INTERNATIONAL MONETARY FUND

ITALY

SELECTED ISSUES

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CONTENTS

ANNEXES

DOES PUBLIC SECTOR INEFFICIENCY CONSTRAIN FIRM PRODUCTIVITY: EVIDENCE FROM ITALIAN PROVINCES[1]

This paper establishes a causal link between public sector efficiency at the provincial level and firm productivity using data for about 450,000 Italian firms. Significant productivity gains could be realized if public sector efficiency improved from currently low levels. If efficiency rose to the frontier in all provinces, output per employee would increase 9 percent for the average firm. Implementing the public adminstration reform agenda and recommendations of the 2014 spending review and competition authority could help deliver some of these productivity gains.

A. Introduction

1.   **Italy's productivity has been stagnant since the late 1990s.** Labor productivity defined as real GDP per hour worked increased a meager 3.5 percent, while TFP fell a cumulative 7.5 percent since Italy adopted the euro in 1998. As a result, a wide gap has emerged between Italy's productivity and that of most major OECD economies (Figure 1). Addressing the productivity problem is essential to boost growth in Italy. A recovery in investment and employment creation will expand output in the near term as the economy emerges from a deep recession. However, productivity gains are necessary to lay the foundations for sustainable growth in the long run.

Figure 1. Italy: Evolution of Aggregate Productivity

Source: Total Economy Database (TED). Labor productivity is measured as GDP per hour worked.
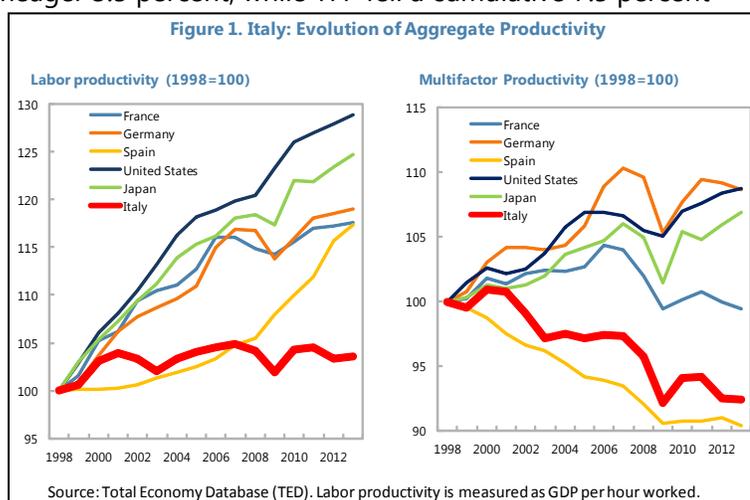
2.   **Identifying the key source of Italy's low productivity is difficult.** Many hypotheses have been put forth in trying to explain Italy's lack of productivity growth—structural deficiencies related to the sectoral specialization of Italian manufacturing (Ciriaci and Palma, 2008) and a business model, which relies predominantly on micro and small firms, and institutional factors, such as labor regulations (Daveri and Parisi, 2010), judicial inefficiency (Giacomelli and Menon, 2013, Esposito and others, 2013), and availability of key factors of production, such as human and entrepreneurship

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[1] Prepared by Sergi Lanau and Petia Topalova. This selected issues paper is based on a forthcoming working paper with Raffaela Giordano and Pietro Tommasino at the Bank of Italy.

capital and managerial knowhow (e.g., Bandiera and others, 2008; Brasili and Federico, 2008; Bloom and others, 2008). Pellegrino and Zingales (2014) examine systematically the various possible explanations of Italy's productivity slowdown. Using industry level data across 23 sectors in 15 countries, they conclude that the main cause of Italy's "disease" is the inability of small firms to adjust to the global change of the 2000s, namely the rise of China and the ICT revolution, due to a lack of managerial talent. This in turn is the outcome of a deeply-rooted system of familism and cronyism.

3.   **Could public sector inefficiency be holding back firm productivity?** Italy lags behind other advanced economies on various measures of public sector efficiency. Among OECD economies, it gets some of the lowest scores on direct efficiency measures as experienced by firms on the ground such as the number of days and cost to get a construction permit, enforce a contract, get electricity or pay taxes according to the World Bank Doing Business indicators (WB, 2015).

Perception based measures of efficiency, as compiled by the World Economic Forum, Global Competitiveness Survey, paint a similar picture, with Italy ranking amongst the worst on measures of government efficiency, wastefulness of government spending,

Figure 2. Italy: Measures of Government Efficiency

A. As experienced by firms

B. As perceived by firms

Days to Get Construction Permit

Government Efficiency: Overall Score

Wastefulness of Government Spending

Source: World Bank Doing Business Indicators, and World Economic Forum, Global Competitiveness Survey (2014).

diversion of public funds, etc. (Figure 2). As government services are inputs into firms' production processes, their inefficient provision may lower the marginal productivity of labor and capital employed by the firm.
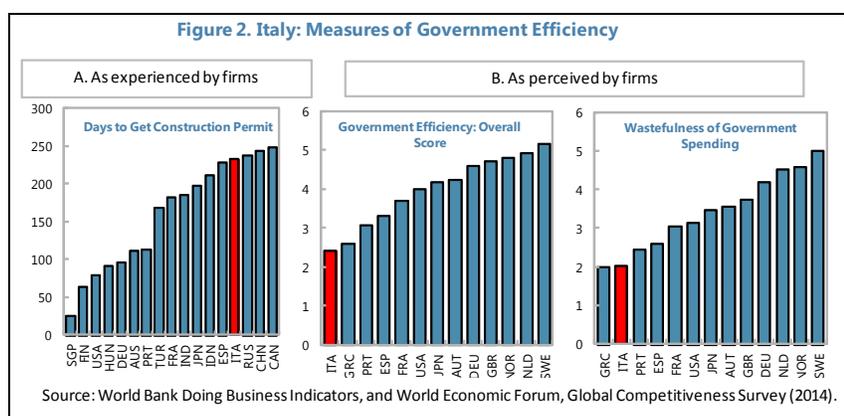
4.   **This paper provides new evidence on the role of Italy's inefficient public sector in explaining its low levels of productivity.** Exploiting the significant variation that exists in the efficiency of the government service provision across Italian provinces, the inter-industry differences in government dependence and detailed firm level data, we ask the following questions: (i) does public sector inefficiency lead to lower firm level productivity?; (ii) which types of firms are more affected by government inefficiency, and what types of services matter the most?; and (iii) what would be the macroeconomic gains from raising the efficiency of the public sector?[2] The remainder of this paper is structured as follows: Section B outlines the empirical strategy used to estimate the

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[2] Pellegrino and Zingales (2014) do not find evidence that government inefficiency constrains productivity growth. However, their study, which relies on cross-country variation, faces the potential problems of limited data comparability across countries, small sample sizes, and higher likelihood of omitted variables. Amici et. al. (2015) find that the measures taken in 2008 and 2010 to simplify the process to start a business in Italy increased the corporate birth rate.

causal effect of public sector efficiency on firm productivity and describes the data used in the analysis; Section C presents the main results and discusses the robustness of the findings; and Section D offers some policy considerations for Italy and concludes.

B. Empirical Strategy, Data and Measurement

Empirical Strategy

5.   Italy is characterized by large regional disparities in government efficiency. The subnational Doing Business survey conducted in 2013 highlights a significant gap between the relatively efficient Center-North and the lagging South: it takes more than twice the number of days to get a construction permit in Sicily than in Lombardy. In fact, of all European economies, Italy has the largest variation between its worst and best performing region according to the European Quality of Governance Index (Figure 3). A similar pattern of geographical variation emerges from an efficiency measure at the more-disaggregated provincial level (explained in more detail below).[3] Giacomelli and Tonello (2015) also document significant heterogeneity in the performance of local governments.

Figure 3. Italy: Regional Variation in Government Efficiency in Italy

Sources: Doing Business 2013.

Sources: European Commission (DG REGIO), based on World Bank Governance indicator and regional-level survey data.
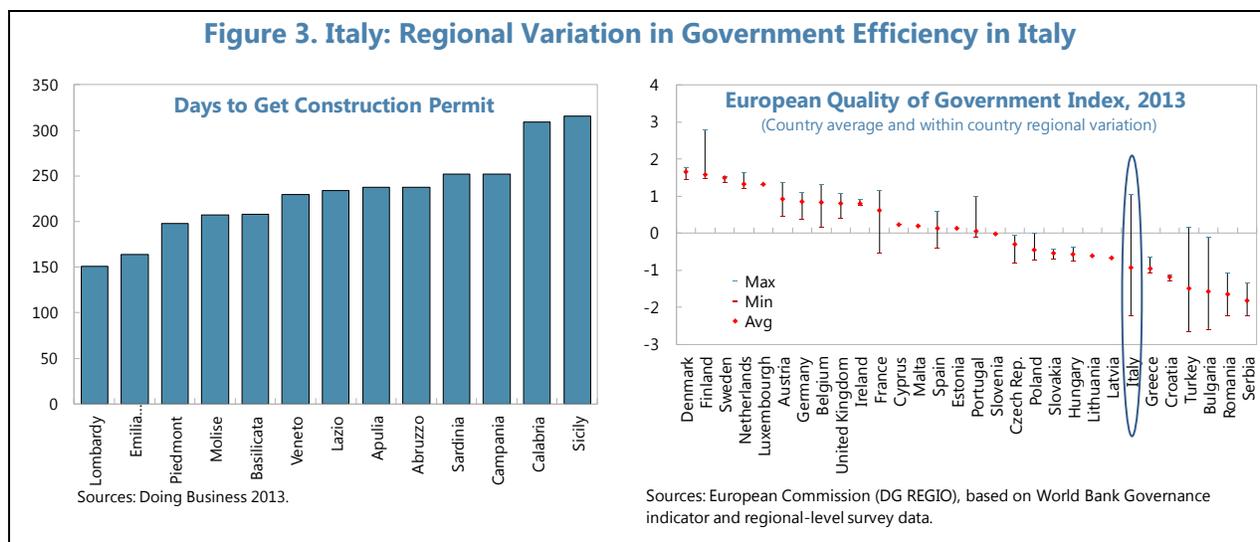
6.   Similarly, there are substantial regional disparities in firm productivity. The median firm in the North produces 9½ percent more per euro spent on employees than the median firm in the South. The median return on assets is 180bps higher.[4] Even a casual visual inspection reveals that

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[3] In Italy, a province is an administrative unit between municipalities and regions. Italy is divided into roughly 20 regions, 100 provinces, and 8,100 municipalities.

[4] Regional disparity in per capita GDP is much more pronounced, with per capita GDP in the North almost double that of the South of Italy. This is largely explained by differences in employment and participation rates. Productivity

(continued)

provinces that have higher public sector efficiency also tend to have higher firm level productivity; a finding also confirmed by the relatively tight correlation between the two variables (Figure 4). However, this simple correlation does not necessarily imply that public sector efficiency affects firm productivity. Provinces with low public sector efficiency may have different industrial structure, different size composition of firms, and may differ in a host of other ways that affect labor productivity, independently of government efficiency.

Figure 4. Italy: Public Sector Efficiency and Firm Labor Productivity at the Province Level

Public Sector Efficiency   *Firm Labor Productivity*
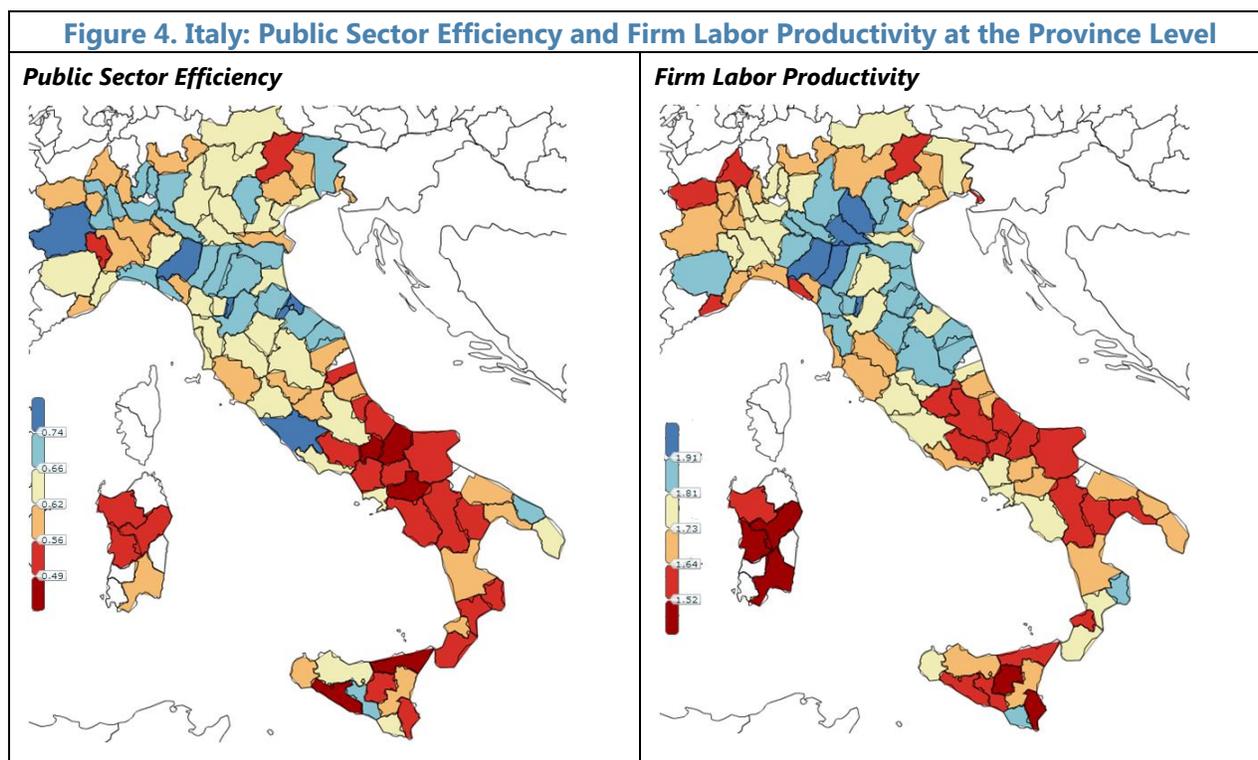
Notes: Province-level public sector efficiency is from Giordano and Tommasino (2011). Firm labor productivity is measured as real output per employee cost. The map on the right panel plots the median for each province based on 2007 Orbis data.

7.   In order to establish a causal link between government efficiency and firm productivity, we employ a simple difference-in-difference empirical strategy. Akin to the Rajan and Zingales (1998) framework, the identifying assumption is that productivity of firms in sectors that are more reliant on the government would be more affected by government inefficiency. In other words, the causal effect of government efficiency is captured in the difference in productivity of firms in sectors highly dependent on the government and those not very dependent of the government in provinces with high government efficiency, and that difference in provinces with low government efficiency. The following equation is estimated at the firm level using data from 2007:

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differentials, as measured by gross value added per euro spent on employees, in national accounts data are of similar magnitude to the ones we uncover in the firm level data.

$$Y_{isp} = \beta * GovDep_s * GovEff_p + \gamma X_{isp} + \alpha_p + \alpha_s + \varepsilon_{isp} \qquad (1)$$

Where Y_{isp} is the productivity of firm i in sector s and province p. In the interaction term, $GovDep_s$ measures how dependent firms in sector s are on the public sector and $GovEff_p$ how efficient the public sector is in province p. X_{isp} contains firm-specific control variables, namely a set of indicators for firm size.[5] α_p is a set of province fixed effects and α_s a set of sector fixed effects (658 sectors, four-digit NACE Revision 2 classification). ε_{isp} is an error term.

8.   In this estimation equation, the coefficient β captures the causal effect of higher public sector efficiency on firm performance. The 600+ sector fixed effects control for any differences in productivity that may exist across sectors including from cyclical factors, such as, demand for output in the sector, and structural sectoral characteristics, such as technology and input requirement, R&D intensity, etc. The biggest advantage of our specification is that we can control for all institutional and geographical factors that affect the productivity of all firms in the province equally (such as, for example, factor endowments, attitude towards work, climate, degree of civil engagement, and trust, etc.) through the province fixed effects.

Measuring Firm Dependence on the Public Sector

9.   A key input for this empirical strategy is the dependence of firms in different industries on the public sector. We rely on a new indicator, developed by Pellegrino and Zingales (2014), which proxies government dependence by the frequency of news about a certain sector also mentioning the government. More specifically, the authors calculate for 21 sectors the percentage of news, containing words like "government", "regulation" in total sector news in Factiva over the period 2000–12. The measure is admittedly imperfect but understandably so given the difficulty of accurately measuring the use of public sector services by industries. Figure 5 depicts the degree of government dependence according to this measure. Not surprisingly, sectors such as agriculture, electricity, and construction are ranked as some of the most government dependent. As a robustness check, we construct an alternative measure of government dependence, using the share of output of a sector sold to the government according to the

Figure 5. Italy: Sectoral Dependence on the Government

Source: Pellegrino and Zingales (2014).

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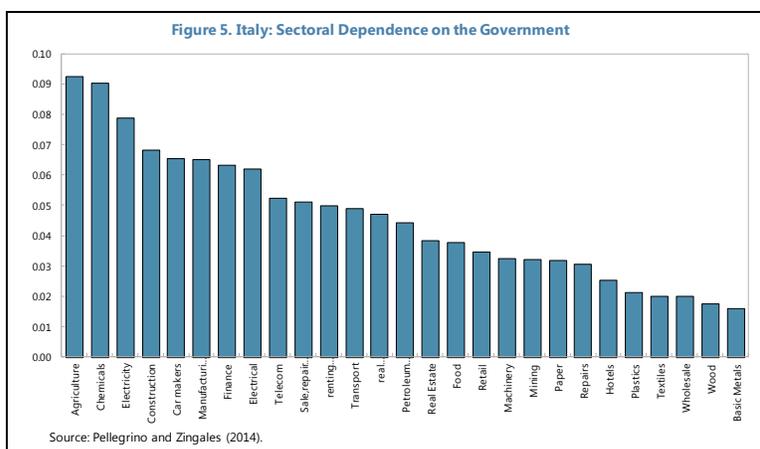
[5] A large literature has documented that large firms are more productive (e.g., Idson and Oi, 1999).

economy-wide input-output matrix. Our findings, based on this measure, are discussed in Section C in greater detail.

Measuring Public Sector Efficiency at the Province Level

10.   **The efficiency of public spending captures how efficiently government units transform inputs into outputs relative to the most efficient province.** Using province-level data on public spending and outputs of five key public services, Giordano and Tommasino (2011) estimate an efficient production frontier using a nonparametric Data Envelopment Analysis (DEA) method. The government efficiency of each of the 103 Italian provinces is then assessed based on its distance to the production frontier.[6]

11.   **Efficiency is calculated for five spending categories on or around 2007: health care, education, civil justice, child care, and waste collection.** Two of them are the responsibility of the central government (education and civil justice), one is within the remit of the regional governments (health), while child care and waste collection are administered by the local governments. Depending on the sector, we consider averages over a given time period (assuming that it takes time for public spending to influence outcomes) or the most recent year for which data are available. Table 1 details the input and output variables used to calculate efficiency in each category. The $GovEff$ score used in equation (1) is a simple average across the five categories. Higher values mean higher efficiency. The score would be one for a province that was the most efficient in the country in each category. Table 2 summarizes the efficiency indicators aggregated at the region and macro-region levels. Similarly to the subnational Doing Business survey and the European Quality of Governance index, there is a north-south gap in the efficiency of the public sector.

Table 1. Italy: Inputs and Outputs Used to Construct Provincial Public Efficiency Indicators			
Category	**Input**	**Output**	**Controls**
Health care	Public health expenditure per capita (age weighted), average 1985–2007	Change in life expectancy between 1981–83 and 2003–05	GDP growth
Education	Number of teachers per student (2005–06)	INValSI test scores of 6th and 9th graders (2005-06)	Adult education
Civil justice	Number of judges per 1,000 new trials in 2006	Average length of trial in 2006	n.a.
Child care	Public expenditure on child care in 2007	Number of children in day care in 2007	Quality of service
Waste disposal	Public expenditure on waste disposal	Tons of waste collected and % recycled	n.a.

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[6] For a full description of the methodology, data and estimation strategy, see Giordano and Tommasino (2011).

Table 2. Italy: Public Sector Efficiency Indicators (Output-Oriented DEA)						
Region [1/]	Health	Education	Judicial system	Daycare	Waste disposal	Average
Valle d'Aosta	0.77	0.92	0.30	0.17	0.70	0.57
Piemonte	0.76	0.91	0.43	0.45	0.65	0.64
Liguria	0.74	0.87	0.23	0.44	0.87	0.63
Lombardia	0.87	0.89	0.32	0.38	0.76	0.64
Trentino Alto Adige	0.89	0.84	0.34	0.38	0.63	0.62
Veneto	0.88	0.89	0.24	0.37	0.72	0.62
Friuli Venezia Giulia	0.82	0.95	0.31	0.33	0.70	0.62
Emilia Romagna	0.72	0.92	0.23	0.71	0.87	0.69
Toscana	0.72	0.90	0.23	0.49	0.89	0.65
Umbria	0.69	0.88	0.25	0.50	0.76	0.61
Marche	0.74	0.91	0.21	0.41	0.82	0.62
Lazio	0.69	0.87	0.22	0.52	0.84	0.63
Abruzzo	0.66	0.89	0.21	0.35	0.75	0.57
Molise	0.62	0.84	0.21	0.11	0.56	0.47
Campania	0.70	0.83	0.21	0.27	0.65	0.53
Puglia	0.78	0.82	0.15	0.34	0.78	0.57
Basilicata	0.69	0.81	0.14	0.38	0.58	0.52
Calabria	0.68	0.81	0.17	0.33	0.74	0.55
Sicilia	0.67	0.82	0.18	0.40	0.74	0.56
Sardegna	0.70	0.82	0.16	0.29	0.77	0.55
ITALIA	0.75	0.87	0.24	0.42	0.76	0.59
North-west	0.79	0.90	0.32	0.36	0.75	0.62
North-east	0.83	0.90	0.28	0.45	0.73	0.64
Centre	0.71	0.89	0.23	0.48	0.83	0.63
South	0.69	0.83	0.18	0.31	0.70	0.54

Source: Giordano and Tommasino (2011)
1/ Regional values are obtained as simple averages of provincial values.

Measuring Firm Productivity

12.   Firm data are from the Orbis database, which offers unique coverage of micro, small, and medium Italian firms. The Orbis database, compiled by Bureau van Dijk, includes all companies required to submit accounts with the Italian Chamber of Commerce. It thus includes a very significant portion of the micro, small, and medium enterprises, which constitute the bulk of economic activity in Italy, but are rarely represented in other commonly-used firm level datasets.[7] The coverage in the Orbis database is high: the firms included in the database account for roughly 70 percent of the gross value added, and 75 percent of the total wage bill of Italy's nonfinancial corporations. The raw dataset contains balance sheets, income statements, geographical information, and industrial classification for about 650,000 firms in 2007. Missing variables and data cleaning reduce the sample to about 450,000 firms.

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[7] In 2012, more than 99.9 percent of businesses employed fewer than 50 people. These businesses accounted for 70 percent of value added and 54 percent of overall employment in Italy (ISTAT, 2014).

13. **We use several indicators to measure firm-level productivity:** (i) the ratio of operating revenue to costs of employees; (ii) the ratio of gross value added to cost of employees; (iii) operating revenue per worker; (iv) gross value added per worker; (v) operating revenue; and (vi) return on assets (defined as EBIT over total assets). Our preferred measures of labor productivity are the ratios to costs of employees for two reasons: (i) firms often do not report the number of employees, hence using the costs of employees increases the sample size; and (ii) by controlling for difference in wage levels across firms, we partially account for variations in the skill level of workers. Measures (i)–(v) are expressed in logs in the regressions. Measure (v) is a more indirect proxy for productivity as it relies on the stylized fact that large firms are more productive. Output (operating revenue), gross value added and cost of employees are converted in real terms using the relevant industry specific deflators (at the two-digit NACE 2 level) from ISTAT. Table 3 reports summary statistics for the different productivity measures.

Table 3. Italy: Measures of Firm Productivity—Summary Statistics, 2007								
		All regions			**North West**	**North East**	**Center**	**South**
	N Obs	**Mean**	**Median**	**StDev**		**Median**		
Operating Revenue/Costs of employees	400,310	13.13	6.04	23.90	6.04	6.29	6.16	5.70
GVA/Costs of Employees	360,736	2.07	1.49	2.13	1.49	1.51	1.48	1.47
Operating Revenue/Worker (000s)	216,328	316	193	357	218	216	181	147
GVA/Worker (000s)	204,822	59	50	41	57	55	47	40
Log Operating Revenue	452,323	13.44	13.45	1.55	13.69	13.75	13.27	13.07
Return on Assets	474,511	0.04	0.04	0.12	0.05	0.05	0.04	0.03

Note: The reported summary statistics are based on data excluding the top and bottom 2 percent so as to avoid distortions from extreme outliers. Return on assets is defined as earnings before interest and tax over total assets. All variables (operating revenue, gross value added and costs of employees) are deflated using the relevant industry specific deflator at the NACE 2-digit sector level from ISTAT.

C.   Results

Baseline

14. **We find strong evidence that public sector efficiency raises firm productivity.** To build the intuition for our empirical strategy, Table 4 reports the coefficient on our government efficiency measure, when it is included linearly in equation (1), without the interaction with sectoral government dependence (i.e., the single difference).[8] Columns (1) and (4) contain the estimated coefficient

Table 4. Italy: Correlation between Public Sector Efficiency and Firm Productivity						
	Output per employee cost			**Gross Value added per employee cost**		
	All	Constructio n	Basic Metals	All	Construction	Basic Metals
	(1)	(2)	(3)	(4)	(5)	(6)
Government Efficiency	0.713 ***	1.345 ***	0.466 *	0.133 ***	0.434 ***	0.073
	[0.102]	[0.283]	[0.267]	[0.042]	[0.118]	[0.075]
r2	0.23	0.03	0.02	0.08	0.02	0.02
N	438,087	67,183	23,208	393,492	61,150	22,011

Note: All regressions include firm class size dummies. Columns (1) and (4) control for industry fixed effects at the 4 digit NACE Rev 2 level. Standard errors are corrected for heteroskedasticity and clustered at the province level.

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[8] More specifically, we estimate: $Y_{isp} = \beta * GovEff_p + \gamma X_{isp} + \alpha_s + \varepsilon_{isp}$.

for output per euro spent on employees and gross value added spent on employees for all firms in our sample. Columns (2) and (5) are based only on firms in construction—one of the most government dependent sectors, while columns (3) and (6) include only firms in the basic metals industry, one of the least dependent on the government. As expected, firm productivity tends to be higher on average in provinces with more efficient public spending (columns 1 and 4). However, the positive correlation is much larger for firms in construction, relative to basic metals, a pattern we would expect if indeed there was a causal relationship between public sector efficiency and firm productivity. Table 5 reports the estimated coefficients on the interaction between public sector efficiency and government dependence from equation (1) for various measures of firm productivity. Across all measures of productivity, the estimated coefficient is positive and statistically different from zero, implying that public sector inefficiency holds back labor productivity.[9]

	Table 5. Italy: Effect of Public Sector Efficiency on Firm Productivity					
	Output per employee cost	GVA per employee cost	Output per worker	GVA per worker	Log Output	ROA
	(1)	(2)	(3)	(4)	(5)	(6)
GovEff*GovDependence	17.864 ***	8.061 ***	15.862 ***	5.908 ***	6.361	0.342 **
	[4.540]	[1.268]	[4.231]	[1.443]	[4.171]	[0.164]
r2	0.23	0.08	0.27	0.17	0.33	0.04
N	404,536	364,019	224,460	206,812	455,101	479,417
Note: All regressions include province and industry fixed effects, and control for firm size category. Robust standard errors clustered at the province level.						

15.   The economic magnitude of the causal impact of government efficiency on productivity is nontrivial. A firm in the electrical equipment sector (which is just below the upper quartile of dependence on the public sector) in a province in the upper quartile of public efficiency produces 13 percent more output per euro spent on salaries than the same firm in a province in the lower quartile of public efficiency. The equivalent figure for gross value added per euro spent on salaries is 5.8 percent, for output is 4.5 percent, output per worker 11 percent, and value added per worker 4.2 percent. Finally, its return on assets is 25bps higher than the equivalent firm in a province with public sector efficiency at the 25th percentile.

16.   Alternatively, for a firm in a sector above median dependence on government, being in a province with above median public efficiency increases output per euro spent on salaries by 11.3 percent. This simplified presentation of the results, reported in Table 6, follows from estimating equation (1) with dependence on government and public sector efficiency coded as dummies taking the value of one if the sector/province is above the median government dependence and public sector efficiency respectively. Being in above median province in terms of

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[9] The drag on productivity from the inefficient provision of public goods adds to the disadvantages faced by firms in relatively inefficient regions. Limited geographical differentiation in nominal public sector wages and downward private sector wage rigidity due to competition with the public sector and a centralized wage bargaining system prevent firms from adjusting wages to fully accommodate the lower labor productivity.

public efficiency, also raises gross value added per euro spent on employees, output and return on asset by 4.3 percent, 8.6 percent, and 50bps respectively for the average firm in a sector with above median government dependence.

Table 6. Italy: Effect of Public Sector Efficiency on Firm Productivity: Alternative presentation						
	Output per employee cost	**GVA per employee cost**	**Output per worker**	**GVA per worker**	**Log Output**	**ROA**
	(1)	(2)	(3)	(4)	(5)	(6)
GovEff*GovDep	0.113 ***	0.043 ***	0.126 ***	0.057 ***	0.086 ***	0.005 ***
Indicator	[0.041]	[0.016]	[0.039]	[0.016]	[0.027]	[0.001]
r2	0.21	0.05	0.26	0.15	0.22	0.04
N	396,484	357,105	220,975	203,767	445,283	468,955

Note: All regressions include province and industry fixed effects, and control for firm size category. Robust standard errors clustered at the province level.

Robustness

17.   The results are robust to several modifications of the baseline empirical approach (Appendix Table A1).

- In the baseline estimation, we use firm level data from 2007, which most closely matches the time for which public sector efficiency is measured at the province level. Using firm data for 2008, 2009, or 2010 does not alter the findings (public sector efficiency is still measured in 2007, a reasonable assumption in the absence of major reforms of the public administration). In fact, the significance of the results for output in levels is stronger (Panels A–C).

- Results are generally robust to an alternative measure of dependence on government based on the percent of sectoral output sold to the public sector (Panel D). In order to preserve the exogeneity of the dependence measure, we use the input-output table for Germany, a country where the public sector is fairly efficient, to calculate the share of output sold to the private sector.

- We find similar effects if we compute our measure of public sector efficiency at the regional level, which might help reduce potential measurement error if firms' inputs and/or interactions with the government are not restricted to the province but to the broader region in which the firm is located (Panel E).

- The findings are also robust to an alternative proxy for government quality. Instead of public sector efficiency, we use the *effectiveness* of government as captured in the European Quality of Governance Index at the region level (see Figure 3). This index, available for 2010 and 2013, is based on a large survey of citizens' perception of the quality, impartiality and level of corruption of three public services (education, health, and law enforcement), combined with the World Bank

Doing Business Indicators (see Charron, Lapuente, and Dijkstra, 2014, for details about the index). In Panel F, we replicate our cross-sectional specification (equation 1) with data for 2010, but we replace the provincial public sector efficiency score with the regional quality of governance index. In Panel G, we take advantage of the time series dimension of the data, and examine whether firm productivity rose relatively more in regions where quality of governance improved relatively more between 2010 and 2013.[10] Both in the cross-section and in the time-series, we find evidence that government ineffectiveness constrains firm productivity. The time series findings make a particularly compelling case for the causal impact of government effectiveness on firm productivity.

- ORBIS provides a unique database to study Italy's firms, but its representativeness of certain types of firm (such as smaller or younger firms or firms in the service sector) may be an issue. Indeed, while the database contains virtually all of the establishments classified as large or medium, only 15 percent of the small and medium enterprises are included in the data. As a robustness check, we follow Gal (2013) and apply re-sampling weights, based on the number of enterprises in each (industry-size) class cell, which essentially scale-up the number of ORBIS observations in each cell so that they match the number in the population.[11] The weighted regression yield even stronger estimates of the effect of public sector efficiency on firm productivity (Panel H).

- The results are also not affected by a number of additional robustness checks such as the inclusion of more firm-level controls (leverage, share of tangible assets in total assets, firm age – results available upon request), and controlling for firm size X four-digit sector fixed effects (resulting in about 3,300 sector-firm-size categories, Panel I).

Government Inefficiency, Firm Type, and Level of Government

18.   The effects of public sector efficiency on productivity are stronger for certain types of firms. Table 7 estimates equation (1) for the subsamples of firms incorporated before and after 2005; as well as micro, small, medium, and large firms. The effects of public inefficiency are larger for young firms. This finding is intuitive since young firms are more likely to interact with the public sector to obtain permits and certifications. With regards to firm size, public sector inefficiency seems to be a bigger constraint for the smallest firms (micro establishments with less than 10 employees), and the largest firms (establishments with more than 250 workers). This finding is consistent with the

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[10] In particular we estimate: $Y_{ispt} = \beta * GovEff_{rt} * GovDep_s + \delta * GovEff_{rt} + \alpha_t + \alpha_i + \varepsilon_{ispt}$ where α_t are year fixed effects while α_i are firm fixed effects.

[11] This method of resampling implicitly assumes that firms in ORBIS within a specific industry and industry class size cell are representative of the true population within that cell. However, we cannot correct for potential selection bias from differential propensity of reporting by firms based on other characteristics (e.g., profitability, age etc.) and our findings should be interpreted in light of this analytical shortcoming.

importance of the public sector for young firms, as well as very large firms, which tend to be more heavily regulated (for example, many labor laws apply only for firms with more than 15 employees).

	All	Young	Old	Micro	Small	Medium	Large
Table 7. Italy: Firm Type and the Effect of Public Sector Efficiency on Productivity							
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
			Panel A. Output per employee cost				
GovEff*GovDep	17.864 ***	24.352 ***	16.004 ***	20.289 ***	11.138 **	10.873 **	39.422 ***
	[4.540]	[7.363]	[3.782]	[5.239]	[4.387]	[4.733]	[12.317]
r2	0.23	0.18	0.21	0.19	0.3	0.41	0.57
N	404,536	84,161	345,782	277,013	106,076	18,420	3,027
			Panel B. GVA per employee cost				
GovEff*GovDep	8.061 ***	11.659 ***	7.643 ***	9.678 ***	3.610 **	6.517 ***	23.122 ***
	[1.268]	[3.114]	[1.288]	[1.650]	[1.459]	[1.972]	[6.365]
r2	0.08	0.07	0.07	0.05	0.1	0.17	0.38
N	364,019	69,351	311,415	243,686	99,806	17,591	2,936

Note: Young companies are defined as those incorporated since 2005. Micro firms are those with 1-9 wokers, Small with 10-49 workers, Medium with 50-249 workers, and Large are firms with more than 250 workers. All regressions include province and industry fixed effects, and control for firm size category. Robust standard errors clustered at the province level.

19.   There is some evidence that the efficiency of the central government matters more for firms. As mentioned above, three of the services included in the average public sector efficiency variable are provided by local or regional governments (health, child care, and waste collection). Education is provided by the central government and civil justice is provided by the judiciary as an independent branch of power. We calculate the average efficiency scores for services provided by the central and regional/local governments and interact these separately with the dependence of industries on the public sector. The results from estimating the modified version of equation (1) are in Table 8 and suggest that the effects of improving the efficiency of education and justice may in some cases be up to twice as large as the effects of improving decentralized services.

	Output per employee cost	GVA per employee cost
Table 8. Italy: Level of Government and the Effect of Public Sector Efficiency on Productivity		
Local GovEff*GovDependence	7.350 **	3.924 ***
	[2.969]	[1.070]
Central GovEff*GovDependence	18.099 ***	5.906 **
	[5.070]	[2.318]
r2	0.23	0.08
N	404,536	364,019

Note: Locally provided services include child care, waste collection and health. Centrally provided services include education and civil justice. All regressions include province and industry fixed effects, and control for firm size category. Robust standard errors clustered at the province level.

D.   Conclusions and Policy Implications

20.   Significant macroeconomic productivity gains could be realized if public sector efficiency improved from currently low levels. The analysis in this paper establishes a causal link between public sector efficiency at the provincial level and firm productivity using a rich dataset containing information for about 450,000 Italian firms. The quantitative estimates imply that if public sector efficiency rose to the frontier in all provinces, productivity measured as output per euro spent on salaries could increase by up to 22 percent in the sectors that depend the most on the public sector, while gross value added per employee costs could rise from 2 to 10 percent. For the average firm, output would expand by 3 percent.

21.   The impact of increasing public sector efficiency could be potentially much more sizable than the gains from raising local financial development. Several studies have documented the importance of local financial development for growth and productivity in the context of Italy (e.g., Guiso, Sapienza, and Zingales, 2004; D'Alfonso, 2004; and Barra, Destefanis, and Lavadera, 2013). We compare the gains from raising public sector efficiency to those of raising local financial development by estimating equation (1) but substituting government dependence with a measure of dependence on external finance for each sector and government efficiency with financial development. We then compute the increase in firm labor productivity if financial development were to rise to that of the most financially developed province.[12] Figure 6 presents the findings for both public sector efficiency and financial development. The dividends from raising public sector efficiency appear to be substantially larger.

Figure 6. Italy: Gains from Raising Public Sector Efficiency and Financial Development

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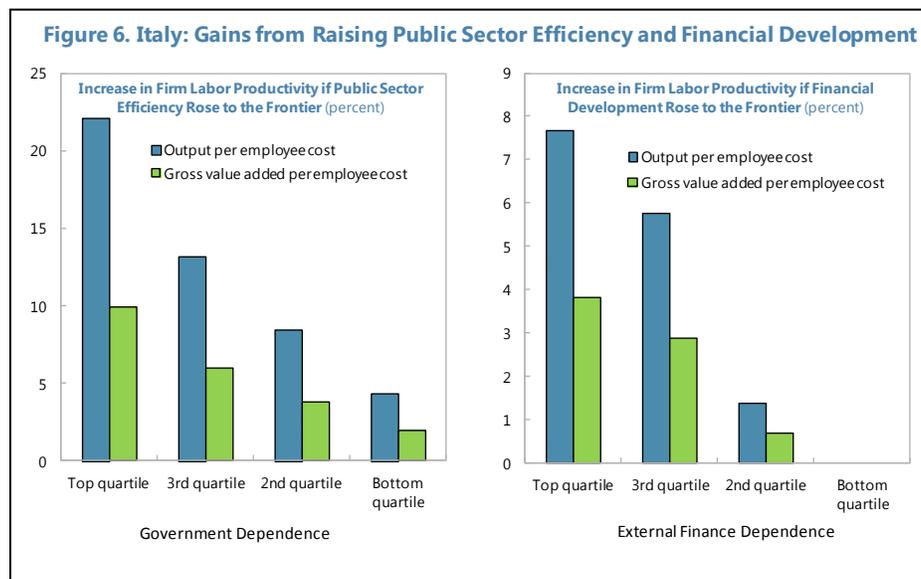
[12] A sector's dependence on external finance is from Tong and Wei (2011), which build on the methodology first developed by Rajan and Zingales (1998). Specifically, financial dependence of a sector is constructed as the difference of the capital expenditures of the sector and its cash flow as a share of its total capital expenditures in the 1990–2006 period in the U.S. Financial development at the province level is proxied by the log of outstanding credit per capita.

22. **Our findings argue for reforming public service to increase the efficiency of government spending.** Given that various levels of government are responsible for the provision of different public services, a comprehensive reform would aim at improving efficiency of all levels of government. Accelerating the legislation and implementation of the public adminstration reform agenda, implementing the recommendations of the 2014 spending review and competition authority (Autorità Garante della Concorrenza e del Mercato, 2014) would be important steps in the right direction and could help deliver some of the gains identified in this paper.[13]

Local Public Services

- **Rationalization of local public enterprises.** In many areas, the provision of local services (e.g., public transport, water supply, waste management, etc.) is dominated by monopolies assigned to companies directly owned by or related to local governments. The existence of more than 8,000 local public enterprises has been highlighted as a source of inefficiency, and a burden on public finances. The Report on the Commissioner for the Spending Review identified options to reduce the number of local public companies to less than 1,000 within three years to improve efficiency and exploit economies of scale. Efficiency gains would also follow from the use of standard costs to determine the size of transfers. The Competition Authority provided specific proposals to enhance competition in local transport and waste collection. Implementing these reforms swiftly would result in fiscal savings and a more growth-friendly public sector.

- **Privatization.** Accelerating privatization could improve the quality of services, especially at the local level. At the same time, it would reduce macroeconomic vulnerabilities related to high public debt.

- **Public tenders.** Public tenders for the provision of local public services are required, and the Competition Authority has been given the power to question actions by local authorities. However, data on contract award procedures suggest that the majority of contracts is still done through "in-house" awards or similar procedures (European Commission, 2015, and Anti-Corruption Authority).

Public Administration Reform

- **Performance-based budgeting.** As noted in SM/14/261, a large array of performance indicators are collected at the central level but are not used often enough in the executive phase of budget preparation. Result indicators, primarily on outputs, should take a larger role and local authorities should be encouraged to adopt performance-budgeting arrangements too.

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[13] See Bank of Italy (2015) and the references therein for a discussion of public administration reforms, including coordination among different levels of government, staffing, performance measurement, and ICT adoption. Rizzica (2015) studies the effects of temporary contracts in the public sector.

- **Management of human resources.** Increased autonomy and accountability of public-sector managers, improved mobility of workers and wage differentiation across agencies and geographical areas could deliver efficiency gains.

- **Organizational structure.** Review organizational structure to avoid duplication and exploit economies of scale.

Judicial Reform

- Despite incremental reforms, the judicial system remains highly inefficient. IMF (2014) and Esposito, Lanau, and Pompe (2013) outline several recommendations to reduce these inefficiency, such as (i) rationalizing the type of cases that reach the Supreme Court; (ii) use of ad hoc measures to reduce the backlog of pending cases; (iii) promoting the use of out-of-court case resolution, both for corporate and household debt; and (iv) developing court performance indicatiors (in line with CEPEJ best practices).

Appendix. Effect of Public Efficiency of Firm Productivity: Robustness

	Output per employee cost	GVA per employee cost	Output per worker	GVA per worker	Log Output	ROA
	(1)	(2)	(3)	(4)	(5)	(6)
			Panel A. Data from 2008			
GovEff*GovDep	15.355 ***	7.680 ***	15.438 ***	5.242 **	6.947 **	0.31
	[3.278]	[1.068]	[4.280]	[2.323]	[2.984]	[0.191]
r2	0.22	0.07	0.25	0.16	0.33	0.04
N	424,056	376,702	327,024	296,481	476,798	500,593
			Panel B. Data from 2009			
GovEff*GovDep	15.280 ***	8.277 ***	16.187 ***	8.872 ***	9.837 ***	0.910 ***
	[3.405]	[1.291]	[4.791]	[2.355]	[3.655]	[0.172]
r2	0.22	0.08	0.24	0.15	0.33	0.03
N	427,842	377,457	268,459	241,804	485,530	511,395
			Panel C. Data from 2010			
GovEff*GovDep	14.307 ***	5.870 ***	16.064 ***	7.561 ***	8.090 **	0.472 **
	[3.252]	[1.055]	[4.067]	[1.785]	[3.246]	[0.200]
r2	0.21	0.07	0.26	0.18	0.33	0.03
N	438,195	386,139	205,722	186,242	500,032	526,827
		Panel D. Alternative Measure of Government Dependence				
GovEff*Share of Sales to Gov	0.006 **	0.001	0.008 ***	0.001	0.009 ***	0.001 ***
	[0.002]	[0.001]	[0.002]	[0.001]	[0.003]	[0.000]
r2	0.24	0.08	0.29	0.18	0.35	0.04
N	433808	389811	239000	219928	488562	513434
		Panel E. Regional Measure of Government Efficiency (2010)				
Reg GovEff*GovDep	23.605 ***	9.755 ***	32.281 ***	14.094 ***	21.047 ***	1.058 ***
	[5.774]	[2.473]	[7.604]	[3.099]	[5.619]	[0.304]
r2	0.21	0.07	0.26	0.18	0.33	0.03
N	438195	386139	205722	186242	500032	526827
	Panel F. Alternative Measure of Government Efficiency: Quality of Governance (2010)					
Reg Quality Gov*GovDep	1.965 ***	0.823 ***	2.891 ***	1.366 ***	1.804 ***	0.067 ***
	[0.313]	[0.174]	[0.335]	[0.183]	[0.219]	[0.022]
r2	0.21	0.07	0.26	0.18	0.33	0.03
N	438195	386139	205722	186242	500032	526827
		Panel G. Times Series Evidence: Quality of Governance (2010, 2013)				
Reg Quality Gov*GovDep	1.204 ***	2.279 ***	4.027 ***	4.334 ***	3.125 ***	0.245 ***
	[0.465]	[0.373]	[0.937]	[0.887]	[0.662]	[0.083]
r2	0.92	0.88	0.95	0.92	0.93	0.8
N	794858	697262	570204	504660	898991	937748
			Panel H. Weighted Regression			
GovEff*GovDep	27.282 ***	11.174 ***	25.136 ***	10.137 ***	12.567 **	0.857 ***
	[6.476]	[2.134]	[5.613]	[1.674]	[5.068]	[0.199]
r2	0.21	0.05	0.26	0.15	0.22	0.04
N	396,484	357,105	220,975	203,767	445,283	468,955
		Panel I. Industry X Firm Size Fixed Effects				
GovEff*GovDep	18.012 ***	8.160 ***	16.414 ***	6.608 ***	6.459	0.363 **
	[4.443]	[1.288]	[4.309]	[1.457]	[4.242]	[0.161]
r2	0.24	0.08	0.28	0.18	0.34	0.04
N	404,536	364,019	224,460	206,812	455,101	479,417

Note: All regressions (except in Panel G) include province and industry fixed effects, and control for firm size category. Regressions in Panel G include data from 2010 and 2013, and include firm and year fixed effects, as well as the regional quality of government index, which varies by region and year. Standard errors in panel G are clustered at the firm level. In the rest of the panels, standard errors are clustered at the province level.

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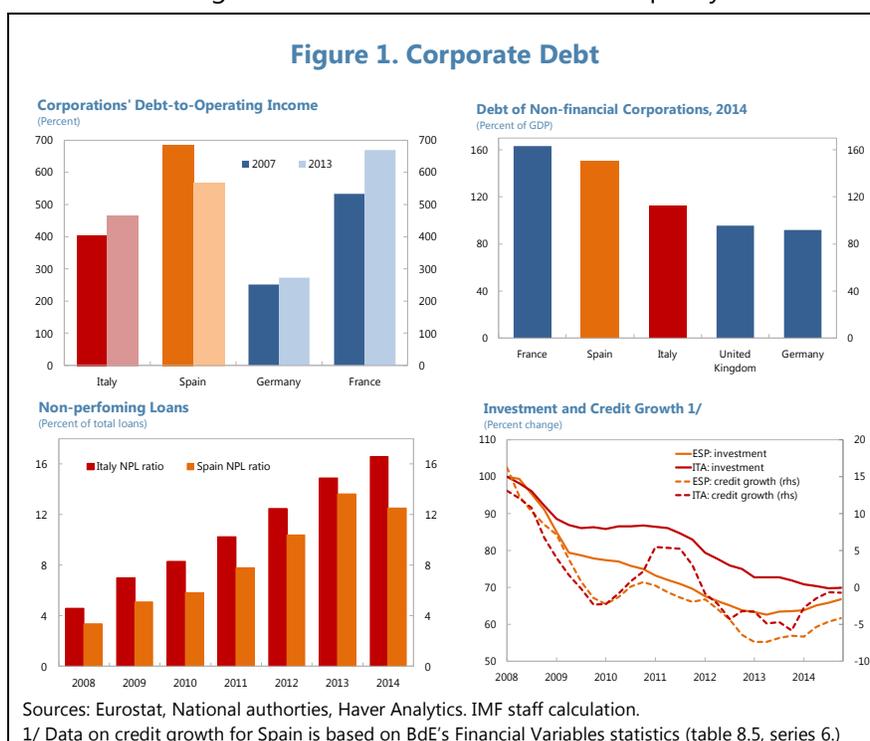
THE ITALIAN AND SPANISH CORPORATE SECTORS IN THE AFTERMATH OF THE CRISIS[1]

A. Introduction

1.   The nonfinancial corporate sectors (NFC) in Italy and Spain were hit hard by the global financial crisis and the economic downturn that followed. In Italy, firm profits fell sharply, and debt levels, although not particularly high at the onset of the crisis, have risen relative to income (Figure 1). In contrast, the Spanish corporate sector borrowed heavily during the boom years with the NFC debt to GDP ratio peaking at nearly 190 percent in 2007. Since then, Spanish NFCs have deleveraged quite rapidly, but debt remains high, at nearly 150 percent of GDP. The significant debt overhang in both countries poses risks to the recovery despite mitigating policy actions, and has led to a significant deterioration in the asset quality of the banking systems. At 17 percent, the nonperforming loan (NPL) ratio in Italy has reached systemic levels, impeding the supply of credit, and potentially holding back private investment. In Spain, the stock of NPLs has started to decline, reflecting concerted efforts to cleanse the banking sector balance sheets. But at 12.5 percent, the NPL ratio remains high. Debt overhang and impaired balanced sheets could act as a drag on firm investment. Indeed, real private investment has fallen to levels not seen in 15 years, dramatically slowing the pace of recovery, and casting a shadow on these economies' long run

Figure 1. Corporate Debt

Corporations' Debt-to-Operating Income (Percent)

Debt of Non-financial Corporations, 2014 (Percent of GDP)

Non-perfoming Loans (Percent of total loans)

Investment and Credit Growth 1/ (Percent change)

Sources: Eurostat, National authorities, Haver Analytics. IMF staff calculation.
1/ Data on credit growth for Spain is based on BdE's Financial Variables statistics (table 8.5, series 6.)

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[1] Prepared by Nina Budina, Sergi Lanau, and Petia Topalova (EUR). We thank Vizhdan Boranova and David Velazquez-Romero for excellent research assistance. This is a cross-country Selected Issues paper and will also serve as background material for the upcoming Executive Board Meeting on Spain 2015 Article IV Consultation.

potential output. This is of particular concern in Italy, where investment was weak even before the crisis.

2.   This paper evaluates the health of the Italian and the Spanish corporate sectors using firm level data, the implication for the strength of banks' balance sheets, and impact on firm investment. In particular, we ask the following questions: (i) What is the state of the Italian and the Spanish nonfinancial corporate sectors, in terms of profitability, liquidity, leverage, cost of borrowing, and debt repayment capacity? What have the main trends been over the past 8 years, across firms of different size, and economic sectors? (ii) How vulnerable are the corporate sectors of Italy and Spain to an adverse shock to real activity, or a rise in funding costs? What would be the likely impact of a rebound in activity on firms in poor financial health? And (iii) To what extent have impaired balance sheets of firms and banks held back corporate investment in Italy and Spain?

3.   The rest of the paper is organized as follows: Section B describes the firm level data and methodology used in the analysis. Section C takes stock of the health of firms in Italy and Spain, and examines their vulnerability to various shocks. Section D presents econometric evidence linking firm's balance sheets and credit conditions to corporate investment decisions, while Section E offers policy considerations and concludes.

B.   Data and Methodology

4.   The paper uses data for roughly one million Italian companies and about 700,000 Spanish ones for the 2006–13 period.[2] The Orbis database, compiled by Bureau van Dijk, includes all companies required to submit accounts with the Chambers of Commerce in Italy and the Registered Commerce of the Province in Spain. It thus includes a very significant portion of the micro, small, and medium enterprises, which constitute the bulk of economic activity in Italy and Spain (Figure 2).[3] These types of firms are rarely represented in other commonly-used firm

Figure 2. SME Demographics, 2012
(Number of firms per 1,000 population)

Source: Eurostat.

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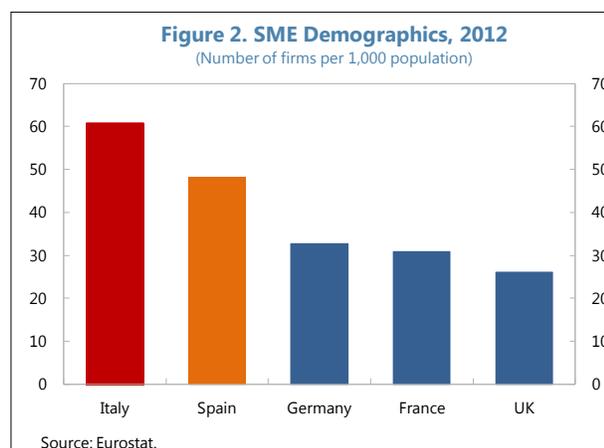
[2] The sample of firms for which 2014 financial statements were available was too small to conduct a systematic analysis. Where possible, the findings are complemented by a discussion of the corporate sector data available in the 2014 national accounts.

[3] In 2012, more than 99.9 percent of businesses employed fewer than 50 people in Italy and in Spain. These businesses accounted for 70 percent of value added and 54 percent of overall employment in Italy (ISTAT, 2014). In Spain, they comprise slightly less than ½ of value added and about 60 percent of total employment (SME Performance review database, 2014).

level datasets. The coverage in the Orbis database is high: the firms included in the database account for roughly 70 percent of the gross value added, and 75 percent of the total wage bill of Italy's NFC. In Spain, the coverage of the Orbis sample is also high, accounting for half to about 2/3 of the gross value added and cost of employees.[4]

5.   We gauge corporate health and vulnerability based on several commonly used indicators of profitability, leverage, and ability to service debt. Using the detailed, harmonized balance sheets, and profit and loss statements, we construct firms' return on assets and profit margins, their debt-to-assets and debt-to-income ratio, and the interest coverage ratio (ICR). Having described how the financial state of the corporate sector has evolved since 2006, we classify firms (and the debt that they hold) as vulnerable if, for example, their current revenues are insufficient to fund interest expenses (ICR<1). An ICR below one in a particular year does not indicate that insolvency is imminent. Firms may have assets that can be easily liquidated, unused credit lines, or other sources of funding on which to draw. But research has found that such indicators could be particularly good harbingers of vulnerabilities.[5] Stress test of the 2013 corporate balance sheets, with shocks to borrowing costs, and profits (on the order of the changes already observed since the beginning of the global financial crisis) shed light on the likely effect of worsening (or improving) economic conditions on firms' financial health.

6.   We then use the findings on corporate sector vulnerability as indicators of the prospective debt at risk in the banking system in alternative scenarios. The ICR can illustrate

in a simplified way the links between firms' financial performance and the financial system's asset quality. If macroeconomic conditions deteriorated and firms with low ICR could not find additional sources of funds, they would likely delay interest payments. If the delay persisted, loans to those companies would eventually be classified as nonperforming assets in banks' balance sheets. By aggregating the financial liabilities of firms with ICRs below a

Figure 3. Domestic Bank Loans in the Non-Financial Corporate Sector
(Share of Total Financial Debt, end 2013)

Sources: European Commission, Italy Country Report, February 2015.

particular threshold, and comparing this number to the total financial liabilities of the firms in our sample, we get a rough estimate of how large corporate debt-at-risk could be in alternative

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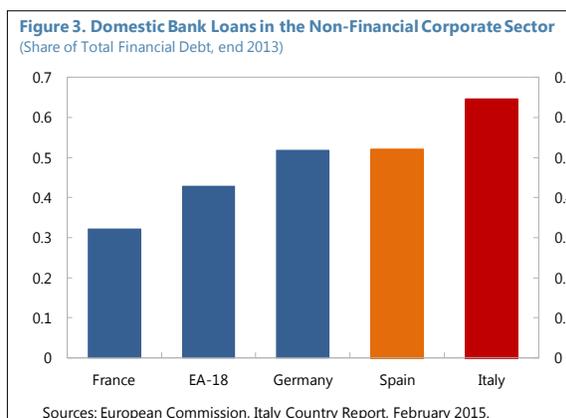
[4] An important caveat is that about half of the firms in the sample report their financials (e.g., debt, assets, etc.) due to simplified filing requirements for SMEs (Orbis, 2014).

[5] Jones and Karasulu (2006), for example, found that stress testing applied to the balance sheets of Korean corporations in advance of the Asian crisis of the late 1990s would have shown the degree of vulnerabilities present in the country.

scenarios.[6] In this thought exercise, the corporate financial link is particularly important in Italy due to the structural characteristics of the economy. Small businesses, which form the backbone of the Italian economy, are particularly reliant on bank credit due to limited access to capital market funding. Indeed, Italy has one of the highest shares of domestic bank loans in total financial debt of the nonfinancial corporate sector (Figure 3). Italian banks also have a strong focus on traditional deposit-taking and lending activities, and more than 65 percent of total bank credit goes to the corporate sector.

7.   Finally, to examine the link between impaired firm balance sheets, credit conditions, and corporate investment, we estimate a standard investment model. We exploit the variation over time and across firms in balance sheet strength, debt overhang, and profitability to estimate their effect on firm investment, and how this effect might have changed in the postcrisis period.[7] In the case of Italy, we also look for evidence of financial frictions operating through the banking sector, by examining whether firms in sectors more dependent on external finance and in regions where lending standards tightened the most or credit contracted more severely experienced a sharper drop in investment.

C. The Health of the Corporate Sector in Italy and Spain

8.   The crisis has left its mark on the health of the corporate sector in Italy and Spain. Evidence of weakening performance can be seen across a range of measures of profitability and liquidity. The deterioration has occurred across the board, though the negative effects of the crisis are particularly pronounced for smaller businesses, and firms in select sectors, such as construction. Below we describe the time trends of key financial ratios, based on *a sample of firms that have been active throughout 2006–13*. Focusing on surviving firms allows us to abstract from the compositional changes that might have occurred during this time period due to firm entry and exit, which may not be very well captured in the Orbis database. This comes at the cost of potentially introducing "survivor" bias in some of the results.[8] The reported summary statistics are based on data excluding the top and bottom 5th percentile so as to avoid distortions from extreme outliers. Throughout the paper, we use the European Commission classification of firms

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[6] This estimate will present an upper bound since ICR do not capture all the resources companies may have to meet their obligations and to smooth over the idiosyncratic shocks to profits they may experience.

[7] Kalemli-Özcan, Laeven and Moreno (2015) examine the role of debt overhang, leverage, and banking sector weakness in investment using a more detailed version of the Orbis database for all European economies.

[8] More specifically, the downside from this approach is that (i) our analysis does not reflect the churn that might have occurred in response to the downturn, a potentially important margin of adjustment, and (ii) there might be differences in the time trends of the indicators we study relative to the available macro data due to survivors' bias introduced by the sample selection. Namely, the decline in profitability or interest coverage ratios might be more pronounced within our sample, as firms that had successfully weathered the crisis and the protracted downturn were likely a stronger subset of the universe of firms in Italy and Spain—hence, their profitability and liquidity were likely higher prior to the crisis. That said, by the end of the sample period, the crisis had likely taken a heavy toll on these firms relative to the new entrants in the corporate sector, exacerbating the fall in measured profitability. Only firm census data could accurately capture the time trends in the corporate sector.

ITALY

by size according to their assets for Italy and according to the number of employees for Spain.[9] Micro firms are those with total assets of less than 2 billion euros or less than 9 employees. Small and medium (SME) firms have total assets between 2 and 43 billion euros or between 10–249 employees, while large firms are those with assets exceeding 43 billion euros or with more than 250 employees.

Profitability

9.   **The profitability of Italian and Spanish firms fell dramatically over 2006–13.** For the median surviving company, return on assets (as measured by profits before tax in percent of total assets) fell from about 3 percent in 2006/07 to just about 1 percent in Italy and ½ percent in Spain (Figure 4). Profit margins (defined as profit before tax over total operating revenue) generally followed the trend in return on assets (Figure 5). In terms of broad industrial sectors, construction and services were hit the hardest in both countries. The decline in profitability was even deeper in Spain.[10] The firm level data reveals remarkable dispersion in profitability across firms, especially within the set of small businesses. In both Spain and Italy, the change in profitability was much more pronounced for the average than the median firm within this category (results available upon request), suggesting that firms at the bottom of the profitability distribution to begin with were hit especially hard. National accounts data for 2014 suggest the decline in profitability (defined as gross operating income in percent of gross value added) moderated significantly in Italy and improved in Spain.

Leverage

10.   **Deleveraging has been relatively slow in Italy in light of the stronger balance sheets of Italy's corporate sector at the onset of the crisis.** The leverage of the median and average surviving firm in 2006–13, as captured in the financial debt to assets ratio, peaked in 2012 and declined slightly in 2013 (Figure 6a).[11] The dynamics across firms of different sizes, however, have been quite different. Small and medium firms have made little progress in reducing their

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[9] There are significant gaps in the coverage of number of employees for Italian firms in Orbis, hence we use firm assets to classify firms into micro, small, medium, and large. However, given this difference in the definitions, some caution is required when comparing directly levels and, to a smaller degree, dynamics of variables by firm size in the two countries. Classifying Spanish firms by asset size does not alter significantly the findings but results in an almost-empty group of large firms.

[10] The broad sectors considered here include manufacturing, construction, utilities (electricity, gas, water supply and sewage), wholesale and retail trade, market services (transport and storage, accommodation, professional and technical, and real estate, entertainment and other services), and basic services (administrative support, education, health).

[11] We define leverage as the sum of short term financial debt (Loans) and long term financial debt (long term loans and other noncurrent liabilities), divided by total assets. Note that this definition of debt excludes provisions, trade credits and other short term liabilities (such as pensions, deferred taxes, accounts receivables in advance) that are part of firms' total debt. The patterns described above are similar if one uses a more restrictive definition of financial debt to include only long term and short-term loans as in ECB (2014).

leverage and are the most leveraged by the end of the study period. The leverage of the largest firms has continuously, albeit very modestly, declined, but edged up in 2013.[12] The national accounts indicate that leverage fell very modestly in 2014. About a fifth of micro firms on the other hand had zero financial debt at the onset of the crisis (consistent with potential barriers to access to finance for these firms). These firms saw a slight increase in financial leverage until 2012 with some signs of deleveraging in the last year for which data are available. The evolution of leverage also varies depending on the initial level of leverage. Firms that had financial debt in 2007 but were levered below the median within their industry have seen a sizable increase in their debt-to-asset ratio (from 0.10 to 0.17 for the median firm) despite the slowdown in aggregate credit growth in Italy. Highly levered firms (those with leverage above the median for their industry in 2007) have kept their financial obligations in line with their assets with a decline of the debt-to-asset ratio from its peak of 0.44 in 2007 for the median company to 0.40 by 2013.

11.   And debt overhang in Italy has increased. Despite efforts by medium and large enterprises to keep leverage in check, financial debt as a share of earnings before taxes, interest, and depreciation (EBITDA) has risen quite sharply since 2007 (by 34 and 48 percent for the average and median firm respectively), reflecting the large reduction in income (part of which reflects cyclical developments). Consistent with the trends in debt-to-assets and profitability, the increase has been the smallest for the largest firms, which were more indebted to begin with (Figure 6b). Debt as a share of EBITDA is higher than in Spain, but the ratio to assets was very similar in 2013.

12.   After peaking at a very high level in 2007, overall leverage has declined much faster in Spain (Figure 6a). National account data suggest the trend continued in 2014. The leverage profile is broadly similar across small and medium sized firms, but even more pronounced among micro firms—perhaps due to the predominance of securitized lending (e.g., individual mortgages), which accelerated during the final phase of the boom. The leverage profile of large firms, however, is relatively less pronounced. In terms of sectoral composition, leverage is the highest in construction, services, and utilities. Despite the rapid pace of deleveraging since the crisis, it took longer for the upward movement in debt-to-income to reverse, and a significant fraction of corporates continues to show symptoms of debt overhang, with financial debt in multiples of income Figure 6b). In trade and market services, the debt-income ratio even continued to increase. Conversely, micro firms reduced debt relative to income at a faster clip than larger enterprises.

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[12] Alternative measures of leverage, namely the ratio of debt to debt plus equity, suggest that among firms that had financial debt, leverage was the highest among the smallest companies, and the lowest among the large companies, in line with analysis by the Bank of Italy of a larger sample of firms with substantially more detailed financial data.

Interest Coverage Ratio

13.   The fall in profits and slow reduction in debt have curtailed firms' ability to service their obligations in Italy. The sharp cuts in policy rates in response to the crisis were partially transmitted to firms. Effective interest rates fell by close to 200 bps since 2007 (Figure 7) and aggregated banking system data indicate that rates declined further in 2014 and 2015. However, the interest coverage ratio (ICR)—measured as the earnings before interest, tax, depreciation, and amortization (EBITDA) over interest payments—fell by about 30 percent for the median firm in our sample of surviving enterprises as a result of the contraction in sales and profits (Figure 8).[13,14] The share of companies whose earnings before interest, tax, depreciation, and amortization are insufficient to cover their interest payments (i.e., for which the ICR is less than 1) was roughly 20 percent in 2013. Considering a more widely used threshold of two, the share of vulnerable firms within the sample of surviving firms was about 30 percent.[15] Micro firms again saw the biggest decrease in ICRs. However, due to their lower levels of indebtedness at the onset of the crisis, they are not much more likely to have an ICR less than one. The incidence of low ICRs in 2013 was greatest among firms in the construction sector and in market services.

14.   In Spain, interest coverage ratios fell through 2012, but have started to improve since 2013. Effective interest rates fell by about 160 basis points since the peak of the crisis, and similar to Italy, continue to decline. However, the fraction of firms struggling to generate enough profits to meet interest payments (i.e., those with ICR<1) increased steadily between 2008 and 2012, from 13 to about 31 percent of surviving firms in 2012, before dropping slightly to 30 percent in 2013 (see also Mendez and Mendez, 2013). For 2014, Mulino and Menendez (2015) document a further slight improvement in ICRs. The pattern is similar when considering an ICR threshold of two. These difficulties have been relatively more pronounced for smaller companies with less than 50 employees, with nearly a half of them having difficulties meeting their interest payments. Among other things, this reflects the fact that the interest rate decline was less pronounced for smaller than for larger firms. Another factor is that, on average, nonfinancial corporates in Spain continue to face relatively high interest rates with spreads still exceeding their precrisis levels.

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[13] Using an alternative measure of earnings, EBIT yields qualitatively similar findings of the overall decline in ICR, and patterns across companies of different sizes and in different industries.

[14] It is important to note the sample of surviving firm likely overstates the decline in ICR and the rise of the share of vulnerable firms over time relative to what actually occurred in the overall corporate sector. Firms that survived through the severe economic downturn were likely a stronger subset of the universe of firms and hence they had a higher ICR at the onset of the crisis.

[15] A threshold of two was used in the 2013 joint IMF-Bank of Italy FSAP. The report notes that an ICR below two is broadly consistent with B ratings or lower by rating agencies, suggestive of about 20 percent probability of default over a 5-year horizon.

Vulnerability

15.   In both Italy and Spain, corporates remain vulnerable to adverse shocks to profits and interest rates. The share of vulnerable firms increases moderately for a range of shocks to profits and interest rates perhaps reflecting the weak baseline, and a combined shock could raise that proportion by more (Figure 9). Specifically, as illustrative examples, we consider the impact of a 10 percent decline in profits, a 100 bps increase in interest rates and the combination of the two, on the full set of companies for which the necessary data are available in 2013.[16] The shock to profits raises the proportion of vulnerable firms (those with ICR<2) by about 2 percentage points in Italy and Spain. Interest coverage ratios appear to be slightly more sensitive to a shock of 100 bps interest rate increase than to the 10 percent reduction in profits. A 100 bps increase in interest rate would increase the share of vulnerable firms by about 3.5 percentage points in Italy, and 4.4 percentage points in Spain. A combination of the two shocks would lead to a 5.5 percentage point rise in vulnerable companies in Italy and 6.6 percent in Spain.

16.   Such adverse shocks could have implications for asset quality of the NFC portfolio in the banking sector. In 2013, the financial debt held by companies with ICR less than one was 22 percent of total corporate sector financial debt (as reflected in Orbis) in Italy and 35 percent in Spain, and debt held by companies with ICR less than two was 34 percent in Italy and 47.5 percent in Spain.[17] Under a shock to profits described above, debt at risk (debt of firms with ICR<2) rises by about 3 percentage points in both countries. If interest rates rise, this ratio rises to 42 percent in Italy and 55 percent in Spain. A combined shock could increase the proportion of debt at risk by roughly 10 percentage points in Italy and Spain.

17.   Positive shocks to corporate profits, on the other hand, do little to improve the share of debt at risk. A 10 percent positive shock to profits would lower the share of firms with ICR<2 by about 1.4 percentage points and debt of vulnerable companies by 2.4 percentage points in Italy. Similarly, a positive 10 percent shock to profits would lower the share of vulnerable companies and the share of debt at risk by about 1.6 and 2 percentage points in Spain, respectively.[18] It is important to keep in mind that a positive shock to overall activity might

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[16] For this exercise, in both the Spanish and Italian sample of firms, we exclude firms with zero or negative reported debt in 2013, as well as firms with debt in the top 1 percentile of the distribution.

[17] Note that these estimates are slightly different from debt-at-risk estimates of the Bank of Italy and Bank of Spain. In Italy, debt-at-risk is about 2 percentage points lower than Bank of Italy estimates, while in Spain it is about 5 percentage points higher than Bank of Spain estimates which, as mentioned, also point to improvements more recently. This reflects the smaller sample size, the less precise measurement of bank debt, and differences in data cleaning methodologies.

[18] A large share of firms in both Spain and Italy report negative profits in 2013. This results in little change in the share of vulnerable firms in response to a positive shock modeled as a percent change in profits. To allow for the possibility of firms operating at a loss to swing into positive territory, we examine the consequence of a shock to operating revenue, holding expenses constant. The shock is calibrated to approximate a 10 percent increase in EBITDA for the average firm. As expected, such a shock leads to a more sizable reduction in the share of debt at risk in both countries.

have a differential impact along the distribution of firms as suggested in recent analyses by both Bank of Italy and Bank of Spain. In particular, the Bank of Spain notes that the recent recovery might have benefited more strongly companies in a more vulnerable situation.

D.   Corporate Health, Credit Conditions, and Investment

18.   In this environment, firms have cut back investment significantly.[19] Despite some variations, all industrial sectors and broad geographical regions experienced strong declines in investment. (Figure 10). The widespread collapse implies that common shocks—such as a fall in aggregate demand, for example—are likely the main driver behind the weak investment. Indeed, a number of papers document that weakness of economic activity is the overriding factor holding back investment in many advanced economies (see Chapter 4 of the April 2015 WEO, Barkbu and others (2015)). These studies estimate that in Italy, about 90 percent of the decline in investment could be explained by the evolution of aggregate output, suggesting that other factors such as financial sector deleveraging, impaired corporate sector balance sheets and debt overhang may also play a role in explaining investment weakness. Similar factors were at work in Spain, where the investment impact of the sudden shortfall in demand seems to have been amplified by the very high precrisis debt levels compared to peers (see Lopez-Murphy, 2014).

19.   Has the deterioration in the health of the corporate sector contributed to the weakness in investment? In a world of complete markets, firm's investment would depend solely on the risk-adjusted expected return of a project. In the presence of financial frictions, however, firm's financial health could play a large role in determining its investment decisions (see Martinez-Carrascal and Ferrando, 2008 for a review of the literature). High leverage may reduce the credit-worthiness of the firm due to asymmetric information between borrowers and lenders. This could raise the borrowing costs it faces or restrict credit supply, particularly during downturns when credit institutions' risk aversion may rise and for smaller firms where information asymmetries are more pronounced.[20] High debt overhang (as captured in the debt to income ratio) may also reduce firm's incentives to invest as most of the benefits of the new investment would accrue to its debtors (Myers, 1977). Numerous studies, initiated by the Fazzari, Hubbard, and Petersen (1988) have found firm's balance sheet strength, profitability and the availability of liquid assets to be a significant determinant of investment (see Kalemi-Ozcan and others, 2015 for recent firm-level evidence from Europe).

20.   Econometric analysis confirms that in both Italy and Spain weak balance sheets explain part of the weakness in investment. For each country, we estimate a standard firm

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[19] Firm-level data suggest a much deeper decline in investment in 2010 than is discernible in the macro data. We use two different measures of investment. Gross investment is defined as the change in total fixed assets between t and t-1 plus depreciation and amortization over total fixed assets at t-1. Net investment is defined as the change in total tangible fixed assets over the total tangible fixed assets in the previous year.

[20] See Gertler and Gilchrist (1993, 1994) for the potential asymmetry in the financial accelerator.

level investment model for the period 2006–13 with all companies included in the Orbis database, in which the net (and gross) investment rate is a function of firm leverage (measured as debt to assets), debt overhang (captured as EBITDA over debt),[21] sales growth, return on assets, and cash-to-assets ratio. Namely,

$$\frac{I_t}{K_{t-1_i}} = \beta_1 * \frac{Debt}{Assets}_{i,t-1} + \beta_2 * \frac{EBITDA}{Debt}_{i,t-1} + \beta_3 * SalesGrowth_{i,t-1} + \beta_4 * ROA_{i,t-1}$$

$$+ \beta_5 * \frac{Cash}{Assets}_{i,t-1} + \alpha_i + \alpha_t + \varepsilon_{i,t}$$

The return on assets proxies the profitability of the firm. Growth in sales captures firm-specific demand shocks and proxies for future growth opportunities in the absence of measures of future sales expectations (i.e., beyond fluctuations in aggregate demand). The year fixed effects directly control for fluctuations in aggregate demand, overall financial conditions, uncertainty and all other factors that may affect investment equally across firms.[22] Firm level fixed effects, on the other hand, absorb all time-invariant heterogeneity across firms.

21.   High leverage and debt overhang constrain firm investment in both countries.

- Firms cut back investment as leverage (debt-to-assets) and debt overhang increase (i.e., lower EBITDA-to-debt ratio), suggesting the presence of financial constraints (Table 1). These constraints appear to be more binding in Spain than in Italy, with the estimated coefficient on debt-assets more than 1.5 times larger in Spain than in the sample of Italian firms.

- Debt-overhang also puts a stronger break on investment in Spain—the estimated coefficient on EBITDA/debt is more than twice the magnitude than in Italy. Several factors might explain the higher sensitivity of investment to balance sheet strength and debt overhang in Spain. First, given the higher indebtedness of Spanish firms, it might reflect nonlinearities in the relationship between investment and debt burden: previous empirical studies have found asymmetric effects of leverage on investment, with balance sheet weakness having a larger impact on investment beyond a certain threshold of leverage/indebtedness (see e.g., Hernando and Martinez-Carrascal, 2008; Jaeger, 2003; Goretti and Souto, 2013; and Ceccheti and others, 2011 for macrolevel evidence). Second, it might signal more restrictive bank lending policies in Spain, especially towards the end of the sample period following the concerted effort to cleanse bank balance sheets with strict provisioning requirements and forbearance criteria, and reclassification of assets on the back of a national Asset Quality

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[21] We follow Kalemi-Ozcan and others (2015) and use the inverse of debt overhang (i.e., EBITDA over debt, rather than the debt-to-income ratio) since earnings may be zero or negative.

[22] Data limitations prevent us from examining the role of firm-specific uncertainty shocks, which have been shown to significantly dampen investment in the case of Italy (see Bontempi, Golinelli, and Parigi, 2010).

Review (AQR). Finally, with regard to the role of debt-overhang, firms with particularly high debt levels might have been less willing to invest in Spain anticipating a larger fraction of their return might go to their creditors. Based on the World Bank Doing Business Survey, creditor rights and the ability to enforce contracts are relatively high in Spain.

22.   Liquidity and sales growth are important determinants of investment as well. In both countries, strong growth in sales in the previous period is associated with higher investment, as found in the literature. Investment is also quite sensitive to the availability of cash on hand. The evidence on profitability is mixed. In Italy, higher profitability is associated with higher investment, but the estimated coefficient is negative in Spain.

23.   The role of financial constraints has intensified since the crisis. In columns (2), (3), (5) and (6) of Table 1, we examine whether financial constraints have become more binding in the post crisis period, by interacting our measures of debt overhang and leverage with a post 2009 indicator. As expected, the sensitivity of firm investment to net worth rises, suggesting that high leverage puts an even stronger brake on investment in the post-crisis period. Interestingly, it seems that Italian firms have become slightly less responsive to growth opportunities in the post crisis period, perhaps consistent with heightened uncertainty about the future.

24.   Large firms are less financially constrained during normal times, though constraints have tightened in the post crisis period even for large firms. We estimate the investment model described above separately for the set of micro, SME, and large firms. As presented in Table 2, and consistent with theory, the financial position of the firm seems to play a much smaller role in driving investment for large firms. In the post crisis period, however, the sensitivity of investment to leverage rises substantially even for the large firms.

25.   Tight credit supply may have also contributed to investment weakness both in Italy and Spain. So far, we have documented the importance of financial frictions operating via firms: as firms' financial health deteriorates, they become risky borrowers. But weak bank balance sheets may prevent banks from lending to any borrower. To test this hypothesis, we examine whether firms in sectors more dependent on external finance cut investment less in Italian regions where growth in credit outstanding fell less.[23] Table 3 suggests that this was indeed the case. Since credit outstanding captures both demand and supply of credit, we explore a more direct (albeit still imperfect) measure of credit supply: lending standards reported by banks, which are available for the four Italian macro-regions, and separately for firms in manufacturing, construction and services since 2009.[24] Using this alternative measure of credit supply by banks,

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[23] A sector's dependence on external finance is from Tong and Wei (2011), who build on the methodology first developed by Rajan and Zingales (1998). Specifically, financial dependence of a sector is constructed as the difference of the capital expenditures of the sector and its cash flow as a share of its total capital expenditures in the 1990–2006 period in the US.

[24] The measure of credit supply reflects the response of banks to the question on whether they have tightened or relaxed lending standards in the previous three months.

we do find that firms in sectors more dependent on external finance cut investment more in areas and sectors where lending standards were tightened relatively more.[25] This broadly matches results reported by Jiménez and others (2015) for Spain. Matching company and loan application data between 2002 and 2010, they report that firm leverage is a strong predictor of the approval of loan applications in both good and crisis times. In contrast, bank balance-sheet strength determines the granting of loan applications only during crisis times, suggesting that weak bank balance sheets also weighed on investment in Spain.

26.   The implications of the declining health of the corporate sector for aggregate business investment are non-trivial. A back of the envelope calculation using the point estimates in Table 1 and the change in net worth, debt overhang, sales, and profitability over 2006-13, gives a rough sense of how much of the decline in aggregate corporate investment is due to firms' deteriorating health. We find that this deterioration can explain about 8–10 percent of the decline in aggregate investment in Italy. Using aggregate data, Busetti, Giordano, and Zevi (2015) find that up to one third of the decline in nonconstruction investment in Italy was due to credit supply constraints in the most acute phases of the recession.

E.   Conclusion

27.   The crisis has had a severe impact on the corporate sector in Italy and Spain. The analysis of a rich firm-level dataset up to 2013 highlights a number of stylized facts.

- Firms in both countries are indebted and suffer from weak profitability, recent improvements notwithstanding. As a result, their capacity to deal with shocks is limited, with important potential implications for the banking sector.

- Starting from a higher initial level, leverage has come down significantly in Spain, driven by a remarkable reduction in net lending starting in 2008, when firms became net savers, and since 2013, has been supported by increasing profits and strengthening recovery. Nevertheless, leverage is still high relative to peers and historical standards. Starting from a better initial position, corporate deleveraging has been much slower in Italy, and debt overhang has actually risen due to the sharp fall in firm income.

- Weak balance sheets and debt overhang are putting a break on business investment, thus slowing the process of recovery in both economies. These effects have been stronger in Spain during the crisis, where they have been compounded by the impact of the deep restructuring and strengthening of banks' balance sheets under the ESM-led program. More recently, bank balance sheets and profitability have considerably improved thanks to those

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[25] Of course, the change in lending standards may reflect not only the strength of bank's balance sheets and its willingness to lend but also the perceived riskiness of borrowers.

measures and business investment has picked up strongly. In Italy, there is also evidence that tight credit supply may have also contributed to investment weakness.

28.   These findings highlight the need for a broad strategy to repair and revive the corporate sector. This strategy should aim to ease the reallocation of resources towards the healthier firms and sectors in the economy, rehabilitate the financial and operational structure of viable enterprises to give them a fresh start, and expand firms' access to alternative sources of funds to strengthen their resilience and reduce the interdependence of the corporate and banking sectors in the future.

Figure 4. Firm Profitability: Return on Assets

Italy

Return on Assets

Median ROA By Firm Size

Percent Change in Median ROA by Sector (2007-13)

Spain

Return on Assets

Median ROA By Firm Size

Percent Change in Median ROA by Sector (2007-13)

Sources: Orbis and IMF Staff calculations. Return on assets is measured as the profit or loss before tax divided by total assets of the firm. The sample is restricted to surviving firms over the 2006-2013 period. The top and bottom 5th percentile of values for ROA are excluded to avoid distortions from outliers.

Figure 5. Firm Profitability: Profit Margin

Italy

Profit Margin

- - - - 25th percentile
——— Median
——— Average
- - - - 75th percentile

Median Profit Margin By Firm Size

——— Micro
——— Small
——— Medium
——— Large

Percent Change in Median by Sector (2007-13)

Mfg Uti Cnstr Trade Mrkt Serv Basic Serv

Spain

Profit Margin

- - - - 25th percentile
——— Median
——— Average
- - - - 75th percentile

Median Profit Margin By Firm Size

——— Micro
——— Small
——— Medium
——— Large

Percent Change in Median by Sector (2007-13)

Mnf Uti Const Trade Mrkt Ser Basic Serv

Sources: Orbis and IMF Staff calculations. Profit margin is measured as the profit or loss before tax divided by total operating revenue of the firm. The sample is restricted to surviving firms over the 2006-2013 period. The top and bottom 5th percentile of values for profit margin are excluded to avoid distortions from outliers.

Figure 6a. Leverage (Debt-to-Assets)
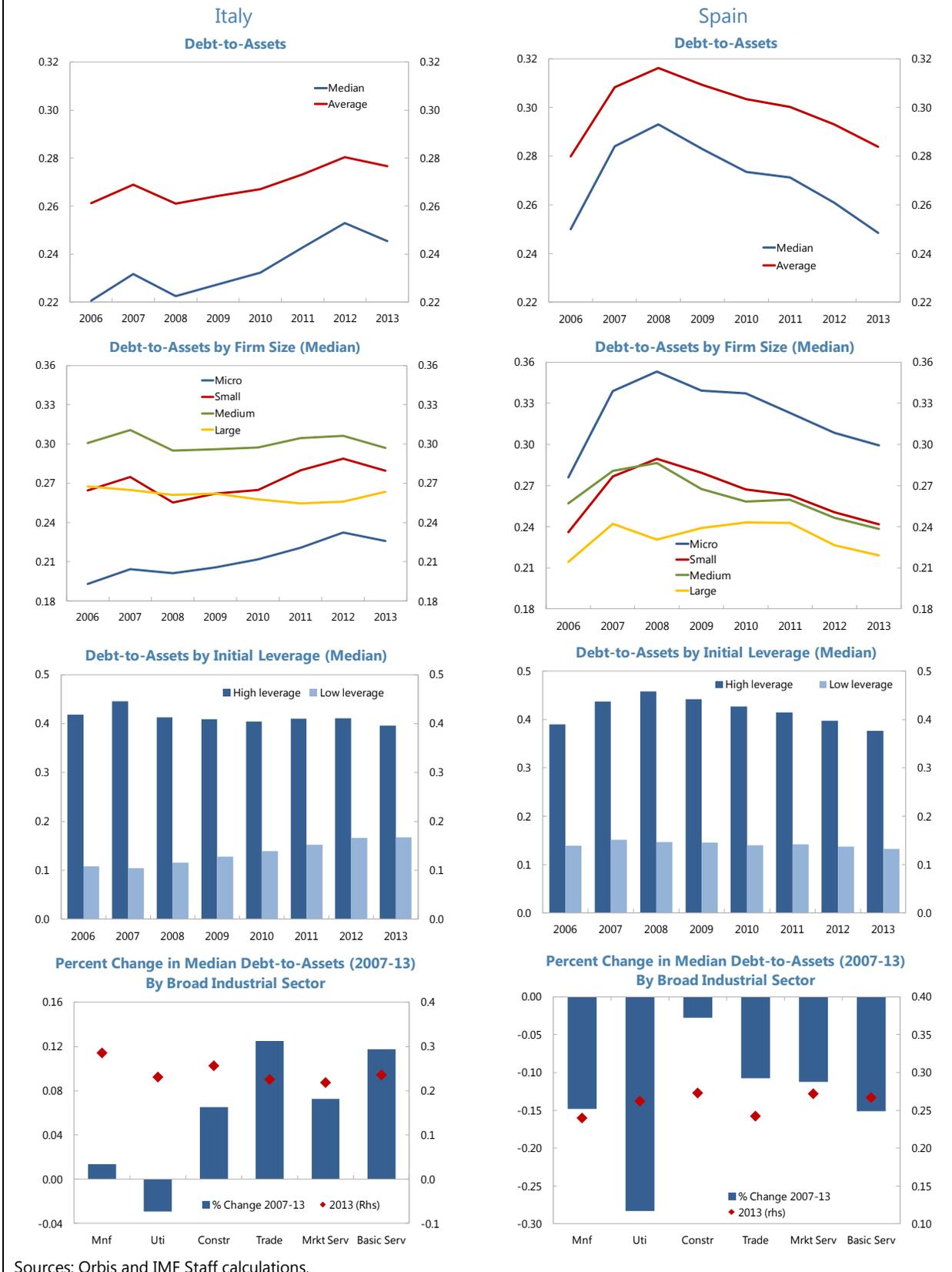
Sources: Orbis and IMF Staff calculations.

Figure 6b. Debt Overhang (Debt-to-Income)

Italy

Debt-to-Income

Debt-to-Income by Firm Size (Median)

Debt-to-Income by Initial Leverage (Median)

Percent Change in Median Debt-to-Income (2007-13) By Broad Industrial Sector

Spain

Debt-to-Income

Debt-to-Income by Firm Size (Median)

Debt-to-Income by Initial Leverage (Median)

Percent Change in Median Debt-to-Income (2007-13) By Broad Industrial Sector
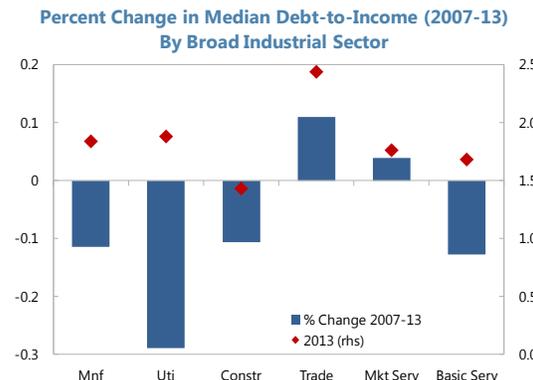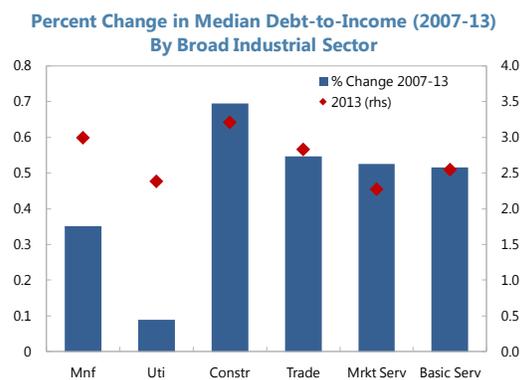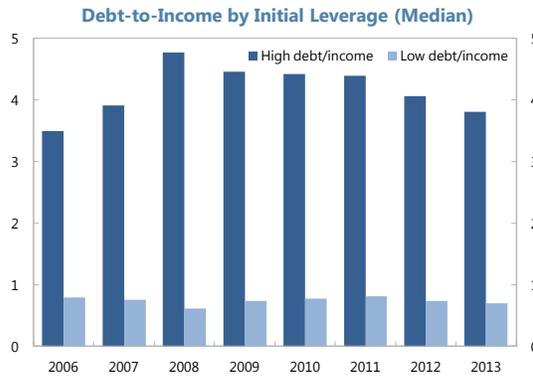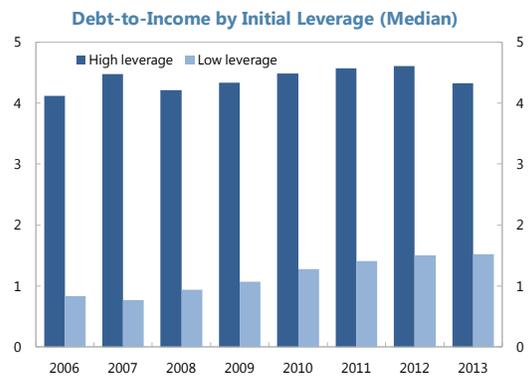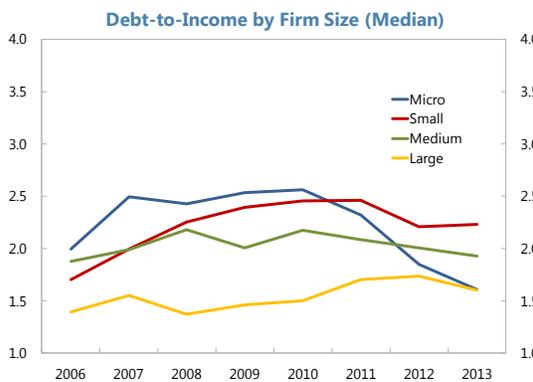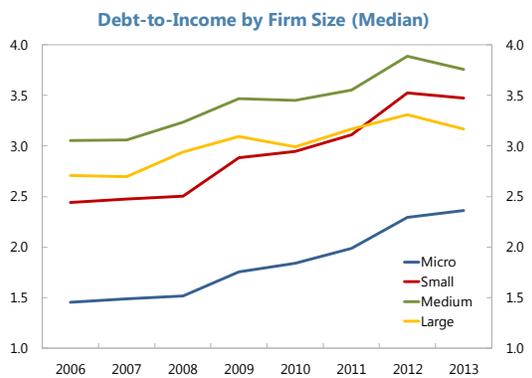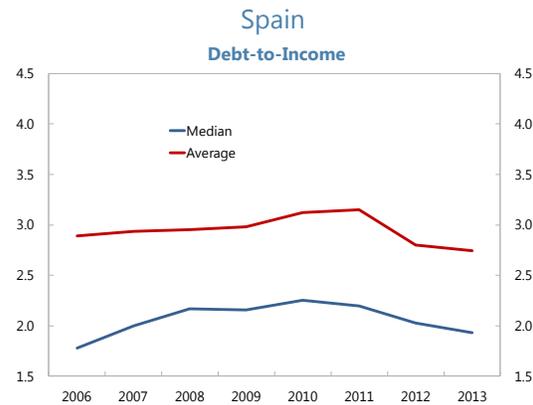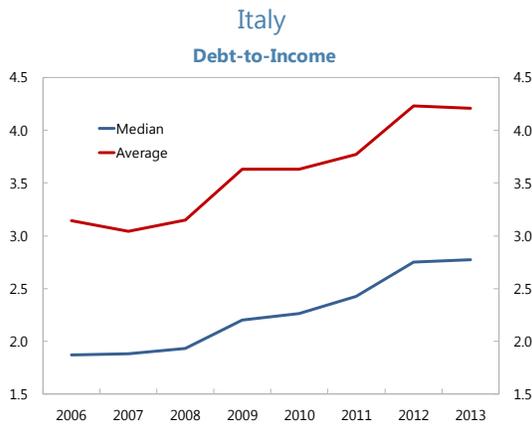
Sources: Orbis and IMF Staff calculations.

Figure 7. Effective Interest Rates

Italy

Effective Interest Rate

Spain

Effective Interest Rate

Median Effective Interest Rate by Firm Size

Median Effective Interest Rate by Firm Size
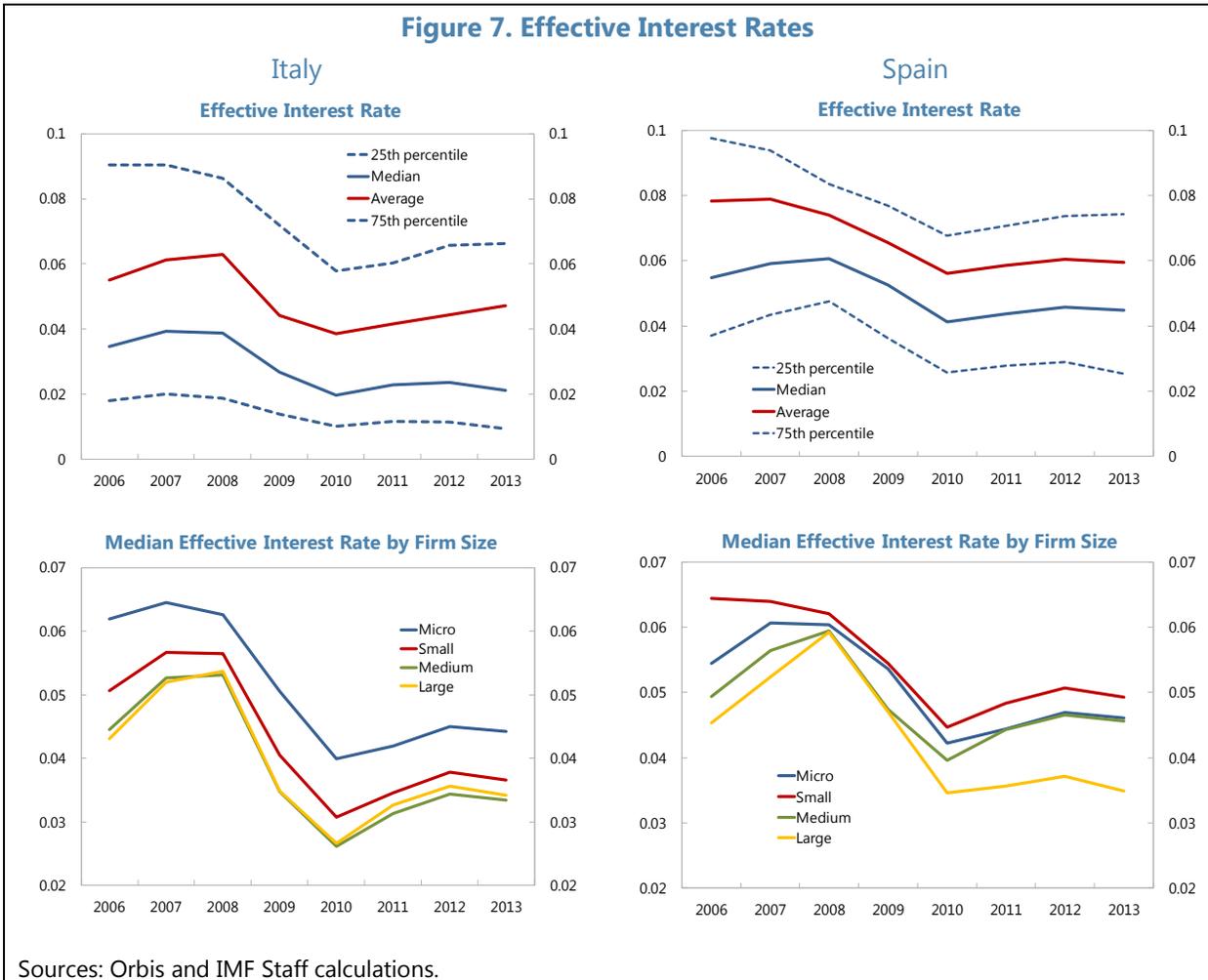
Sources: Orbis and IMF Staff calculations.

Figure 8. Interest Coverage Ratio

Italy

Interest Coverage Ratio

- - - - 25th percentile
——— Median
——— Average
- - - - 75th percentile

Share of Firms with ICR<2

■ ICR<1   ■ 1<ICR<1.5   ■ 1.5<ICR<2

Spain

Interest Coverage Ratio

- - - - 25th percentile
——— Median
——— Average
- - - - 75th percentile

Share of Firms with ICR<2

■ ICR<1   ■ 1<ICR<1.5   ■ 1.5<ICR<2
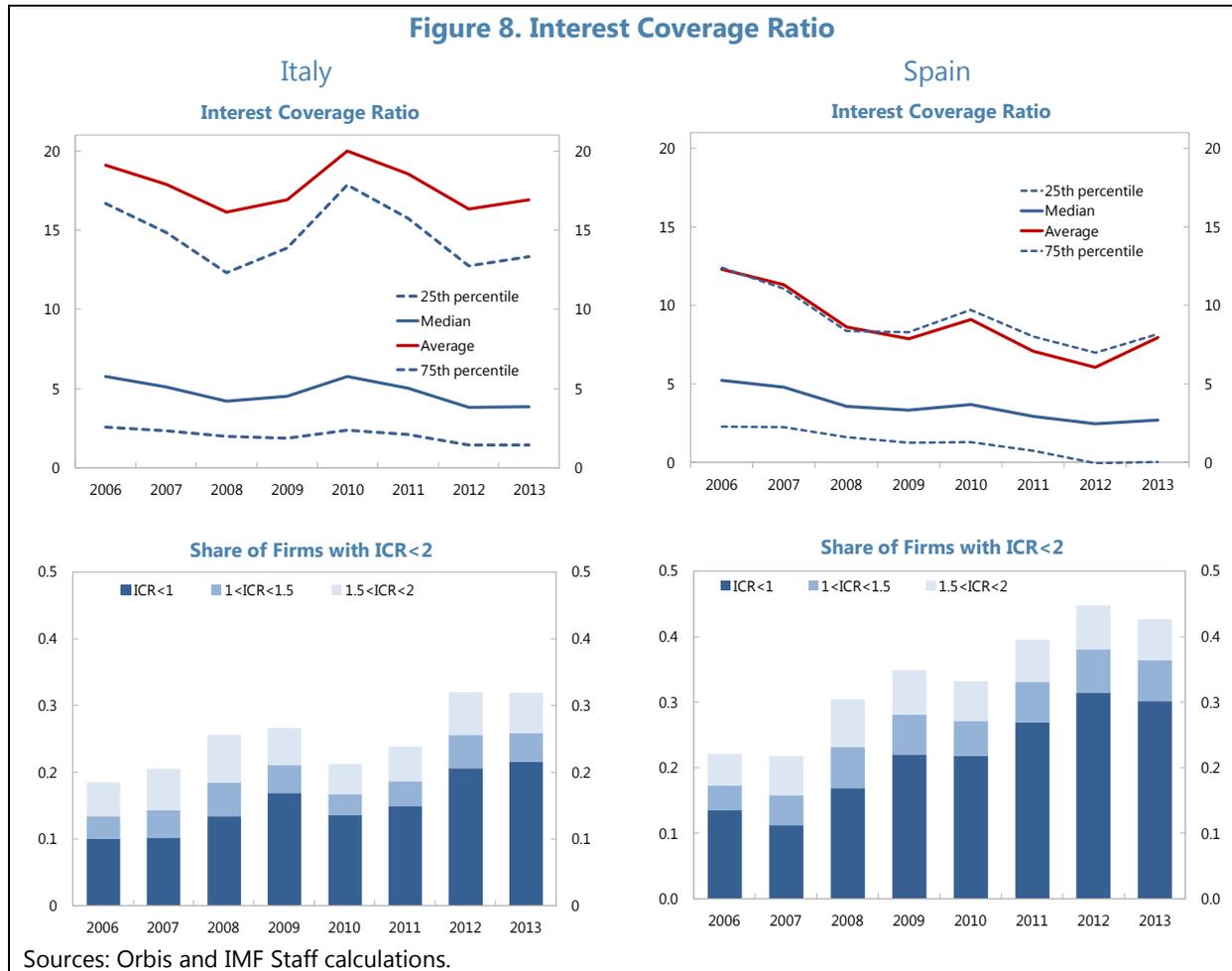
Sources: Orbis and IMF Staff calculations.

Figure 9. Firm Vulnerability and Banking System Implications

Italy

Share of Vulnerable Companies

Debt at Risk

Spain

Share of Vulnerable Companies

Debt at Risk

Sources: Orbis and IMF Staff calculations.
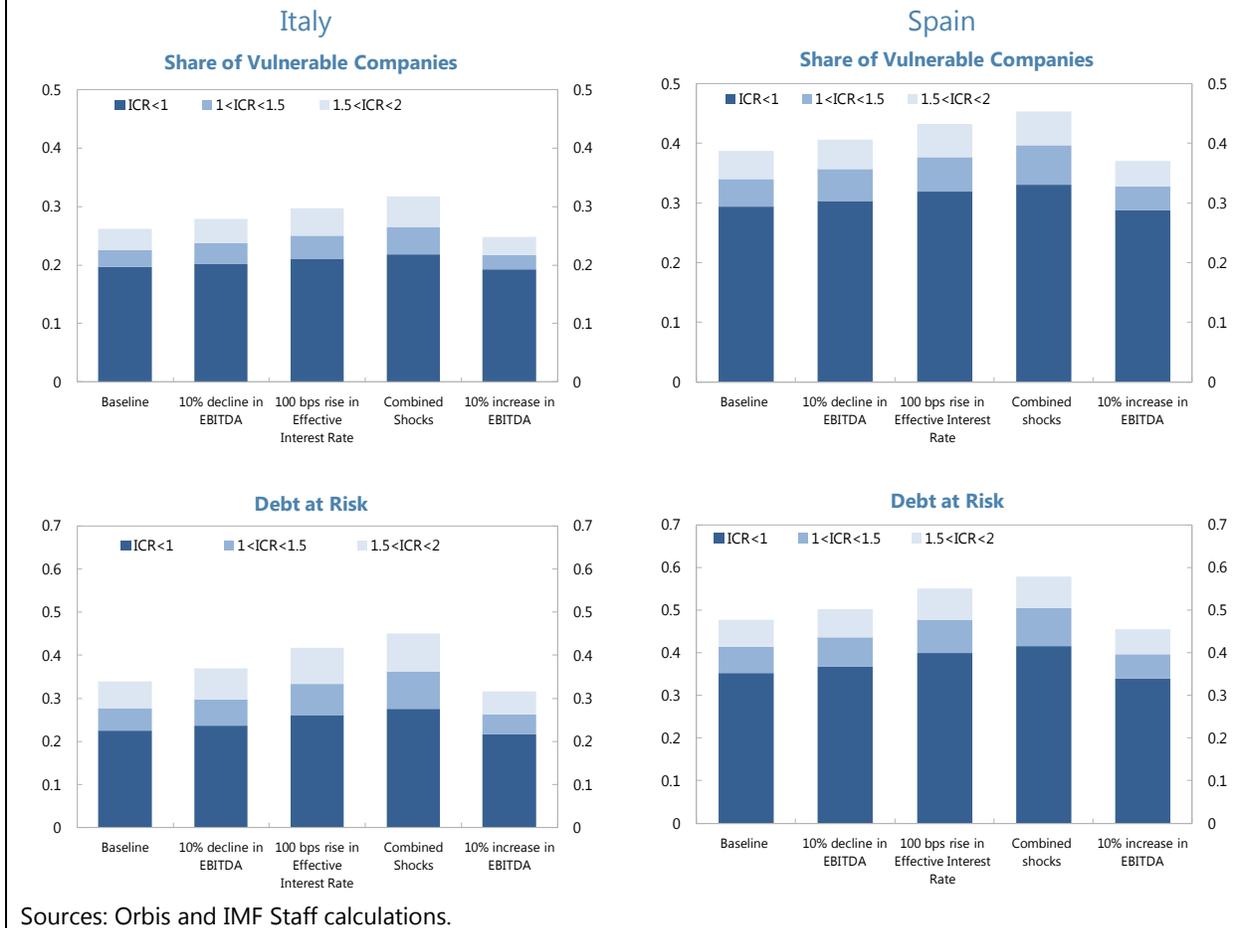
Figure 10. Median Change in Investment (2007–13)

Sources: Orbis and IMF Staff calculations.
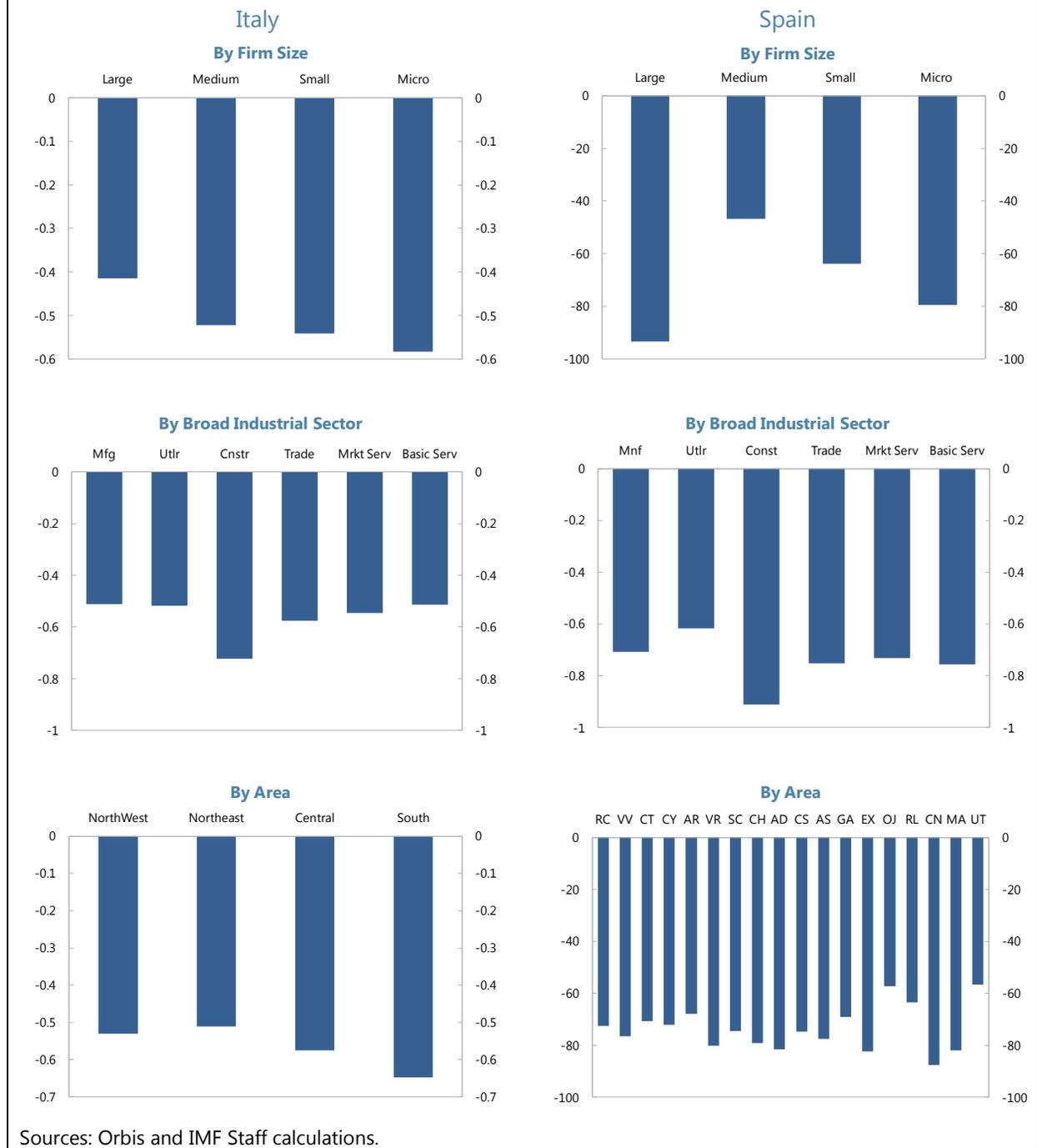
Table 1. Determinants of Net Investment: The Role of Firm Balance Sheets

	Italy			Spain		
	(1)	(2)	(3)	(4)	(5)	(6)
Debt-Assets	-0.271 ***	-0.236 ***	-0.252 ***	-0.4436***	-0.4354***	-0.4330***
	[0.008]	[0.010]	[0.010]	[0.011]	[0.015]	[0.015]
EBITDA-Debt	0.002 ***	0.002 ***	0.002 ***	0.0059***	0.0059***	0.0041***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Sales Growth	0.055 ***	0.055 ***	0.065 ***	0.0710***	0.0710***	0.0728***
	[0.002]	[0.002]	[0.004]	[0.002]	[0.002]	[0.005]
Return on Assets	0.112 ***	0.111 ***	0.090 ***	-0.1007***	-0.1006***	0.1715***
	[0.010]	[0.010]	[0.018]	[0.012]	[0.012]	[0.0307]
Cash-Assets	0.777 ***	0.777 ***	0.658 ***	0.7222***	0.7224***	0.8075***
	[0.014]	[0.014]	[0.019]	[0.019]	[0.019]	[0.028]
Debt-Assets * Post		-0.056 ***	-0.031 ***		-0.0109	-0.0341**
		[0.009]	[0.009]		[0.013]	[0.013]
EBITDA-Debt * Post		0	0		0	0.0029**
		[0.000]	[0.000]		[0.000]	[0.000]
Sales Growth * Post			-0.015 ***			-0.0017
			[0.005]			[0.006]
Return on Assets * Post			0.034 *			-0.3582***
			[0.019]			[0.032]
Cash-Assets * Post			0.179 ***			-0.1397***
			[0.018]			[0.028]
r2	0.26	0.26	0.26	0.3825	0.352	0.352
N	2,998,090	2,998,090	2,998,090	1,615,829	1,615,829	1,615,829

Note: All regressions include firm and year fixed effects. Standard errors are clustered at the firm level.

Table 2. Determinants of Net Investment by Firm Size

	Italy			Spain			
	Micro	SME	Large	Micro	Small	Medium	Large
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Debt-Assets	-0.294 ***	-0.159 ***	-0.054	-0.4665***	-0.5633 ***	-0.218***	-0.3082 ***
	[0.011]	[0.020]	[0.083]	[0.011]	[0.034]	[0.070]	[0.076]
EBITDA-Debt	0.002 ***	0.004 ***	0.008	0.0064***	0.0025 **	0.003	0.006
	[0.000]	[0.001]	[0.005]	[0.001]	[0.001]	[0.002]	[0.000]
Sales Growth	0.068 ***	0.049 ***	0.011	0.0869 ***	0.0986 ***	0.0484**	0.0865 ***
	[0.005]	[0.008]	[0.032]	[0.007]	[0.012]	[0.027]	[0.022]
Return on Assets	0.055 ***	0.281 ***	0.231	0.0926	0.2965 ***	0.4788***	0.219
	[0.019]	[0.048]	[0.186]	[0.044]	[0.0606]	[0.127]	[0.146]
Cash-Assets	0.632 ***	0.880 ***	0.693 ***	0.8634 ***	0.7309 ***	0.756 ***	0.6822 ***
	[0.022]	[0.045]	[0.203]	[0.042]	[0.049]	[0.113]	[0.141]
Debt-Assets * Post	-0.007	-0.051 ***	-0.191 ***	0.0201	-0.0773***	-0.2717 ***	-0.0775
	[0.011]	[0.017]	[0.064]	[0.019]	[0.028]	[0.057]	[0.068]
EBITDA-Debt * Post	0	-0.001	-0.008 *	0.0003	0.004***	0.0025	0.000
	[0.001]	[0.001]	[0.005]	[0.001]	[0.001]	[0.002]	[0.004]
Sales Growth * Post	-0.011 *	-0.019 **	-0.022	-0.027	-0.0772 ***	0.003	-0.049 **
	[0.006]	[0.009]	[0.038]	[0.008]	[0.028]	[0.032]	[0.023]
Return on Assets * Post	0.033	0.112 **	0.034	-0.3064***	-0.5302 ***	-0.6337***	-0.3462**
	[0.021]	[0.048]	[0.171]	[0.046]	[0.063]	[0.131]	[0.147]
Cash-Assets * Post	0.155 ***	0.169 ***	-0.092	-0.1545***	-0.0838 *	-0.1916	-0.2327
	[0.021]	[0.041]	[0.166]	[0.042]	[0.050]	[0.1273]	[0.153]
r2	0.27	0.22	0.21	0.4035	0.4128	0.3955	0.6122
N	2,170,628	778,187	49,275	965,613	411,058	74,115	165,044

Note: All regressions include firm and year fixed effects. Standard errors are clustered at the firm level.

Table 3. Net Investment in Italy: The Role of Firm Balance Sheets and Credit Conditions

	Net Investment		
	(1)	(2)	(3)
Estimation Period	2006-13	2009-13	2010-13
Debt-Assets	-0.271 ***	-0.345 ***	-0.409 ***
	[0.008]	[0.013]	[0.017]
EBITDA-Debt	0.002 ***	0.002 ***	0.003 ***
	[0.000]	[0.000]	[0.001]
Sales Growth	0.055 ***	0.042 ***	0.031 ***
	[0.002]	[0.003]	[0.004]
Return on Assets	0.112 ***	0.045 ***	0.054 ***
	[0.010]	[0.016]	[0.020]
Cash-Assets	0.777 ***	0.768 ***	0.794 ***
	[0.014]	[0.023]	[0.028]
Financial Dependence * Credit Growth		0.059 *	
		[0.030]	
Financial Dependence * Lending Standards			-0.085 ***
			[0.031]
r2	0.26	0.34	0.39
N	2,998,090	1,600,368	1,279,203

Note: All regressions include firm and year fixed effects. Standard errors are clustered at the firm level.

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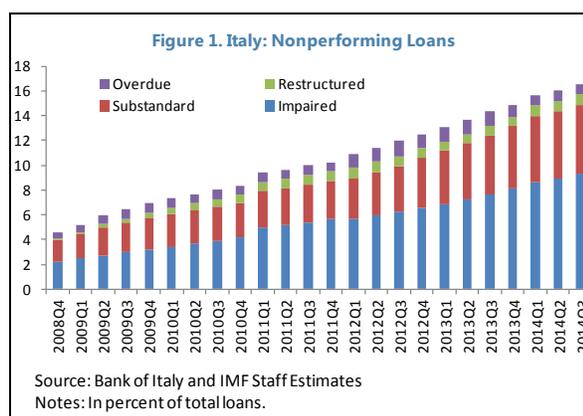
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RESOLVING NONPERFORMING LOANS IN ITALY: A COMPREHENSIVE APPROACH[1]
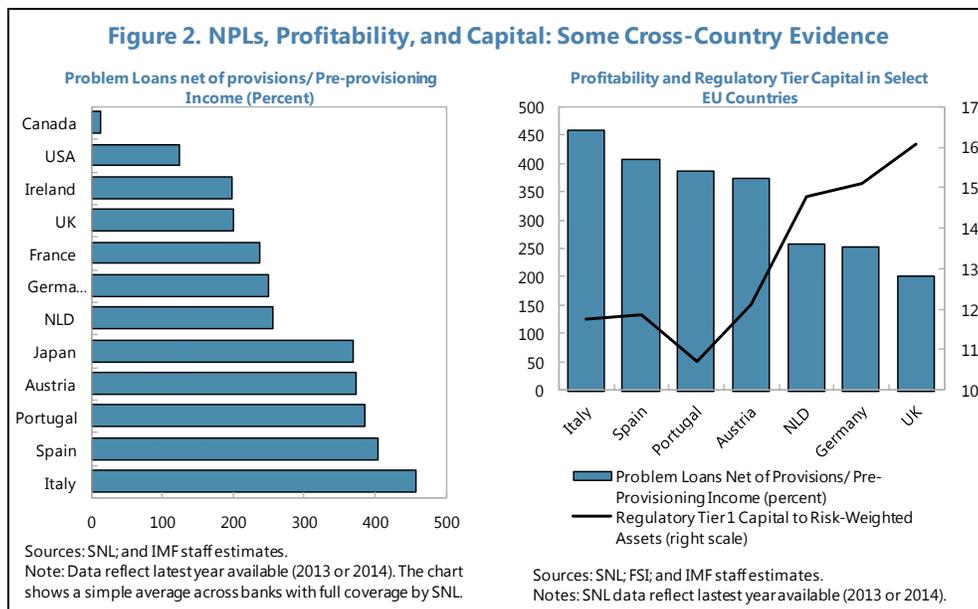
A. Background

1.   Nonperforming loans (NPLs) in Italy have reached systemic levels. They have tripled since the beginning of the crisis and, according to national definition, now stand at €330 billion (17 percent of total outstanding loans).[2] The problem is especially pronounced for bad (impaired, or *sofferenze*) loans, which amount to more than half of total NPLs (Figure 1). The combination of over-indebted corporates, banks low in capital buffers but high in risks, a legal system complicating corporate restructuring and insolvency, lengthy judicial processes, and a tax system that discourages NPL write-offs, have all contributed to the build-up of NPLs. And while the rise in NPLs has recently decelerated, the stock of NPLs is still growing and the pace of write-offs has not increased significantly.

Figure 1. Italy: Nonperforming Loans

Source: Bank of Italy and IMF Staff Estimates
Notes: In percent of total loans.

2.   Loan losses have depressed profitability and hindered Italy's recovery. Loan losses and high administration costs for NPLs weigh heavily on bank profitability and hamper attempts to build up capital buffers (Figure 2). Banks' reluctance to write off NPLs can be explained by several factors, including the high risk premia and ROEs targeted by investors. It may also be suggestive of provisioning gaps that would need to be closed. At the same time, corporate debt overhang has grown substantially in the wake of the crisis (see accompanying paper on corporate sector). Hence, despite availability of ample and cheap liquidity, banks have become much more cautious in extending new credit, especially to SMEs. For more risky corporates, bank financing has become largely unavailable or simply too expensive to be economically reasonable. Given the absence of alternative sources of corporate financing, this has constrained investment and undermined the economic recovery.

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[1] Prepared by Jose Garrido (LEG), Emanuel Kopp (MCM), and Anke Weber (EUR).

[2] NPLs in Italy consist of four categories: impaired/bad debt or *sofferenze* (loans in a state of insolvency), substandard (*incagli*), overdue, and restructured. In 2014, the ECB performed an AQR of Italy's largest 15 banks, based on harmonized definitions of loan quality, asset classification, and provisioning. This resulted in an aggregate nonperforming exposures ratio for the 15 banks of almost 22 percent.

Figure 2. NPLs, Profitability, and Capital: Some Cross-Country Evidence

Problem Loans net of provisions/ Pre-provisioning Income (Percent)

Profitability and Regulatory Tier Capital in Select EU Countries

Sources: SNL; and IMF staff estimates.
Note: Data reflect latest year available (2013 or 2014). The chart shows a simple average across banks with full coverage by SNL.

Problem Loans Net of Provisions/ Pre-Provisioning Income (percent)
Regulatory Tier 1 Capital to Risk-Weighted Assets (right scale)

Sources: SNL; FSI; and IMF staff estimates.
Notes: SNL data reflect lastest year available (2013 or 2014).

3.   The authorities recognize the scale of the problem and have already introduced successive reforms to revamp the Italian insolvency system. Still, more needs to be done and the authorities have set up a commission to make proposals for the reform of the insolvency system by the end of this year. Separately, Bank of Italy (BoI) has issued supervisory guidance on how and when to write-off uncollectable exposures. Recently, NPL resolution has received significant attention as the authorities are considering the establishment of a state-backed asset management company (AMC). At this stage, many details of the proposal are still unknown, however.

4.   This paper aims to contribute to the ongoing discussion by proposing a comprehensive strategy to repair private sector balance sheets and support the recovery. For the strategy to be effective, the strong interlinkages between Italian bank and corporate balance sheets need to be acknowledged. Hence, a potential solution needs to involve a broad-based clean up of bank balance sheets, corporate restructuring, and exit of unviable firms from the market. Elements of this strategy include economic, supervisory, and legal measures.

5.   The remainder of the paper is structured as follows. Section B presents the distribution of NPLs across banks, sectors, and regions and analyzes the macroeconomic and bank-specific factors that explain the build-up of NPLs, including the deteriorated health of Italy's corporate sector. Section C outlines the main obstacles to resolving NPLs. Section D discusses some preliminary recommendations for tackling the NPL problem.

B. The Nature of the Problem

Distribution of NPLs by Size, Region, and Sectors

6.   The NPL problem in Italy has several features that need to be considered when devising a potential solution (Figure 3).

- The bulk of bad debt consists of relatively small loans. In terms of the total value of bad debt (impaired loans), more than 75 percent relates to loans above €250,000. However, in terms of the total number of borrowers, about 75 percent of bad debt relates to loans of less than €75,000.

- About three quarters of bad debt are related to the corporate sector. Since the corporate sector in Italy comprises mostly small and medium sized companies (often with less than 10 employees), this may explain the prevalence of small loans noted above.[3] The service sector and less technology-intensive sectors are most affected.

- The problem has a pronounced regional dimension. Looking at all types of NPLs and all sectors of economic activity, there appears to be a north-south divide, especially in terms of bad loans to the corporate sector. While in early 2009 most regions had bad debt (*sofferenze*) ratios below 10 percent, by end 2014, most central and southern Italy regions saw their bad debt ratios increase above 20 percent.

Distribution of NPLs Across Banks

7.   Large banks hold the lion's share of NPLs, but NPL ratios are high across all types of banks suggesting a system-wide problem (Figure 4). Specifically, the following patterns emerge from the data:

- There are a few banks (especially smaller ones) that face extremely high NPL ratios. However, most banks have NPL ratios between 15 and 20 percent. There is no clear correlation between NPL ratios (in percent of total loans) and bank size.

- As of December 2014, the five largest banks in Italy account for two-thirds of total bad debt and NPLs.

- NPL ratios are high across different types of banks suggesting a system-wide problem. However, large cooperative banks (*banche popolari*) faced the highest NPL ratios with the lowest coverage

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[3] Of course, if most loans had been to households, the prevalence of small loans would likely have been even higher.

ratio at end-2014.[4] This is consistent with the findings from the IMF's 2013 Financial Sector Assessment Program.

Figure 3. Italy: NPLs by Size, Sectors, and Region

Bad Debts: by Amount
(Size classes in euros, end-2014)

Bad Debts: Used Margin: by Segment of Economic Activity (percent of total bad debt, end 2014)

Legend:
- Non-financial companies: industry
- Non-financial companies: services
- Construction
- Producer households
- Consumer households and NPIS

Bad Debts by Economic Activity
(Percent of total loans, end-2014)

Geographical Distribution of NPLs: By Type
(End-2014)

Legend:
- Restructured
- Overdue
- Impaired (net of bad debt)
- Substandard

Bad Debts by Region
(Percent of total loans, NFCs, Q1-2009)

Bad Debts by Region
(Percent of total loans, NFCs, end-2014)

Sources: Bank of Italy; and IMF staff estimates.

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[4] This is consistent with Jassaud (2014), who concludes that due to their corporate governance structure, large cooperatives tend to display lower buffers and weaker asset quality metrics than the system average.

Figure 4. Distribution of NPLs Across Banks, End-2014

NPLs and Bank Size (2014) 1/

Distribution of Bad Loans Among Italy's Largest Banks, 2014 2/

Asset Quality by Bank Type
(Percent of total loans)

Sources: SNL; Bank of Italy; and IMF staff estimates.

1/ 2014 data. NPLs are in percent of total gross loans. Full SNL sample of 402 Italian banks.

2/Total system wide bad loans and NPLs based on from supervisory returns data from BoI.

Data for bad loans from SNL are net of provisions.

3/ bad loans and problem loans from SNL based on 2013 data.

4/ largest five banking groups by total assets as of December 2014.

Contributing Factors to the Build-up of NPLs

8.   Bank specific factors, such as low profitability and past excessive lending, are associated with higher NPLs (Figure 5). Using cross-sectional data from SNL that cover 402 banks, we find a strong negative correlation between profitability (measured as returns on equity) and NPLs.[5] This suggests that banks with better risk management practices are, on average, more profitable.

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[5] Data for the 402 banks do not typically span beyond 2012 for most variables.

Figure 5. NPLs, Profitability, and Lending

Source: SNL.
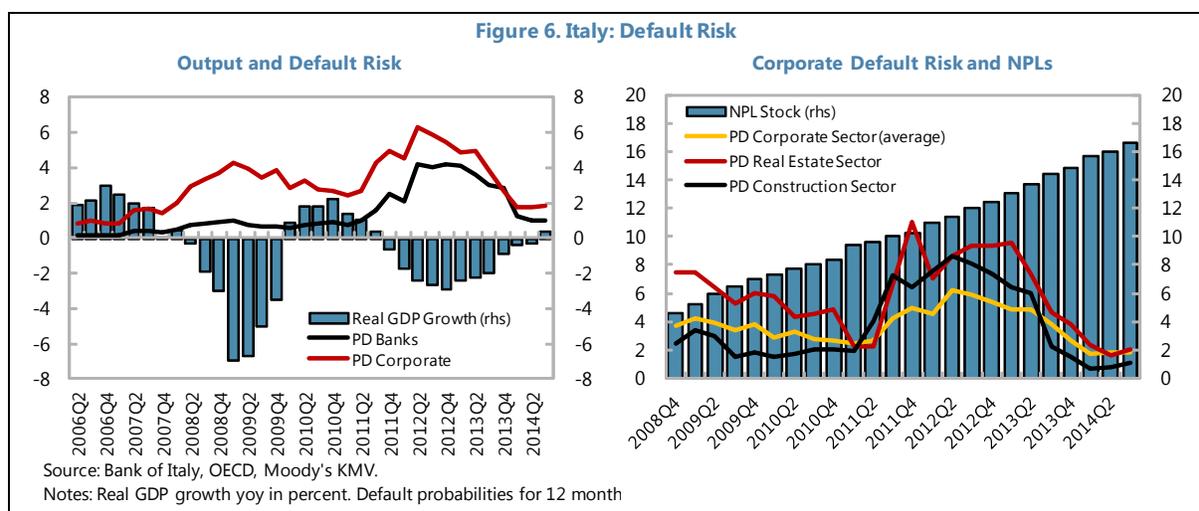Notes: NPLs (in percent of total gross loans).
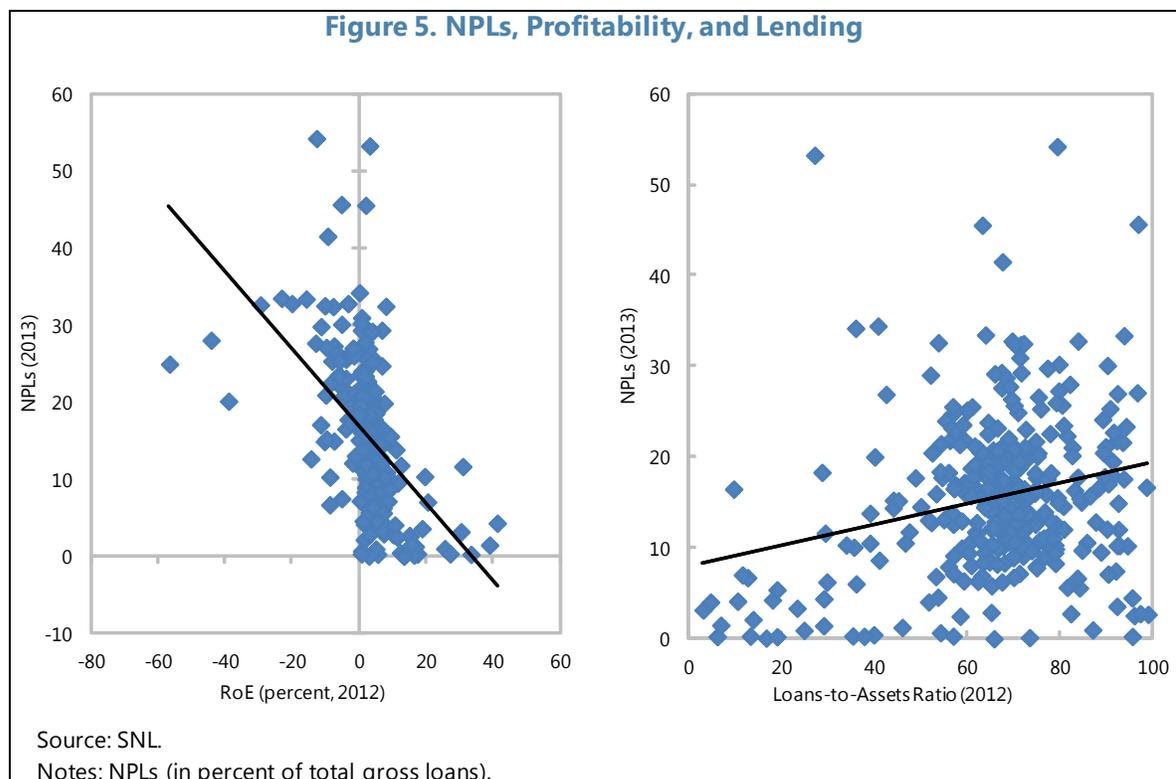
9.   Using a dynamic panel regression, we attempt to differentiate between bank-specific and macroeconomic factors. We run fixed effects and GMM regressions of NPLs (problem loans in percent of total gross loans) on various macro variables common to all banks (lagged inflation, NEER percentage change, percentage change in unemployment, lagged real GDP growth, lagged percentage change in house and stock prices), as well as bank-specific variables (lagged equity/assets ratio, lagged ROE, lagged loan growth and lagged Tier 1 ratio). In order to have data for a number of years, we use SNL data for 62 banks for which time series data since 2005 are available. Various robustness checks are performed (see Annex A for details).

10.   The analysis suggests that both bank-level and macro-economic factors have affected banks' asset quality. Higher NPL levels cause lower profitability.[6] And higher lending in the past—measured by (lagged) loan growth—is related with higher NPLs, indicating that faster loan book expansion on average results in worse asset quality. A number of macro-economic variables are significant as well. For instance, lower growth, exchange rate appreciations, and falling house prices are significantly associated with higher NPLs.[7] Overall, the analysis suggests that the crisis had a profound impact on banks' asset quality, which was exacerbated by bank-specific factors.

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[6] The causality between RoE and NPLs could be two ways as higher NPLs also worsen banks' equity position. This is why all independent variables are lagged.

[7] House prices are only significant in the fixed effects regression, not when performing system GMM.

11. **The prolonged recession led to higher default risk for firms and banks** (Figure 6, left chart). In particular, corporate and bank default probabilities peaked in mid-2012. And while default probabilities have come down substantially since then, NPLs have continued to rise (Figure 6, right chart). At 2 percent, the one-year default probability for corporates is still high, however.[8]

Figure 6. Italy: Default Risk

Source: Bank of Italy, OECD, Moody's KMV.
Notes: Real GDP growth yoy in percent. Default probabilities for 12 month

Output, Credit Default Risk, and Nonperforming Loans

12. **In turn, corporate sector default risk has been driven mostly by the interest rate environment and real activity.** A dynamic macro-financial state space model (DSSM) illustrates how the dynamics have changed over the past few years (Figure 7). The estimates suggest that (i) further output losses would fuel credit risk considerably more than in the past; and (ii) higher interest rates would now have a much more substantial impact on corporates than in the past. Similarly, increases in interest rates would negatively impact the market value of banks' holdings of Italian sovereign assets, as the volume of sovereign bonds in banks' books has risen substantially.[9]
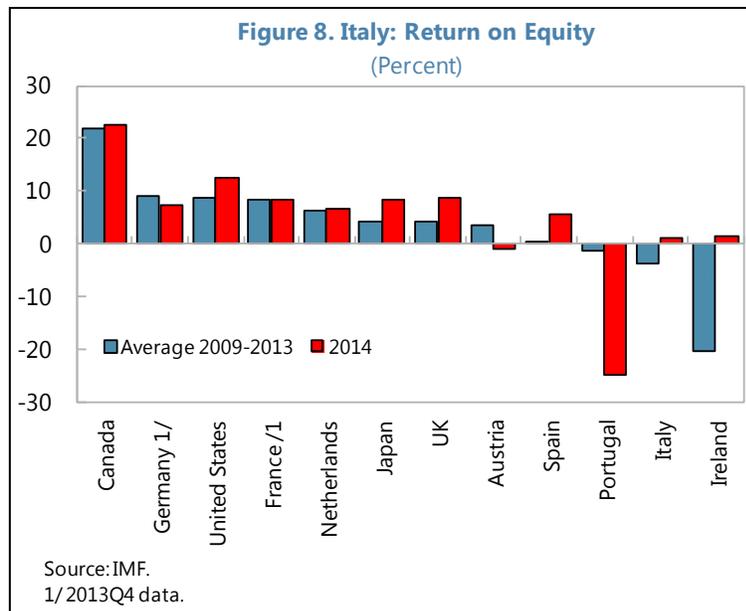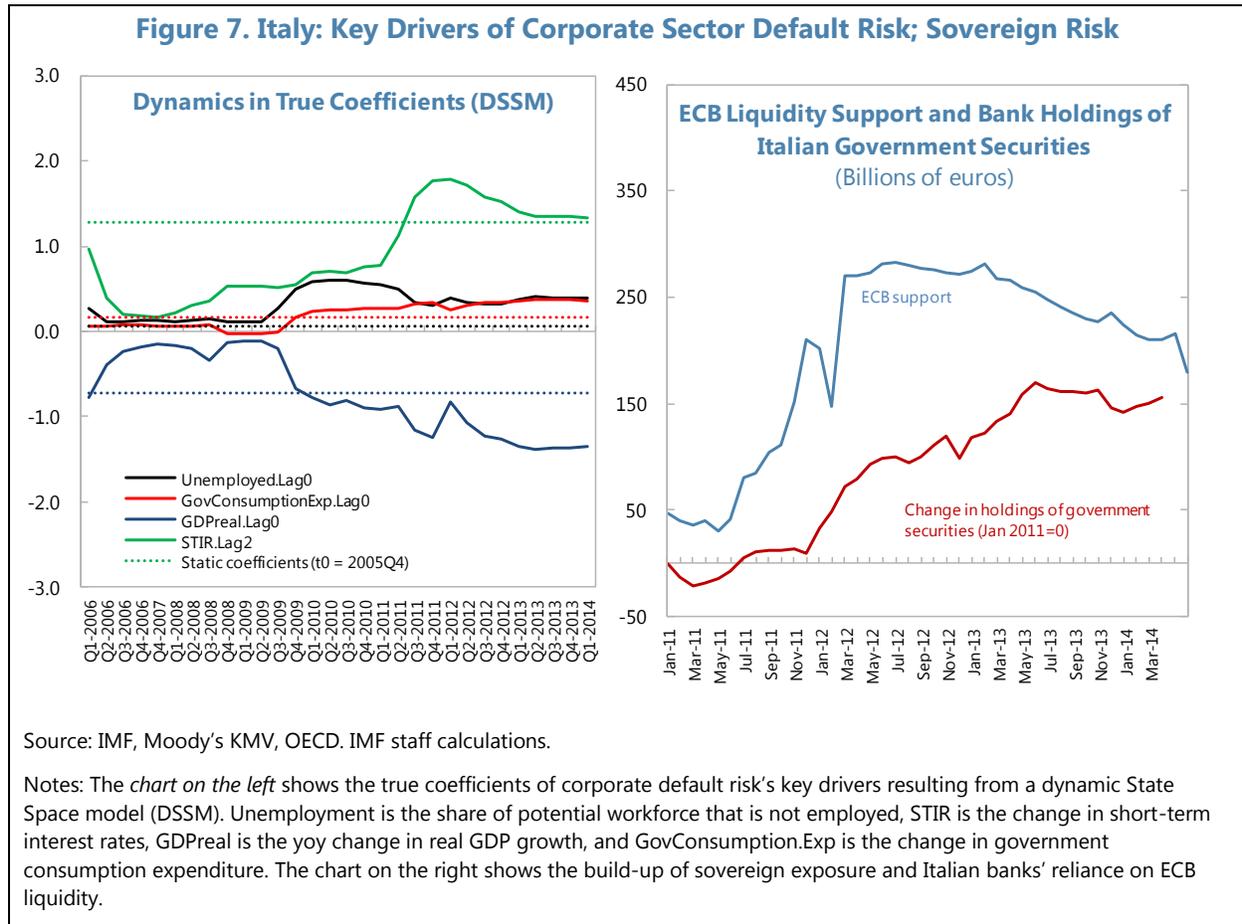
C. Obstacles to NPL Resolution

Economic Factors

13. **Potentially substantial pricing gaps lead to disincentives for banks to write-off and sell NPLs.** Writing off under-provisioned loan exposures requires closing the provisioning gap, eating into banks' capital. And if investors believe NPLs are not adequately provisioned, transfer prices are discounted. In both cases, the result is that banks would have to realize losses. Structurally weak profitability and, for some banks, low capital buffers give only limited space for balance sheet clean

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[8] This means that one in 50 corporates which have not defaulted already are expected to do so within 12 months.

[9] However, Italian banks do have significant unrealized capital gains from sovereign bond holdings. See BoI Financial Stability Report April 2015.

up. A key factor is asset quality, as NPLs weigh heavily on bank profitability (Figure 8). Already thin profit margins make it difficult for banks to digest additional loan loss impairments.

Figure 7. Italy: Key Drivers of Corporate Sector Default Risk; Sovereign Risk

Dynamics in True Coefficients (DSSM)

ECB Liquidity Support and Bank Holdings of Italian Government Securities
(Billions of euros)

Source: IMF, Moody's KMV, OECD. IMF staff calculations.

Notes: The *chart on the left* shows the true coefficients of corporate default risk's key drivers resulting from a dynamic State Space model (DSSM). Unemployment is the share of potential workforce that is not employed, STIR is the change in short-term interest rates, GDPreal is the yoy change in real GDP growth, and GovConsumption.Exp is the change in government consumption expenditure. The chart on the right shows the build-up of sovereign exposure and Italian banks' reliance on ECB liquidity.

Figure 8. Italy: Return on Equity
(Percent)

Source: IMF.
1/ 2013Q4 data.

14.   Italy's banking system is largely based on relationship lending. Banks have long-standing relationships with their customers, and keeping these relationships is essential for the banks' reputation. Relationship banking is an important element of many cooperative and regional banks, and has arguably helped many embattled nonfinancial corporation survive the deep recession suffered by the Italian economy. At the same time, related-party lending has likely contributed to the build-up of problem loans in medium-sized and small credit institutions. It also makes it more difficult to resolve NPLs.

15.   The previous tax treatment penalized Italian banks that wrote off problem loans more aggressively. Until the 2013 reform, write-offs were only tax deductible in the state of insolvency. Tax deductibility of loan-loss provisions from taxable income was limited to 0.3 percent of outstanding loans, with the remaining part treated as a deferred tax asset (DTA). DTAs were deductable from taxable revenues over a period of 18 years.[10] This cap constituted a clear disincentive to provisioning. Since 2013, provisions and write-offs can be deducted in equal installments over five years, and with a higher tax rate. While this approach is still more restrictive than in other countries, incentives for accelerated write-off have increased.[11] As of end-2014, DTAs not deducted from capital amounted to €43 bn.

16.   In the past, insufficient guidance on accounting under IFRS decelerated NPL write-offs. IAS 39 does not define when and how defaulted loans are to be written off. Since the current accounting regime does not include clear write-off rules, banks (including Italian credit institutions) apply a de-recognition rule (loan cancellation). This practice, however, was supposed to be applied only under certain conditions, like asset transfer, and not as a general practice. BoI recently issued guidance on when and how uncollectable loans are to be removed from the balance sheet.

17.   Smaller banks have limited experience and capacity to deal with NPLs. While the largest Italian banks have been able to dispose of NPLs, invest in internal NPL management, and set up decentralized AMCs, the medium and small-sized banks have struggled to bring down NPLs.[12] These banks lack risk management capacity, NPL management experience, and access to distressed debt markets.

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[10] This has also contributed to the build-up of Deferred Tax Assets (DTAs) in Italian banks, as remaining provisions could be deducted in equal installments over a period of 18 years (and at a lower net present value).

[11] For further details, see http://www.bancaditalia.it/pubblicazioni/note-stabilita/2014-0001/index.html.

[12] In fall 2014, UCG sold €2 bn in NPLs in the market. And in February 2015, the bank announced the sale of its entire participation in UniCredit Credit Management Spa, including a €2.4 bn NPL portfolio, to a private AMC (Fortress/Prelios) aimed at both liquidation (bad debt) and NPL management (other NPLs), in particular for SME NPLs. Net of provisions, bad debts at UCG stood at about €36 billion in 2013.

18. **The sectoral composition of NPLs makes the problem more difficult**. Unlike in other countries, where NPLs were concentrated in the real estate sector and therefore were relatively easy to value, Italian NPLs are mostly in the corporate sector, and very heterogeneous.

Legal Factors

19. **The Italian insolvency system has evolved significantly in the last decade**.

- Successive reforms have resulted in a revamped reorganization procedure (*concordato preventivo*, reformed in 2005, 2007, 2012, and 2013) and special procedures that only apply to large companies and special enterprises (*amministrazione straordinaria*, versions "Prodi" and "Marzano" for the reorganization of large companies; *liquidazione coatta amministrativa* for specially regulated enterprises).

- The system includes the traditional bankruptcy liquidation (*fallimento*), which is the procedure most commonly used in practice for corporate distress.

- The insolvency system also includes some informal or hybrid debt restructuring options (*piani di risanamento, accordi di ristrutturazione*).

- Until recently, consumers and small entrepreneurs were outside the scope of the insolvency legislation. But new insolvency procedures were introduced to cover both individuals (consumers and entrepreneurs) and small enterprises (law of January 27, 2012, modified by Decree-Law no. 179 of 2012).

Despite these changes, which make the current framework largely consistent with best international practices, the insolvency system still appears inadequate—due to procedural complexity, coupled with the lack of efficiency of the judiciary—in dealing with the magnitude of the corporate distress problem.

20. **The number of insolvency cases has increased substantially since the onset of the crisis.** In 2014, enterprise bankruptcies surpassed 15.000 cases (+10.7 percent in comparison with 2013) (Figure 9). It is estimated that more than 82,000

Figure 9. Italy: Bankruptcies and Reorganizations

Sources: ; Cerved; and IMF staff estimates.
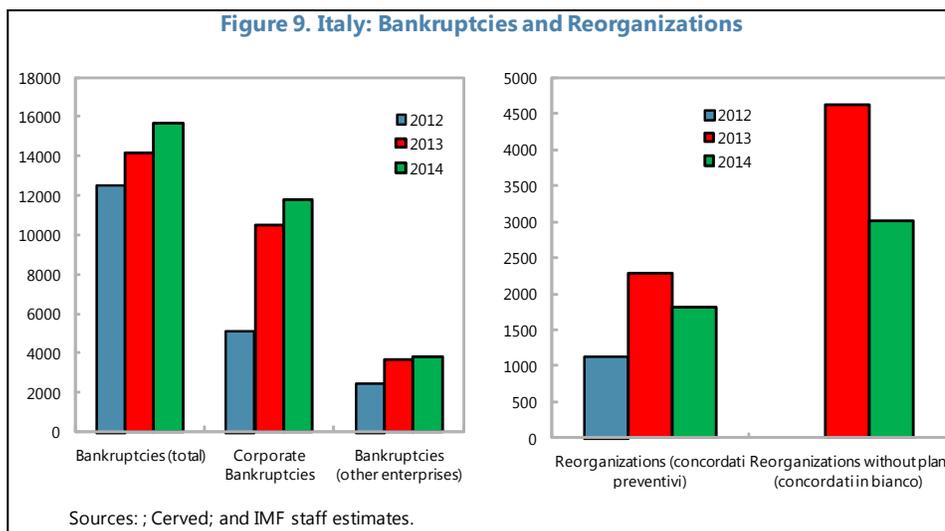
enterprises have been liquidated in insolvency processes since 2008, with an associated loss of about a million jobs (Cerved 2015). By contrast, enterprise reorganizations (*concordati preventivi*) declined by 20 percent in 2014.

21.   The current framework does not seem conducive to the reorganization of viable businesses.

- Given the number of different techniques available to debtors, by way of informal or hybrid restructuring options (*piani di risanamento*, *accordi di ristrutturazione*), and by way of the reformed reorganization procedure (*concordato preventivo*), one could raise the question of whether successive legislative reforms have been effective.

- The comprehensive reform of the *concordato preventivo* in 2005–2007 did not result in an efficient reorganization procedure. Some targeted revisions (e.g., in 2012) intended to make the process more attractive to debtor companies, by allowing them to access the procedure and enjoy bankruptcy protection while preparing a reorganization plan (*concordato con riserva*, or *concordato in bianco*). After an initial period in which there was an unprecedented increase in the number of proceedings, including the abuse of the procedure by recalcitrant debtors, corrective measures were introduced (a 2013 reform made it possible for the court to appoint an examiner in these cases) and the number of cases decreased considerably.

- Overall, most reorganization attempts fail and result in protracted liquidations. The liquidation process is slow, due to frequent and extensive litigation within the insolvency process. In turn, the lengthy process tends to reduce the value of the enterprise even further. The existence of numerous priorities in favor of creditor groups—including public creditors—results in a very low return for unsecured creditors.

22.   The lack of legal tools for effective corporate restructuring poses a constraint. There are difficulties in the use of advanced corporate restructuring options, such as recapitalizations and debt/equity swaps. Informal restructuring is not anchored in a set of principles that govern negotiations among financial institutions. The informal restructuring arrangements are limited in their contents and disconnected from the other procedures in the insolvency framework. There are no procedures for the insolvency of groups of companies. There are no specific restructuring options for SMEs.
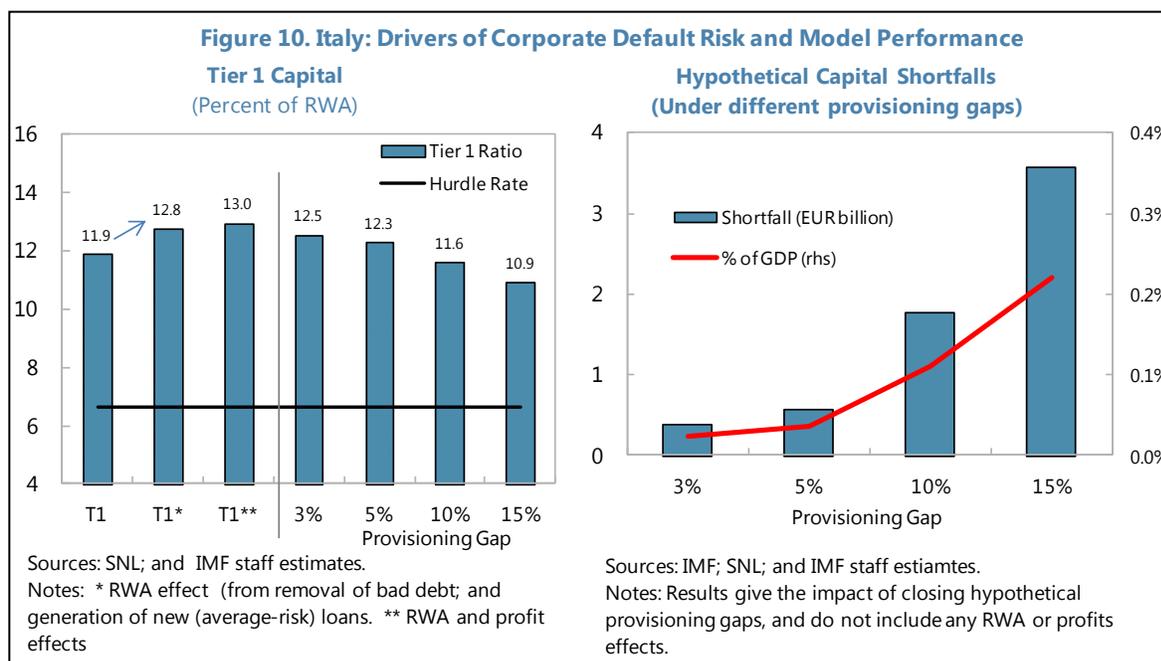
23.   These issues should be considered in the context of a less-than-optimal system for the protection of creditor rights. The current system does not afford enough opportunities for enterprises to use efficiently their movable assets as collateral: the system for the creation and registration of security interests is fragmented and rigid. Also, the law does not provide for swift remedies in case of default by borrowers because enforcement necessitates multiple procedural steps in a court system overburdened by the backlog of existing cases. These factors affect both the stock of NPLs and the inflow of NPLs in the system. The judiciary is overburdened and lack specialization in debt enforcement, restructuring and insolvency. The *tribunali delle imprese*, created in 2012, and whose competences are being revised, represent an attempt at specialization of the

judiciary, but insolvency matters are still dealt by the sections of the civil courts, which effectively prevents specialization in the smaller districts. The general problems affecting the civil justice system are especially relevant in the area of insolvency and creditor rights. The institutional framework includes an established profession of insolvency administrators, but their expertise focuses more on liquidation than in the reorganization of enterprises

D. Impact from Balance Sheet Clean-up

24.   The removal of bad debt from the banks' balance sheets has the potential to boost solvency levels (Figure 10, left chart). Under the assumption that *sofferenze* are adequately provisioned, write-off would cause RWAs to drop, freeing up valuable capital that can be used to extend new loans and to support Italy's recovery. Estimates show that a full write-off of existing *sofferenze* would (i) increase the banking system's Tier 1 capital ratio by 1.1 percentage points, and (ii) free-up capital resources to generate about €150 billion in new loans to the real economy.[13]

25.   However, if bad debt was not adequately provisioned, write-off would force banks to close provisioning gaps, hitting bank capital directly (Figure 10, right chart). Sensitivity tests show that provisioning gaps of 3 and 15 percent would result in capital shortfalls of €0.4 to €3.6 billion (in 5 and 8 banks), respectively, against the January 2016 minimum Tier 1 capital requirement plus capital conservation buffer (together 6.625 percent of RWA). Hypothetical provisioning gaps are calculated based on NPL gross value.

Figure 10. Italy: Drivers of Corporate Default Risk and Model Performance

Sources: SNL; and IMF staff estimates.
Notes: * RWA effect (from removal of bad debt; and generation of new (average-risk) loans. ** RWA and profit effects

Sources: IMF; SNL; and IMF staff estiamtes.
Notes: Results give the impact of closing hypothetical provisioning gaps, and do not include any RWA or profits effects.

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[13] These results reflect the impact from (i) write-off of *sofferenze*, (ii) generation of new, average-risk loans, (iii) reduced loan administration costs for bad debt, and (iv) the profit margin for newly generated loans, based on current (TLTRO) funding rate and average effective SME lending rates observable from the market.

26.   These results indicate that banks' solvency levels would on average be sufficient to digest balance sheet clean-up. Banks could strengthen their solvency position through the reduction in RWAs and the generation of new average-risk loans at current market funding and lending rates. Furthermore, potential additional losses at the time of write-off as a result of insufficient loan loss provisioning would be absorbed by banks' capital while staying well above regulatory minimum capital requirements. In some banks, capital would drop to or below minimum requirements, but at less than 0.2 percent of annual GDP the total shortfall would be relatively small.

E. Recommendations for Bringing Down Nonperforming Loans

27.   The size and prevalence of NPLs call for a comprehensive strategy. This section presents some preliminary recommendations to reduce the stock and decelerate the flow of NPLs. In a nutshell, this may involve a "stick-and-carrot" approach, with banks facing strong disincentives/incentives for keeping/removing NPLs from their balance sheets. Separately, to facilitate NPL resolution, the conditions for corporate debt enforcement, debt restructuring, and insolvency would need to be improved systematically.

Reducing the Stock of NPLs

28.   Any remaining uncertainty about Italian banks' asset quality needs to be resolved. Applying a common asset classification system, the ECB's 2014 Comprehensive Assessment revealed sizeable provisioning gaps among the 15 participating banks (which are expected to be filled by July 2015). However, uncertainty remains about the rest of the Italian banking system. Since January 2015, a new asset classification framework harmonized on the EU level, has become effective and is applicable to all banks operating in Italy. If under the new framework provisioning and capital shortfalls are identified, the coverage would need to be topped up and capital buffers strengthened, including through retention of earnings and capital increases.

29.   Regulatory and supervisory action would be required to increase the ability of the banks to deal with NPLs. This would include measures such as the establishment of specialized workout units, the development of codes of conduct for the treatment of arrears (e.g., like in Ireland and Spain), further increase of reporting obligations on NPLs, and guidance on restructuring options available to banks, including on triage approaches (e.g., Iceland).[14] This may also include the development of debt restructuring principles for multilateral workouts (Austria, Slovenia).

30.   Strong disincentives for keeping bad debt on balance sheets would foster NPL clean up. Supervisory actions that effectively introduce time limits for write-off of vintage NPLs can play an important role in this respect. One option is to raise considerably capital charges for vintage NPLs

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[14] See Act 107/2009, "Act on measures to assist individuals, households and businesses due to extraordinary circumstances in the financial market," Ministry of Social Affairs and Social Security, 2009.

after a certain period. Separately, a macro-prudential instrument can be introduced that limits going forward the size of the NPL and the impaired (*sofferenze*) portfolio.

31.   In parallel, tax incentives can motivate quicker disposal of NPLs. For instance, consideration could be given to shortening further the five-year period over which banks are allowed to deduct loan-loss provisions from taxable revenues. While there is no best international practice in the recognition of write-offs of NPLs for tax purposes, there is consensus that the regulatory and the tax regime should be as aligned as possible. There is wide variety of regimes, but those that are most widely used are i) the "charge-off" method (USA, Australia), that allows for deductibility of the whole loan once it has been classified as uncollectible for regulatory purposes; and ii) the "reserve method" (France, UK, and Canada), that allows the credit institutions to make tax deductions corresponding to each of the special provisions corresponding to every downgrade in classification of the loans. Both methods present advantages and disadvantages, but both are superior to the system currently in force in Italy.

32.   A further development of the Italian market for restructuring NPLs would help banks improve asset quality quickly and efficiently. Involving outside investors that work together with the banks on corporate restructuring, or directly purchase NPLs, can be seen as a regular tool in the management of NPLs. The transfer of NPLs would relieve banks from the burden of debt collection and foreclosure, and quicker resolution can help conserve recovery values, facilitate debt restructuring and debt/equity conversions, inject capital into firms, and clean-up Italy's corporate sector.[15]

33.   Intra-segmental cooperation can help smaller banks improve their NPL management infrastructure. As discussed in Section C, smaller banks appear to have insufficient risk and NPL management capacity and limited (or no access) to distressed debt markets.[16] In order to reduce the stock of NPLs, banks in the same segment of the banking system (e.g., *banche popolari*) could cooperate in cleaning up balance sheets. One possibility is to establish a corporate restructuring vehicle (CRV) within a bank segment, aimed at managing NPLs and orderly corporate restructuring. Such a vehicle could be owned by the banks but managed independently, in order to facilitate the design of appropriate incentive schemes, as well as the build-up of NPL management capacity within the segment. Separately, *sofferenze* need to be resolved decisively (see below).

34.   AMCs can also play a useful role in developing a distressed debt market. This can be achieved through setting uniform market standards for pricing distressed assets, conducting regular auctions to facilitate price discovery, and publishing data that facilitates the price discovery, including, for instance, payment history, default rates, and collateral values.

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[15] See also Jassaud and Kang (2015); IMF Global Financial Stability Report April 2015.

[16] The 2013 FSAP demonstrated that medium-sized banks are less profitable, more vulnerable to macrofinancial shocks, experience relatively more phase-out of capital due to the implementation of Basel III, and were not able to strengthen capital like other banks did (in particular due to their ownership structure).

35.   A centralized, state-backed AMC could also help by kick-starting a distressed debt market. A centralized solution could be a useful complement, not a substitute, to the economic incentives, supervisory disincentives, and legal changes outlined above. Unlike the AMCs in Spain or Ireland, however, this vehicle could be of smaller scale—concentrating on SMEs, only temporary, and with limited government involvement. Furthermore, transfer prices would need to be conservative enough not to invoke EU State Aid rules.

36.   Any such vehicle would need to be properly designed and in line with best international practice (see Box 1). Specifically, the AMC should (i) purchase assets at market prices; (ii) use transparent and uniform valuation criteria; and (iii) have strong governance, including operational independence and accountability. Given the small fiscal space and EU State Aid rules, the government should have minimum involvement (minority stake, limited guarantees) and receive adequate remuneration (conservative pricing, equity warrants).

Box 1. Addressing Corporate Debt Overhang and Bank Asset Quality

The AMC could evaluate SME *sofferenze* and *incagli,* and restructure or resolve those that meet selective eligibility criteria. The centralized AMC could be managed by an asset valuation and coordination entity that decides on restructuring (corporate restructuring vehicle; CRV) or liquidation (corporate liquidation vehicle; CLV). The AMC could implement a triage approach, in which the decision to restructure rests on a conservative estimate of a firm's ability to service its debt using standard criteria or assessing firms, including interest coverage and future cash-flows. Purchase of NPLs should be selective and based on clear eligibility criteria. Also, the strategy could prioritize the removal of those NPLs that are considered critical from a public policy point of view, and are important for the rehabilitation of financial institutions and the corporate sector.[1] Nonviable firms should not be subject to management by the CRV, but be liquidated and removed from the market. The CLV on the other hand should be concerned only with the quick disposal of assets to conserve collateral values, and a maximization of asset values. The concentration of collateral provides the AMC with substantial power and could speed up the insolvency process and help preserve collateral values. Hence, this approach is very different from an indiscriminate purchase of defaulted loans.

Efficient transfer pricing would allow for the implementation of a state-backed AMC without distortion of competition. Troubled loans need to be classified and provisioned for correctly. This is essential for the strategy to be effective, and to avoid triggering State Aid rules. Assets subject to transfer need to be priced at or below the current market value (as otherwise this would constitute a public subsidy). Any loss from the revaluation would need to be taken by the bank before or at the time of transfer. Tax incentives for disposal and supervisory disincentives for holding on to NPLs will foster the transfer of NPLs to the AMC.

The properties of the AMC:

- *Operational independence and limited public ownership.* The government should have no means to intervene in the operational work of the AMC. The centralized, state-backed AMC would need to be predominantly owned by private investors, with the sovereign holding a minority stake. The entity should be insulated from political interference in both the disposal and management of NPLs. CRV and CLV should be established as independent entities, with different goals and targets.

- *Temporary character.* Banks could be given a period of six months to transfer existing *sofferenze* and *incagli* to the AMC. This would help jump-start the market, while preserving bank-lending standards going forward. Furthermore, the vehicle should be self-liquidating in order to limit moral hazard and warehousing of assets. Incentive structures should be designed in a way that profit maximization within a predefined period of time is warranted.

Box 1. Addressing Corporate Debt Overhang and Bank Asset Quality (concluded)

- *Limited scope.* The AMC would concentrate on SME *sofferenze* and *incagli* as the market failure is most prominent in that part of the corporate sector. About two thirds of *sofferenze* and *incagli* are related to the corporate sector, 30 percent of which is SME exposure. Gross (net) of provisions, the potential volume of the vehicle is estimated at €55–65bn (€25–30bn). Exposure size restrictions would reduce the volume further.

- *Limited role of the Government.* The involvement of the state is limited to three areas: (i) the design of the AMC; (ii) the provision of guarantees on the mezzanine tranches of the emitted assets (in order to improve investor sentiment and enhance marketability of the assets emitted by the AMC); and (iii) the provision of equity in form of a minority stake in the AMC.

Italy: Structure and Debt of Firms

Source: ORBIS. IMF staff calculations.

- *Sale and resolution of NPLs.* The AMC aims at both the sale and the securitization of exposures. Recent NPL sales by large Italian banks clearly underline the market appetite for higher yield investments. But the identification problem needs to be solved in order to increase volumes. As regards securitization, a guarantee for the mezzanine tranches of Asset Backed Securities issued by the CRV will help attract institutional investors facing minimum credit quality requirements. Such *bulk sales* allow for quick resolution and the generation of immediate cash-flows. *Individual sales*, on the other hand, can be used for larger loans that profit from specific market valuation. The possibility of granting special enforcement powers to the AMC could raise constitutionality issues, and cannot be a substitute for a general improvement of the legal enforcement and insolvency regime, which should benefit all economic actors.
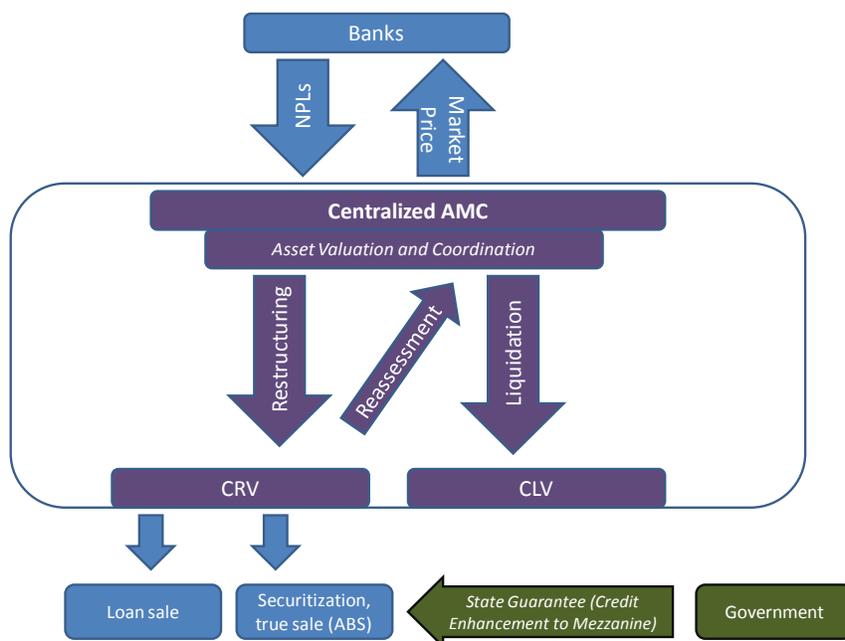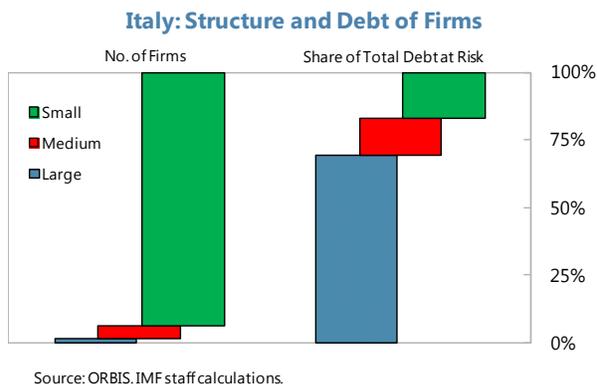
[1] He (2004), p.11.

Decelerating the Flow of Nonperforming Loans

37.   Banks would need to demonstrate their efforts to reduce NPLs. BoI and the Single Supervisory Mechanism (SSM) are recommended to take an even more proactive approach to supervision, including the issuance of further guidance on and regulation of NPL management in banks. For instance, banks should be required to report regularly to the supervisory authority detailed loan portfolio information and develop decisive NPL workout plans if needed. In order to complement these efforts, supervision should strictly enforce banks' compliance with existing and future rules and guidance.[17]

38.   Applying the same provisioning approach for all banks would alleviate the problem going forward. Forthcoming IFRS 9 will include a clear definition of write-off.[18] When the new accounting rules become applicable, scheduled for 2018, banks can no longer apply loan de-recognition and keep loans on balance sheets until all legal means are exhausted. They would be forced to write off earlier, opening the way for corporate restructuring or liquidation. Common definitions can help improve cross-country comparability, increase transparency, and reduce forbearance going forward.

39.   Better cooperation among banks could become a catalyst for decisive clean-up. Common asset disposal and management platforms would also pave the way for further consolidation. The recent reform that requires the largest ten *banche popolare* to transform into joint-stock companies has already had a positive impact on bank valuations, and going forward will result in a second wave of consolidation in the sector.

40.   To prevent a further increase in NPLs, banks may need to improve their credit risk and NPL management capacity. Specifically, banks may need to build up internal expertise in collateral valuation, insolvency procedures, and financial restructuring. Alternatively, these activities could be outsourced to specialized third parties; or banks could cooperate and use synergies as discussed above.

Legal Recommendations

41.   Further revisions to the insolvency framework would be necessary to allow the swift liquidation of non-viable businesses and a better reorganization of viable enterprises.

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[17] The BoI's earlier guidance on writing off defaulted exposures would need to be enforced strictly. As mentioned, IAS 39 does not define when and how uncollectable loans are to be written off. Therefore, until the new international accounting rules become effective, it is critical that banks adhere to existing BoI guidelines.

[18] Loan de-recognition requires the exhaustion of all legal means or to waive contractual rights on the loan before the exposure can be removed from the balance sheet. IFRS 9 will include a definition of write-off different from loan cancellation.

- A rationalization and better integration of the different options available to enterprises in distress (in informal, hybrid and formal insolvency procedures) would ensure that these procedures work efficiently and seamlessly (e.g., possibility of "pre-packed" arrangements).

- Insolvency procedures could be initiated at an earlier stage, increasing the recovery possibilities, with effective provisions establishing directors' liability (wrongful trading).

- The insolvency regime should also offer wider restructuring possibilities, including recapitalizations and debt/equity swaps without allowing shareholders to interfere with these solutions.

- Creditor priorities may need to be revisited to increase the rate of return for unsecured creditors. Public creditors may have to take a more constructive role in enterprise restructuring, possibly assisted by guidelines on public sector participation in insolvency processes.

- Insolvency processes should be further streamlined, reducing appeals and opportunities for delay, while, at the same time, providing for adequate protection for all participants.

- The increased flexibility in the sale of assets should be effectively implemented, and supported by the use of mechanisms such as Internet platforms.

- The reform could also include a simplified debt restructuring mechanism for SMEs, preferably a hybrid framework (see Bergthaler and others, 2015), based on a *triage* approach establishing the viability of SMEs according to basic objective indicators. Principles for debt restructuring could be useful for the restructuring of the debt of large companies. A more specific set of principles could address the situation of over-indebted SMEs.

42.   The legal environment of credit would greatly benefit from reforms of the law of secured transactions. Changes in this area should improve the possibility of creating security interests over movable assets, with corresponding reforms of the registration systems (Box 2), and coordination among existing registry systems. Fiduciary contracts and other mechanisms to increase out-of-court enforcement options are necessary for the take up of new security interests and the improvement of the existing ones. These reforms would reduce the inflow of NPLs by improving the position of creditors and the realization of collateral.

43.   The institutional framework for insolvency and creditor rights remains a substantial challenge. The program of judicial reforms, especially focused on civil justice, should continue. Further special measures to address the backlog at the court seem necessary. These could include more specialization of judges in commercial matters, especially in debt enforcement, restructuring and insolvency, and the reinforcement of insolvency administrators.

Box 2. The Importance of Efficient Secured Transaction Laws

Security rights provide certainty for creditors and increase access to finance. The importance of the secured transactions system has been highlighted by legal and economic experts, and has given rise to detailed best practice recommendations (UNCITRAL, 2007). The possibility of using different types of collateral creates opportunities for more efficient financing arrangements. This is the case with the creation of security interests over movable collateral: there are important differences in the flexibility and efficiency of secured transactions over movable assets. These affect the availability of credit for enterprises, particularly SMEs.

The use of movable collateral in the context of entrepreneurial activities requires a high degree of flexibility in the creation of security interests. These should cover not only specific assets, such as machinery, but also categories of assets, such as inventory, equipment and accounts receivable, without the need to specify each and every asset covered by the security interest. The main reason is that these security interests should allow the debtor to remain in possession of the assets. This implies that the debtor will be able to use the assets, and even, with respect to inventory, to sell the assets in the ordinary course of business. Dispossession of the debtor is not necessary because these security interests are recorded in public registries. Registries are "notice-based": they merely provide notice to the public of the creation of the security interest. Registries are computerized and allow for interaction with other registries and databases.

Priority of the security interest is another crucial element in the design of the legal framework. The protection of the borrowers' interests and the corresponding positive effects for borrowers require that the position of the secured creditor be granted a priority status. Registration establishes the point in time when the lender acquires his priority rights versus other creditors and third parties.

Finally, an efficient secured transactions system requires swift enforcement of the secured claim. In the case of movable collateral, the speed in enforcement of the secured claim is critical, because the depreciation of assets is fast. Enforcement mechanisms may include summary judicial procedures, or out-of-court enforcement. The possibility of using fiduciary contracts can be understood in this context as one way of improving the enforcement of security interests over movable collateral without having to resort to the court system.

The economic importance of efficient secured transactions laws has been emphasized in the economic literature. According to recent research, loan-to-values of loans collateralized with movable assets are on average 21 percentage points higher in countries with strong-collateral laws relative to immovable assets. Further, stronger collateral laws tilt collateral composition away from immovable to movable assets (Calomiris and others, 2015).

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Annex I. Dynamic Bank-by-Bank Panel Regressions

Fixed Effects Panel Regression 2005–2014

NPL	Coefficient	P-value
NPLs (-1)	0.92	0.00
Inflation (-1)	-0.02	0.74
REER 1/	0.14	0.03
Unemployment change (-1)	0.01	0.59
Real GDP Growth (-1)	-0.23	0.01
Stock Price Growth	0.00	0.96
House Price Growth	-0.13	0.01
Equity-to-Assets (-1)	-0.02	0.73
RoE (-1)	-0.07	0.00
Loan growth (-1)	0.001	0.13
Tier 1 (-1)	-0.02	0.62
Constant	15.17	0.00
R-squared(within)	0.86	
R-squared (between)	0.95	
No. of banks	57	
No. of observations	309	

Sources: SNL, World Economic Outlook.

1/ an increase in REER indicates appreciation.

System GMM Estimation, 2005–2014

NPL	Coefficient	P-value
NPLs (-1)	1.13	0.00
Inflation (-1)	-0.04	0.27
REER 1/	0.11	0.03
Unemployment change (-1)	0.01	0.10
Real GDP Growth (-1)	-0.17	0.08
Stock Price Growth	-0.01	0.14
House Price Growth	0.04	0.26
Equity-to-Assets (-1)	0.01	0.70
RoE (-1)	-0.05	0.00
Loan growth (-1)	0.001	0.01
Tier 1 (-1)	-0.01	0.46
Constant	0.6	0.265
Arellano-Bond AR (1) p-value	0.02	

Arellano-Bond AR (2) p-value	0.11
Hansen test p-value	0.47
No. of banks	57
No. of observations	309

Sources: SNL, World Economic Outlook.

1/ an increase in REER indicates appreciation.

Annex II. State Space Modeling and Filtering

Dynamic State Space models (DSSM) have a number of important advantages:

- *First, nonlinearities in the functional relationship between variables can be modeled*, and structural changes over time can be included explicitly. This is an important property as the influence of different macrofinancial factors on credit risk typically changes during periods of financial distress ("correlation breakdown").

- Second, DSSMs make it easier to handle measurement errors and missing values as they allow describing the observed data as a function of the underlying state process. This is an important feature when dealing with snapshots of asset quality data.

- *Third, DSSM are not as myopic as classical time-series models*, which tend to wash out older historical realizations while concentrating mainly on recent performance. However, there is always the possibility for past patterns to reemerge. SSMs have a long memory, and model each observation as a function of its entire history.

- Fourth, the performance of a DSSM can be measured using true *out-of sample criteria*, and the forecast error is not invariably an in-sample error (as in classical regression models), because in any estimation at point in time $t < T$, only the data up to time t is known.

This allows for much more realistic description of the dynamic relationship between variables over time. Second, the measurement of credit risk variables tends to be fairly blurred, and it is unlikely that the default or default probability time-series at hand can give the true risk. The DSSMs helps push imprecise measurements towards the true values, thereby increasing precision.

The *static* multivariate linear regression model with a constant, i.e.,

$$y_t = \beta_0 + \beta_1 x_{1,t} + ... + \beta_n x_{n,t} + \varepsilon_t = \beta_0 + \sum_{i=1}^{n} \beta_i x_{i,t} + \varepsilon_t \tag{1}$$

$$with \ \varepsilon_t \sim i.i.d. \, N(0, \sigma^2)$$

can be specified to include time-varying coefficients:

$$y_t = \beta_{0,t} + \beta_{1,t} x_{1,t} + ... + \beta_{n,t} x_{n,t} + \varepsilon_t = \beta_{0,t} + \sum_{i=1}^{n} \beta_{i,t} x_{i,t} + \varepsilon_t \tag{2}$$

A *dynamic multivariate regression model* can be expressed in State Space form as

$$\theta_{t+1} = F_{t+1} \, \theta_t + v_{t+1}$$
$$y_t = H_t' \, \theta_t + w_t \tag{3}$$

where θ_t denotes the regression coefficients in the state vector $\left(\beta_0, \beta_1, ..., \beta_n\right)$, $H_t' = (1, x_{1,t}, ..., x_{n,t})$ the n regressors, and F_t is the state transition matrix from time t to $t+1$. The variance of the multidimensional noise vectors v_t and w_t are driven by the time-variant matrices V_t and W_t. If the variances in V_t are larger than zero, the coefficients become time-varying.[1] Hence, for the dynamic multivariate state space regression model, both V_t and W_t are nonzero.[2]

The dynamic coefficients can be estimated using the Kalman Filter, a recursive linear estimation algorithm. The Kalman filter is a set of recursion equations determining, conditional on the information available at time t, optimal estimates of the state vector. The estimation is performed recursively, i.e.,

$$\hat{y}_t = H_t' \hat{\theta}_{t|t-1} \tag{4}$$

$$\varepsilon_t = y_t - \hat{y}_t \tag{5}$$

$$\hat{\theta}_{t|t} = \hat{\theta}_{t|t-1} + \varepsilon_t \left[P_{t|t-1} H_t \left(H_t' P_{t|t-1} H_t + R_t \right)^{-1} \right] \tag{6}$$

$$\hat{\theta}_{t+1|t} = F_{t+1} \hat{\theta}_{t|t} \tag{7}$$

with the updating equations:

$$P_{t|t} = P_{t|t-1} - H_t' P_{t|t-1} \left[P_{t|t-1} H_t \left(H_t' P_{t|t-1} H_t + R_t \right)^{-1} \right] \tag{8}$$

$$P_{t+1|t} = F_{t+1} P_{t|t} F_{t+1}' + Q_{t+1} \tag{9}$$

The variance of the state vector θ_t forecast is denoted by $P_{t|t}$. And the variance of the forecast of θ_{t+1} is described by $P_{t+1|t}$. As new data becomes available, the Kalman Filter updates both forecasts based on the two variance-covariance matrices $P_{t|t}$ and $P_{t+1|t}$. The updating equations (10) and (11) show how the variance of the state vector and the variance of its forecast are updated. As more and more new observations come in, variance decreases as uncertainty reduces:

$$Var\left(\theta_{t+1} \mid y_1, ..., y_t\right) = Var\left(F_{t+1}\theta_t \mid y_1, ..., y_t\right) + Var\left(v_{t+1} \mid y_1, ..., y_t\right)$$
$$= F_{t+1} P_{t|t} F_{t+1}' + Q_{t+1} \tag{10}$$

The Kalman Gain, $P_{t|t-1} H_t \left(H_t' P_{t|t-1} H_t + R_t \right)^{-1}$, assigns the optimal weight to the unexpected forecast error ε_t, which depends on the new observation y_t. The update of $\theta_{t|t}$ due to the new observation y_t is a combination of the old estimate forecast and the forecast error.

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[1] Since $W_t > 0$, the state space model also includes the correlation patterns between the variables in H_t.
[2] The signal-to-noise ratio $V / W > 0$ indicates how adaptive the coefficients are.

The DSSM model outperforms other models in describing Italian corporates' default probabilities (Figure A1). The chart gives *in-sample* estimates for (i) multivariate contemporaneous static regression without lags, (ii) with lags,[3] and (iii) *out-of-sample fitted values for the DSSM*. Even the out-of-sample fit of the dynamic regression is better than the in-sample fit of the static models.

Figure A1. Italy: Key Drivers of Corporate Sector Default Risk
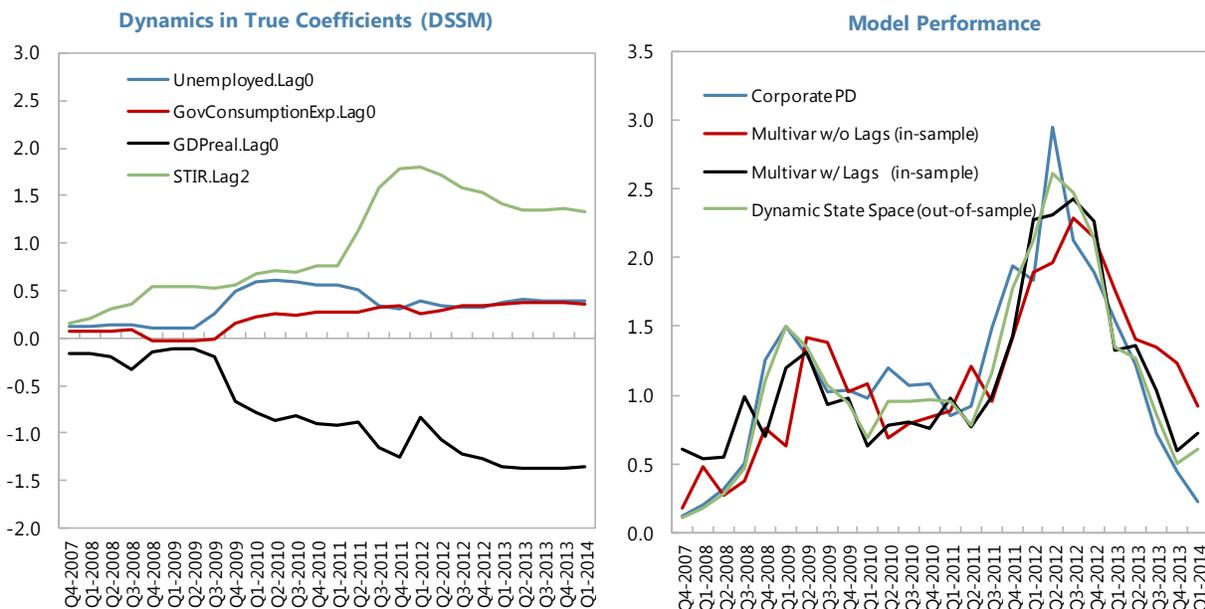
Sources: IMF WEO, OECD; IMF Staff Calculations.

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[3] The optimal multivariate regression models were determined using the branch-and-bounds algorithm for best subset selection. Expected sign tests were included.