

Can domestic trade credit insurance contracts be effective collateral for banks? A quantitative study of the Italian market

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ABSTRACT

A domestic credit insurance contract is a policy that covers the risk of the non-payment of future commercial credit as a result of the failure to pay within the agreed terms and conditions (protracted default) or the insolvency of the buyer. To evaluate the effective level of financial protection offered by trade credit policies, we collected a database of contracts issued between 2006 and 2013 by a number of Italian insurance companies, which account for 80-85% of the Italian market. We find that, to be considered as able to mitigate credit risk, the policies must have their contract clauses changed. In that case, such a policy, if accepted by the supervisory authority, could permit banks to reduce the capital requirement connected with the discount of trade credits. These results are particularly important for insurance companies.

KEYWORDS

credit insurance; trade credit; LGD

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1. Introduction

Trade credit—a deferred payment to suppliers—is an important source of funds for many firms, especially those that are constrained in terms of credit by the banking sector.

Trade credit in general—both domestic and export—has been extensively analysed in the literature (for a review of theories and evidence, see, among others, Peterson and Rajan 1997). Meltzer (1960) identified the relationships between mercantile credit and monetary policy, Haley and Higgins (1973) analysed how inventory policy can influence bank financing of trade credit, and Smith (1987), Lee and Stowe (1993), and Pike et al. (2005) placed trade credit in the more discussed strand of information asymmetry. Instead of considering trade credit as a financing instrument, Long, Malitz, and Ravid (1993) supposed that a firm chooses trade credit to guarantee product quality (see also Deloof and Jegers 1996). Ferrando and Mulier (2013) also decided to analyse the accounts receivable part of trade credit, finding that firms can use this channel to manage their growth.

More recently, Burkart and Ellingsen (2004) developed a contract-theoretic model of trade credit in competitive markets, explaining the short maturity of trade credit, while Giannetti, Burkart, and Ellingsen (2011) related trade credit to product characteristics and to the bank–firm relationship. The importance of that relationship—between trade credit and the bank channel—has been empirically analysed by Nilsen (2002). The author found that during both small and large monetary contractions, firms increase trade credit. Another interesting paper by Deloof and La Rocca (2015) analysed, in an integrated financial market, the relationship between trade credit and local financial development in Italy. The two authors found that lower levels of local banking development reduce the use of trade credit. Trade credit is also an important model in which to apply the game-theoretic approach because of the behaviour of two agents—the supplier and the retailer (Li, Zhen, and Cai 2016; Smith 2014).

Although the literature on trade credit is large, there are only a few papers that analyse trade credit insurance, and most are related to foreign credit insurance (see, among others, Jones 2010). The main stream of research on this topic is also related to government policy, as in Dewit (2001). The author investigates how the premium rating of export insurance is affected by export promotion and other political objectives. The recent paper by Li, Zhen, and Cai (2016), who propose a theoretical model to analyse the connection between credit insurance and capital constraints, using a game approach to modelling the behaviour of manufacturers and banks, can be added to this strand of the literature. In our paper, we want to fill this gap by analysing two different aspects of domestic credit insurance. First, we want to empirically evaluate the average coverage in terms of indemnization of the contract. Second, we want to evaluate the impact on banks if the contract can be considered a credit risk mitigant.

These issues are studied using trade credit data from Italy. Trade credit is commonly used in Italy, and even before the 2008 financial crises, Italian firms displayed very high levels of trade credit in their balance sheets, either as receivables or payables. According to de Blasio (2005), although the volume of trade credit exceeds the volume of short-term bank credit in almost all the developing and industrial countries, in Italy, the amount of trade credit both received and extended is the highest among such countries. The Italian industrial and commercial structure is largely based on small firms that have limited access to alternative sources of finance in addition to from bank and trade credit. After the 2008 financial crises, many firms have been rationed by banks, and there is evidence that the importance of trade credit in balance sheets has further increased (De Laurentis, Pisani, and Trinca Colonel 2015).

A domestic credit insurance contract is a policy that covers the risk of non-payment of future commercial credit as the result of a failure to pay within the agreed terms and conditions (protracted default) or the insolvency of the buyer. Basically, the seller and the buyer must be two companies based in the same country, and the credit must be the consequence of a trade of goods and/or services. A standard policy will cover all receivables (although specific policies could cover a selected group of invoices or even a single transaction) because this global approach guarantees that the insurance company will not be faced only with bad debtors. Policies generally exclude trade between companies belonging to the same group or with strong ties and trade with government departments, government agencies or individuals. Of course, the insurer will not cover trade credit in the case of litigation between the seller and the buyer. Generally, financial credits are also excluded from this coverage.

Although domestic credit insurance contracts offer an indemnization that is less than the amount of the trade credit assured (because of limits of liability, deductibles and unpaids stipulated in the contracts), the average coverage could be very significant

according to the insurance contract if used properly, ranging between 70% and 90% of the amount of the trade credit assured in the Italian market. To evaluate the effective level of financial protection offered by trade credit policies, we collected a database of contracts issued by a number of Italian insurance companies, which account for 80-85% of the Italian market. More specifically, we examined all the indemnizations paid by those companies in the period 2006-2013 to investigate and quantify the coverage ratio for each insolvency.

Additionally, since trade credits are usually discounted by banks, banks identify the present value of the credit to the company creditor, that is, the value of the credit less the interest rate for the days that go by from the presentation to the bank to when the credit expires. The interest rate reflects the expected loss and the return on capital allocated by the bank to oversee the unexpected loss. In this context, another question is whether an insurance contract can be a significant and legal credit risk mitigant for a bank that could discount the commercial credit of a non-financial company (in the sense of effectively and legally reducing the amount of capital allocated to oversee the unexpected loss).

The Basel 2 Regulation on credit risk differs significantly according to the different options offered to the banks (Basel Committee on Banking Supervision 2006). As is well known, the Basel 2 rules were complemented by additional provisions that significantly increased the capital requirements of a bank while also raising the share of equity in the regulatory capital. Nevertheless, the structure of Basel 2 has remained in place both for the differentiation of banks and to define the legal effectiveness of the policy as a risk mitigant (Basel Committee on Banking Supervision 2017). Basically, banks are supposed to use the “standard formula”, but they could apply the internal rating-based approach, further differentiated into “basic” and “advanced”. According to the different regulatory approaches, from a legal standpoint, a trade credit policy is differentially recognized as a credit risk mitigant for a bank if the policy could act as collateral because the commercial credit is discounted.

This paper is organized as follows: in Section 2, we will concentrate on policy structure, and in Section 3, we will investigate the coverage ratio following the analysis of the indemnizations paid by the insurance companies examined in the period 2006-2013. In Section 4, we will discuss the implications for banks, and in Section 5, we will identify some conclusions and policy implications.

2. Trade credit policy contract structure

Trade credit insurance contracts do not cover all claims. They do not cover the “damage” to the credits from any cause to be produced or any damage that may occur in case of loss. The contracts insure only the definitive failure of the trade credit, not the mere delay in payment or losses deriving from accident or force majeure. Moreover, the policy covers only the direct damages caused by the inability to collect the receivables and possibly their consequential damages (costs of the prosecution of the debtor) but not the indirect damages (higher financial charges on bank debt, inability to perform new payments, etc.). In fact, the policy covers only the following types of trade credits:

- (1) those related to relationships between entrepreneurs and resulting from the sale of goods and services;
- (2) those certain in their amount, payable at maturity, documented in written form and uncontested (in case of dispute about the quality of the goods services after

- insolvency, the insurance company will wait for the outcome of the dispute);
- (3) those recruited on the criterion of globality: to mitigate the risk of adverse selection by the insurance company, the insurance company will underwrite all the trade credits of the insured company or a homogenous group of those credits;
 - (4) those in case of the debtor's insolvency: partial or total insolvency is covered, but a delay in payment is not, except in the case of protracted default (usually after 180 days), which will be considered equivalent to insolvency;
 - (5) those within an amount (limit of liability) that corresponds to the maximum credit loss that could be indemnified by the insurance company (identified in terms of single or cumulative trade credit amount year by year). The limit of liability can be modified by the insurance company (according to the evolution of the insurer loan portfolio risk or the trade credit policy of the company assured) and usually is based on a revolving rule (the insurer accepts all trade credits arising in a certain period of time up to a limit of liability, and the regular payment of the trade credits will re-create space within the contract to encompass new credits that will be accepted and insured by the insurance company);
 - (6) those with the participation of the company assured: generally, the company assured is reimbursed a net of deductibles (to exclude from coverage loans of limited amounts for which the liquidation costs may be particularly high compared to the trade credit loss) and unpaids (percentage of the insured damage) called "mandatory" (i.e., those that are not to be reinsured with other insurers).

The previous elements express rules introduced by the insurance companies as a business practice. However, it must also be remembered that the Italian Supervisory Insurance Authority (ISVAP) issued a Circular (no. 162/1991) to regulate the trade credit insurance contract accepting some of the above elements, giving them legal validity. In particular, the Circular stated that the assumption of the risk must meet the criteria of (i) the commercial nature of the claim, such that they cannot be the subject of insurance claims arising from purely financial transactions (see above n. 1), (ii) the globality principle (n. 3), (iii) permanent loss due to insolvency of the debtor (n. 4), and (iv) the mandatory unpaids (n. 6).

Moreover, as business practices, trade credit insurance contracts usually exclude the following from coverage (and consequently from insurance compensation):

- (1) credit losses resulting from systemic events that alter the probability of default and the loss given default (war, revolution, riots, catastrophes, explosions or radioactive contamination and political events);
- (2) loans to borrowers usually considered creditworthy or not subject to bankruptcy law (public authorities or bodies);
- (3) claims against other entities for which the likelihood and severity of defaults can be influenced by the assured (parent, subsidiary and affiliated company with the company assured);
- (4) default interest, expenses and losses arising from disputes with debtors and damage from impairment of receivables (because expression of an indirect damage is difficult to quantify in terms of probability and severity of default);
- (5) claims arising from sales that are not connected with the assured's usual object (because the company assured may not be able to properly assess the risk of the trade credit);
- (6) losses resulting from non-compliance by the assured company with the Italian legislation or regulation or the assured's breach of contract or warranty information (trade credit must be uncontested as written above point 2);

- (7) trade credits that the insurance company was not notified of or for which the relative premium was not paid or arising from new deliveries to the debtor after the date of default (once a customer goes into default, the company assured does not have to increase its exposure to that customer).

From a technical standpoint, the actors involved in the contract are the policyholder, the insured, and the beneficiary. These subjects often coincide in a single figure so that, usually, the seller company is at the same time the policyholder, the insured, and the beneficiary of the trade credit insurance contract. The contract may be issued for third parties (that is, when the policyholder and the insured are not the same company because the first insures the interest of a third party) or on behalf of third parties as well. It follows that a bank could be the policyholder insuring the trade credits of some companies towards their debtors, especially if such credit were transferred to the bank. Nevertheless, each of these figures has specific obligations.

The policyholder has to pay the premium in advance. Usually, the premium consists of two payments: (i) a minimum price is paid at the time of signing the framework contract, and (ii) an additional premium is paid when the trade credit is issued and notified to the insurer (declaration of application). This second component of the premium usually is a percentage of the insured turnover and depends on different variables such as the type, duration and credit rating of the trade credits insured, the losses suffered by the insured company in the past, and the characteristics of its trade credit strategy.

The insured is the seller company, which must notify the insurer immediately after all new trade credit is issued that is subject to be protected by the insurance contract (the abovementioned “declaration of application”). In the event of trade credit insolvency, the insured also has to suspend all new supplies of goods/services and trade credits to the insolvent company.

The beneficiary (which could in principle be the insured company or a bank in case the trade is transferred to it) has to communicate to the insurer the status of the trade credit insolvency within the period reported in the policy, such that the insurer can start any recovery actions. The object of the guarantee is the permanent loss of value of the trade credit as a result of the insolvency. The contracts distinguish among the following:

- (1) legal insolvency as a result of bankruptcy proceedings defined in the contract (bankruptcy, preventive arrangement with creditors, court, etc.);
- (2) effective default if a legal action fails to recover the trade credit. In this case, the contract defines exactly the day when the executive procedure was to be considered unsuccessful;
- (3) protracted default in case of a delay in payment lasting for a certain number of days defined in the policy (e.g., 180 days from the date notice of default of a customer).

As a result, in case of a trade credit being unpaid, the beneficiary could receive up to three different payments from the insurer:

- (1) a pre-indemnization payment if the insurer will successfully recover all or part of the credit;
- (2) an indemnization payment; if the debt is not recovered fully, the insurance company will pay the indemnization to the seller/insured to cover the credit loss suffered. The coverage could not be complete because of the deductibles and the unpaids;

- (3) post-indemnization payments: once the indemnization is paid, the credit owner is no longer the seller/insured but the insurer and will continue to recover the credit. In that case, a small part of it (the proportion of deductibles and unpaid on the loss suffered) could be paid back to the seller/insured.

3. Statistical methodology and data analysis

The initial dataset contains information about the entire population of claims in the period 2006-2013 for four credit insurance companies. To assess the actual effectiveness of the credit insurance policy, only claim settlements have been considered (total observations $n = 81,406$). Claims closed without payment, due to the internal activity of credit recovery, have been eliminated. In this paragraph, the preliminary steps of all data analyses are presented: checking the consistency and accuracy of the total claim size (insured, covered, uncovered, exposure, and compensation paid and recovered), examining and describing claim distributions, and selecting important variables. The dataset contains the following variables:

- Total credit amount (at compensation date)
- Uncovered amount
- Total insured amount (at compensation date)
- Mandatory uncovered amount
- Deductibles amount
- Recovery amount (before compensation)
- Compensation payment
- Recovery amount (after compensation)

The analysed information has been observed on four sequential dates. The time intervals between these dates is measured in days:

- Claim request date (t_1)
- Recovery date (before compensation) (t_2)
- Last compensation payment date (t_3)
- Recovery date (after compensation) (t_4)

Moreover, the default date has been estimated as six months prior to the claim request date to include delays for management activities:

- Estimated default date ($t_0 = t_1 - 180\text{days}$)

As indicated in Tab. 1, the compensation is paid approximately eight months after the claim request date and approximately 14 months after the estimated default date, given our assumptions of a total delay of 6 months from the claim request date by the creditor.

To verify the effectiveness of the policy as a risk mitigant, it is necessary to calculate the recovery rate (RR) as the percentage of the trade credit recovered and the correspondent loss given default (LGD) as the portion of trade credit unrecovered for the seller/insured. To calculate the RR, it is necessary to consider all the payments made by the insurance company to the seller/insured. As mentioned above in the previous paragraph, the seller/insured could receive up to three different payments from the insurer: (i) pre-indemnization payments in case the insurer will successfully recover part or all of the trade credit; (ii) the indemnization payment in case the debt is not recovered fully, and the insurer will pay the indemnization to the seller/insured; and

Table 1. Summary statistics of time interval (all data expressed in days).

Value	$(t_2 - t_1)$	$(t_3 - t_1)$	$(t_4 - t_1)$	$(t_2 - t_0)$	$(t_3 - t_0)$	$(t_4 - t_0)$
Mean	113.95	235.47	564.27	293.95	415.46	744.27
Std. deviation	152.02	193.95	409.00	152.00	193.95	409.00
1st percentile	0.00	0.00	15.26	180.00	180.00	195.26
5th percentile	0.00	0.00	113.00	180.00	180.00	293.00
25th percentile	0.00	121.00	269.00	180.00	301.00	449.00
50th percentile	78.00	208.00	455.00	258.00	388.00	635.00
75th percentile	157.00	294.00	756.00	337.00	474.00	936.00
95th percentile	352.00	571.00	1381.00	532.00	751.00	1561.00
99th percentile	704.72	1001.00	1928.22	884.72	1181.00	2108.22
# valid	20381	81406	9725	20381	81406	9725
# missing	61025	0	71681	61025	0	71681

(iii) post-indemnization payments since the insurer will continue to recover the credit. In that case, a small part of it (the proportion of deductibles and unpaid on the loss suffered) could be paid back to the seller/insured.

Table 2. Summary statistics of initial data (all data expressed in EUR; “comp.” means “compensation date”).

Value	Total credit amount (at comp.)	Total insured amount (at comp.)	EAD	Recovery amount (before comp.)	Compensation payment	Recovery amount (after comp.)
Mean	20692.52	16867.74	16623.99	11765.52	10674.18	3117.96
Std. deviation	93179.99	65602.86	65486.70	42902.27	47720.30	16443.38
1st percentile	295.55	296.01	285.36	0.00	0.00	24.08
5th percentile	826.67	840.65	807.49	159.16	86.10	80.43
25th percentile	3106.16	3134.54	3023.00	1211.59	1210.50	409.63
50th percentile	7569.99	7445.13	7216.27	3645.00	3873.69	1113.82
75th percentile	18320.25	16659.15	16197.71	10000.00	10087.56	2698.81
95th percentile	68525.96	51394.99	50757.31	42418.50	39000.00	10348.55
99th percentile	201178.08	150000.00	150000.00	124019.28	98104.11	30126.01
# valid	81406	81406	81406	20381	81406	9637
# missing	0	0	0	61025	0	71769

Tab. 2 reports the total credit amount unpaid at the compensation date in the first column, the total credit amount effectively insured at the compensation date in the second column, and the amount of the exposition at default (EAD) such as the minimum value between total credit amount (at compensation date) and the total insured amount (at compensation date) in the third column. In the fourth column, we find the recovery amounts before compensation (pre-indemnization payments); in the fifth column, we find the compensation payments (or the indemnizations); and in the last column, we find the recovery payments after compensation (post-indemnization payments). The average values of the compensation payments and the recovery amounts (before and after compensation) are higher than the EAD; this result is due to the presence of a few compensation payments (and recovery amounts) with very high and abnormal amounts. The compensation payments and the recovery amounts are more frequent for the largest total credit and insured amounts. At the same time, compensation and recovery amounts are less frequent for the smaller insured amounts, as you can see in lower percentile values of compensation payments and recovery amounts (1-5th and also 10th percentile values).

To define the recovery rate (RR) and the loss given default (LGD) at the (estimated) default date, we first identified the exposure at default (EAD), such as the minimum value between the total credit amount (at compensation date) and the total insured amount (at compensation date). As indicated in Tab. 2, the average credit amount

is higher than the average insured amount, and this is due to the fact that for some loans the seller/insured did not respect the contractual clauses imposed by the credit insurance contract (for instance, the credit arises from sales that are not connected with the seller’s usual legal object), or the credit arises from new deliveries to the debtor after the date of default. It is important to note that the average insured amount represents the actual commitment to compensation payments by the insurance companies and consequently the amount for which the insurance companies develop their efforts for recovery before and after compensation. The average credit amount is approximately EUR 20,700, whereas the average insured amount is approximately EUR 17,000.

RR and LGD are estimated considering both the date of the claim request and the estimated date of default. We used four methodologies (see Eq. 1 for approaches (a), (b), (c), and (d), where “comp.” stands for “compensation”, and “am.” stands for “amounts”) to estimate the RR at t_1 (claim request date) and t_0 (estimated default date) using discount rates $i = 3\%$, 5% , 8% , and 13% .

$$\text{RR}_{i\%} = \begin{cases} \frac{\text{Comp. payment}_{i\%}}{\text{EAD}} & \text{(a)} \\ \frac{\text{Comp. payment}_{i\%} + \text{Recovery am. post-comp.}_{i\%}}{\text{EAD}} & \text{(b)} \\ \frac{\text{Comp. payment}_{i\%} + \text{Recovery am. before comp.}_{i\%}}{\text{EAD} + \text{Recovery am. before comp.}_{i\%}} & \text{(c)} \\ \frac{\text{Comp. payment}_{i\%} + \text{Recovery am. before comp.}_{i\%} + \text{Recovery am. post-comp.}_{i\%}}{\text{EAD} + \text{Recovery am. before comp.}_{i\%}} & \text{(d)} \end{cases} \quad (1)$$

To calculate the LGD properly, we compute the present value of the compensation payment and the recovery amounts (before and after compensation) considering different scenarios with different discount rates ($i = 3\%$, 5% , 8% , and 13%) to estimate the recovery rates and the LGD at the claim request date (t_1) and at the estimated default date (t_0). Due to the wide and largely unresolved debate on the discount rate to be used¹, we decided to use four different interest rates.

We compute the LGD considering not only different discount rates (3%, 5%, 8%, and 13%) but also different recovery amounts (before and after compensation) over and above the compensation payment itself (see Eq. 2).

$$\text{LGD}_{i\%} = (1 - \text{RR}_{i\%}) \quad (2)$$

Moreover, the estimated LGD has been weighted by the exposure value (EAD) to account for the presence in the data of a large proportion of small credit amounts. Regarding the empirical evidence of the performed analysis, we find that the LGD weighted by EAD is always lower than the unweighted LGD; thus, the losses on the greater amount of exposures are minor (see Tab. 3 and Tab. 4). This is due to the fact that the compensation payments and the recovery amounts are more frequent for the largest total credit and insured amounts. At the same time, compensation and recovery amounts are less frequent for the smaller insured amounts, as can be observed from

¹The issue was initially extensively discussed in Gibilaro and Mattarocci (2007) and recently the European Banking Association “. . . has considered various possibilities with regard to the discounting rate and analysed various practices in that regard. Approaches used by institutions include the use of discounting factors based on effective interest rates of the underlying loans, various add-ons in the range of 0 to 10% and even higher in some cases, and various underlying internal and external interest rate benchmarks.” EBA (2017), pag. 32.

the lower percentiles values of compensation payments and recovery amounts (the 1st-, 5th- and 10th-percentile values in Tab. 2).

Table 3. Means of the LGD % computed for the four approaches (a), (b), (c), and (d) of Eq. 1

Approaches	LGD _{t1} % (claim request date)				LGD _{t0} % (estimated default rate)			
	<i>i</i> = 3%	<i>i</i> = 5%	<i>i</i> = 8%	<i>i</i> = 13%	<i>i</i> = 3%	<i>i</i> = 5%	<i>i</i> = 8%	<i>i</i> = 13%
Approach (a)	39	39	40	42	40	41	43	46
Approach (b)	36	37	38	40	37	39	41	44
Approach (c)	32	33	34	36	33	34	36	39
Approach (d)	30	31	32	34	31	32	34	37
# valid	81 406	81 406	81 406	81 406	81 406	81 406	81 406	81 406
# missing	0	0	0	0	0	0	0	0

If we consider the recovery amounts before and after compensation, the LGD decreases. Therefore, the LGD computed based on the compensation payment only is the highest. Recovery activities are a crucial aspect of the credit insurance contracts. If we consider the case of LGD computed based on the compensation payment only (less favourable to the insured), the values of LGD are almost always less than 45% (of the threshold limit for senior unsecured credit according to the regulations). Finally, the LGD distribution tends to be bimodal (two modes: losses often both very high and very low), and the volatility of LGD is similar to that in the extant literature (its standard deviation is one-third to approximately two-thirds of the average). Regarding the first aspect, very low losses are usually due to technical defaults, whereas very high losses are likely to represent errors during the underwriting process. The losses in the middle are the losses from “true economic defaults” and, as such, are rather rare and relatively less frequent.

Table 4. Means of the LGD % weighted by the EAD computed for the four approaches (a), (b), (c), and (d) of Eq. 1

Approaches	LGD _{t1} % (claim request date)				LGD _{t0} % (estimated default rate)			
	<i>i</i> = 3%	<i>i</i> = 5%	<i>i</i> = 8%	<i>i</i> = 13%	<i>i</i> = 3%	<i>i</i> = 5%	<i>i</i> = 8%	<i>i</i> = 13%
Approach (a)	37	38	39	41	38	39	41	44
Approach (b)	35	36	37	39	36	37	39	42
Approach (c)	30	31	32	34	31	32	34	37
Approach (d)	28	29	30	32	29	30	32	36
# valid	81 406	81 406	81 406	81 406	81 406	81 406	81 406	81 406
# missing	0	0	0	0	0	0	0	0

4. Implications for banks

According to the Basel 2 regulatory framework, there are a few restrictions about the use of trade credit policies as recognized credit risk mitigant instruments for banks using the Standard Formula and the Foundation Internal-Based Approach (FIRBA). In contrast, the Advanced Internal-Based Approach (AIRBA) banks have fewer restrictions on the type of eligible guarantors. The main restriction is that the guarantee must be evidenced in writing, non-cancellable by the guarantor, in force until the debt is satisfied in full and legally enforceable against the guarantor in a jurisdiction, where the guarantor has assets to attach and enforce a judgement. In some cases, the insurance contract could reveal itself as a sort of “conditional guarantee”, such as when

some credits turn out ex post excluded from coverage (credits that the insurance company was notified of, for which the premium was not paid properly, or arising from new deliveries to the debtor after the date of default).

However, conditional guarantees (according to them, the guarantor may not be obliged to perform) for AIRBA banks may be recognized under certain conditions: “the onus is on the bank to demonstrate that the assignment criteria adequately address any potential reduction in the risk mitigation effect” (see Basel Committee on Banking Supervision 2006, par. 483). According to Italian domestic regulation², guarantees eligible by AIRBA banks must still comply with some general criteria, which must be respected by all banks. Particularly, any guarantee must comply with legal certainty standards and timely realization, organisational, and public disclosure standards.

The integrated interpretation of the provisions of Circular 263 and Basel 2 shows that the specific requirements of the standardized approach of non-cancellation by the guarantor (the cover must be irrevocable, i.e., contractual clauses that allow the protection provider to unilaterally to cancel the credit or increase the cost of coverage are not permitted) and completeness (the guarantor covers all types of payments) remain as binding requirements. The only requirement removed for banks admitted to the AIRBA approach is the unconditional coverage³ “provided that the banks demonstrate to the Bank of Italy that the exposures are assigned to the classes of credit-worthiness criteria that adequately address any limitations of the effect of attenuation risk”. Consequently, for AIRBA banks, an effort is required to modify some clauses of the trade insurance contract to fulfil the requirement of irrevocable commitment by the insurance company.

To measure the ability of a trade credit insurance contract to be a risk mitigant for a bank, we assumed an AIRBA bank, which quantifies the capital absorbed by a senior corporate loan according to the following conditions:

- (1) the bank uses the formula currently used by FIRBA banks. According to this formula, the LGD of a loan without any recognized guarantee is quantified by the regulation based on the loan characteristics (e.g., 45% for the senior corporate debt and 75% for subordinate debt);
- (2) the bank recognizes the trade credit policy as a valid risk mitigant, and consistent with our analysis, the LGD in case of senior corporate loans guaranteed by the policy is reduced to 35%;
- (3) the maturity of the loan is fully recognized in the formula (thus moving away from the maturity date (2.5 years) for FIRBA banks).

To facilitate the comparison of the benefits acquired because of trade credit policy, we assume that an AIRBA bank evaluates a generic senior unsecured loan (therefore, with an LGD of 45%) with a maturity of 2.5 years. In this context, the capital requirement on the basis of the formula imposed by the supervisory authority for such lending corresponds to the hypothesis of an IRB Foundation bank.

Tab. A1 in the Appendix reports the sensitivity of a capital requirement, which is analysed under situations when the maturity is allowed to vary between 0.25 and 2.5 years. We focus on the lower maturities (0.25-0.5 years, corresponding to 3-6 months) to be consistent with the corresponding maturity of trade credit instruments. Let us

²See Circular 263/2006 Section V of Bank of Italy

³The unconditional coverage is defined as the absence of contractual conditions outside the direct control of the bank, which may prevent the protection provider from the obligation to make timely payments due in the case where the original counter-party has not fulfilled the obligation specified in the contract.

imagine a trade credit discounted without any recognized guarantee by an AIRBA bank (such that the LGD is quantified by the regulation as 45%) for 100 Euros with a deadline of 6 months and a probability of default (PD) of 1%. The bank capital absorbed by such a loan (according to Tab. A1 in the Appendix) would be 5.68 euros if the loan were classified as “corporate”. If, instead, the discount of the trade credit could be classified as “SME”, the bank capital requirement will reduce to 3.71 euros, and if it could be classified as “retail”, then such capital requirement will reduce to 3.88 euros.

If, for the same discounted credit, the AIRBA bank recognizes the trade policy as a valid risk mitigant (such that the LGD could be reduced to 35%), for 100 Euros with a deadline of 6 months and a probability of default (PD) of 1%, the bank capital absorbed (see Tab. A2 in the Appendix) would be 4.41 euros if the loan were classified as “corporate”. If, instead, the discount of the trade credit could be classified as “SME”, the bank capital requirement will reduce to 2.89 euros, and if it could be classified as “retail”, to 3.02 euros. This will give rise (according to Tab. A3 in the Appendix) to a capital savings of 1.26 euros (in the case of a corporate loan), 0.75 euros (in the case of an SME loan) and 0.86 euros (in the case of a retail loan).

As a result of this analysis, we have to point out that if we take an LGD of 35% into consideration, the capital savings ratio is equal to 22.22% for all combinations of PD and LGD and market segment considered. This is a direct consequence of the fact that the LGD enters the risk capital-weighting formula as a linear function of the capital requirement. In absolute terms, of course, the savings on capital allocated are an increasing function of PD and, to a lesser extent, of the maturity and type of loan (greater savings for corporate loans, followed by SME and finally by retail). As is easy to understand, the savings are moderate for very small PDs but become significant in absolute terms for higher PDs. In other words, the higher the PD, the higher the capital savings is. Obviously, this will lead to a corresponding higher underwriting risk for the insurer.

These results are based on a prudential approach within the current regulatory framework (Basel Committee on Banking Supervision 2017). In detail, the prudential approach implies that we calculated the capital requirements relating to credit risk as resulting from the application of the formulas provided by the regulation of Basel 2 according to the Italian domestic regulation, without taking into account the add-ons provided by Basel 3 and, instead, taking into account the impact on small and medium-sized enterprises in the SME supporting factor (art. 501 of the EU Regulation No. 575/2013). This implies an underestimation of the savings on capital that a bank could achieve if AIRBA accepts the policy as a risk mitigant⁴.

In the case of a saving in the capital requirement, the corresponding economic benefit for the bank depends on the opportunity of financing the loan with less capital and more deposits: in other words, a replacement effect (between deposits and capital) should be taken into consideration. Therefore, the economic benefit for the bank could be quantified as the difference between the cost of capital and the cost of the marginal deposit. Assuming that the cost of capital (Ke) is 12% and that the cost of marginal deposit is 2% (TIT), this advantage will correspond to 10% ($Ke - TIT$) for every euro of capital saved. Tab. A4 in the Appendix reports the savings due to the lowest weighted average cost of capital for every 100-million-euro loan.

⁴The existing regulatory framework for AIRBA banks will change in the future (Basel Committee on Banking Supervision 2017). As is known from 1.1.2022, a number of new regulations included in the Basel 3 Agreement will come into force, including the Revised IRB framework and the Output Floor. These new rules may partially modify the convenience calculations.

It should also be noted that the portion of capital saved could be used to support other financial assets with a corresponding marginal yield (*Raroc*). Assuming that this yield corresponds to 15%, with a cost of capital assumed to be 12%, we should quantify a further advantage corresponding to 3% of the portion of capital saved. This further economic advantage is quantified in absolute value (for every 100-million-euro loan) in Tab. A5 in the Appendix.

As we can imagine, the final total benefit is equal to the sum between the cost of capital saved and the EVA percentage (difference between *Raroc* and *Ke*), as detailed in Tab. A6 in the Appendix. It should be pointed out that the majority of the benefits could come—as evidenced in the examples—from the cost of capital differential, which in turn depends on the historical volatility of the bank’s financial results (higher volatility and increased *Ke* required by shareholders) and the cost of the marginal deposit.

In the restrictive hypothesis, where the insurance company issuing the credit policy belongs to the same group of banks, the capital savings from the bank should not be offset by an equivalent absorption of capital by the company. For this purpose, it is sufficient to calculate the absorption of marginal capital according to the standard formula of the Solvency II Directive, as is described by the EU Regulation 2015/35 of October 10, 2014. In this sense, the calculation of the marginal capital (gross of further correlation effects with other insurance and financial risks) takes into consideration the premium and reserve risk (see Articles 114 to 117 of the EU Regulation) and the catastrophe risk (Article 134 of the EU Regulation).

In this context, for corporate loans⁵; and the marginal capital requirement would settle at 2.18% of the amount of EAD, at a lower level with respect to the capital savings of a bank (2.49%, Tab. A3).

5. Conclusions and policy implications

In this paper, we analyse a large dataset on Italian trade credit guaranteed by trade credit policies. Specifically, we investigate the ability of the policy to be an effective credit risk mitigant. We find that trade credit policies significantly reduce the LGD of trade credit transferred to a bank to be discounted.

From a legal standpoint, trade insurance contracts, to be considered a credit risk mitigant, need some modifications to fulfil the requirement of the irrevocable commitment rule. In that case, the policy, if accepted by the supervisory authority, could permit banks to reduce the capital requirement connected with the discount of trade credits. In more detail, this reduction in capital requirements may therefore be possible (i) for AIRBA banks, if the bank considers explicitly the policy as a risk mitigant under the LGD rating system, and if this choice is validated by the supervisory authority, and (ii) for other banks, if the supervisory authority, recognizing the policy as a risk mitigant, accepts the reduction in LGD from 45% to a lower percentage for a FIRBA bank or for standard banks.

These results are particularly important for insurance companies issuing trade credit policies, considering that the policies guarantee short-term credit and are mainly sold to large corporations. In fact, bank capital requirements on short-term credit lines

⁵We have used the following hypotheses: the amount of the average secured loan (EAD) is 16,000 euros; the first two loans amount to 350,000 and 320,000 euros; the number of contracts issued is 400,000; the contract has a duration of one year; the premium rate is 1.2%; PD is 5% and LGD is 45% for each loan (according to the Basel II regulation); the annual premiums are 76.8 million euro.

increase sharply due to the increase in the PD and *ceteris paribus* are greater on corporate loans than on SME and retail loans. However, the ability of the policy to act as a risk mitigant for a bank is not offset by the increased capital requirement to the insurance company according to the Solvency II regulation. It follows that (i) the underwriting strategy of insurers could be concentrated on PD segments for which the reduction in the capital required for banks is higher than the corresponding levels of capital required for insurance companies, particularly if bank and insurance companies are part of the same group;⁶ (ii) insurers adopting internal models (in the Solvency II framework) could be advantaged to the extent that internal models could predict lower capital requirements compared with the standard formula; and (iii) a regulatory arbitrage risk should be considered by banking and insurance supervisory authorities in case credit risk could be transferred from one industry to the other in the presence of different capital requirements for the credit risk for banks and insurers.

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⁶In particular, from today until January 1, 2027 (and, to a lesser extent, until January 1, 2022), with the definitive entry into force (partial) of the output floor, according to which banks' risk-weighted assets must be equal to at least 72.5% of the total risk-weighted assets calculated using only the standardized approaches (Basel Committee on Banking Supervision 2017).

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Appendix A. Tables

Table A1. Capital requirement in percentage of 1 euro for different maturity – 45% LGD

PD %	Corporate loan												SME loan					Retail loan							
	2.50				2.00				1.50				1.00					0.25		0.50					
	1.22	1.43	1.67	1.03	1.43	1.67	1.03	0.84	0.84	0.95	0.64	0.45	0.35	0.73	0.61	0.50	0.50	0.71	0.57	0.38	0.27	0.43	0.21	0.21	0.38
0.03	1.67	2.20	2.51	2.20	3.78	4.85	4.38	3.90	3.43	3.20	2.91	2.63	2.35	2.06	1.92	2.41	2.74	3.40	3.88	4.31	4.92	4.45	4.30	4.92	4.53
0.05	4.20	5.32	5.90	5.41	4.92	5.45	4.92	3.93	3.68	3.55	3.25	2.95	2.66	2.36	2.21	2.74	3.40	3.88	4.31	4.92	4.53	4.92	4.64	5.16	5.63
0.10	7.83	7.29	7.02	6.50	5.97	5.45	4.92	3.93	3.68	3.55	3.25	2.95	2.66	2.36	2.21	2.74	3.40	3.88	4.31	4.92	4.53	4.92	4.64	5.16	5.63
0.25	8.95	8.41	8.95	8.41	7.87	7.32	6.78	6.51	6.11	5.09	4.77	4.44	4.12	3.80	3.63	4.31	4.92	4.53	4.92	4.64	5.16	5.63	5.32	5.95	6.41
0.50	10.36	9.83	9.29	8.76	8.12	7.58	7.31	5.72	5.40	5.09	4.77	4.44	4.12	3.80	3.63	4.31	4.92	4.53	4.92	4.64	5.16	5.63	5.32	5.95	6.41
1.00	10.89	10.37	9.84	9.32	8.79	8.23	7.96	6.04	5.73	5.42	5.11	4.80	4.64	4.30	4.13	4.81	4.92	4.53	4.92	4.64	5.16	5.63	5.32	5.95	6.41
1.50	11.84	11.32	10.81	10.29	9.78	9.52	9.52	6.79	6.49	6.20	5.90	5.61	5.46	5.11	4.94	5.62	5.95	5.63	5.95	5.63	6.41	6.97	6.67	7.15	7.51
2.00	12.71	12.20	11.69	11.19	10.68	10.42	10.42	7.25	6.96	6.67	6.38	6.09	5.95	5.63	5.32	6.01	6.41	6.09	6.41	6.09	6.67	7.15	6.86	7.34	7.71
2.50	13.54	13.03	12.53	12.03	11.52	11.27	11.27	7.72	7.43	7.15	6.86	6.57	6.43	6.11	5.82	6.51	6.97	6.67	6.97	6.67	7.15	7.63	7.34	7.82	8.19
3.00	14.37	13.86	13.36	12.86	12.36	12.11	12.11	8.19	7.90	7.61	7.32	7.03	6.74	6.45	6.16	6.85	7.31	7.02	7.31	7.02	7.50	8.00	7.71	8.21	8.58
4.00	15.20	14.69	14.19	13.69	13.19	12.94	12.94	8.66	8.37	8.08	7.79	7.50	7.21	6.92	6.63	7.32	7.78	7.49	7.78	7.49	7.97	8.47	8.18	8.68	9.05
5.00	16.03	15.52	15.02	14.52	14.02	13.77	13.77	9.13	8.84	8.55	8.26	7.97	7.68	7.39	7.10	7.81	8.27	7.98	8.27	7.98	8.17	8.67	8.38	8.88	9.25
6.00	16.86	16.35	15.85	15.35	14.85	14.60	14.60	9.58	9.29	9.00	8.71	8.42	8.13	7.84	7.55	8.26	8.75	8.46	8.75	8.46	8.65	9.15	8.86	9.36	9.73
7.00	17.69	17.18	16.68	16.18	15.68	15.43	15.43	10.03	9.74	9.45	9.16	8.87	8.58	8.29	8.00	8.71	9.30	9.01	9.30	9.01	9.20	9.70	9.41	9.91	10.28
8.00	18.52	18.01	17.51	17.01	16.51	16.26	16.26	10.48	10.19	9.90	9.61	9.32	9.03	8.74	8.45	9.16	9.75	9.46	9.75	9.46	9.55	10.05	9.76	10.26	10.63
9.00	19.35	18.84	18.34	17.84	17.34	17.09	17.09	10.93	10.64	10.35	10.06	9.77	9.48	9.19	8.90	9.61	10.20	9.91	10.20	9.91	10.00	10.50	10.21	10.71	11.08
10.00	20.18	19.67	19.17	18.67	18.17	17.92	17.92	11.38	11.09	10.80	10.51	10.22	9.93	9.64	9.35	10.06	10.63	10.34	10.63	10.34	10.43	10.93	10.64	11.14	11.51
15.00	21.01	20.50	20.00	19.50	19.00	18.75	18.75	11.83	11.54	11.25	10.96	10.67	10.38	10.09	9.80	10.51	11.08	10.79	11.08	10.79	10.88	11.38	11.09	11.59	11.96
20.00	21.84	21.33	20.83	20.33	19.83	19.58	19.58	12.28	11.99	11.70	11.41	11.12	10.83	10.54	10.25	10.96	11.53	11.24	11.53	11.24	11.13	11.63	11.34	11.84	12.21

Table A2. Capital requirement in percentage of 1 euro for different maturity – 35% LGD

PD %	Corporate loan					SME loan					Retail loan			
	2.50	2.00	1.50	1.00	0.50	0.25	2.50	2.00	1.50	1.00	0.50	0.25	0.16	0.29
0.03	0.95	0.80	0.65	0.50	0.35	0.27	0.57	0.48	0.39	0.30	0.21	0.16	0.16	0.29
0.05	1.30	1.41	0.93	0.74	0.55	0.46	0.77	0.66	0.55	0.44	0.33	0.28	0.28	0.44
0.10	1.96	1.71	1.47	1.23	0.99	0.87	1.17	1.03	0.88	0.74	0.59	0.52	0.52	0.74
0.25	3.26	2.94	2.61	2.29	1.96	1.80	1.96	1.76	1.57	1.37	1.18	1.08	1.08	1.40
0.40	4.14	3.77	3.40	3.04	2.67	2.49	2.49	2.27	2.05	1.83	1.61	1.50	1.50	1.87
0.50	4.59	4.21	3.82	3.44	3.06	2.87	2.76	2.53	2.30	2.07	1.84	1.72	1.72	2.13
0.75	5.46	5.05	4.64	4.24	3.83	3.62	3.27	3.03	2.78	2.54	2.30	2.17	2.17	2.64
1.00	6.09	5.67	5.25	4.83	4.41	4.21	3.64	3.39	3.14	2.89	2.64	2.51	2.51	3.02
1.30	6.66	6.24	5.81	5.39	4.97	4.75	3.96	3.71	3.46	3.20	2.95	2.83	2.83	3.35
1.50	6.96	6.54	6.12	5.70	5.27	5.06	4.13	3.88	3.62	3.37	3.12	3.00	3.00	3.52
2.00	7.58	7.16	6.74	6.32	5.90	5.69	4.45	4.20	3.96	3.71	3.46	3.34	3.34	3.82
2.50	8.06	7.64	7.23	6.81	6.40	6.19	4.70	4.45	4.21	3.97	3.73	3.61	3.61	4.02
3.00	8.47	8.06	7.65	7.25	6.84	6.63	4.90	4.67	4.43	4.19	3.96	3.84	3.84	4.14
4.00	9.21	8.81	8.41	8.01	7.61	7.41	5.28	5.05	4.82	4.59	4.36	4.25	4.25	4.29
5.00	9.88	9.49	9.09	8.70	8.30	8.11	5.64	5.42	5.19	4.97	4.74	4.63	4.63	4.38
6.00	10.53	10.14	9.74	9.35	8.96	8.77	6.00	5.78	5.56	5.33	5.11	5.00	5.00	4.47
10.00	12.74	12.35	11.97	11.59	11.21	11.02	7.36	7.14	6.92	6.70	6.48	6.37	6.37	4.98
15.00	14.61	14.25	13.89	13.53	13.17	12.98	8.64	8.42	8.21	8.00	7.78	7.68	7.68	5.84
20.00	15.71	15.38	15.04	14.71	14.37	14.20	9.47	9.27	9.06	8.86	8.66	8.56	8.56	6.61

Table A3. Capital saved in percentage of 1 euro for different maturity – 35% LGD

PD %	Corporate loan						SME loan						Retail loan			
	2.50	2.00	1.50	1.00	0.50	0.25	2.50	2.00	1.50	1.00	0.50	0.25	0.50	0.25	0.08	0.12
0.03	0.27	0.23	0.19	0.14	0.10	0.08	0.16	0.14	0.11	0.09	0.06	0.05	0.06	0.05	0.08	0.08
0.05	0.37	0.32	0.26	0.21	0.16	0.13	0.22	0.19	0.16	0.13	0.09	0.08	0.09	0.08	0.12	0.12
0.10	0.56	0.49	0.42	0.35	0.28	0.25	0.33	0.29	0.25	0.21	0.17	0.15	0.17	0.15	0.21	0.21
0.25	0.93	0.84	0.75	0.65	0.56	0.51	0.56	0.50	0.45	0.39	0.34	0.31	0.34	0.31	0.40	0.40
0.40	1.18	1.08	0.97	0.87	0.76	0.71	0.71	0.65	0.58	0.52	0.46	0.43	0.46	0.43	0.54	0.54
0.50	1.31	1.20	1.09	0.98	0.87	0.82	0.79	0.72	0.66	0.59	0.52	0.49	0.52	0.49	0.61	0.61
0.75	1.56	1.44	1.33	1.21	1.09	1.04	0.94	0.87	0.80	0.73	0.66	0.62	0.66	0.62	0.76	0.76
1.00	1.74	1.62	1.50	1.38	1.26	1.20	1.04	0.97	0.90	0.83	0.75	0.72	0.75	0.72	0.86	0.86
1.30	1.90	1.78	1.66	1.54	1.42	1.36	1.13	1.06	0.99	0.92	0.84	0.81	0.84	0.81	0.96	0.96
1.50	1.99	1.87	1.75	1.63	1.51	1.45	1.18	1.11	1.04	0.96	0.89	0.86	0.89	0.86	1.01	1.01
2.00	2.16	2.04	1.92	1.80	1.68	1.62	1.27	1.20	1.13	1.06	0.99	0.95	0.99	0.95	1.09	1.09
2.50	2.30	2.18	2.07	1.95	1.83	1.77	1.34	1.27	1.20	1.13	1.07	1.03	1.07	1.03	1.15	1.15
3.00	2.42	2.30	2.19	2.07	1.95	1.89	1.40	1.33	1.27	1.20	1.13	1.10	1.13	1.10	1.18	1.18
4.00	2.63	2.52	2.40	2.29	2.17	2.12	1.51	1.44	1.38	1.31	1.25	1.21	1.25	1.21	1.23	1.23
5.00	2.82	2.71	2.60	2.49	2.37	2.32	1.61	1.55	1.48	1.42	1.35	1.32	1.35	1.32	1.25	1.25
6.00	3.01	2.90	2.78	2.67	2.56	2.50	1.72	1.65	1.59	1.52	1.46	1.43	1.46	1.43	1.28	1.28
10.00	3.64	3.53	3.42	3.31	3.20	3.15	2.10	2.04	1.98	1.91	1.85	1.82	1.85	1.82	1.42	1.42
15.00	4.17	4.07	3.97	3.86	3.76	3.71	2.47	2.41	2.35	2.28	2.22	2.19	2.22	2.19	1.67	1.67
20.00	4.49	4.39	4.30	4.20	4.11	4.06	2.71	2.65	2.59	2.53	2.47	2.45	2.47	2.45	1.89	1.89

Table A4. Savings in the cost of capital for 100 mln. euros for different maturity

PD %	Corporate loan						SME loan						Retail loan
	2.50	2.00	1.50	1.00	0.50	0.25	2.50	2.00	1.50	1.00	0.50	0.25	
0.03	27 218	22 906	18 594	14 283	9 971	7 815	16 223	13 653	11 083	8 513	5 943	4 658	8 388
0.05	37 032	31 734	26 436	21 139	15 841	13 192	22 105	18 942	15 780	12 618	9 456	7 875	12 492
0.10	55 881	48 982	42 082	35 183	28 283	24 833	33 449	29 320	25 190	21 060	16 930	14 865	21 036
0.25	93 227	83 924	74 621	65 319	56 016	51 365	56 010	50 421	44 832	39 243	33 654	30 860	39 864
0.40	118 188	107 715	97 242	86 769	76 295	71 059	71 055	64 758	58 462	52 165	45 869	42 721	53 563
0.50	131 179	120 220	109 261	98 302	87 343	81 863	78 839	72 252	65 666	59 079	52 493	49 200	60 983
0.75	155 991	144 336	132 682	121 028	109 374	103 547	93 531	86 543	79 555	72 567	65 580	62 086	75 563
1.00	173 966	162 007	150 048	138 089	126 130	120 151	103 941	96 796	89 651	82 506	75 360	71 788	86 256
1.30	190 229	178 146	166 063	153 980	141 898	135 856	113 097	105 914	98 730	91 547	84 363	80 771	95 719
1.50	198 984	186 895	174 806	162 717	150 628	144 583	117 893	110 730	103 568	96 405	89 243	85 662	100 575
2.00	216 436	204 449	192 462	180 475	168 487	162 494	127 130	120 089	113 048	106 007	98 966	95 445	109 272
2.50	230 195	218 365	206 535	194 705	182 875	176 960	134 147	127 253	120 359	113 465	106 571	103 124	114 757
3.00	242 034	230 358	218 683	207 007	195 332	189 494	140 098	133 340	126 582	119 824	113 066	109 686	118 328
4.00	263 027	251 594	240 160	228 727	217 294	211 577	150 814	144 259	137 703	131 147	124 592	121 314	122 513
5.00	282 392	271 114	259 835	248 557	237 279	231 639	161 185	154 747	148 310	141 872	135 435	132 216	125 156
6.00	300 782	289 603	278 425	267 246	256 067	250 477	171 547	165 171	158 796	152 420	146 044	142 856	127 635
10.00	363 862	352 972	342 082	331 192	320 303	314 858	210 357	204 062	197 766	191 470	185 175	182 027	142 356
15.00	417 467	407 139	396 810	386 482	376 154	370 989	246 816	240 709	234 603	228 497	222 390	219 337	166 963
20.00	448 934	439 345	429 756	420 167	410 578	405 784	270 519	264 741	258 963	253 185	247 407	244 518	188 967

Table A5. Economic marginal benefits ($RAROC - Ke$) on capital reinvested by 100 mln. euros for different maturity

PD %	Corporate loan					SME loan					Retail loan		
	2.50	2.00	1.50	1.00	0.50	2.50	2.00	1.50	1.00	0.50	0.25	0.25	loan
0.03	8 165	6 872	5 578	4 285	2 991	2 344	4 096	3 325	2 554	1 783	1 397	1 397	2 516
0.05	11 109	9 520	7 931	6 342	4 752	3 958	5 683	4 734	3 785	2 837	2 362	2 362	3 748
0.10	16 764	14 695	12 625	10 555	8 485	7 450	8 796	7 557	6 318	5 079	4 459	4 459	6 311
0.25	27 968	25 177	22 386	19 596	16 805	15 409	16 803	13 450	11 773	10 096	9 258	9 258	11 959
0.40	35 456	32 314	29 173	26 031	22 889	21 318	19 428	17 539	15 650	13 761	12 816	12 816	16 069
0.50	39 354	36 066	32 778	29 491	26 203	24 559	23 652	19 700	17 724	15 748	14 760	14 760	18 295
0.75	46 797	43 301	39 805	36 308	32 812	31 064	28 059	23 867	21 770	19 674	18 626	18 626	22 669
1.00	52 190	48 602	45 014	41 427	37 839	36 045	31 182	29 039	26 895	24 752	22 608	22 608	25 877
1.30	57 069	53 444	49 819	46 194	42 569	40 757	33 929	31 774	29 619	27 464	25 309	25 309	28 716
1.50	59 695	56 069	52 442	48 815	45 188	43 375	35 368	33 219	31 070	28 922	26 773	26 773	30 172
2.00	64 931	61 335	57 739	54 142	50 546	48 748	38 139	36 027	33 914	31 802	29 690	29 690	32 782
2.50	69 059	65 510	61 961	58 412	54 863	53 088	40 244	38 176	36 108	34 040	32 937	32 937	34 427
3.00	72 610	69 107	65 605	62 102	58 600	56 848	42 030	40 002	37 975	35 947	33 920	33 920	35 498
4.00	78 908	75 478	72 048	68 618	65 188	63 473	45 244	43 278	41 311	39 344	37 378	37 378	36 754
5.00	84 718	81 334	77 951	74 567	71 184	69 492	48 355	46 424	44 493	42 562	40 630	40 630	39 665
6.00	90 235	86 881	83 527	80 174	76 820	75 143	51 464	49 551	47 639	45 726	43 813	43 813	38 291
10.00	109 158	105 892	102 625	99 358	96 091	94 457	63 107	61 218	59 330	57 441	55 552	55 552	42 707
15.00	125 240	122 142	119 043	115 945	112 846	111 297	74 045	72 213	70 381	68 549	66 717	66 717	50 089
20.00	134 680	131 804	128 927	126 050	123 174	121 735	81 156	79 422	77 689	75 956	74 222	74 222	56 690

Table A6. Total benefits of 100 mln. euros for different maturity

PD %	Corporate loan					SME loan					Retail loan		
	2.50	2.00	1.50	1.00	0.50	0.25	2.50	2.00	1.50	1.00	0.50	0.25	
0.03	35 384	29 778	24 173	18 567	12 962	10 159	21 090	17 749	14 408	11 067	7 726	6 055	10 904
0.05	48 141	41 254	34 367	27 480	20 593	17 150	28 736	24 625	20 514	16 403	12 292	10 237	16 240
0.10	72 646	63 676	54 707	45 737	36 768	32 283	43 484	38 115	32 746	27 378	22 009	19 324	27 347
0.25	121 195	109 101	97 008	84 914	72 821	66 774	72 813	65 547	58 281	51 016	43 750	40 117	51 823
0.40	153 644	140 029	126 414	112 799	99 184	92 376	92 371	84 186	76 001	67 815	59 630	55 537	69 631
0.50	170 533	156 286	142 040	127 793	113 546	106 422	102 490	93 928	85 366	76 803	68 241	63 960	79 278
0.75	202 788	187 637	172 487	157 337	142 186	134 611	121 590	112 506	103 422	94 338	85 254	80 711	98 231
1.00	226 156	210 609	195 062	179 516	163 969	156 196	135 124	125 835	116 546	107 257	97 968	93 324	112 133
1.30	247 297	231 590	215 882	200 174	184 467	176 613	147 027	137 688	128 349	119 010	109 672	105 002	124 435
1.50	258 680	242 964	227 248	211 532	195 816	187 958	153 260	143 949	134 638	125 327	116 016	111 360	130 747
2.00	281 367	265 784	250 200	234 617	219 033	211 242	165 269	156 116	146 962	137 809	128 655	124 079	142 054
2.50	299 254	283 875	268 496	253 117	237 738	230 048	174 391	165 429	156 467	147 505	138 542	134 061	149 184
3.00	314 644	299 466	284 288	269 110	253 931	246 342	182 128	173 342	164 557	155 771	146 985	142 592	153 826
4.00	341 935	327 072	312 208	297 345	282 482	275 050	196 059	187 536	179 014	170 492	161 969	157 708	159 268
5.00	367 110	352 448	337 786	323 124	308 462	301 131	209 540	201 171	192 802	184 434	176 065	171 880	162 702
6.00	391 017	376 484	361 952	347 419	332 887	325 621	223 011	214 723	206 434	198 146	189 857	185 713	165 926
10.00	473 020	458 863	444 707	430 550	416 393	409 315	273 464	265 280	257 096	248 911	240 727	236 635	185 063
15.00	542 708	529 281	515 854	502 427	489 000	482 286	320 860	312 922	304 984	297 045	289 107	285 138	217 052
20.00	583 614	571 149	558 683	546 218	533 752	527 519	351 675	344 164	336 652	329 141	321 629	317 873	245 657