial linkages is highly nonuniform. Table 2 shows that NFCs have a very negative NFA

[3]Summing up all sectors, total financial assets equal total financial liabilities, i.e., the system is closed, as it includes the position of the rest of the world vis-à-vis Italy.

Table 2. Sectoral Financial Asset Exposures, 2017:Q3 (percent of GDP)

	NFC	MFI	BOI	OFI	INP	GOV	HH	RoW	Tot. As.	NFA
NFC		14	7	1	2	6	5	27	61	−112
MFI	54		5	13	1	37	37	23	170	0
BOI	0	16		0	0	22	0	13	53	6
OFI	11	18	2		0	8	4	26	69	27
INP	4	3	1	3		20	0	25	55	−2
GOV	11	5	1	4	1		4	4	30	−124
HH	54	64	19	16	50	14		30	247	196
RoW	39	50	12	6	3	47	1		157	8
Tot. Liab.	174	170	47	42	56	154	51	149	843	

Notes: Rows indicate the creditor sector and columns indicate the debtor sector. Rows sum to total assets and columns to total liabilities. NFA: net financial assets. The source data are from the Bank of Italy.

position, with liabilities mainly to MFIs and households. The mirror image is the extremely positive NFA of households, with assets predominantly in MFIs, NFCs, and insurance and pension funds (in this order). The government is very indebted, mostly due to the financial sector and the rest of the world. The Bank of Italy is an important creditor of the government, reflecting the Eurosystem's implementation of QE via its local branch. However, the public sector also holds a significant amount of assets in private sectors, especially NFCs, suggesting it has room to divest and cut its gross liabilities. MFIs are (not surprisingly) financially balanced, with assets in NFCs and the government, and liabilities to households and the rest of the world.

The portfolio composition is visualized in table 3, which expresses financial exposures as a share of total sector assets. This nets out the effect of a sector's balance sheet size. One key message is that MFIs and insurance and pension funds are relatively more exposed to government assets, which indirectly exposes their creditors and/or shareholders, such as households and NFCs.

Next, the evolution of sectoral exposures over five data snapshots is explored. These snapshots are (i) the beginning of the sample, 1995:Q1; (ii) the deployment of the euro, 2001:Q4; (iii) the onset of the GFC, 2008:Q1; (iv) the Outright Monetary Transactions program announcement, 2012:Q2; and (v) the end of the

Table 3. Sectoral Financial Asset Exposures, 2017:Q3 (percent of sector assets)

	NFC	MFI	BOI	OFI	INP	GOV	HH	RoW	Total
NFC		23	11	2	3	10	9	43	100
MFI	32		3	7	1	22	22	14	100
BOI	1	31		1	0	42	0	25	100
OFI	16	27	3		0	11	6	37	100
INP	7	5	1	5		36	0	46	100
GOV	36	17	3	12	2		14	15	100
HH	22	26	8	6	20	6		12	100
RoW	25	32	8	4	2	30	1		100
All	21	20	6	5	7	18	6	18	100

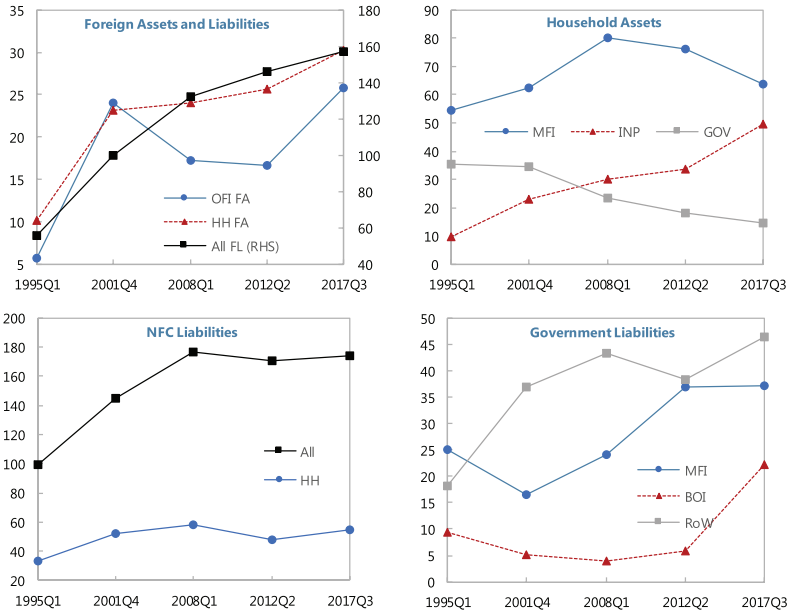
Notes: The last row shows the portfolio composition for the aggregate of all sectors. The source data are from the Bank of Italy.

sample, 2017:Q3. Appendix B contains the full matrix of bilateral exposures at each point in time, while figure 3 reports key takeaways.

The sum of financial assets in all sectors doubled from 1995:Q1 to 2017:Q3 (from 418 to 843 percent of GDP). This reflects the process of European financial integration as well as the increase in financial intermediation. The first panel of figure 3 shows the growing importance of foreign liabilities as well as the diversification of households and other financial institutions (OFIs) toward foreign asset holdings, peaking at the time of euro accession. Yet, the diversification process has slowed down, and the degree of home bias remains elevated.

The second panel shows that households shifted their asset portfolio away from the government and into insurance and pension funds. Their asset holdings in MFIs peaked in the run-up to the GFC but receded thereafter. The GFC also halted the accumulation of NFC liabilities, mostly due to a decline in household investment. On the other hand, the government became more reliant on MFI funding after the GFC, when some international creditors retreated. Since 2012, the Bank of Italy stepped in as a major creditor through the implementation of monetary policy.

Figure 3. Select Sectoral Financial Exposures (percent of GDP)



Notes: The charts are based on five (non-uniformly spaced) data snapshots. The source data are from the Bank of Italy.

4. Simulating the Impact of Financial Shocks

The sectoral exposures matrix is used to simulate the impact of financial shocks across sectors. This section describes how to calculate the impact of different shocks on sectoral net financial assets, whereas the next section discusses the results of each shock scenario.

As previously noted, such simulations capture the impact on wealth rather than on economic activity. Negative shocks to household and government wealth could depress private and public consumption, while shocks to corporate or bank balance sheets could hinder investment.[4] Instead, the focus of the paper is on gauging the

[4]Yet, financial shocks concentrated on wealthy households, such as the ones modeled in this paper, are not likely to induce a large consumption response, given their smaller marginal propensity to consume.

households' shock or loss-absorption capacity, given its importance for financial stability in Italy. Moreover, for simplicity, the simulations abstract from potential correlated price changes in other securities—beyond the change in equity values, portfolio reallocation after the shocks (e.g., prompted by regulatory constraints), or adjustment dynamics.

4.1 Valuation Shock

4.1.1 One Instrument in One Sector

A valuation shock to an instrument issued by a particular sector is considered first. A valuation shock has a *direct* impact on other sectors' NFA positions given by these sectors' holdings of the instrument suffering the shock. Formally, the direct impact on sector i's NFA of a shock to the value of its instrument-k assets in sector j is given by

$$d_{ijk} = \Delta p_{jk} a_{ijk}, \text{ if } i \neq j$$

and for sector $i = j$,

$$d_{jjk} = -\Delta p_{jk} l_{jk},$$

where Δp_{jk} is the change in value of instrument k issued by sector j, a_{ijk} the holdings of sector i in instrument-k liabilities of sector j, and l_{jk} the total instrument-k liabilities of sector j. The vector $\vec{d}_{jk}$ collects the impact for all sectors.

However, shocks also have an indirect impact given by intersectoral equity linkages. To calculate this indirect impact, sectors are divided into ultimate equity owners {BOI, GOV, HH, or RoW} and others. The four ultimate-owner sectors combined own all the equity issued by other sectors and have no equity liabilities themselves, i.e., they cannot be owned by any other entities, so they end up absorbing all shocks.[5] For the remaining sectors, the final NFA impact is zero, as any direct impact is compensated by an equal change in equity

[5]Technically, the rest of the world includes equity-issuing sectors such as foreign firms. However, data disaggregated by sector are not available for foreign residents. Hence, the small-economy assumption that changes in Italian asset prices have a negligible effect on the value of equity issued by foreigners is imposed.

liabilities to either HH, GOV, BOI, or RoW. Of course, this is not to say that financial shocks are without consequences for the non-ultimate-owner sectors, which may suffer from lower profitability, higher funding costs, default or restructuring events, market runs, and/or regulatory pressure.

Formally, the calculation involves two steps. First, the intermediate equity impact e' among the non-absorber sectors is

$$e'_{ijk} = (I - M)^{-1} \sum_{s=\{\text{NFC,MFI,OFI,INP}\}} d_{sjk} E'_{is},$$
$$\text{if } i = \{\text{NFC, MFI, OFI, INP}\},$$

where I is the identity matrix,

$$M \equiv E' - diag\,(E') - \lambda\,(E' - diag\,(E'))\,I,$$

λ is a vector of ones, and E' is a matrix showing the fraction of sector s's equity owned by sector i if $i \neq s$ and equal to the residual share otherwise, defined for $i = \{\text{NFC, MFI, OFI, INP}\}$.[6] The matrix M captures the difference between a sector's equity holdings in other sectors (off-diagonal entries) and its equity liabilities (diagonal entries). The geometric-sum term $(I - M)^{-1}$ reflects the infinite rounds of knock-on effects across sectors interlinked by mutual equity exposures.

Second, the ultimate equity impact e for the shock absorbers is calculated as

$$e_{ijk} = \sum_{s=\{\text{NFC,MFI,OFI,INP}\}} e'_{sjk} E_{is}, \text{ if } i = \{\text{BOI, GOV, HH, RoW}\},$$

where E is a matrix showing the fraction of sector s's equity owned by sector i, imposing zero ownership for $i = \{\text{NFC, MFI, OFI, INP}\}$.[7]

[6] Equity positions include both the ESA category "shares and other equity" and the fraction of non-money-market mutual fund positions which are invested in shares and other equity: 15 percent.

[7] Given the lack of perfect sector-by-sector disaggregation in the data, non-absorption by $i = \{\text{NFC, MFI, OFI, NPI}\}$ must be imposed as a constraint in the calculation.

For the non-absorber sectors, the equity impact is simply the opposite of the direct impact:

$$e_{ijk} = -d_{ijk}, \text{ if } i = \{\text{NFC, MFI, OFI, NPI}\},$$

which makes the total impact zero, as discussed above.

The total NFA impact across sectors is the sum of the direct and indirect impact of the shock:

$$\Delta NFA = \vec{d}_{jk} + \vec{e}_{jk}.$$

4.1.2 Multiple Instruments and Sectors

Generalizing the formulas to account for shocks to the prices of multiple instruments or sectors is straightforward. The direct impact for instrument k held by sector i becomes

$$d_{ijk} = \sum_{s \in \{S\} \setminus j} \Delta p_{sk} a_{isk} - \Delta p_{ik} l_{ik},$$

where S represents the subset of issuer sectors experiencing a price change in instrument k.

If price changes occur in multiple instruments, the direct impact can be simply added up. The formulas for the equity and total impacts are as for the case with one instrument in one sector above.

4.2 Bank Shock: Bail-in Scenario

The cases of a bank bail-in and bailout are slightly more complex than a simple valuation shock. These two scenarios assume that the value of other sectors' assets in a set of MFIs decline. In particular, the bail-in case assumes that all the equity of affected MFIs is wiped out and all their bonds are converted into equity, at a conversion rate of 50 percent.[8] For simplicity, it also assumes that no public

[8]This was approximately the conversion rate applied to Monte dei Paschi junior debtholders in its July 2017 bailout—the most recent one that occurred in Italy. Combined with the equity wipeout, the value of affected liabilities assumed here is above the minimum required eligible liabilities (MREL) mandated by the Bank Recovery and Resolution Directive (BRRD) to contribute public funds to a bail-in. Appendix D considers the alternative assumption of a zero conversion rate.

resolution funds are used and that other (nonbond) debtholders are not affected.

The direct impact is given by the sum of the valuation change in MFI equity and bond liabilities times the exposure of each sector to these two assets.

Since in a bail-in equity is wiped out, original shareholders do not benefit from the reduction in bond liabilities, so there is no indirect equity impact for MFIs:

$$e_{ijk} = 0, \text{ if } i = \text{MFI}.$$

For the rest of non-absorber sectors, the intermediate equity impact is

$$e'_{ijk} = (I - M'')^{-1} \sum_{s=\{\text{NFC,OFI,INP}\}} d_{sjk} E''_{is}, \text{ if } i = \{\text{NFC, OFI, INP}\},$$

where E'' and M'' are, respectively, defined like E' and M but only for sectors $i = \{\text{NFC, OFI, INP}\}$.

The ultimate equity impact for sectors other than MFIs is given by the same formulas as in the valuation shock case above.

4.3 Bank Shock: Bailout Scenario

The difference in the bailout scenario compared with the bail-in scenario is the government's intervention. In a bailout, the government makes a transfer to compensate MFI bondholders for any losses—which are assumed to be equal to those in a bail-in—so only shareholders are wiped out. Formally, the government makes a transfer t to affected MFI bondholders equal to the loss in value of their bonds:

$$t = \Delta p_{jk} \sum_i a_{ijk}, \text{ where } j = \text{MFI and } k = \text{bond}.$$

Hence, the direct impact for the government is equal to $-t$. For other sectors, the direct impact is given by their exposure to MFI equity.

Since among the troubled-bank bondholders are other MFIs, their corresponding share of the government transfer increases their equity value. Hence, the indirect equity effect for MFIs is in this case negative, equal to (minus) the government transfer to troubled-bank

bondholder MFIs. Thus, the equity impact for MFIs can be calculated as the difference between the bail-in direct impact and the bailout direct impact (as the former does not include the government transfer, which is ultimately transmitted to MFI shareholders).

For the rest of non-absorber sectors,

$$e'_{ijk} = (I - M)^{-1} \sum_{s=\{\text{NFC,MFI,OFI,INP}\}} d'_{sjk} E'_{is},$$
$$\text{if } i = \{\text{NFC, OFI, INP}\},$$

where d'_{sjk} is equal to d_{sjk} if $s = \{\text{NFC, OFI, INP}\}$, and it is equal to minus the ultimate equity impact for MFIs if $s = \text{MFI}$.

The ultimate equity impact for sectors other than MFIs is given by the same formulas as in the valuation shock case.

5. Illustrative Shock Scenarios

5.1 Individual Shocks

This section presents results for a calibration of the three types of individual shocks dicussed above. A shock equivalent to a 10 percent decline in the value of government bonds (e.g., due to an increase in market perception of risk or nominal interest rates) is considered first.[9] Table 4 shows that the direct impact, given by government bond exposures, is concentrated on the financial sector—including MFIs, the Bank of Italy, and insurance and pension funds—as well as on the rest of the world. However, once equity linkages are considered, the sector with a larger total NFA decline is the rest of the world, followed by households. The impact on households as a fraction of GDP is non-negligible at about 4 percent of GDP, but only 2 percent as a fraction of their NFA. Government liabilities diminish by an equal amount, which raises the government's NFA position.

[9] This is equivalent to an increase in yields of around 220 basis points, given the duration of Italian outstanding government debt of 4.88 years (source: Bloomberg, as of May 2018), or a two-standard-deviation spread change, based on end-of-quarter year-on-year data for 1995:Q1–2018:Q3 (source: Reuters). For comparison, this is about 1.5 times the increase Italy experienced in late May 2018, and thus an economically sizable shock. Since the analysis is purely static, there is no need to specify the persistence of the shock.

Table 4. Impact of a Government Bond Value Shock (percent of GDP)

	NFA	Direct Impact	Equity Impact	ΔNFA
NFC	−112	−0.3	0.3	0.0
MFI	0	−2.1	2.1	0.0
BOI	6	−2.2	0.0	−2.2
OFI	27	−0.7	0.7	0.0
INP	−2	−2.0	2.0	0.0
GOV	−124	11.7	−0.4	11.3
HH	196	−0.8	−3.1	−3.8
RoW	8	−3.7	−1.6	−5.3

Notes: Assuming a 10 percent decline in the value of general government bonds. The direct impact on the NFA is given by the general government bond exposures. The equity impact is given by the bilateral equity linkages. ΔNFA is equal to direct impact plus the equity impact. The results are based on 2017:Q3 data from the Bank of Italy.

Next, a bank bail-in is compared with a bank bailout scenario. The two scenarios simulate a bank restructuring affecting a bank (or set of banks) constituting 10 percent of MFI liabilities, roughly equivalent to the combined size of Italy's third and fourth largest banks (by assets). This implies a 10 percent reduction in the value of MFI equity liabilities and a 5 percent reduction in the value of their bond liabilities (at a 50 percent conversion rate). In the case of a bailout, bond losses are fully compensated by the government, as explained in the previous section.

Table 5 shows that a bank bail-in mostly affects households and the rest of the world. This applies to both the direct and the total NFA impact. In fact, almost half of a bail-in's impact is absorbed by the rest of the world, which should mitigate the shock's damage to the domestic real economy. The impact on households is slightly over 1 percent of GDP, or 1/2 percent of the households' NFA. The NFA of MFIs increases as their liabilities to other sectors are reduced.

A bailout is less successful in sharing the impact with the rest of the world (table 6). The burden of a bailout falls mostly on the government, at over 1 1/2 percent of GDP, which worsens an already

Table 5. Impact of a Bank Bail-In (percent of GDP)

	NFA	Direct Impact	Equity Impact	ΔNFA
NFC	−112	−0.2	0.2	0.0
MFI	0	2.3	0.0	2.3
BOI	6	−0.1	0.0	−0.1
OFI	27	−0.1	0.1	0.0
INP	−2	−0.1	0.1	0.0
GOV	−124	−0.1	0.0	−0.1
HH	196	−0.9	−0.3	−1.2
RoW	8	−0.7	−0.1	−0.9

Notes: Assuming banks constituting 10 percent of MFI assets are bailed in. All their equity is wiped out and all their bonds converted to equity, at a 50 percent conversion rate. The results are based on 2017:Q3 data from the Bank of Italy.

Table 6. Impact of a Bank Bailout (percent of GDP)

	NFA	Direct Impact	Equity Impact	ΔNFA
NFC	−112	−0.2	0.2	0.0
MFI	0	2.9	−0.6	2.3
BOI	6	0.0	0.0	0.0
OFI	27	0.0	0.0	0.0
INP	−2	0.0	0.0	0.0
GOV	−124	−1.7	0.0	−1.6
HH	196	−0.6	0.2	−0.4
RoW	8	−0.3	0.1	−0.2

Notes: Assuming banks constituting 10 percent of MFI assets are bailed out. All their equity is wiped out, and the government compensates bondholders for 50 percent of their bond holdings value. The results are based on 2017:Q3 data from the Bank of Italy.

vulnerable financial position, and secondarily on domestic households. While foreign shareholders of domestic MFIs absorb a small fraction of the shock, the government ends up transferring resources to foreign bondholders. Overall, foreign absorption of the shock falls by 75 percent compared with a bail-in.

Table 7. NFA Impact of Bank Shocks, Higher MFI Capital Counterfactual (percent of GDP)

	Bail-In		Bailout	
	Baseline	Higher Capital	Baseline	Higher Capital
NFC	0.0	0.0	0.0	0.0
MFI	2.3	2.3	2.3	2.3
BOI	−0.1	0.0	0.0	0.0
OFI	0.0	0.0	0.0	0.0
INP	0.0	0.0	0.0	0.0
GOV	−0.1	−0.2	−1.6	−1.0
HH	−1.2	−1.3	−0.4	−0.8
RoW	−0.9	−0.8	−0.2	−0.5

Notes: The table shows the total NFA change after a bank bail-in and a bailout under two different assumptions: the "Baseline" column is based on the actual level of bank capital (like tables 5 and 6), while the "Higher Capital" column assumes a 50 percent higher MFI capital-to-total-assets ratio, proportionally distributed across shareholder sectors. The results are based on 2017:Q3 data from the Bank of Italy.

Italian banks' tier 1 capital ratios remain below the euro-area average, according to the ECB Supervisory Banking Statistics. Table 7 shows results for the bail-in and bailout simulations under the counterfactual assumption that MFIs start with a 50 percent higher aggregate capital-to-assets ratio. Such counterfactual would cut the public cost of a bailout by a third and double the foreign absorption rate. On the other hand, it would slightly increase the impact of a bail-in on domestic households, as these tend to hold a disproportionate amount of equity relative to bonds compared with foreigners. Moreover, while this exercise takes the financial shock as given, less leveraged banks may limit their risk-taking (a well-known mechanism since Jensen and Meckling 1976), potentially reducing the probability and size of shocks.

The above bank shock simulations are subject to a number of caveats. First, the conversion rate of bonds into equity in a bail-in usually depends on circumstance. Appendix C presents results assuming a zero conversion rate. Second, smaller Italian banks, which tend to feature more vulnerable balance sheets and are more

likely to be restructured, are also disproportionately owned by domestic households.[10] Taking this into account would reduce the subsidy to the rest of the world associated with a bailout. Third, unlike a bail-in, a bailout may prevent contagion to other MFIs, potentially preventing detrimental knock-on effects on financial stability and investment. Finally, the bail-in and bailout scenarios must be interpreted as illustrative polar cases, since actual experiences of bank restructuring typically contain elements of both.

5.2 Correlated Shock

Shocks to the value of government debt in Italy tend to cause changes in the value of other debt securities. Albertazzi et al. (2014) estimate that a 100 basis point increase in spreads leads to a 73 basis point increase in MFI bonds rates after one quarter, a 21 basis point increase in corporate credit rates, 17 basis points in household credit, and 34 basis points in MFI term deposits. Using these estimates of the correlation between government bond rates and other securities, tables 8 and 9 recalculate the direct and total NFA impact, respectively, of a shock to the value of government bonds.[11] The tables introduce the correlations in a cumulative manner: the first column corresponds to the table 4 baseline, the second column adds a correlated response of bank bonds, the third column adds the response of corporate and household credit, and the fourth term deposits.[12]

Focusing on the direct exposures (table 8), a depreciation of MFI bonds increases the impact for households and the rest of the world, while it obviously creates a valuation gain for MFIs. Adding a depreciation of debt securities by all sectors harms the financial sector,

[10]See SNL bank-level data showing lower capitalization and profitability in several banks outside the largest two.

[11]To translate interest rate correlations into price correlations, MFI bonds and private credit are both assumed to have similar average duration as government bonds, while MFI deposits are assumed to have half the duration. Data for MFI bond average maturity are available from Bloomberg, while data on outstanding amounts of other debt securities by broad maturity bins are available from Bank of Italy statistics.

[12]The order of addition is motivated by the experience during the 2018 sovereign spread hike, when pass-through was strongest for bank bonds. In fact, the 2018 response of credit and especially term deposit rates has been muted so far, suggesting the last two columns in tables 8 and 9 should be taken as an upper bound.

Table 8. Direct Impact of a Combined Debt Shock (percent of GDP)

	Baseline	MFI Bonds	All Debt	Term Deposits
NFC	−0.3	−0.3	0.4	0.4
MFI	−2.1	−0.7	−1.4	−0.3
BOI	−2.2	−2.3	−2.2	−2.5
OFI	−0.7	−0.8	−1.1	−1.4
INP	−1.9	−2.0	−2.6	−2.6
GOV	11.7	11.7	11.6	11.6
HH	−0.8	−1.3	−0.6	−1.0
RoW	−3.7	−4.3	−4.1	−4.3

Notes: The first column assumes a 10 percent decline in the value of general government bonds, as in table 4. The next three columns cumulatively add correlated declines in the values of debt issued by other sectors. The second column adds a 7.3 percent decline in the value of bank bonds. The third column adds a 2.1 percent decline in the value of corporate debt and a 1.7 percent decline in the value of household debt. The fourth column adds a 1.7 percent decline in the value of term deposits. The results are based on 2017:Q3 data from the Bank of Italy.

Table 9. NFA Impact of a Combined Debt Shock (percent of GDP)

	Baseline	MFI Bonds	All Debt	Term Deposits
NFC	0.0	0.0	0.0	0.0
MFI	0.0	0.0	0.0	0.0
BOI	−2.2	−2.3	−2.2	−2.5
OFI	0.0	0.0	0.0	0.0
INP	0.0	0.0	0.0	0.0
GOV	11.4	11.4	11.3	11.3
HH	−3.9	−3.7	−3.6	−3.5
RoW	−5.2	−5.4	−5.5	−5.4

Notes: The first column assumes a 10 percent decline in the value of general government bonds, as in table 4. The next three columns cumulatively add correlated declines in the values of debt issued by other sectors. The second column adds a 7.3 percent decline in the value of bank bonds. The third column adds a 2.1 percent decline in the value of corporate debt and a 1.7 percent decline in the value of household debt. The fourth column adds a 1.7 percent decline in the value of term deposits. The results are based on 2017:Q3 data from the Bank of Italy.

while it relieves the losses for NFCs and households. If term deposits also depreciate to the extent observed in the past (i.e., deposit rates increase), the NFA impact on banks is quite mitigated, while deposit holders, including the Bank of Italy, other financial institutions, and households, are all worse off.

Table 9 shows that the total NFA impact under a combined shock is not substantially different from the baseline. Households' NFA tends to be slightly less affected by the shock as some of households' liabilities decrease in value, while the rest of the world and the Bank of Italy suffer a worse NFA decline as a larger chunk of their assets depreciate.

6. Distributional Impact

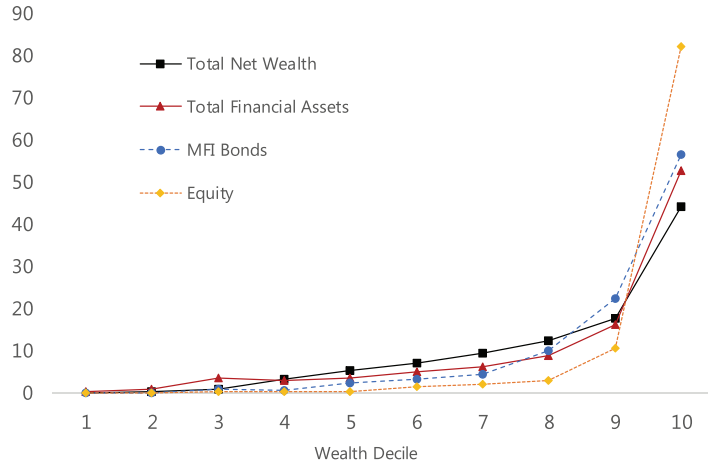
Survey data allow us further decompose the impact of shocks absorbed by each household wealth group. This section documents stylized facts of the financial wealth distribution for different financial instruments. Next, it uses this information to estimate how the burden of the financial shocks considered in the previous section is shared across household wealth deciles.

Financial wealth is concentrated at the top of the distribution (figure 4). Households at the top 20 percent of the wealth distribution hold 69 percent of financial wealth. This is particularly the case for risky assets, such as equity holdings (93 percent at the top 20), and to a lesser extent for bank bonds (79 percent at the top 20). Government bonds are distributed in line with total financial wealth.

Wealthier households hold riskier financial instruments (figure 5). The financial portfolio of less-wealthy households is almost entirely constituted by (insured) bank deposits, so they are not directly affected by government bond or bank financial shocks. Wealthier households, with a higher capacity to absorb losses, invest proportionally more in equity and nonsecured fixed-income instruments. Yet, most of their financial wealth is also in safe assets.

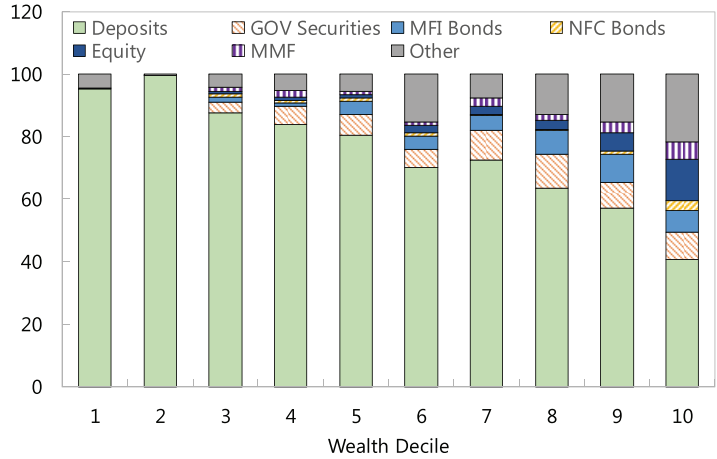
As a result, wealthy households absorb most of the financial losses after a government bond shock or a bail-in. Table 10 shows the impact of the three financial shocks by household decile, expressed both in euros per household and as a percentage of decile total

Figure 4. Distribution of Household Assets by Household Wealth, 2016:Q4 (percentage points)



Notes: Perfect equality would correspond to a flat line across deciles at 10 percent. "Equity" includes shares, equity funds, and exchange traded funds. The data are from the Bank of Italy's Survey on Household Income and Wealth.

Figure 5. Household Financial Asset Portfolio by Wealth, 2016:Q4 (percent of decile total financial assets)



Notes: "MMF" denotes money market funds. "Equity" includes shares and equity mutual funds. The category "Other" consists mostly of mutual funds which are neither equity funds nor MMF, as well as of pension funds. The data are from the Bank of Italy's Survey on Household Income and Wealth.

Table 10. Impact of Financial Shocks by Household Wealth Decile (percentage points)

	Euros per HH					% of Decile Fin. Assets		
Decile	**Wealth**	**Fin. As.**	**Gov. Bond**	**Bail-In**	**Bailout**	**Gov. Bond**	**Bail-In**	**Bailout**
1	−1,584	477	0	0	0	−0.1	0.0	0.0
2	3,326	2,438	0	0	0	0.0	0.0	0.0
3	17,651	9,488	−51	−23	−12	−0.5	−0.2	−0.1
4	65,334	8,486	−76	−18	−8	−0.9	−0.2	−0.1
5	108,434	9,928	−91	−61	−36	−0.9	−0.6	−0.4
6	146,859	13,849	−183	−92	−46	−1.3	−0.7	−0.3
7	194,062	17,044	−306	−126	−62	−1.8	−0.7	−0.4
8	254,080	24,771	−504	−277	−149	−2.0	−1.1	−0.6
9	367,042	45,014	−1,260	−650	−310	−2.8	−1.4	−0.7
10	914,511	146,949	−8,183	−2,113	−511	−5.6	−1.4	−0.3
Total	206,971	27,844	−1,066	−336	−113	−3.8	−1.2	−0.4

Notes: The first column shows household total net wealth (including real assets), while the second one shows gross financial assets.[a] The next three columns show the absolute impact absorbed by each decile in euros per household, while the last three columns show the impact as a percentage of the decile's total gross financial assets. The results assume that bank equity exposures are distributed as total equity exposures. The results are based on data from the Bank of Italy.

[a]The average level of wealth and (especially) financial assets according to the Survey on Household Income and Wealth (2016 release) is significantly lower than the 2013 aggregate reported by the Bank of Italy (see section 1). Beyond the year difference, this could be due to underreporting in the survey, especially at the right tail of the wealth distribution, where financial assets in particular are concentrated. In any case, survey data are only used to obtain the distribution. Financial wealth levels are from the flow-of-funds data.

financial assets, together with the average net real wealth and gross financial assets of each decile (first two columns). Wealthier households are more affected by financial shocks, both in absolute terms as and as a percentage of their financial assets, especially for a government bond shock (where the indirect equity impact is relatively more important). Hence, the social welfare effect of such shocks is smaller than the wealth effect.

On the contrary, the cost of a bailout is less concentrated in wealthier households. In fact, households at the top decile of the wealth distribution contribute less as a percentage of their financial assets than the next three deciles. This is because in a bailout the government compensates MFI bondholder sectors which are ultimately owned by wealthy households, such as other MFIs, OFIs, and NFCs, generating a positive indirect equity impact. Moreover, given that wealthier households have a lower marginal propensity to consume out of income shocks, the fiscal expansion associated with a bailout would probably lead to a meager GDP multiplier.[13]

Table 11 shows how the fiscal transfer implicit in a bailout is mostly distributed to the top of the wealth distribution (see "Data" column). It also computes the counterfactual transfer that would prevail absent the portfolio biases of rich households, i.e., if all wealth deciles held the same fraction of financial assets in equity, and if they held the same fraction in MFI bonds. Removing the equity bias would have a larger effect, making poorer wealth deciles receive a larger share of the transfer. Of course, such portfolio reallocation would imply that poorer deciles are more exposed to the shock in the first place.

The government could neutralize the cost of the bailout transfer implementing a tax on wealth that left each household wealth decile unaffected. Figure 6 shows the average wealth tax rate faced by each decile if such progressive wealth taxation was applied. The *proportional* tax rate on wealth needed to recoup the fiscal losses would be 0.2 percent, but a proportional tax would not completely undo the regressive effects of the bailout.

[13]See, e.g., Arrondel, Lamarche, and Savignac (2015) for an estimate of the marginal propensity to consume by wealth level in France.

Table 11. Bailout Fiscal Transfer by Household Wealth Decile (percentage points)

	Euros per HH			% of Decile Fin. Assets		
Decile	Data	No Equity Bias	No MFI Bond Bias	Data	No Equity Bias	No MFI Bond Bias
1	0	5	2	0.0	1.1	0.4
2	0	27	9	0.0	1.1	0.4
3	17	113	43	0.2	1.2	0.5
4	18	100	43	0.2	1.2	0.5
5	36	134	48	0.4	1.3	0.5
6	73	186	92	0.5	1.3	0.7
7	104	234	121	0.6	1.4	0.7
8	196	377	184	0.8	1.5	0.7
9	559	728	496	1.2	1.6	1.1
10	3,110	2,207	3,073	2.1	1.5	2.1
Total	411	411	411	1.5	1.5	1.5

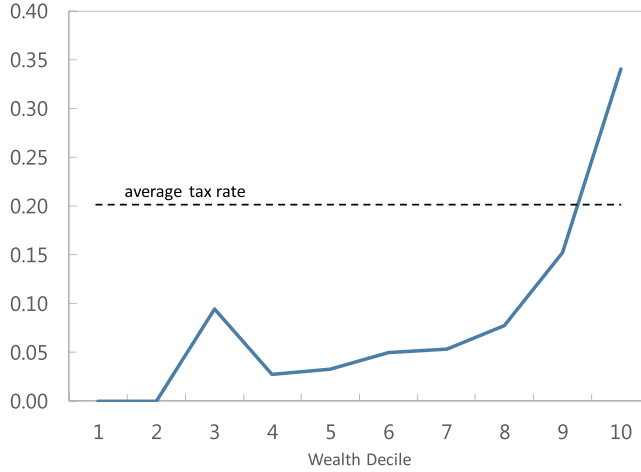
Notes: The first three columns show the absolute impact absorbed by each decile in euros per household, while the next three columns show the impact as a percentage of the decile's total gross financial assets. The results assume that bank equity exposures are distributed as total equity exposures. The results are based on data from the Bank of Italy.

7. Conclusion

Italy's sectoral asset exposures stand out for their strong household net financial positions but also for the weakness of other sectors. The household sector has been increasing its net financial position by building assets in the financial sector, which in turn has been lending to the heavily indebted public and nonfinancial corporate sectors. Reflecting quantitative easing, in recent years, the Bank of Italy has also become heavily exposed to Italian government assets.

An illustrative set of calculations reveals the diverse impact of financial shocks across sectors. The purpose is to assess the loss-absorption capacity of households rather than to fully specify the deleterious GDP and employment effects, which should also be considered in policymaking. A fall in the value of government bonds

Figure 6. Wealth Tax to Neutralize a Bailout's Fiscal Transfer (average tax rate by wealth decile, percent)



Notes: The solid line shows the average tax rate on total wealth by wealth decile needed to compensate the fiscal transfer to each wealth decile in a bailout. The dashed line shows the equivalent proportional tax rate.

affects the financial sector and is ultimately absorbed by domestic households and the rest of the world. The impact of a sizable loss in the value of government assets on net household wealth is relatively large but appears manageable, especially considering that it affects mostly the upper parts of the wealth distribution.

Regarding the analysis of bank bail-ins and bailouts, although not a comprehensive assessment of all their implications, the contribution of the paper is to highlight a series of quantitatively relevant factors that are often not transparent in the policy debate. In the case of a bail-in, the overall impact on wealth is relatively small, and the impact on welfare is even smaller, considering its incidence is almost entirely at the top end of the wealth distribution. The degree of domestic absorption in a bank bail-in is much lower than in a bailout, in which the government in effect transfers resources to foreigners and thus bears the brunt of the loss in value. These costs will need to be passed on to the domestic taxpayer, and thus across the broader parts of the income and wealth distribution, given the

heavy reliance on labor income and consumption taxes as opposed to wealth taxes.

Appendix A. Identification of Sectoral Linkages in the Data

This appendix describes the necessary assumptions to infer intersectoral exposures from Italian flow-of-funds data.

For some sector-instruments, such as government bonds, identifying the counterparty sector is straightforward—the government. If the counterparty sector of an instrument is reported as "other financial institutions," the assets are distributed between OFI and INP according to the relative total liabilities of these two sectors in that particular instrument. A similar assumption applies to instruments issued by MFIs when the data does not specify whether these are issued by the Bank of Italy or other MFIs (e.g., deposits). For instrument categories "short-term loans," "medium- and long-term loans," and "insurance, pension, and guaranteed funds," the data do not provide a complete sectoral disaggregation on the asset side. Hence, the classification is based on liability-side information.

For the remaining sector-instruments, the principle of maximum entropy is applied, following previous literature (most closely Castrén and Kavonius 2009, inspired by Allen and Gale 2000). That is, asset positions of sector i on sector j are obtained multiplying the marginal distribution of sector i assets times the marginal distribution of sector j liabilities. Typically, these "unclassifiable" instruments are reported in the data as assets of sector i in "other sectors" or liabilities of sector i with respect to "other sectors."

This classification approach ensures that all instruments are allocated to both a creditor and a debtor sector. Hence, the total sum of assets and liabilities in each instrument is consistent with the balance sheet positions of the whole economy in that instrument.

Appendix B. Financial Exposures over Time

Table B.1 contains the full matrix of bilateral exposures at select points in time: (i) the beginning of the sample, 1995:Q1; (ii) the deployment of the euro, 2001:Q4; (iii) the onset of the GFC, 2008:Q1;

Table B.1. Sectoral Financial Asset Exposures over Time (percent of GDP)

1995:Q1	NFC	MFI	BOI	OFI	INP	GOV	HH	RoW	Tot. As.	NFA
NFC		7	2	1	2	5	5	10	33	−67
MFI	39		2	2	0	25	16	14	97	−1
BOI	0	2		0	0	9	0	5	17	3
OFI	7	3	0		0	5	1	6	21	0
INP	2	2	0	0		4	0	2	9	−5
GOV	9	5	1	6	1		1	2	24	−77
HH	33	54	8	11	10	35		10	162	139
RoW	11	24	1	1	1	18	0		56	8
Tot. Liab.	100	98	14	21	14	102	23	48	418	
2001:Q4	**NFC**	**MFI**	**BOI**	**OFI**	**INP**	**GOV**	**HH**	**RoW**	**Tot. As.**	**NFA**
NFC		14	1	2	3	4	6	18	48	−96
MFI	46		1	3	1	17	20	15	104	−19
BOI	0	1		0	0	5	0	6	12	4
OFI	11	7	0		0	12	4	24	58	10
INP	3	3	0	2		9	0	8	25	−7
GOV	8	5	0	5	1		3	3	26	−92
HH	52	63	5	31	23	34		23	231	198
RoW	24	31	0	4	2	37	0		100	2
Tot. Liab.	145	123	8	47	31	117	34	97	603	
2008:Q1	**NFC**	**MFI**	**BOI**	**OFI**	**INP**	**GOV**	**HH**	**RoW**	**Tot. As.**	**NFA**
NFC		15	2	1	3	6	6	19	50	−126
MFI	61		1	6	1	24	29	24	146	−13
BOI	0	1		0	0	4	0	9	15	3
OFI	12	6	0		0	4	9	17	48	18
INP	4	5	0	1		8	0	15	34	−3
GOV	10	6	1	2	1		4	2	24	−89
HH	58	80	6	13	30	24		24	235	187
RoW	32	47	1	7	2	43	0		133	22
Tot. Liab.	177	159	11	30	37	113	48	111	686	
2012:Q2	**NFC**	**MFI**	**BOI**	**OFI**	**INP**	**GOV**	**HH**	**RoW**	**Tot. As.**	**NFA**
NFC		11	4	1	1	7	5	26	54	−116
MFI	66		3	14	1	37	38	29	188	−2
BOI	0	18		0	0	6	0	14	37	7
OFI	12	21	1		0	11	5	17	67	29
INP	3	3	0	2		13	0	14	36	−2
GOV	10	5	1	2	0		4	4	27	−103
HH	47	76	14	10	34	18		26	225	171
RoW	31	57	8	9	2	38	1		146	17
Tot. Liab.	170	190	31	38	38	130	54	129	780	

(*continued*)

Table B.1. (Continued)

2017:Q3	NFC	MFI	BOI	OFI	INP	GOV	HH	RoW	Tot. As.	NFA
NFC		14	7	1	2	6	5	27	61	−112
MFI	54		5	13	1	37	37	23	170	0
BOI	0	16		0	0	22	0	13	53	6
OFI	11	18	2		0	8	4	26	69	27
INP	4	3	1	3		20	0	25	55	−2
GOV	11	5	1	4	1		4	4	30	−124
HH	54	64	19	16	50	14		30	247	196
RoW	39	50	12	6	3	47	1		157	8
Tot. Liab.	174	170	47	42	56	154	51	149	843	

Notes: The data are from the Bank of Italy.

(iv) the Outright Monetary Transactions program announcement, 2012:Q2; and (v) the end of the sample, 2017:Q3.

Appendix C. Bank Shock Counterfactual Simulations

This appendix shows the total NFA change after a bail-in and a bailout under alternative assumptions for the bond conversion rate (table C.1). The baseline shows the impact assuming that 50 percent

Table C.1. Impact of Bank Shocks, No Bond Conversion Counterfactual (percent of GDP)

	Bail-In		Bailout	
	Baseline	No Conversion	Baseline	No Conversion
NFC	0.0	0.0	0.0	0.0
MFI	2.3	3.2	2.3	3.2
BOI	−0.1	−0.2	0.0	0.0
OFI	0.0	0.0	0.0	0.0
INP	0.0	0.0	0.0	0.0
GOV	−0.1	−0.1	−1.6	−3.2
HH	−1.2	−1.6	−0.4	0.0
RoW	−0.9	−1.3	−0.2	0.0

Notes: The results are based on 2017:Q3 data from the Bank of Italy.

of the value of bonds is recovered after bonds are converted to equity, while the alternative shows the impact under a zero conversion rate.

A lower conversion rate increases total bondholder losses and thus the required government transfer in a bailout. In the bail-in case, the additional impact is roughly proportionally distributed across sectors.

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