Bonds issued by Italian banks

Risk and return characteristics

R. Grasso, N. Linciano, L. Pierantoni, G. Siciliano

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Abstract

Bonds are among the main source of external funding for Italian banks and one of the most important financial assets held by Italian households. The bond-to-deposit ratio of Italian banks is about 40%, the highest value in Europe after Germany, while the share of bank bonds on Italian households' portfolio is by far the highest among major industrialized economies. Hence, understanding risk and return characteristics of bank bonds is crucial for investor protection policies. This work provides evidence on such characteristics analyzing bank bonds issued from July 2007 to June 2009. During this period, retail investors were offered mainly plain-vanilla bonds (79%), followed by structured (10%), callable (8%) and step up/down bonds (3%). Approximately 64% of the securities sold to retail investors can be classified as "very low" credit and market risk, while around 4% have "high" credit or market risk. However, due to the small average issue size, liquidity risk is high: only 9% of the bonds (approximately 30% of the total amount) are really liquid. The returns of bonds sold to retail investors are weakly related to credit and liquidity risks and on average lower than those of Italian government bonds with similar maturity; ceteris paribus, returns offered to retail investors are lower than that demanded by institutional investors by about 90-100 basis points.

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1 Introduction and main results

Italian banks are among the most dependent on bond funding in Europe and such funding is financed mainly through domestic placements with retail investors (approximately 80% of total bond funding in the two-year period July 2007-June 2009). The share of bank bonds on Italian households' financial wealth is in fact well above the average for advanced economies.

Hence, understanding risk and return characteristics of bank bonds is a key issue for investor protection policies. This work provides evidence on such issue for a sample of bank bonds issued from July 2007 to June 2009. During this period, retail investors were offered mainly plain-vanilla bonds (79%), followed by structured (10%), callable (8%) and step up/down bonds (3%).

Approximately 64% of the securities sold to retail investors can be classified as "very low" credit and market risk; the remaining bonds exhibit either "low" or "medium" credit or market risk (respectively 15 and 17%); around 4% have "high" credit or market risk. Due to the small average issue size, liquidity risk is high: only 9% of the bonds (approximately 30% of the total amount outstanding) are truly liquid.

The spreads at issue of plain vanilla bonds are weakly related to credit and liquidity risks and on average lower by 90-100 basis points than those offered to institutional investors.

Ex-post returns of plain-vanilla bonds (measured through a total return index) are on average lower than those of Italian government bonds. Returns of structured bonds are in line with the performance of appropriate benchmarks, but taking into account fees and structuring costs ex-post returns largely underperform such benchmarks.

In general, bank bonds tend to underperform Italian government bonds, especially when they are purchased on the primary market.

2 The share of bonds in bank funding and in household financial wealth

On international comparison Italian banks show a higher reliance on retail bond funding than their European peers. At the end of 2008, Italian banks exhibited the highest bond-to-deposit ratio (approximately 38%), followed by German banks (about 37%) and Irish banks (35%) and the highest bond-to-customer-deposit ratio (approximately 67%) after German banks (around 83%).[1] At the end of 2009, in spite of the public guarantee programs of bank liabilities launched during the year by many European countries, Italian banks continued to show the highest bond-to-

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1 However the figure for German banks is mainly due to covered bonds.

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deposit ratio (approximately 40%) and the highest bond-to-customer-deposit ratio (after German banks).

Bond funding is financed mainly through domestic placements with retail investors, whose share of financial assets invested in bank bonds is well above that recorded for other major industrialised countries. In particular, such share rose from 2.1% in 1995 to almost 11% in 2009, compared to 1% for Spain and to 0.1% for the U.K..

This phenomenon is due to a number of structural features of the Italian financial system, such as the underdevelopment of pension funds, the business model of the Italian banks, which discouraged the growth of the asset management industry and financial advisory services[2], and by the tax system, which favours bonds over deposits.[3]

3   The basic types of bank bonds

From July 2006 (when prospectus regulation was extended to the offer of bank bonds) to June 2009 Italian banks placed over 12,200 bonds with domestic retail customers, amounting to approximately 350 billion euros (compared to a "planned" amount of offers of about 580 billion); over 600 bonds, equal to approximately 130 billion euros, were sold to institutional investors. Therefore, on average, Italian banks placed with retail customers around 4,000 bonds per year for an average amount of over 110 billion euros per year, and approximately 200 bonds with institutional investors, totalling over 65 billion euros a year (Table 1)[4].

In the period considered, the financial crisis affected the allocation of bond issues between retail and institutional investors. Starting from October 2008, as concerns over systemic stability increased following the Lehman default, bond funding from institutional investors suffered a sharp decline, whereas that from retail customers rose from about 50% in the pre-crisis period (from July 2006 to June 2007) to approximately 80% in the two following years.[5]

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2   See Gentile, Linciano and Siciliano (2006) and Gentile and Siciliano (2009).

3   Moreover, under certain circumstances interests on bond are not taxed at the recipient's marginal rate (as it happens in many European countries), but rather at a fixed withholding tax at a relatively moderate rate (12.5%, compared to, for example, 27% in France).

4   Compared to the most commonly used data providers on the market, and in particular the Interactive Data database managed by the Kler's company, the dataset used in this study (based on prospectuses and on final terms for the offers to retail investors and on Dealogic databank for placements for institutional investors) is much more complete. Kler's assesses approximately 2,000 bonds per year for domestic retail customers, compared to 4,000 in the dataset used. The difference in value however is rather modest. This is because Kler's does not cover issues by very small banks (in particular, cooperative credit banks), which, even if very numerous, have a marginal weight on the total value offered.

5   From July 2007 to June 2009, bond funding from institutional investors recorded a sharp decline (approximately 40%), whereas bond funding from retail customers more than doubled (from 63 to 144 billion euros per year on average).

Table 1 Bonds issued by Italian banks (July 2006 – June 2009)

	domestic issues to retail investors			international issues to institutional investors	
	number of bonds	offered amount (€ bn)	amount issued (€ bn)	number of bonds	amount issued (€ bn)
Jul. 2006–Jun. 2007	3,957	133.9	62.6	195	61.4
Jul. 2007–Jun. 2009	8,294	449.1	288.2	447	74.5
Jul. 2006–Jun. 2009	12,251	582.0	350.8	642	135.9

Source: prospectuses, final terms and supervisory reports for domestic issues; Dealogic for issues on the international market.

The present study focuses on the characteristics of the Italian banks' bonds issued from July-2007 to June-2009. The sample includes 8,294 bonds offered to retail investors and 447 bonds sold to institutional investors. Data come from the offering documents (prospectuses and final terms) supplemented with additional information (rating and banking group of the issuer, coverage from the guarantee fund for bonds of cooperative credit banks).

Bonds are classified into 4 main categories: 1) plain-vanilla, 2) step-up and step-down, 3) callable and 4) structured bonds.

Plain-vanilla bonds include basic fixed-rate and floating-rate securities. Step-up/step-down bonds pay an initial coupon rate for the first period, and then a higher/lower coupon rate for the following periods. Callable bonds, including the previous three categories (fixed rate, floating rate and step up/down), can be redeemed by the issuer usually at par prior to their maturity date. Lastly, structured bonds contain an embedded derivative component with characteristics that adjust the security's risk/return profile to the movement of other financial assets. These securities are classified into three sub-categories: a) linked bonds, embedding a call option on the movement of the underlying index, equity or fund[6]; b) stochastic interest bonds, incorporating options on the structure of interest rates with cap/floor mechanisms or similar structures[7]; c) mixed bonds, i.e. securities set forth in points a) and b) that also include a call option.

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[6] In general, these bonds have a minimum guaranteed coupon, typically very low, which may increase in proportion to the increase in value of other financial assets, according to more or less complex formulas (that may also include the so-called exotic options). An example of a particularly complex linked bonds is the constant proportion portfolio insurance (CPPI) bonds, which can be broken down into a plain-vanilla bond and a portfolio of other financial assets combined with weights varying over time in accordance with a pre-determined formula.

[7] A typical example is a floating-rate bond with a cap or a floor, or so-called adjustable bonds, giving the issuer the right to transform the bond from fixed-rate to floating-rate or vice versa; another example is provided by bonds with yields linked to swap rates.

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Products may also be classified according to seniority into three groups: senior, subordinated and covered bonds, which in turn may include one or more of the categories mentioned above (for example, a subordinated bond may be either plain vanilla or structured).

Figure 1 and Table 2 show some key figures on the types of bonds issued in the two years considered. Plain-vanilla bonds accounted for 79% of the amount issued to retail investors, followed by structured (10%), callable (8%) and step up/down (3%) bonds. Approximately 64% of the amount issued to retail customers was sold by the top 5 bank groups, 7% by banks controlled by foreign groups and approximately 8% by cooperative banks (CBs). Considering structured bonds only, approximately 75% of the amount issued (84% if callable bonds are included) was sold by the top 5 bank groups, about 10% by banks controlled by foreign groups and approximately 16% by other banks (including CBs). The weight of subordinated and covered bonds is around 7%.

For issues to institutional investors, 81% of the amount sold consists of plain-vanilla products, 16% of structured securities, 1% of callable bonds and the remaining 2% of step up/down bonds. The top 5 banks account for about 73% of the amount issued. The share of subordinated and covered bonds is significantly higher than that for issues to retail investors.

Figure 1 Bonds issued by Italian banks by security type (July 2007 – June 2009)

domestic issues to
retail investors

international issues to
institutional investors

- plain vanilla
- step up/down
- structured
- callable
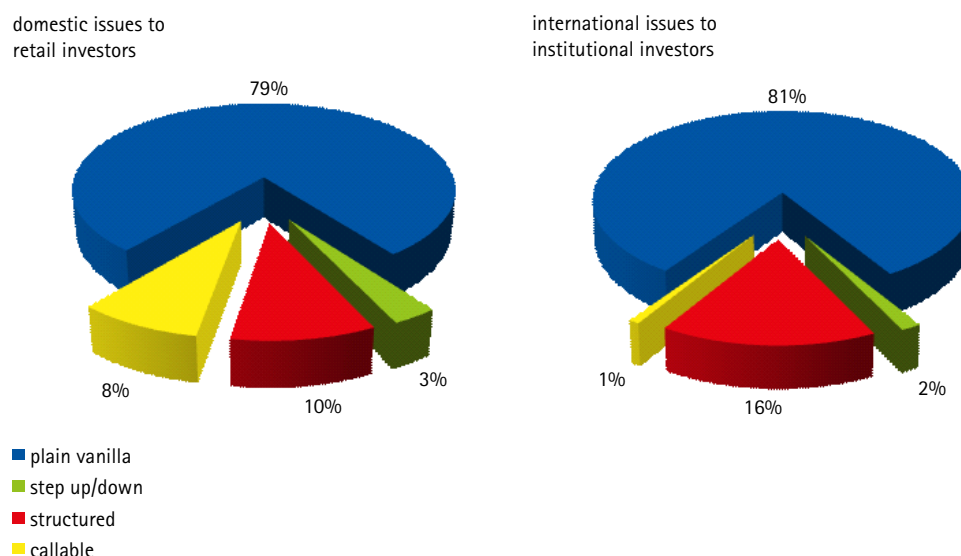
Source: prospectuses for domestic issues and Dealogic for issues on the Euromarket.

Table 2 Bonds issued by Italian banks by security and issuer type (July 2007 – June 2009)
(amount placed in € million)

bank group of the issuer	plain vanilla		step up/down	with call option			structured			TOTAL	of which subordinated and covered bonds	% on total
	fixed rate	floating rate		fixed rate	floating rate	step up/down	linked	stochastic interest	Mixed			
DOMESTIC ISSUES TO RETAIL INVESTORS												
top 5 Italian banking groups	73,063	64,999	3,492	4,712	8,268	7,353	5,721	14,550	744	*182,902*	14,226	63.5
Italian banks controlled by foreign groups	4,571	12,912	714	..	500	25	1,789	719	161	*21,391*	853	7.4
cooperative banks	7,390	11,293	2,269	324	152	182	24	375	17	*22,026*	47	7.6
other banks	23,641	28,846	2,579	391	1,812	551	3,355	583	167	*61,925*	5,313	21.5
TOTAL	*108,665*	*118,050*	*9,054*	*5,427*	*10,732*	*8,111*	*10,889*	*16,227*	*1,089*	*288,244*	*20,439*	*100.0*
INTERNATIONAL ISSUES TO INSTITUTIONAL INVESTORS												
top 5 Italian banking groups	26,067	19,231	1,127	94	--	205	1,382	3,252	3,245	*54,603*	3,758	73.3
other banks	8,603	6,732	10	85	200	25	2,093	1,489	630	*19,867*	400	26.7
TOTAL	*34,670*	*25,963*	*1,137*	*179*	*200*	*230*	*3,475*	*4,741*	*3,875*	*74,470*	*4,158*	*100.0*
GRAND TOTAL	*143,335*	*144,013*	*10,191*	*5,606*	*10,932*	*8,341*	*14,364*	*20,968*	*4,964*	*362,714*	*24,597*	

Source: prospectuses for domestic issues and Dealogic for issues on the euromarket.

4 Risk characteristics

4.1 Market risk

Market risk is measured on the basis of two standard indicators: historical volatility of returns and one-month 95% VaR both calculated on a total return index of different bond types[8].

According to such approach the various types of bonds can be ranked on average as follows over the period analyzed: floating-rate are less risky than fixed-rate bonds when the return volatility indicator is taken into account, whereas the opposite holds when considering the one-month VaR; stochastic interest bonds are riskier than fixed-rate securities (even if the difference in terms of VaR is small), while index-

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8   See the Appendix for technical details on the total return index.

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linked bonds are significantly riskier than other types of bonds both in terms of return volatility and VaR (Table 3).

We assume that callable bonds have a higher market risk than fixed-rate and floating-rate securities, since they have the additional exposure to interest rate volatility because of the embedded option, but a lower risk than stochastic interest bonds.[9] Lastly, we assume that the market risk of mixed structured bonds is higher than that of pure index-linked bonds.

Table 3 Market risk of Italian bank bonds
(percentage values expressed on an annual basis)

	plain vanilla bonds		structured bonds	
	fixed-rate	floating-rate	stochastic interest	index-linked
volatility	2.26	1.77	2.98	6.89
one-month 95% VaR	−5.07	−5.79	−7.88	−15.26

Note – Volatility and VaR are based on time series of the monthly total return indices of the various types of bonds from 2007 to 2009 (see the Appendix for details). Plain-vanilla fixed-rate bonds include step up/down bonds.

4.2 Credit risk

Credit risk is measured taking into account Moody's issuer ratings.[10] Credit risk was also checked looking at CDS spread between Italian banks and the Republic of Italy for each Moody's rating scale. Such spread is very close to zero for Aa3 and Aa2 ratings (and even negative from the end of 2008 to the beginning of 2009), signalling that the market did not price banks' credit risk very differently from that of the Italian Republic. This evidence holds also for banks rated A1, whereas for those rated A2 the spread is largely positive (Figure 2).

Special attention deserve cooperative banks (CB): none of them are rated but most of them joined a guarantee scheme providing bondholders compensation up to approximately 103,000 euros in case of default. The scheme is unfunded; the resources backing the fund amounted to approximately 278 million euros in the second

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9 Compared to a plain vanilla bond, the probability distribution of returns of a callable bond will be truncated to the right (because the issuer will exercise the call option in favourable market conditions), while the left side of the distribution is similar; therefore, in terms of VaR, a callable bond has a market risk similar to a plain-vanilla bond. For this reason, callable bonds are classified as less risky than stochastic interest (which, as shown above, have a market risk substantially higher than that of plain-vanilla bonds).

10 At that time Standard & Poor's rated the Republic of Italy two notches lower (A+ which is equivalent to Moody's A1). In the present study, however, Moody's opinion was chosen as a benchmark because of its higher coverage of the Italian banking sector.

half of 2009.[11] Assessing the credit risk of guaranteed CB bonds is quite complex because it is difficult to gauge the real ability of the scheme in absorbing losses under periods financial turmoil of systemic relevance; given these a medium credit risk level.

Figure 2 Five year CDS spreads between main Italian banking groups and the Republic of Italy
(basis points; daily data from 14/12/07 to 30/6/09)
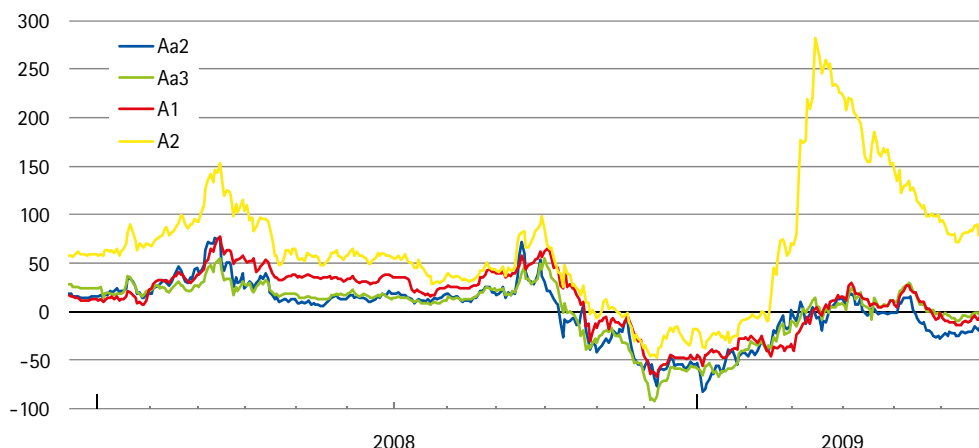
Source: calculation based on Thomson Financial data.

Table 4 shows the distribution of bonds placed with retail customers by market and credit risks. The lower part of the Table further reclassifies credit and market risks on the basis of a qualitative scale ranging from "very low" to "high". Credit risk is classified as "very low" if Moody's issuer rating is Aa or A, "low" if Moody's rating is Baa and if bonds are unrated but covered by a guarantee scheme (as for some CBs bonds), "medium" for unrated bonds (both senior and subordinates). Credit risk was never classified as "high", even in case of unrated bonds, since banks are subject to prudential supervision and this should keep average default probability at a reasonably low level. On the basis of the evidence discussed in the previous paragraph, bonds are classified as having "very low" market risk if they are plain vanilla and step up/down, "low" if they are callable, "medium" if they are stochastic interest and "high" if they are index-linked and mixed bonds. Based on this approach, both credit and market risks were defined as "very low" for approximately 64% of the bonds sold to retail investors; "low" for about 15%; "medium" for about 17% and high for 4%.

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11 Contributions to the fund are risk-based. To this end, the CCBs are divided into 5 classes of risk depending on a number of parameters (including the specific risk of the bank, the maturity of the bonds, the share of bonds guaranteed by the bank on the total number of bonds guarantees by the fund). Banks in the highest risk class are kept under observation for 2 years and during this period are not eligible for the guarantee fund. The same applies to newly formed banks, which are classified in the highest risk class and are kept under observation for at least 3 years.

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Table 4 Distribution of bonds placed with retail customers by credit risk and market risk

(July 2007 – June 2009; percentage values)

credit risk (Moody's rating)	type of bond					
	plain vanilla and step up/down	callable	stochastic interest	linked	mixed	*TOTAL*
Aa	30.8	1.9	4.0	1.5	0.3	*38.6*
A	33.0	5.7	1.5	2.3	--	*42.4*
Baa	2.2	0.1	--	--	--	*2.3*
unrated but covered by guarantee scheme	5.1	0.2	0.1	--	--	*5.4*
senior unrated	10.3	0.3	0.1	--	--	*10.7*
subordinated unrated	0.4	0.2	--	--	--	*0.6*
TOTAL	*81.8*	*8.4*	*5.6*	*3.8*	*0.3*	*100.0*

		market risk				
		very low	low	medium	high	*TOTAL*
credit risk	very low	63.8	7.6	5.4	4.1	*81.0*
	low	7.4	0.3	0.1	--	*7.7*
	medium	10.6	0.5	0.1	0.1	*11.3*
	high	--	--	--	--	*--*
	TOTAL	*81.8*	*8.4*	*5.6*	*4.2*	*100.0*

Source: calculations based on prospectuses and final terms. Bonds are classified as "very low" credit risk if Moody's rated the issuer Aa or A, "low" if Moody's rating is Baa and for unrated bonds covered by guarantee schemes (namely Federcasse's one for the CCBs), "medium" for unrated bonds (both senior and subordinated). Bonds are classified as "very low" market risk if they are plain vanilla and step up/down, "low" if they are callable, "medium" if they are stochastic interest and "high" if they are index-linked and mixed bonds.

4.3 Liquidity risk

Bond liquidity is normally high for bonds admitted to trading on regulated markets and MTFs (such as MOT or EuroTLX), though due to a number of structural factors bank bonds tend to be traded mainly OTC with market makers displaying indicative prices on the main data providers (Bloomberg or Reuters). In some cases, even when no indicative quotes are available, a theoretical or fair price is calculated and published by Bloomberg or Reuters.

For retail investors, who do not have direct access to very expensive information channels such as Bloomberg or Reuters, even bonds with an active OTC market can be regarded as illiquid. For institutional investors, with easier access to Bloomberg or Reuters, liquidity can be measured on the basis of the frequency with which indicative prices are displayed on such information networks. Of course, there are other better liquidity indicators, such as the bid-ask spread and the volumes actually traded – on which, however, no precise information are available for OTC trading.[12]

Given the above considerations, the Italian bank bonds outstanding as at 30 June 2009 have been broken down into 4 groups which may proxy a decreasing level of liquidity (Table 5). The first group includes securities admitted to trading on the regulated market and/or MTF (MOT or EuroTlx); the second group includes bonds with dealers' indicative prices available on Bloomberg or Reuters; the third group includes securities with fair prices calculated and published by Bloomberg or Reuters; the last group includes bonds with no indicative or theoretical prices. Bonds have also been distinguished depending on whether they were placed with retail or institutional investors. Table 5 shows that for bonds issued to retail investors only 9% of the outstanding at 30 June 2009 (30% in terms of value) can be considered "liquid" since it is traded on regulated markets or MTF, while for institutional investors this percentage rises up to 15% of the issues (33% in terms of value) since we consider as liquid the first two groups of bonds.

Table 5 also shows that liquidity is clearly influenced by the average issue size. For bonds placed with retail investors, the minimum size in order to have an active secondary market exceeds 100 million euros, while for bonds placed with institutional investors this threshold rises up to 250 million. Therefore, the small issue size seems to be one of the main determinant of the low liquidity of most bank bonds.

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12 Bonds which are not admitted to trading on regulated markets are not subject to any pre-trade or post-trade transparency obligations, nor post-trade reporting obligations to the Supervisory Authorities (so called transaction reporting).

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Table 5 Liquidity indicators of Italian bank bonds
(data relating to outstanding bonds at 30/06/09)

	value (€ billion)		number of bonds		average issue size (€ million)
		% on total		*% on total*	
DOMESTIC ISSUES TO RETAIL INVESTORS					
bonds traded on regulated markets or MTF (Mot and Eurotlx)	163.1	*29.0%*	1,063	*9.2•*	15••4
bonds with prices quoted by dealers on t•e OTC market reported on Bloomberg or Reuters	34.5	*6.1%*	298	*2.6%*	115.7
bonds with fair value reported on Reuters or Bloomberg	150.5	*26.8%*	4,246	*36.8%*	35.4
unlisted bonds with no prices or fair values reported by Bloomberg or Reuters	213.6	*38.0%*	5,942	*51.5%*	36.0
TOTAL	*561.7*	*100.0%*	*11,549*	*100.0%*	
INTERNATIONAL ISSUES TO INSTITUTIONAL INVESTORS					
bonds traded on regulated markets or MTF (Mot and Eurotlx)	24.5	*21.0%*	38	*6.6%*	643.9
bonds with prices quoted by dealers on t•e OTC market reported on Bloomberg or Reuters	13.7	*11.8%*	50	*8.7%*	274.7
bonds with fair value reported on Reuters or Bloomberg	61.6	*52.8%*	287	*49.7%*	214.6
unlisted bonds with no prices or fair values reported by Bloomberg or Reuters	16.8	*14.4%*	202	*35.0%*	83.1
TOTAL	*116.6*	*100.0%*	*577*	*100.0%*	

Source: authors' calculations based on Bloomberg and Reuters data.

5 Return characteristics

This section analyzes the returns of bank bonds sold to retail investors, comparing them with returns of bonds issued to institutional investors and with the returns of Italian Treasury bonds (BTP and CCT). The sample includes the securities issued in the period July 2007- June 2009 by the top 5 Italian banking groups, CBs and banks controlled by foreign groups.

For fixed-rate and floating-rate plain vanilla bonds (representing, as shown in Figure 1, approximately 80% of the value placed with retail investors) returns are measured using two different approaches.

The first, based on a buy-and-hold assumption, measures the spread between the bond's yield to maturity (YTM) at the issue date and the YTM of fixed rate

government bond (BTP) with a similar maturity; for floating-rate securities we take simply the spread at issue over Euribor.[13] This approach basically measures ex-ante returns for plain vanilla bonds assuming investors buy the security at the issue price and hold them till maturity.

In the second approach we remove the buy-and-hold assumption and esti-mate ex-post bond returns based on the calculation of total return indices (see the Appendix for details).

5.1 Plain vanilla fixed-rate bonds

Ex-ante returns

Table 6 shows summary statistics on bank bond spreads over BTP by rating classes and investor type. [14]

For issues to retail investors, both mean and median spreads are close to zero for Aa2 bonds (i.e. when credit risk is equal to that of Republic of Italy); Aa3 rated bonds have a median spread of about 10 basis points (with a mean value slightly lower), whereas the median spread is negative for A1 bonds (-22 basis points). For banks rated A2, A3, and Baa1, the average and median spread is close to zero; only for those rated Baa2 mean and median spreads significantly greater than zero (approximately 30 basis points). For CB' guaranteed issues average and median spreads are equal to 7 basis points, while for non-guaranteed issues they are slightly higher (approximately 13 basis points).

These date show that spreads of plain-vanilla fixed-rate bonds placed with retail customers are very weakly related with credit and liquidity risks and very often negative even for banks with a lower rating than that of the Italian Republic.

Returns of bonds sold to institutional investors incorporate instead a signifi-cant premium against Italian Treasuries. In particular, Aa2 bank bonds (same rating of the Republic of Italy) show median and average spreads of approximately 80 basis points (thus accounting for a liquidity premium), while for Aa3 bank bonds the me-dian spread rises to 90 basis points; for A1 issuers the median spread equals 120 ba-sis points, while for A2 banks equals to approximately 100 basis points (such anomaly probably reflects different timing of issues, different liquidity premium or other risk factors).

Therefore, differently from retail customers, institutional investors demand a significant premium for credit and liquidity risk as shown by several empirical stud-ies.[15]

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13 The spread as computed above does not factor in distribution fees; therefore it slightly overestimates real ex-ante return for investors. However distribution fee are almost always zero for plain vanilla bonds.

14 The figures refer to plain vanilla fixed rate bonds and step up/down bonds.

15 See Resti & Sironi (2007) and Sironi & Gabbi (2002).

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Table 6 Spread over Italian Treasury bonds with similar maturity of plain-vanilla fixed-rate and step up/down bonds
(values in basis points; bonds placed from July 2007 to June 2009)

	domestic offers to retail investors				international offers to institutional investors			
	median	mean	st. dev.	number	median	meab	st. dev.	number
Moody's rating								
Aa2	-4	6	50	115	77	83[+]	73	73
Aa3	9	6	30	117	90	99[+]	125	63
A1	-22	-22	29	336	120	127[+]	28	6
A2	-4	-3	32	180	96	114[+]	91	13
A3	0	0	46	231	--	--	--	--
Baa1	-6	-4	38	41	--	--	--	--
Baa2	35	36	61	49	--	--	--	--
Baa3	--	--	--	--	--	--	--	--
CB covered by guarantee fund	7	7	42	765	--	--	--	--
CB not covered by guarantee fund	13	13	40	238	--	--	--	--

Source: calculations based on prospectuses and final terms for offers to retail investors and Dealogic for offers to institutional investors. The [+] sign indicates that the difference compared with respect to the retail investors subsample is statistically different from zero at 1% level.

Overall these data indicate that there are at least two anomalies character-ising returns of bond sold to retail investors: first, the correlation between spreads and credit risk is close to zero, while the literature documents a strong correlation between these two variables for bonds sold to institutional investors; secondly, hold-ing credit risk constant, returns are considerably lower than those institutional inves-tors are willing to accept.

The statistical significance of these anomalies was tested through an econometric analysis conducted on a sample of 2,258 plain-vanilla fixed-rate and step/up down bonds issued from July 2007 to June 2009.[16] This sample was then split into two sub-samples of bonds offered to retail investors (2,117 observations) and bonds offered to institutional investors (141 observations). The following model was then regressed both on the whole sample (specification I), including bonds offered to all types of investors, on the institutional investors' sample (II) and on the one includ-ing bonds placed with retail investors only (III):

16 Outliers were excluded after being identified through the analysis of the "studentized" residuals, the leverage and the Cook's D statistics. Moreover, bonds rated Aa1, issued by foreign banks with a higher rating than that of the Italian Republic, were excluded.

$$Spread = f(retail, rating, maturity, size, Lehman) \ (1).$$

- *RETAIL* is a dummy equal to 1 for bonds offered to retail investors and zero other-wise. The dummy's coefficient, capturing the difference between the yield spread delivered to retail investors and that offered to institutional ones, is expected to be negative.

The others are control variables which the literature showed to be relevant as deter-minants of bond spreads.

- *RATING* stands for the following dummies: Aa2, Aa3, A1-A3, and Baa; GUARANTEE FUND (for CBs' bonds covered by the guarantee fund); NO RATING for all the re-maining bonds. In order to avoid multicollinearity, the Aa2 dummy was omitted from the regression. The expected sign of the rating dummies' coefficients should be positive and increase as the rating class worsens: this is the evidence collected by Resti and Sironi (2010), by Sironi and Gabbi (2002) and by Belcredi et al. (2010).

- *MATURITY* is expressed in years. This variable should have a positive impact on the spread given it's positive relation with credit risk; the empirical evidence provided by the studies mentioned above seems to confirm this assumption.

- *SIZE* is the natural logarithm of the planned amount of the issue.[17] The impact of this variable is ambiguous: it may be negative if SIZE captures a liquidity effect; such an effect however may be mitigated or removed should a buy-and-hold be-haviour prevail, given that in this case investors would be indifferent to the possi-bility of trading a more liquid bond more easily. As the issue size grows, however, economies of scale may rise thus reducing the placement costs and increasing the yield offered to investors.

- LEHMAN is a dummy equal to 1 if the bonds were issued after Lehman Brothers' default in September 2008. This event, which marked the worsening of the crisis, might be associated with a raise in risk premia and with higher expected returns. Therefore, the expected sign of *LEHMAN* is positive.

Table 7 shows the results of the regressions on the three samples mentioned above.

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17 The model (1) was estimated also by using the amount actually placed; however, results did not show significant changes.

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Table 7 Determinants of the spread of plain vanilla fixed–rate and step–up/down bonds

	– I – POOLED SAMPLE		– II – INSTITUTIONAL INVESTORS' SAMPLE		– III – RETAIL INVESTORS' SAMPLE	
CONSTANT	64.2247	***	-188.8336	***	23.1320	
	(19.683)		(75.5120)		(16.6511)	
RETAIL	-90.2076	***				
	(7.1226)					
Aa3	1.1162		-18.0131		-0.5902	
	(5.9219)		(15.6226)		(5.0723)	
A1–A3	-12.0050	**	-17.7167		-17.0060	***
	(4.3962)		(12.9592)		(4.5491)	
Baa	6.1378		41.3326	***	1.1061	
	(6.1944)		(9.3101)		(6.3921)	
GUARANTEE FUND	8.9539	***			3.0789	
	(4.5070)				(4.6141)	
NO RATING	15.2661	***			8.4471	**
	(5.0063)				(5.0798)	
LEHMAN	-2.1252		39.0383	***	-4.3575	**
	(1.7336)		(16.6933)		(1.6172)	
SIZE	2.5054	***	14.2430	***	0.1999	
	(0.9818)		(4.2287)		(0.9237)	
MATURITY	-4.7280	***	3.0705	**	-6.3124	***
	(0.8879)		(1.7683)		(0.9845)	
N	2258		141		2117	
R2	0.2286		0.1660		0.0815	
Adjusted R2	0.2256		0.1221		0.0780	
F – statistic	74.04	***	3.78	***	23.39	***

OLS estimates and robust standard errors (in brackets). Values in basis points. Symbols ***, ** and * indicate statistical significance at the confidence level of 1%, 5% and 10%, respectively.

In the first specification, the estimate of the *RETAIL* coefficient shows that, other factors being equal, the return offered to retail investors is on average 90 basis points lower than that demanded by institutional investors. Considering the sub-sample of bonds offered to retail investors, the regression analysis confirms that the relation between spread and credit risk is either statistically insignificant or does not have the expected sign. For instance, the coefficient of the variable A1-A3 is statistically significant but negative, thus meaning that A1-A3 rated bonds have lower spreads than those of Aa2 bonds by approximately -17 basis points. Bonds rated Baa1-Baa3 or unrated and covered by the guarantee fund have spreads not statistically different from those of Aa2 bonds while unrated bonds have a slightly higher spread than Aa2 bond (+8 basis points on average). The LEHMAN coefficient is significant but negative, as well as that of MATURITY (issues with greater maturity offer lower returns on average). Lastly, the liquidity risk premium is not significantly different from zero, as shown by the SIZE coefficient which is close to zero and not statistically significant.

The results differ considerably for the institutional investors sub-sample (regression II). In particular, the spread of Baa1-Baa3 bonds is 40 basis points higher than that of Aa2 bonds. Moreover, after the Lehman bankruptcy, returns demanded by institutional investors increased by about 40 basis points; the coefficient of *MATURITY* has the expected positive sign while *SIZE* has a positive impact.

Ex-post returns

Figure 3 shows total return indices for a portfolio of fixed-rate bank bonds and of long-term Italian Treasury bonds (BTP) over the period December 2006-December 2009.

The bank bond returns remains lower than the BTP index for most of the period considered, implying an average annual return of 3.4% (against 4.9% of BTP). However, the return falls from 3.4 to 2.5%, thus considerably widening the gap with the BTP, when it is computed using the issue price, rather than the secondary market price, as starting price (see Section 6.4). In fact the first price available on the secondary market is usually significantly lower than the issue price (on average by 3.5%).

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Figure 3 Total return indices of fixed-rate bank bonds and Italian Treasury bonds
(1.12.2006=100)
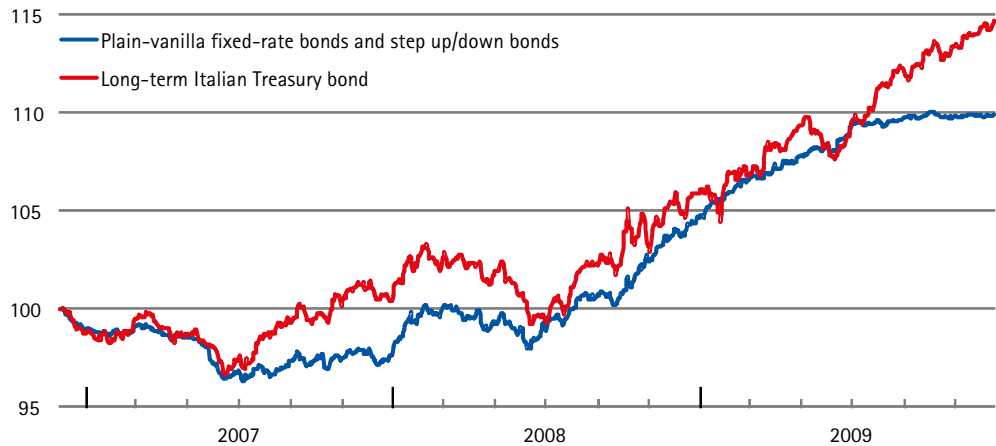
Source: authors' calculation for bank bonds and MTS Spa for fixed-rate Italian Treasury bonds (BTP).

The total return bond index is computed by neglecting illiquid bonds, which may be very difficult to sell at fair prices and which may be characterised by high bid-ask spreads. Given that the securities included in the index represent a very small portion of all the issues considered in the present study[18], average returns computed from the index probably largely overestimate the actual returns of fixed-rate bank bonds.

5.2 Plain vanilla floating-rate bonds

Ex-ante returns

Table 8 presents the descriptive statistics of the spread of plain-vanilla floating-rate bonds relative to the Euribor rate by rating classes.[19]

For the sub-sample of bonds sold to retail investors spreads are negative across almost all rating classes; for CB bonds the median spread equals zero (regardless of the coverage of the Federcasse consortium guarantee fund). Therefore, as for the fixed-rate bond sub-sample, there is no relation between spreads and credit risk. The funding cost borne by the Italian banks through the issue of floating-rate bonds is on average significantly lower than the Euribor rate even when their credit risk is higher than that of the Republic of Italy.

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18 The bonds included in the index cover approximately 7% of the bonds issued in the period considered in terms of amount issued and approximately 2% in terms of number of securities (see Appendix, Table 1A).

19 The spread used for calculating the coupons is adjusted for the difference between the issue price and the nominal value. In fact, though bonds offered to retail investors are almost always issued at par value, bonds sold to institutional investors are frequently priced below or above nominal.

Table 8 Spread over Euribor of plain-vanilla floating-rate bond
(values in basis points)

	domestic offers to retail investors				international offers to institutional investors			
	median	mean	st. dev.	number	median	mean	st. dev.	number
Moody's rating								
Aa2	-15	-13	30	110	50	54[+]	43	25
Aa3	-10	-12	17	91	119	130[+]	45	18
A1	-25	-27	25	189	184	140[+]	87	8
A2	-20	-10	37	89	57	95[+]	72	9
A3	-10	-9	13	44	--	--	--	--
Baa1	-15	-15	15	41	--	--	--	--
Baa2	0	-6	21	56	197	184[+]	30	4
Baa3	--	--	--	--	--	--	--	--
CB covered by guarantee fund	0	-3	20	602	--	--	--	--
CB not covered by guarantee fund	0	0	20	320	--	--	--	--

Source: calculations based on prospectuses and final terms for offers to retail investors and Dealogic for offers to institutional investors. The [+] sign indicates that the difference compared with respect to the retail investors subsample is statistically different from zero at 1% level.

On the contrary, offers to institutional investors exhibit on average positive spreads: about 50 basis points for banks with the same rating of the Republic of Italy and about 120 basis points for Aa3 rated banks; the median spread rises further for A1 rated banks (above 180 basis points) and Baa2 rated banks (close to 200 basis points).

Therefore, holding credit risk constant, spreads of floating-rate bonds sold to retail investors are significantly lower than those offered to institutional investors. This evidence is statistically robust, as shown by the results of the regressions presented in Table 9 based on the same model given by equation (1).

In particular, regression I highlights that, other factors being equal, the spread for retail investors is lower than that for institutional investors by about 100 basis points.

The regression for the retail investor sample (regression III) confirms the lack of correlation between return and credit risk already found for fixed-rate bonds. Only bonds rated Baa offer a higher and statistically significant spread than Aa2 bonds, though of only about 5 basis points, as well as unrated bonds (10 basis points for the bonds covered by the guarantee fund and 14 basis points for the remaining bonds with no rating). The anomaly of bonds rated A1-A3 with spreads lower than those rated Aa2 (by about 8 basis points). Only the LEHMAN variable is significant among the remaining regressors and has the expected positive sign (but the coefficient is only about 6 basis points).

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Table 9 Determinants of the spread of plain vanilla floating–rate bonds

|	– I – POOLED SAMPLE		– II – INSTITUTIONAL INVESTORS SAMPLE		– III – RETAIL INVESTORS SAMPLE	
CONSTANT	79.4123	***	17.2742		-20.9590	
	(16.1941)		(58.1145)		14.9324	
RETAIL	-99.4864	***				
	(4.9425)					
Aa3	4.2664	*	36.7684	***	0.8579	
	(2.6401)		(12.5578)		2.7084	
A1–A3	-6.3045	***	11.9864		-7.5012	***
	(2.6883)		(14.3044)		2.7656	
Baa	6.5033	***	67.3195	***	4.7477	*
	(2.8902)		(4.9316)		2.8950	
GUARANTEE FUND	11.4167	***			10.3209	***
	(2.4252)				2.5278	
NO RATING	14.8082)	***			13.7258	***
	(2.5532)				2.6791	
LEHMAN	6.1130	***	17.6881	***	5.7205	***
	(1.1371)		(5.8744)		1.1466	
SIZE	0.1603		1.7625		0.3160	
	(0.8155)		(3.9252)		0.8511	
MATURITY	0.0319		2.0127	***	-0.0695	
	(0.2857)		(1.4653)		0.3698	
N	1599		33		1566	
R2	0.3374		0.5792		0.119	
Adjusted R2	0.3336		0.4821		0.1145	
F – statistic	89.9	***	5.96	***	26.28	***

OLS estimates and robust errors in brackets. Values in basis points. Symbols ***, ** and * indicate statistical signifi-cance at the level of confidence of 1%, 5% and 10%, respectively.

Though the results for the institutional investors sub-sample (regression II) must be taken with caution because of the limited number of observations, the corre-lation between spread and credit risk is very strong and statistically significant for Aa3 bonds (+37 basis points compared to Aa2 bonds) and Baa bonds (+67 basis points compared to Aa2 bonds) and the coefficient of LEHMAN has the expected positive sign (+17 basis points) even if lower than the one estimated for fixed-rate issues.

Ex-post returns

As shown in Figure 4, floating-rate bank bonds largely underperformed floating-rate Italian Treasury bonds (CCT) over the entire period under consideration. In particular, the average annual return of bank bonds is 3.0% (decreasing to 2.6% when using issue prices rather than the first available market price), compared to 3.5% for CCT; for reasons previously discussed, the actual performance of bank bonds is likely to be lower for illiquid floating-rate bonds (not included among the constituents of the index).[20]

Figure 4 Total return indices of floating–rate bank bonds and floating–rate Italian Treasury bonds (1.12.2006=100)
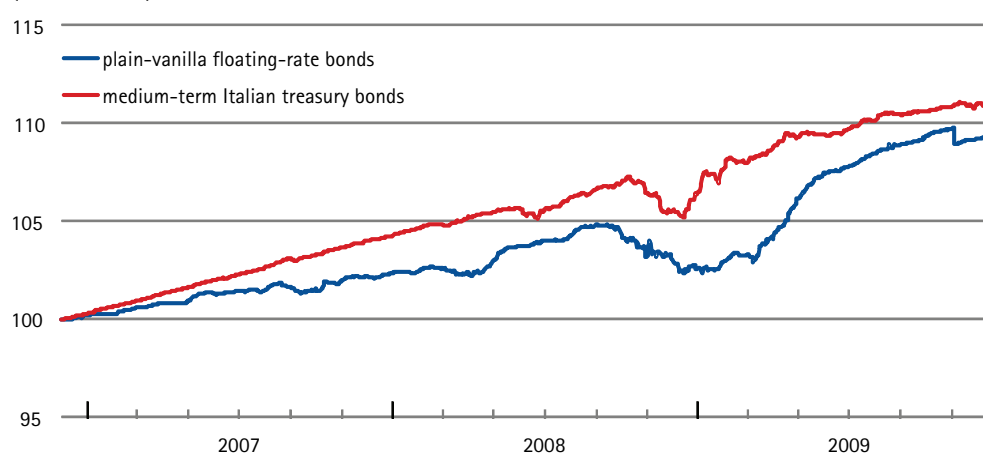
Source: authors' calculation for bank bonds and MTS Spa for floating-rate Italian Treasury bonds (CCT).

5.3 Callable bonds

The analysis carried out so far has been replicated for callable fixed-rate bonds, by using the bond yield to maturity under the hypothesis that the bank does not to exercise the redemption option.

Prospectuses and final terms usually present the unbundling of the issue price of a callable bond into the value of the plain vanilla bond component and the value of the call option.

Therefore, the spread of callable bonds against a BTP with similar maturity is not directly comparable to the spread of plain-vanilla non-callable bonds, since the theoretical value of the plain vanilla bond component is higher than the issue price.

In order to compare spreads against BTP of callable and non-callable bonds, Figure 1A in the Appendix presents, for each rating class, three charts: the first shows

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20 The bonds included in the index cover only about 13% of the bonds issued in the period considered in terms of value and approximately 2% in terms of number (see Appendix, Table 1A).

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spreads of non-callable bonds, in order to provide a reference point; the second shows spreads of callable bonds in the most favourable case for the subscriber in which the bank does not exercise the call option; the third presents such spread adjusted for early redemption risk[21] plus fees and structuring costs included into the issue price.

The second chart for each rating class of Figure 1A shows that for A1 rated banks and for CBs, the "unadjusted" spread of callable bonds is about 30 basis points, whereas it is close to zero for bonds rated A2.[22] After adjusting the yield of callable bonds for early redemption risk and structuring costs, the spread has a median value close to zero for CB (as for plain vanilla non-callable bonds) and about –20 basis points for bonds rated A2 and –30 basis points for bonds rated A1 (see the last chart on the right in Figure 1A).

Hence, spreads against BTP of callable bonds adjusted for structuring costs and early redemption risk are on average negative, and, holding credit risk constant, lower than those of plain vanilla non-callable bonds.[23]

5.4 Structured bonds

The approach hitherto adopted for plain-vanilla bonds (and partially for callable bonds) cannot be used for more complex structured bonds, such as index-linked or stochastic interest, because their yield to maturity or spread on a floating-rate cannot be computed in a deterministic way.

Moreover, information reported in prospectuses and in final terms indicate that the issue price of structured bonds usually includes significant fees and structuring costs.

Figure 5 shows the annualized value of fees and structuring costs implicit in the issue price over the life of the bond for a sample of the two main categories of structured bonds, i.e. index-linked and stochastic interest[24]. On average fee and structuring cost may reduce expected annual return by 50 basis points for both index-linked and stochastic interest bonds.

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21 This adjustment is computed on the basis of the value of the derivative component of the call option sold by the subscriber as reported in prospectuses and in final terms.

22 The analysis was carried out only for those rating classes for which a statistically significant sample of callable bonds was available.

23 This analysis was not replicated for floating-rate callable bonds because of lack of information on the value of the call option implicit in the placement price. Moreover, total return indices similar to those of plain-vanilla bonds cannot be computed due to lack of a sufficient number of callable bonds with a liquid secondary market.

24 This information was given in 53% of cases for linked bonds and in approximately 37% for stochastic interest bonds for which the final terms were available.

Figure 5 Annualized fees and structuring costs implicit in the issue price of structured bonds
(senior structured bonds issued to retail investors in the period July 2007-June 2009;
percentage values)
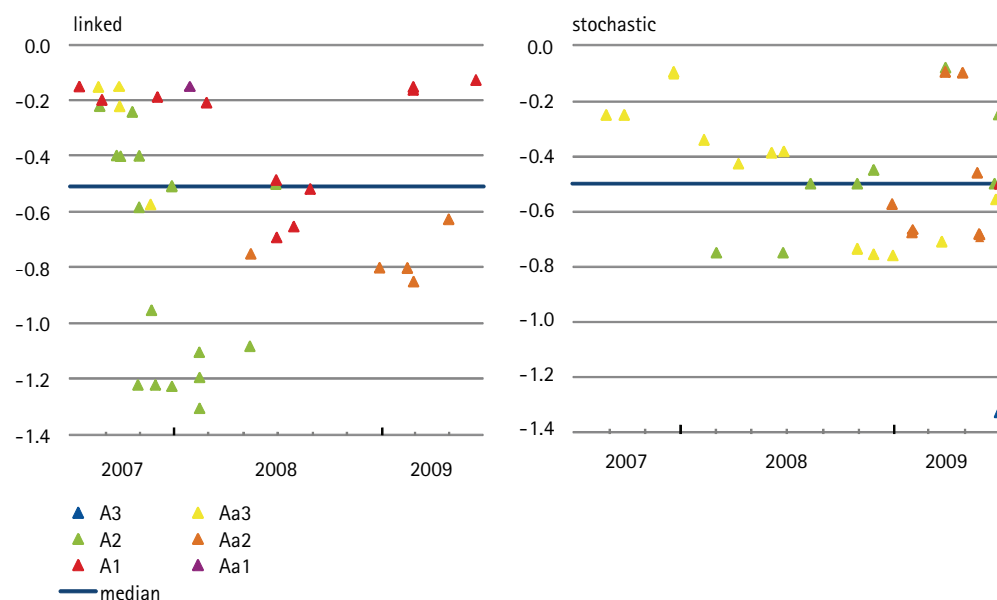
Source: authors' calculations on the basis of prospectuses and final terms.

This evidence highlights that the estimation of ex-post return for structured bonds through total return indices can be misleading, since the high structuring costs determine a strong difference between the first available market prices, that are used to compute the indices, and the issue prices. Table 10 shows that on average the first available market price is lower than the issue price by approximately 9.0% for equity-linked bonds and by 4.5% for stochastic interest bonds, whereas for plain vanilla bonds such difference is lower though still quite relevant, especially for fixed-rate bonds. These differences are also due to changes in market conditions occurring from the issue date to the time in which the first market price is recorded and to the fact that secondary market prices are likely to reflect more accurately credit and liquidity risks.

Hence, total return indices, starting from the available first market price, do not account for the strong incidence of fees and structuring costs on issue price and will overestimate ex-post returns when structured bonds are bought on the primary market.

On the basis of total return indices, the performance of structured bonds is in line with that of appropriate benchmarks (Figures 6 and 7). In particular, stochastic interest bonds outperform BTP in the 2007-2009 three-year period (5.6% vs. 4.9%) and the equity-linked bonds do better than a portfolio of 90% Italian Treasury bonds and 10% Italian share (3.6% vs. 3.2%).

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Figure 6 Total return indices of stochastic interest bank bonds and Italian Treasury bonds
(1.12.2006=100)
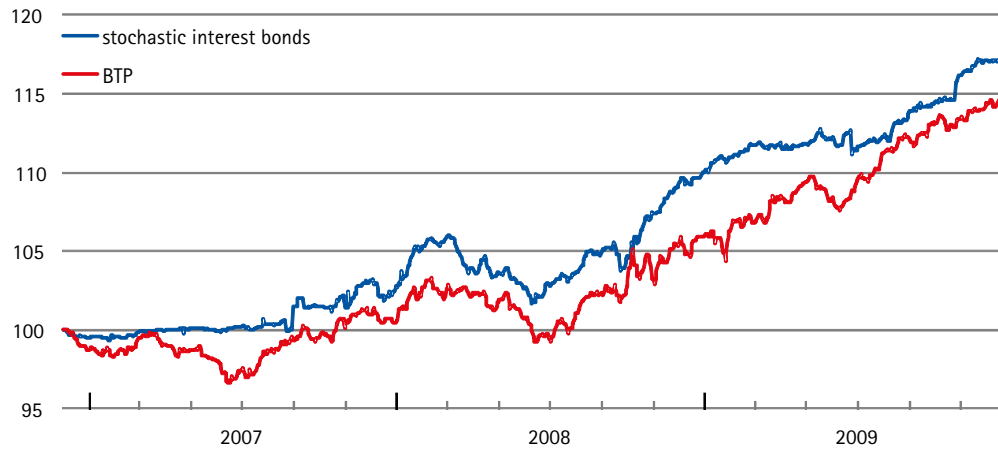
Source: authors' calculations for bank bonds (see Appendix for methodological details) and MTS Spa for BTP.

Figure 7 Total return indices of equity–linked bank bonds and a portfolio of Italian Treasury bonds and Italian shares
(1.12.2006=100)
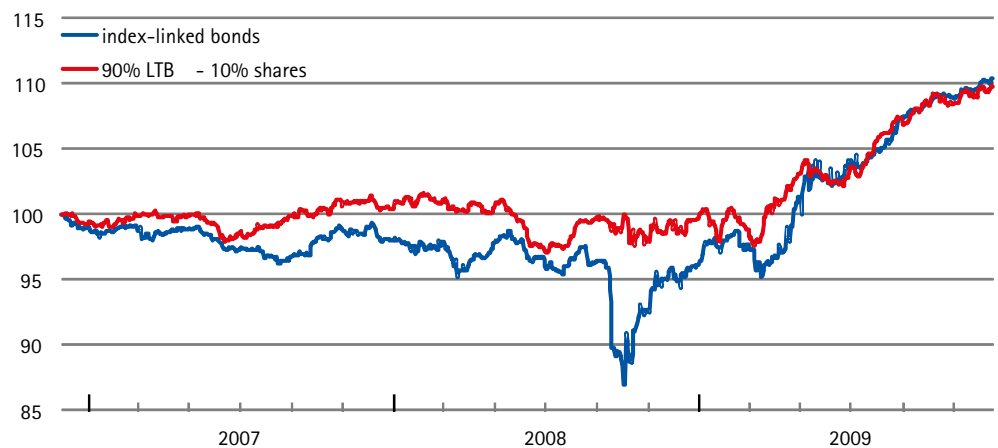
Source: authors' calculations for bank bonds (see Appendix for methodological details), MTS Spa for BTP total return index and Thomson Financial for the total return index of Italian shares (inclusive of the reinvestment of dividends).

However, returns of structured bonds are much lower when computed using as starting point issue price rather than the first available market price. The issue price cannot be used to compute the index over the whole period considered, because usually no market price is immediatly available after the issue date. The terminal value of the index, however, can be recalculated replacing the first available market price with the issue price, under the assumption that between the issue date and the date on which the first market price is available the bond delivers the risk-free rate.

Table 10 shows that, on the basis of the recalculated terminal value, the average annual compound return in the period 2007-2009 becomes virtually zero for index-linked bonds, falls to 3.8% (from 5.6%) for stochastic interest bonds and to 2.5% (from 3.4%) for fixed-rate plain vanilla bonds.

This analysis highlights that in the period under consideration the return of structured bonds is largely below that of domestic government bonds. Using a benchmark portfolio combining long-term Italian Treasury bonds (90%) and Italian shares (10%), equity-linked bonds underperform by more than 300 basis points per year (0.1% vs. 3.2% of the benchmark), whereas stochastic interest bonds underperform Italian Treasury bonds by about 110 basis points per year (3.8% vs. 4.9%). Moreover, the underperformance of plain vanilla bonds gets more evident to what was documented in Section 5.2: fixed-rate bonds underperform long-term Italian Treasury bonds by about 240 basis points per year (2.5% vs. 4.9%), whereas floating-rate bonds underperform floating-rate Italian Treasury bonds by about 90 basis point per year (2.6% vs. 3.5%).

Table 10 Impact of the issue price on the calculation of total return indices of bank bonds

	average spread between the first available market price and the issue price	terminal value of the index calculated with the first market price	terminal value of the index recalculated	2007–2009 average return with the first available market price	2007–2009 average return with the issue price
equity-linked bonds	-9.0%	110.4	99.7	3.6%	0.1%
stochastic interest bonds	-4.5%	117.1	111.5	5.6%	3.8%
plain vanilla fixed-rate bonds	-3.5%	109.9	107.1	3.4%	2.5%
plain vanilla floating-rate bonds	-1.0%	109.3	108.2	3.0%	2.6%

In conclusion, the evidence about the underperformance of the bank bonds relative to government bonds is robust with respect to different methodological approaches and different hypotheses about the investors' behaviour. This result would likely be strengthened if liquidity risk were fully priced, provided that such risk is quite high for the majority of the bank bonds and total return indices tend to include most liquid bond only. However it is not clear weather investment strategies on the secondary markets are necessarily more profitable than those based on the purchase of bonds on the primary market at the issue price. Despite the ability of secondary market prices to reflect more accurately credit risk and structuring costs, trading illiquid bond can involve substantial transaction costs, potentially exceed the mispricing implicit in issue prices due to fees and distribution costs.

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Bank bond total return index

As mentioned in Section 5, the actual performance of bank bonds was estimated on the basis of a value weighted total return index. To this purpose, we defined a portfolio of N bank bonds at t=t_o and computed its value (then set to 100) at the market prices prevailing at that date. Then we recalculated the new value of the portfolio at date t_1 on the basis of the market prices prevailing at that date and by assuming that all coupons received are reinvested at the risk free rate. Of course, bonds were included in the index only if prices existed, either because bonds were admitted to trading on regulated markets and MTFs or because, in spite of being traded OTC, theoretical or fair prices were available.

The resulting index is a gross total return one, given that it neglects the 12.5% withholding tax on coupons and capital gains, as well as gross of transaction costs. Therefore, the net performance for investors can be very different from the gross performance measured by our index given that, apart from the tax levy, transaction costs can be significant.

Total return indices were computed for each bond category, namely plain vanilla floating-rate, plain vanilla fixed-rate (including step up/down), stochastic interest and index-linked bonds. Subordinated and covered bonds, bonds with less than 50 million euro issue size and bonds expiring before December 31st 2009 were excluded (indices were calculated until the end of 2009). An additional filter was applied by including only bonds traded in a sufficiently active secondary market or with indicative prices reported by major data providers. The resulting representativeness of the sub-samples used to compute the total return indices is shown in the following Table.

Table 1A Representativeness of the bond sub-samples used for computing total return indices

	planned value (€ bn)			number of bonds		
	index	universe	coverage %	index	universe	coverage %
Index-linked	13.1	46.1	28.4%	50	358	14.0%
stochastic interest	3.7	40.2	9.2%	24	250	9.6%
plain vanilla floating-rate	38.9	303.6	12.8%	116	5,347	2.2%
plain vanilla fixed-rate	20.7	283.1	7.3%	101	6,432	1.6%

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Figure 1A Spread of callable and non-callable plain vanilla bank bonds (fixed-rate and step up/down) over fixed-rate Italian Treasury bonds with similar residual life by credit risk and liquidity[1] (bonds offered to retail investors in the period from 1/7/07 to 30/6/09; percentage values)

Source: authors' calculations on the basis of prospectuses and final terms. [1] The spread is adjusted for structuring fees and early redemption risk.