Can Italy Grow Out of Its NPL Overhang? A Panel Threshold Analysis[1]

Kamiar Mohaddes (Cambridge and ERF), Mehdi Raissi (IMF), and Anke Weber (IMF)

2018 ASSA, Philadelphia

January 5, 2017

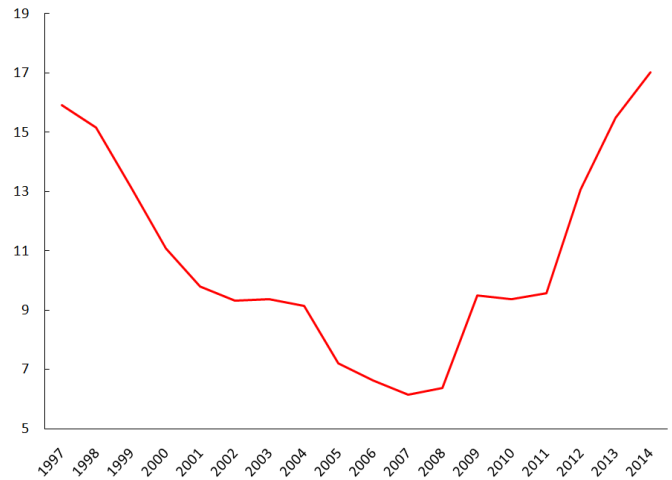
[1] The views expressed in this paper are those of the authors and do not necessarily represent those of the International Monetary Fund or IMF policy.

NPLs and Growth

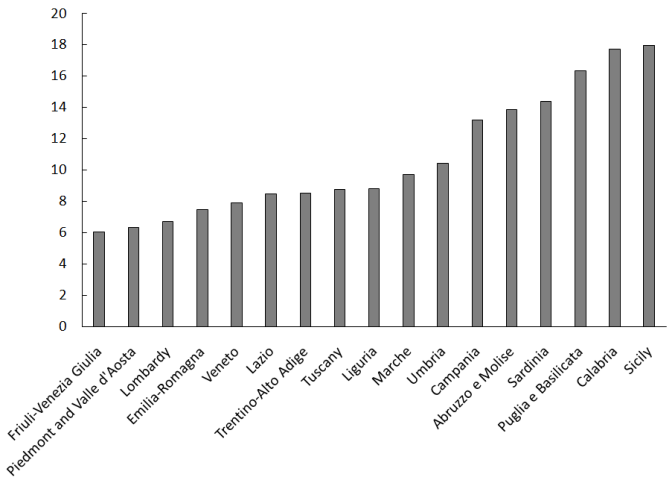
- The ratio of non-performing loans (NPLs) to total loans in Italy has reached very high levels post global financial crisis (about 18% of total loans; 20% of GDP; and one-third of the Euro Area total at end-June 2016). As a ratio of total assets, NPLs were mostly concentrated in the south of the country.

Figure 1: Italian NPL Ratios Over Time and Across Regions

(a) Evolution of the NPL Ratio Over Time



(b) Geographical Distribution of NPL Ratios (Averages over 1997-2014)



Source: Authors' construction based on Bank of Italy data.

- *High NPLs are a drag on bank profitability and may also adversely affect economic activity.*

Growth and NPLs

Fast growth can result in a stabilization or reduction in stock of NPLs through:

- a reduction in the new flow of NPLs as firms' probability of default falls;
- an improvement in prospects of firms whose loans may have become non performing, resulting in previous NPLs becoming performing again;
- an increase in the disposal of NPLs as recovery values improve;
- and, an increase in bank profitability, leading to higher retained earnings, higher provisions and greater write offs.

Research Questions and Contributions

Can Italy grow out of its NPL overhang? Is there a tipping point for real GDP growth in Italy beyond which the NPL ratio falls significantly (i.e., by about 5–10 percent per year)?

- We specify a heterogeneous dynamic panel-threshold model and provide formal statistical tests of growth-threshold effects on NPL ratios in a sample of 17 Italian regions over the period 1997–2014.
- Our estimation strategy takes into account dynamics, regional heterogeneity, and feedback effects between NPL ratios and growth.
- Acknowledging that cyclical developments are an important driver of NPL ratios, we distinguish between the short-term and long-term effects of faster growth on NPL ratios, and focus on the latter.

Methodology I

Consider the following equation for the change in NPL ratio (Δd_{it}):

$$\begin{aligned} \Delta d_{it} &= \alpha_{i,d} + \varphi I\left(\Delta y_{it} > \tau\right) + \delta \Delta d_{i,t-1} + \eta \Delta y_{i,t-1} + e_{it}, \quad (1) \\ \text{for } i &= 1, 2, ..., N, \text{ and } t = 1, 2, ..., T, \end{aligned}$$

and combine it with an equation for real GDP growth, Δy_{it}

$$\Delta y_{it} = \alpha_{i,y} + \varkappa \Delta y_{i,t-1} + \psi \Delta d_{i,t-1} + \varepsilon_{it}, \quad (2)$$

Eq. (2) allows for feedbacks from lagged NPL-ratio growth ($\psi \neq 0$) to real GDP growth. Even if τ was known, estimates of φ based on (1), would be biased when ε_{it} is correlated with e_{it}. To deal with this, we assume:

$$e_{it} = \kappa_i \varepsilon_{it} + u_{it}, \quad (3)$$

where $u_{it} = e_{it} - E(e_{it} \,|\varepsilon_{it}\,)$, and by construction u_{it} and ε_{it} are uncorrelated. κ_i measures the degree of simultaneity between NPL ratio and growth innovations for region i.

Methodology II

Substituting (3) in (1) and then substituting (2) for ε_{it}, we obtain a "panel threshold-ARDL" specification for Δd_{it}:

$$\Delta d_{it} = c_i + \varphi I\left(\Delta y_{it} > \tau\right) + \lambda_i \Delta d_{i,t-1} + \beta_{i0} \Delta y_{it} + \beta_{i1} \Delta y_{i,t-1} + u_{it}, \tag{4}$$

- Conditional on $\left(\Delta d_{i,t-1}, \Delta y_{it}, \Delta y_{i,t-1}\right)$ and under our identification assumption, u_{it} and $I\left[\Delta y_{it} > \tau\right]$ are uncorrelated.
- Hence, for a given value of τ, φ can be consistently estimated after the fixed effects and the heterogeneous dynamics are filtered out (Since the focus of the analysis is on φ, assumed to be homogeneous, (4) can be estimated treating the other coefficients, c_i, λ_i, β_{i0}, β_{i1}, as heterogeneous).
- The threshold coefficient, τ, can then be estimated by a grid search procedure (see Chudik et al., 2017).

Methodology III

Extending (4) to p lags, we obtain the following baseline autoregressive distributed lag (ARDL) specification,

$$\Delta d_{it} = c_i + \varphi I\left(\Delta y_{it} > \tau\right) + \sum_{\ell=1}^{p} \lambda_i \Delta d_{i,t-\ell} + \sum_{\ell=0}^{p} \beta_{i\ell} \Delta y_{i,t-\ell} + v_{it}, \tag{5}$$

We also consider an alternative approach of estimating long-run effects using the distributed lag (DL) counterpart of (5),

$$\Delta d_{it} = c_i + \theta I\left(\Delta y_{it} > \tau\right) + \phi_i \Delta y_{it} + \sum_{\ell=0}^{p} \alpha_{i\ell} \Delta^2 y_{i,t-\ell} + v_{it}, \tag{6}$$

The threshold variable $I\left(\Delta y_{it} > \tau\right)$ takes the value of 1 if real GDP growth is above τ and zero otherwise.

Data

- We construct regional NPL ratios based on supervisory returns data from the Bank of Italy over the period 1997-2014.
  - Specifically, we use end-of-year data on NPL ratios by region.
  - From 1997-2007, we use supervisory returns data compiled by the Bank of Italy on the non-performing/total loans ratio (percentage) for the different regions. NPLs comprise overdue, substandard, restructured and impaired loans.
  - From 2008-2014, we compile our own NPL ratio adding up loans across those four NPL categories and dividing them by total loans (total maturity).
  - We have data on 17 regions, as opposed to 20, as some regions are grouped together in the Bank of Italy's statistical database after 2007.

- We obtain regional real GDP data from Italy's National Institute for Statistics (Istat) over the same period.

Results I

Tests of real GDP growth-threshold effects on changes in NPL ratios

	ARDL		DL		
lags:	(1,1)	(2,2)	p=0	p=1	p=2
Regressions with threshold variable $I[\Delta y_{it} > \tau]$					
$\widehat{\tau}$	1.2%	1.2%	1.2%	1.2%	1.2%
$Sup\mathcal{T}$	$4.31^{\ddagger}$	$4.54^{\ddagger}$	1.89	3.11^{*}	3.11^{*}
$Ave\mathcal{T}$	$3.00^{\ddagger}$	$3.13^{\ddagger}$	1.17^{*}	$1.88^{\ddagger}$	$1.98^{\ddagger}$

Notes: The ARDL and DL specifications are given by (5) and (6). The $Sup\mathcal{T}$ and $Ave\mathcal{T}$ test statistics for the statistical significance of the threshold variable $I[\Delta y_{it} > \tau]$ are reported in the Table. *, † and ‡ denote statistical significance at 10%, 5% and 1% level, respectively.

Results II

Mean Group estimates of the long-run effects of real GDP growth on changes in NPL ratios (1997-2014)

	ARDL		DL		
lags:	(1,1)	(2,2)	p=0	p=1	p=2
(a) Regressions with threshold variable $I\left[\Delta y_{it} > \tau\right]$					
$\widehat{\theta}$	-8.337‡	-8.635‡	-6.944‡	-8.588‡	-9.533‡
	(0.5719)	(0.6903)	(0.4643)	(0.5923)	(0.7528)
(b) Regressions without threshold variables					
$\widehat{\theta}$	-6.472‡	-6.522‡	-6.676‡	-7.016‡	-7.541‡
	(0.5616)	(0.7994)	(0.5811)	(0.7304)	(0.5139)

Notes: The ARDL and DL specifications are given by (5) and (6). Standard errors are given in parentheses. Statistical significance is denoted by *, † and ‡, at 10%, 5% and 1% level, respectively.

Summary of Results

- We find a statistically significant growth-threshold effect on the NPL ratio in Italy at about 1.2 percent, once we account for cross-region heterogeneities, simultaneous determination of the NPL ratio and growth, and dynamics.

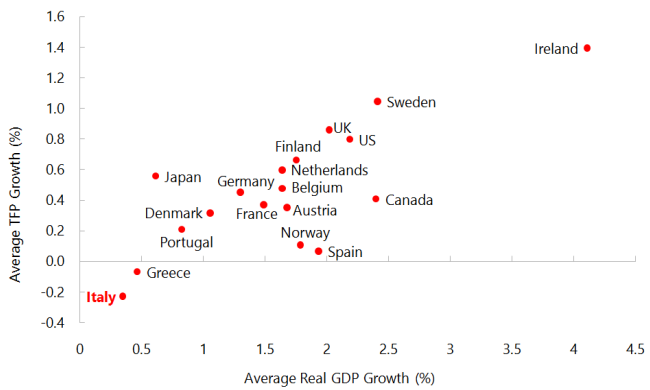
- Moreover, we find that there is a significant and robust negative long-run association between economic growth and NPL ratios. Quantitatively, a one percentage points faster growth than the baseline in Italy, if persistent, would reduce the NPL ratio by about 6.5 to 9.5 percent per year (i.e. halving the NPL ratio in $3-6$ years).

Policy implications I

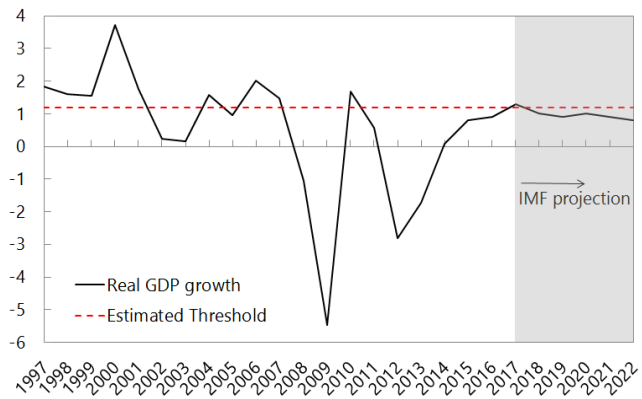
- Given Italy's moderate growth outlook, banks could thus struggle to grow out of their NPL overhang.
- Italy has experienced historically weak economic growth (and negative productivity growth) predating the global financial crisis. It is, therefore, important for Italy to improve its growth prospects compared to the currently moderate outlook by fully implementing the reform efforts pursued in recent years and scaling them up.

Figure 2: Real GDP and TFP Growth

(a) Real GDP and TFP Growth (averages over 1997-2014)



(b) Real GDP Growth (1997-2022)



Source: (a) The annual macro-economic database of the European Commission's Directorate General for Economic and Financial Affairs (AMECO); (b) Authors' estimates and IMF projections.

Policy implications II

- Active NPL resolution measures are also needed to bring NPL ratios on a firm downward trajectory over the medium term.

- The Italian authorities have already introduced several measures to deal with the NPL problem. These include steps to improve the insolvency system, foster consolidation within a fragmented banking sector, deal with some problem banks, and facilitate securitization and sale of NPLs.

Policy implications III

- Additionally, supervisors need to ensure that banks' NPL reduction strategies and targets are ambitious and credible. Sizeable NPL sales are planned in the coming year, which need to be implemented and backed up by strong and credible restructuring plans. Complementary measures include further advancing insolvency and debt enforcement reforms (beyond recent policy measures), and the facilitation of distressed debt markets.

- Should the need arise, making timely and effective use of the resolution framework to minimize costs to taxpayers and the rest of the financial system is also important.