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Research Department

**To Accept or Not to Accept?
Considerations in Providing Credit Insurance^ψ**

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להיענות או לא להיענות? שיקולים במתן ביטוח אשראי

מיטל גראם-רוזן ונועם מיכלסון

תקציר

במחקר זה אנו סוקרים את ביטוח האשראי בישראל ב-2010—2017 בעזרת מסד נתונים ייחודי שהעמידה לרשותנו בססח (ביטוח סיכוני סחר חוץ), המובילה בין החברות הפועלות בתחום ביטוח האשראי בישראל. המחקר נועד להשיב לשאלה מהם הגורמים המשפיעים על שיעור המענה (היקף הביטוח שניתן ביחס להיקף הביטוח שביקשו המבוטחים), שכן זהו הפרמטר המרכזי שבססח קובעת והוא משקף את תמחור הסיכונים בכל עסקה. אנו מוצאים כי שיעור המענה מושפע בעיקר ממידת החשיפה של החברה המבטחת למדינת הקונה, אך גם מגודל המבוטח, מסיכון הקונים שהוא פועל מולם ומהמצב הריאלי בעולם. גורמים אלה משפיעים אחרת על קונים מקומיים ועל קונים מחו"ל, ככל הנראה בשל הבדלים במידע על שני סוגי הקונים. נוסף לכך אנו בוחנים מהו היקף היצוא המבוטח בביטוח אשראי ומאפיינים אותו לפי הפיזור הגיאוגרפי ורמות הסיכון. לבסוף אנו בודקים – לראשונה בישראל – את אשראי הספקים ומוצאים קשר חזק בין סיכון אשראי הספקים לפעילות הריאלית.

To Accept or Not to Accept? Considerations in Providing Credit Insurance

Meital Graham-Rozen and Noam Michelson

Abstract

In this paper, we study credit insurance in Israel between 2010 and 2017, using a unique database provided for our use by ICIC—the Israeli Credit Insurance Company, the leading credit insurer in Israel. The research aims to determine what factors impact on the acceptance rate (the amount of insurance provided relative to the amount of insurance requested). This is the main parameter set by ICIC, and it reflects the pricing of the risks in each transaction. We find that the acceptance rate is impacted on primarily by the extent of the insurance company's exposure to the buyer's country, but also by the size of the insured company, the risk of the buyer with whom the company is transacting, and by the global real economic situation. These factors impact differently on domestic buyers and on buyers abroad, apparently due to differences in information on the two types of buyers. In addition, we examine the scope of exports insured by credit insurance and characterize them by geographical distribution and by risk levels. Finally, we examine—for the first time in Israel—suppliers' credit and find a strong link between suppliers' credit risk and real activity.

1. Introduction

Credit insurance is designed to insure suppliers in transactions in which the customers do not pay for the merchandise at the time of delivery. Credit insurance companies insure both exporters and domestic suppliers. The former involves foreign trade credit—customers can insure themselves against commercial and/or political risks. Studies show that this insurance encourages exports, particularly by small companies (Auboin and Engemann, 2014; van der Veer, 2015). The case of domestic suppliers involves suppliers' credit—customers can insure themselves against commercial risks. This insurance is a common method of financing customers' activity.

Suppliers' credit in Israel is given for long periods; many days pass between the date on which the merchandise is supplied and when payment for it is made. In the first quarter of 2016, the average number of credit days was 99—92 granted by agreement and 7 in arrears.¹ The number of credit days granted by agreement was higher in Israel than in all of the European Union member countries. Figures for Israel's public companies show that the average number of credit days in 2014 was 66 for large companies and 85 for small companies.² Another report claims that the number for small and medium-sized suppliers was 72.³ Postponement of payment creates difficulties for these small and medium-sized companies because they lack the capability and financial resilience needed to wait a long time for payment. They are therefore forced to seek alternative sources of financing until they receive the proceeds, in a reality where bank credit for small and medium-sized businesses is more expensive than credit for large businesses. A law designed to solve the problem, the Payment Ethics Law, was enacted in March 2017. This law states that the State and its institutions will pay suppliers within 45 days of receiving an invoice and no later than current month end plus 30 days.

Like all credit, suppliers' credit also incurs credit risk—the risk that buyers will not meet their financial obligations after receiving the goods or the service. The risk exists whether the buyer is domestic or located abroad. Credit insurance reduces this risk and transfers it to the insurance company, thereby increasing certainty among both exporters and participants in the domestic market.

This paper is intended to clarify the factors affecting an insurance company's decision of whether to sell credit insurance. We assess all of the negotiations stages between the company and the customer with the aid of a unique database provided for our use by ICIC—the Israeli Credit Insurance Company, the leading credit insurer in Israel. In this framework, we analyze the process and considerations leading the company to approve, partially approve, or reject a transaction request. In other words, we examine the acceptance rate—the ratio of the insurance granted to the total insurance requested by the client—and the factors affecting it.

In addition to understanding the factors affecting the acceptance rate, this paper makes two other contributions. The first is a presentation of the descriptive statistics for a unique database containing information on a main source of credit for which we have no micro level data—suppliers' credit; in addition, we link this credit with economic activity. The

¹ Knesset Research and Information Center, "Description and Analysis of the Credit Days Period in Israel and in European Countries", May 2016.

² According to an analysis by Calcalist based on financial statements published by 78 companies.

³ The Small and Medium Businesses Agency at the Ministry of Economy and Industry (January 2016), "Periodic Report: The State of Small and Medium Businesses in Israel."

second contribution is of much broader importance—as the paper facilitates understanding of the process involved in granting credit insurance, it also sheds light on the process involved in granting bank credit, since the processes share a broad common denominator.⁴ The analysis shows that the database is a good representation of Israel's export activity in 2010–16. It cannot be determined whether it is also a good representation of domestic credit, but the risk indicators derived from it are well correlated and anticipate variables reflecting real activity in Israel. As for the acceptance rate, we found that it is affected mostly by the size of the company, the distribution of the activity of the insurance company among different countries, and, of course, the buyer's risk. This result is robust to a wide variety of sensitivity tests. These factors, however, have different effects when the policyholder is transacting with a domestic buyer and when the buyer is foreign. The difference is probably due to differences in the information about the two types of buyers. The paper is organized as follows: Section 2 reviews the theoretical background and the literature on the subject; Section 3 presents ICIC's activity and the database used in the paper; in Section 4, we analyze the factors affecting the receiving of credit insurance; and in Section 5 we summarize and conclude.

2. Literature Review

Jones (2010) reviews credit insurance in domestic transactions and exports. He notes that insurance enables businesses to reduce credit risk and enables manufacturers to increase the volume of sales without worrying about the risk. This is more prominent and has a greater effect in the macroeconomic sphere when export transactions are involved, because insurance enables small manufacturers to take risks and engage in exporting, thereby increasing a country's total exports. In addition, spreading the risks between the manufacturers and the insurance companies alleviates the negative effects of an economic downturn, because the insurance companies are better prepared to absorb shocks.

Although there are other methods of ensuring payment (such as letters of credit provided by banks and factoring of deferred payments), most of them are more expensive than credit insurance, among other reasons because the insurers are specialists in this area, which lowers monitoring costs and makes it possible to at least partially adapt the insurance policy to the customer's needs.

Academic research on credit insurance is relatively sparse in comparison with the importance of the matter. In particular, there is a shortage of empirical research, due among other things to an absence of high-quality data. The empirical studies that have been conducted include Auboin and Engemann (2014) and van der Veer (2015). These researchers used databases of credit insurance companies—in particular figures for foreign trade insurance—in order to assess the connection between the volume of insured exports and the overall volume of exports. Auboin and Engemann (2014) show that in 2005–11 the connection is positive and significant, with no difference between periods of growth and periods of crisis. However, since it is possible that the volume of exports affects the volume of insured exports, rather than the other way around—meaning that endogeneity is possible—they use two-stage estimation. In the first stage, they test how the volume of insured exports is affected by the rate of claims for insurance payment in a country. They then run the model for the volume of exports in a country using the predicted value from

⁴ For example, assessing the buyer's risk in the framework of underwriting processes, risk pricing, etc.

the previous stage. One of the interesting findings from this study contradicts the hypothesis by Jones (2010): although the supply of credit insurance was reduced during the 2008–09 crisis, this apparently did not have an exceptional effect on the volume of trade (compared with how credit insurance affects trade on average).

The research by van der Veer (2015) uses a database containing the exports of all the OECD countries in 1992–2006. Using the gravitation model, he shows that the volume of insured exports affects total exports and the connection is not only positive, but also greater than 1. This means that exports increased by more than insured exports, indicating the positive externalities that foreign-trade credit insurance has on exports. Using a series of tests for endogeneity, he rejects the hypothesis of reverse causality.

In theoretical research, it is important to mention Funatsu (1986), who shows that export insurance provides protection against the commercial and political risks deriving from importers, and that export insurance enables small (and risk-averse) companies to venture to export. It also shows that if there is a government insurance company and it sets a premium that is low in comparison with the risk, this is equivalent to an export subsidy.

The current paper also fits in with the literature addressing the supply of credit and the factors affecting it. From the standpoint of considerations pertaining to supply, credit insurance to some extent is similar to credit, and it is therefore reasonable to assume that at least some of the factors affecting one of these affect the other as well. Berg (2016) uses data for credit requests submitted by companies to a large German bank and examines the effects of the response (acceptance or rejection) on their results. He also describes the way the bank handles requests, which includes collecting hard information (financial statements, for example) and soft information (additional business information) and turning it into a rating that determines whether the request is granted or rejected. Jimenez, et al. (2014) present the probability of approval of a credit request as a function of the company's variables (such as risk, profitability, and size). Ongena, et al. (2013) employ a similar method, although they use fewer financial variables reflecting the company's situation.

3. ICIC's Activity and the Database

3a. ICIC's Activity

Credit insurance is intended to insure companies against a situation in which their customers receive certain credit terms and ultimately do not pay. ICIC appeals to both exporters and domestic suppliers; it can insure them against commercial risks, and for exporters, against political risks as well. Commercial risk materializes when a customer encounters insolvency or economic difficulties and fails to pay the proceeds within a predetermined period from the agreed upon payment date. Political risk materializes when a customer does not pay the proceeds because a political event, such as a revolution, a ban on foreign currency outflows, nationalization, cancellation of import licenses, etc., has taken place in its country. ICIC usually insures the expected activity in the coming year, but it has also recently begun to insure activities for periods of one to three years. The insurance applies mainly to goods and sometimes also to the services accompanying them (for example, training in the operation of machinery that has been sold). Due to the structure and pricing of the activity, a matter that will be discussed below at greater length, ICIC insures mainly relatively large companies, but most of them are still at a stage in which they have major growth potential.

When an exporter/domestic supplier wants to buy an insurance policy, it must provide ICIC with particulars about its customers, activity volume, the payment terms that are granted, and the amount of coverage (the cover) being requested—a figure derived from the activity volume. ICIC conducts an underwriting analysis: it analyzes the main risks to which the potential policyholder is exposed and the sectors of its goods. If the firm is an exporter, ICIC also examines the destination countries and whether the exporter grants short or long payment terms, what reputation the firm and its customers have acquired over the years, and more. ICIC then gives a coverage proposal. The amount it is willing to cover divided by the requested amount is the acceptance rate.

ICIC requires businesses to insure their activity with all of their customers, not just specific ones, thereby avoiding exclusive involvement with transactions with riskier customers. The potential policyholder also has no interest in insuring only some of the transactions with each buyer, since as will be seen, the premium depends on actual deliveries, not the insurance coverage. These characteristics are an important feature for the study, because the study population is not affected by selection according to the level of risk; in other words, we obtain the probability distribution of risk for the entire population.

The maximum coverage determined has no expiry date, and as long as it exists, the policyholder does business with the buyer under the umbrella of that coverage. Every month, policyholders report their sales volume to ICIC, and they also have the option of reporting up to six months after the fact in certain cases. The reports are called "delivery declarations" and the payment to ICIC equals a specified premium rate of the policyholder's total delivery declarations.⁵ The average premium rate is a few thousandths and there is a minimum premium of \$5,000. Policyholders update ICIC about any change in their transactions, and submit a request for increasing their coverage if necessary. This occurs when an existing customer increases its activity, when a new customer is added, or when a change occurs in how the transaction with an existing customer is conducted. ICIC is likely to initiate a change in coverage if there is a change in the customer's risk profile, for example an increase in its level of risk. Information about such an increase can result from experience accumulated by ICIC with the customer and/or its parent company,⁶ or from new information about the customer or its country.

The policyholders must report any payment arrears of more than 30 days to ICIC, which analyzes the reasons for the arrears—such as whether the problem is typical of the entire sector or is confined to a specific customer. If the customer in arrears enters bankruptcy, ICIC transfers the case to the claims department, where the particulars are examined—the policy terms, whether they were met, and so forth—and pays the policyholder if necessary. The compensation amounts to 90 percent of the loss in an export transaction and 85 percent in a domestic transaction. The policyholder pays the rest (the deductible).

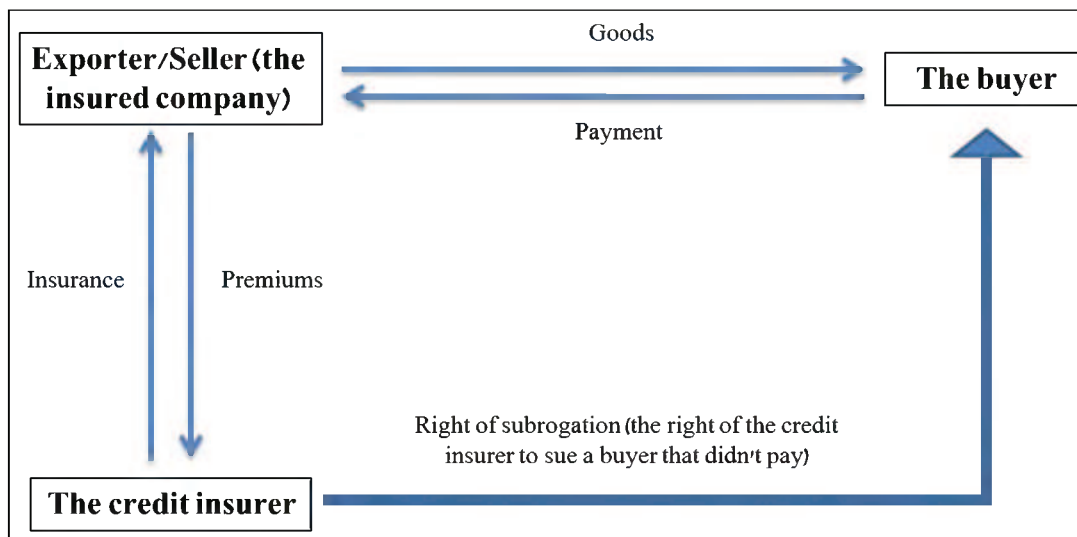
Since the price of the insurance is equal to a fixed proportion of the delivery declarations, ICIC's perception of the risk incurred from the policyholder's customers is reflected in the acceptance rate. The perceived risk should theoretically also be reflected in the price of the insurance, i.e., the premium paid. According to ICIC, however, the two are usually independent of each other: the premium and the acceptance rate are each determined

⁵ This pricing method, like most what ICIC does, is identical to the method prevailing at most of the credit insurance companies (Jones, 2010). In a very few cases, the payment is determined according to the amount of covers, not the volume of deliveries.

⁶ Euler Hermes and Harel. We will discuss them further below.

independently; the former is not a substitute for the latter. This point is important for continuation of the analysis because unfortunately, we see only the acceptance rates, not the premiums. Were these two variables substitutive, we would not be able to regard the acceptance rate as an indicator of the assessed risk incurred from the customers; it would not stand on its own but would be dependent on the premium paid and would influence it.⁷ Note that the price of credit and the identification of the response to a request for credit pose a challenge to all of the studies dealing with the supply of credit. The credit terms (primarily the price) offered are sometimes uncomfortable to the entity making the request, which therefore rejects the offer, but the entity offering the credit records a refusal to accept credit (Berg, 2016). Companies sometimes do not even submit a request for credit because they understand from the credit officer that they will obtain it on terms that they find uncomfortable (Onega et al., 2013). The studies handle this difficulty in various ways, depending on the character of the available data. We rely on the fact that the acceptance rate is usually separate from the premium rate paid and regard the former as a reflection of how ICIC perceives the risk of the transaction.

Diagram 1: Illustration of Credit Insurance Activity



⁷ The acceptance rate can be increased in exchange for a higher premium, but ICIC reports that such transactions account for a negligible proportion of total transactions.

3b. Database and Theoretical Statistics⁸

As noted, we received the database from ICIC. ICIC is a private company owned in equal shares by Harel Insurance and Financial Investments Ltd. and Euler Hermes, the world's largest credit insurance company. ICIC was founded in 1957 as a government company and was split into two in 2000. The medium and long-term insurance activity remained under government ownership and takes place via the Ashra company.⁹ The short-term (up to one year) activity was privatized and is conducted by ICIC, a public company.

In 2016, ICIC insured transactions amounting to \$15 billion, 50 percent of which were transactions with overseas concerns (approximately 15 percent of Israel's total goods exports) and the rest (approximately \$8 billion) in the domestic market. ICIC has the largest share of insurance for export transactions in Israel—approximately 50 percent of goods exports are insured and ICIC accounts for about a third of the activity—and also has a very large share of insurance of domestic transactions. Also active in the market, in addition to ICIC, is Clal Credit Insurance, a company that insures mainly short-term transactions in the domestic market. French credit insurance company Coface recently opened a branch in Israel that is also aimed at providing solutions for short-term credit insurance for transactions with both domestic and overseas buyers.

The database we use includes all of ICIC's policyholders from the beginning of 2010 until August 28, 2017. At the latest point in time, the database contained 40,000 records of active insurance covers (every record represents a credit facility between a policyholder and a buyer for which the policyholder purchases insurance until receiving the payment). There were several hundred policyholders and total insurance coverage amounted to several billion dollars.¹⁰ The average insurance coverage was approximately \$200,000. Table 1 displays the distribution of the number of buyers by policyholder.

Table 1: The Distribution of the Number of Buyers per Policyholder

Mean	86
Median	32
Maximum	2,270
Minimum	1

In addition to transactions with buyers from Israel, the insurance policies in the database cover transactions with buyers from 140 countries. The total insured financial exposure of the policyholders in respect of transactions with overseas buyers is significantly higher than the total exposure in respect of transactions with domestic buyers. The highest insurance coverage is given for transactions with buyers in Israel, both in the amount of insurance and the number of transactions. The next highest category after transactions within Israel is transactions with the US.

⁸ In order to preserve the privacy of the company's customers, we are presenting some of the data in rounded off figures, not precise ones.

⁹ This company insures credit and investments in medium and long-term export transactions (1–15 years).

¹⁰ Note that the insurance coverage differs from the above-mentioned volume of activity (approximately \$15 billion). The compensation for the policyholder is derived from the first amount, while the second amount reflects the actual transactions.

Parent company Euler Hermes assigns each country one of four risk ratings, from A (the lowest risk) to D. There is a special rating scale for buyers from Israel (IS). In practice, an A rating is the same as a B rating; we will therefore refer to three risk ratings: A (including B), C, and D. Most exports (in both total coverage and number of policies) are sent to countries in class A, but the average coverage is higher in less safe countries (Figures 1 and 2). The number and amounts of cases covered are greater for the safe countries, because the volume of exports to them is usually greater.

Figure 1: Amount of Coverage, by Risk Rating
(\$ million, A – lowest risk, IS – Israel)

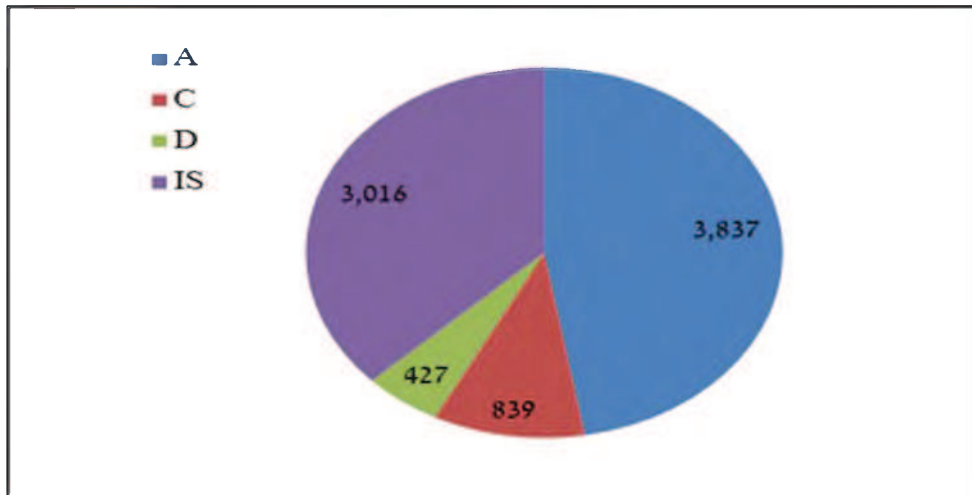
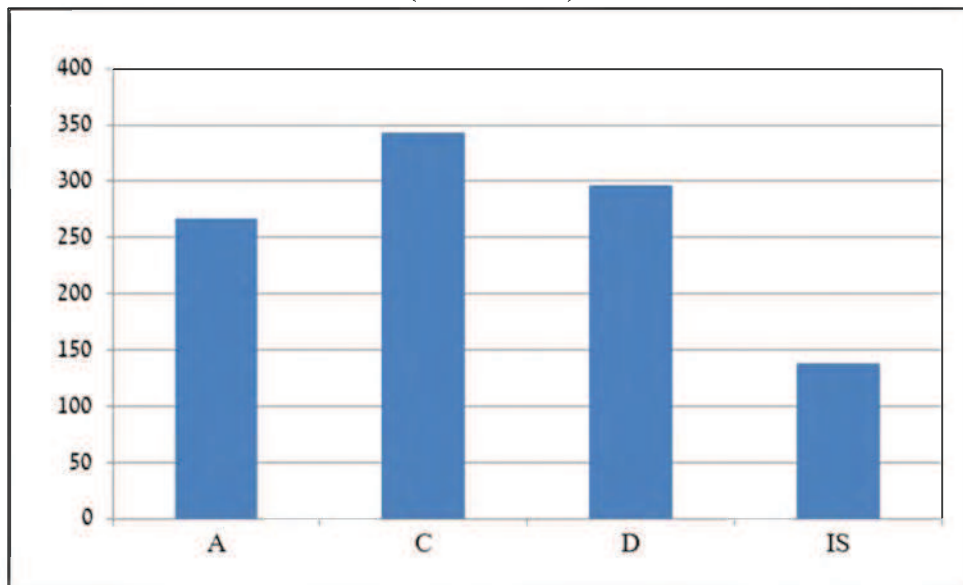


Figure 2: Average Coverage per Transaction
(\$ thousand)



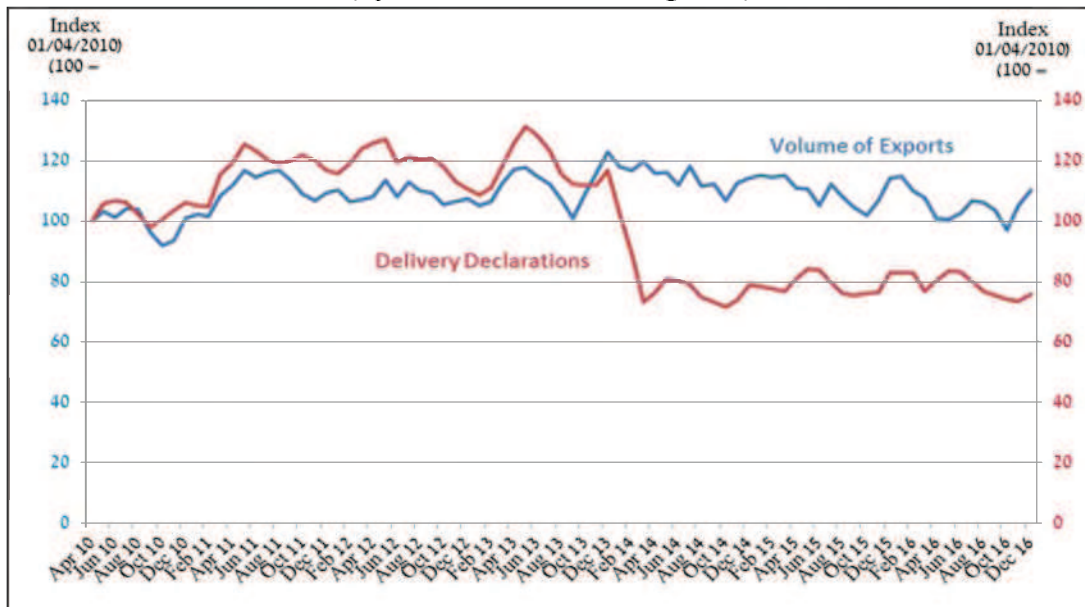
Insurance for Export Transactions

A key question about the database concerns the proportion of Israel's total exports accounted for by the policyholders' activity (policyholders' activity reflects exports only partially because it includes only goods and only exporters with insurance). In order to

answer this question, we sum the policyholders' delivery declarations (the reports on the volume of goods sent overseas) and compare the sum to goods exports (Figure 3). During the period for which we have figures, the declarations constituted an average of 20 percent of exports. At the end of 2013, however, a large exporter withdrew and from the beginning of 2014, the proportion declined to approximately 15 percent. Despite the decrease, there is a high correlation during the entire period between the sum of the declarations of all of ICIC's policyholders and Israel's total exports: before the large policyholder withdrew, the correlation was close to 0.8, but since the cancellation, it has consistently declined until reaching 0.5. This decline, however, does not involve only the cancellation, because even excluding it, the correlation still constantly declines. This is explained by ICIC having changed the nature of its activity and beginning to focus on insuring domestic transactions, among other things.

Another question is whether the activity of insured exporters constitutes a representative sample of the destinations for Israeli exports of goods.¹¹ When exports to the 25 countries to which Israel had the most exports in 2006–10 are considered and compared with the destinations of policyholders' shipments, we find that the declarations constitute an average of 29 percent of total exports (see Figure 4; the countries are ordered according to volume of exports, with volume decreasing from left to right). Figure 5 displays the share of declared exports in total exports by country ratings and indicates that the share of exports to countries classified A and C is higher than the share of exports with a D classification. It therefore follows that most exports to high-risk countries are not insured through ICIC. Figure 2 indicates, however, that if an exporter does insure a transaction with such countries, it requests similar coverage.

**Figure 3: Development of Volume of Exports and Delivery Declarations
(by three-month moving sum)**



¹¹ We are unfortunately unable to compare the export sectors using the database at our disposal.

Figure 4: Share of Declarations in Total Exports, by Country, 2010–16
 (The 25 countries to which Israel exported the largest volumes during these years)

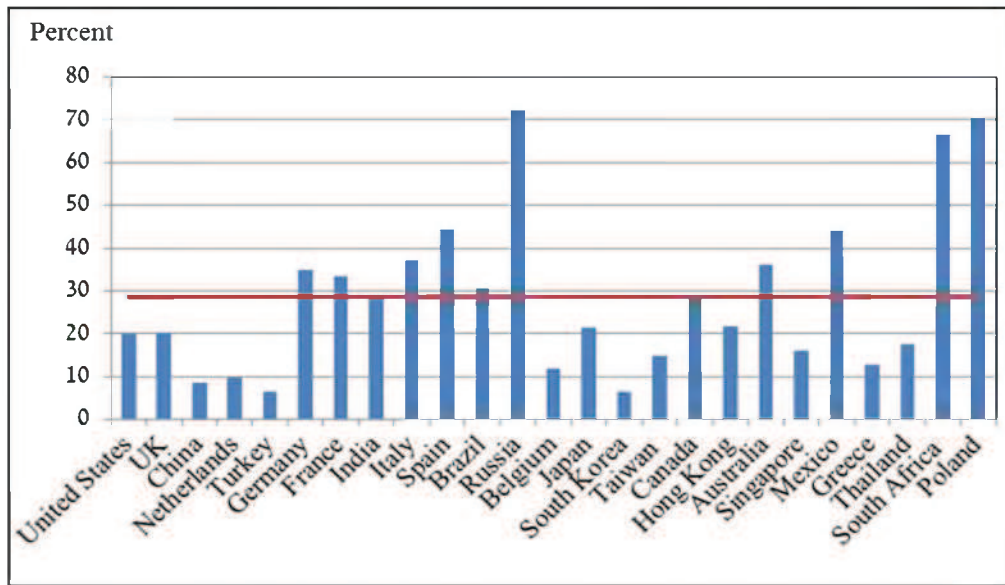
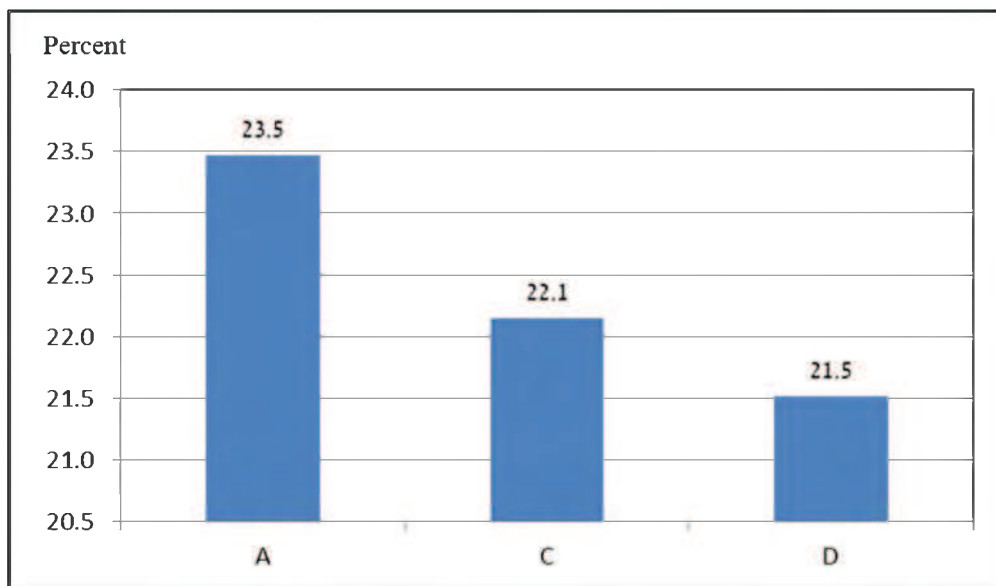


Figure 5: Share of Declarations in Total Exports, by Country Rating



The database makes it possible to derive an indicator for the risk incurred from a buyer, i.e., the number of payment arrears reports about the buyer. ICIC requires its policyholders to report to it as soon as a buyer is more than 30 days in arrears. A case of arrears can end with the buyer paying or with the policyholder filing a claim at ICIC. Even though only a small proportion of cases of arrears culminates in a claim, Figure 6 shows that it is possible to derive an indicator of the credit risk from this figure, both in Israel and abroad, because the periods with many cases of arrears correspond to known crisis events (the Second Lebanon War, the 2008 global financial crisis, and the debt crisis in Europe). Figure 6 does not, however, take into account the volume of active covers in that period. Figure 7 does—it displays the ratio of cases of arrears to the number of active covers in a given month in the period beginning January 2010 (the first date from which figures for active insurance

covers are available to us), with separate figures for transactions in Israel and export transactions. Figure 7 also indicates that the European sovereign debt crisis in mid-2011 is reflected in the number of cases of arrears. The increase in the proportion of cases of arrears in the past two years is also reflected in ICIC's financial statements for 2016, which show an increase in claims filed at the company.

Figure 6: Number of Cases of Payment Arrears in Export Transactions and Transactions in Israel, 2005–16

(without normalizing for the number of active covers at the time, 3-month moving average)

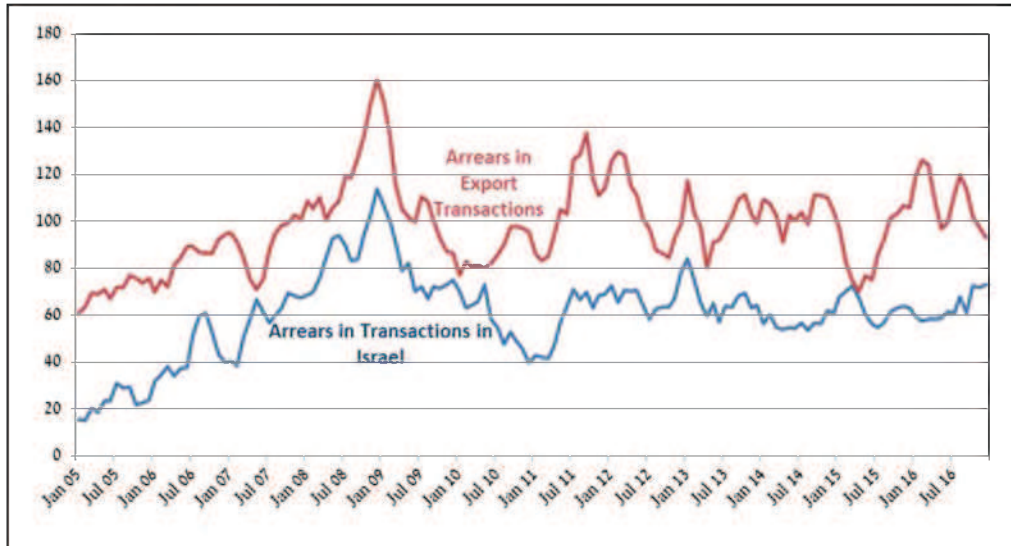
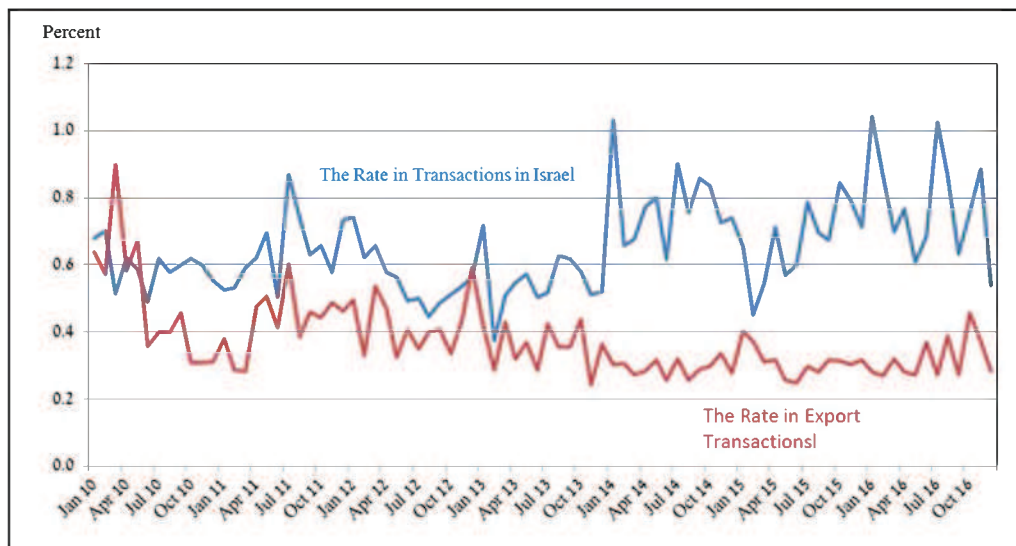


Figure 7: Ratio of Number of Cases of Arrears to the Number of Active Covers in a Given Month, 2010–16

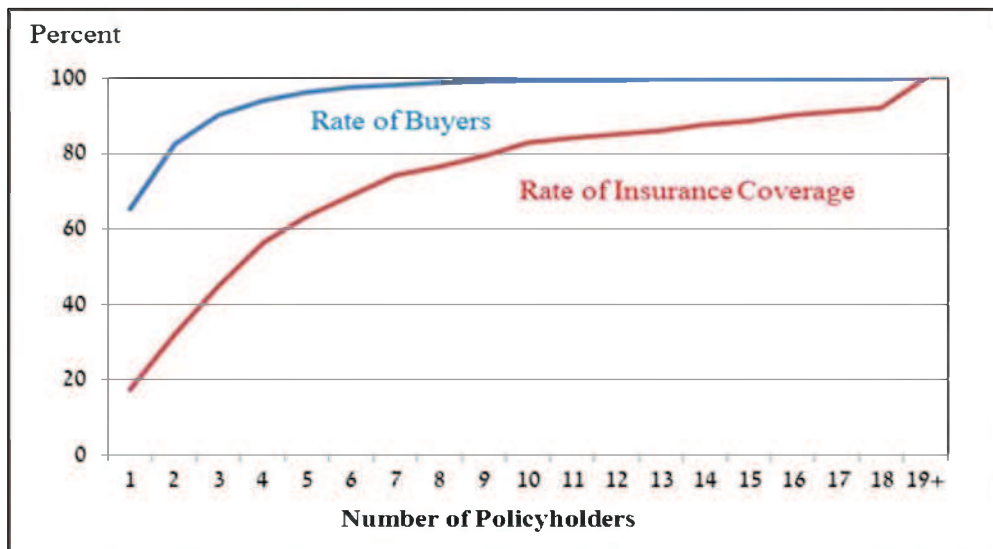


Insurance for Domestic Transactions

The credit insurance database for domestic transactions is the sole source of significant and top-quality information about this credit, since other than this database, there are only a few reports by public companies to the stock exchange. As of August 2017, ICIC had hundreds

of policyholders selling to over 10,000 buyers in Israel. Since some of these buyers bought from several policyholders, however, the number of covers was approximately 21,600 with approximately \$3 billion in aggregate volume of coverage.¹² Sales in Israel totaled \$8.2 billion in 2016. In August 2017, 65.4 percent of the buyers bought from only one policyholder, approximately 17.1 percent bought from two policyholders, and the rest from three or more policyholders. When the volume of activity is taken into account, however, we find that the first group (65.4 percent of the buyers) accounts for only 17.4 percent of activity. In other words, although most of the buyers work with only one policyholder, buyers working with several policyholders account for most of the activity. Figure 8 displays the cumulative probability distribution of the number of buyers and the volume of their activity according to the number of policyholders from whom they buy. The picture that emerges is one of concentration: the volume of activity is concentrated in a few buyers. To illustrate the point, a mere 140 buyers are responsible for a quarter of the active covers. The concentration of activity is even greater: 1 percent of the active buyers in 2016 were responsible for approximately 50 percent of the activity in that year.

Figure 8: Cumulative Probability Distribution of the Number of Buyers and the Volume of their Insurance Coverage, by the Number of Policyholders from Whom They Bought



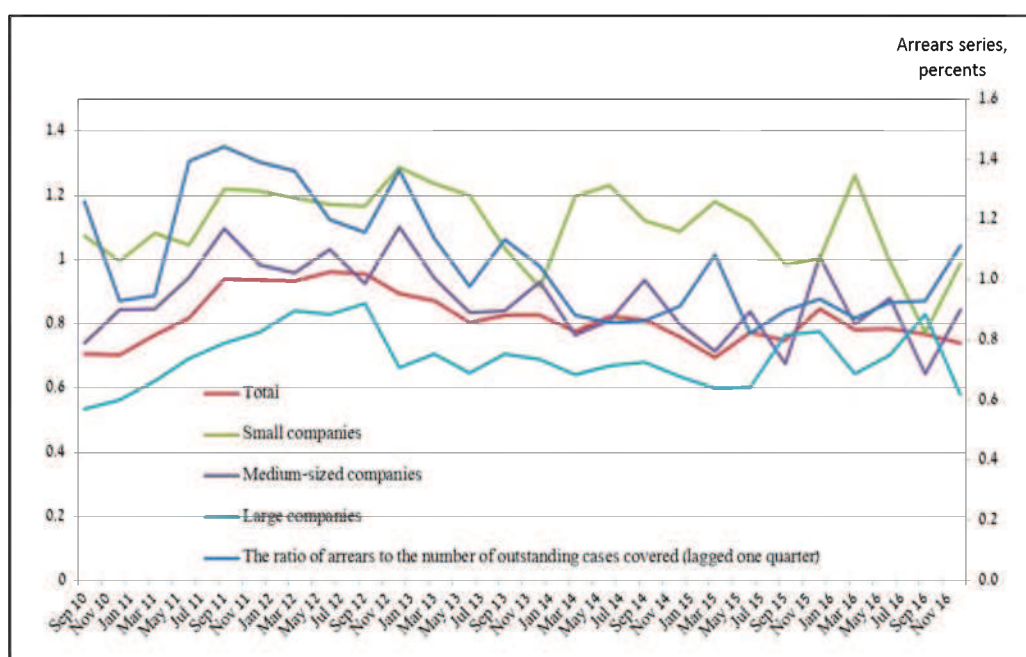
Does ICIC's activity constitute a representative sample of activity? If it does, what proportion of suppliers' credit does it cover? In contrast to export insurance, we are unable to answer these questions in this case. Nevertheless, to the extent that the figures available to us are to some degree representative of domestic economic activity, we expect to find a correlation between those figures and other indicators of domestic activity—for example, financing difficulties reported by respondents in the Bank of Israel Companies Survey.

¹² "Cover" is essentially an insurance policy, and the volume of the cover means the financial amount of insurance coverage of the policyholder's activity with a buyer. To illustrate the point, assume that Company A sells to 10 buyers and its activity with each buyer receives NIS 100 of insurance coverage. In this example, there are 10 active insurance covers, and their total volume is NIS 1,000.

We calculated the ratio of the number (volume) of the buyers' arrears in Israel to the number (volume) of active covers in a given quarter and compared these series to the series of financing difficulties. Figure 9 displays the series while lagging the arrears series by one quarter.¹³ The correlations show that the arrears series, lagged by one quarter, are significantly correlated (0.62) with the financing difficulties of companies regardless of the company size.¹⁴ When the figures are segmented by company size, the following correlations are obtained: 0.6 with financing difficulties for medium-sized companies (the only significant correlation) and 0.36 and 0.34 with the difficulties of small and large companies, respectively. As Figure 10 shows, the arrears series (after being lagged by two quarters) are also correlated with the Composite State of the Economy Index; the correlation is significant and close to 0.5.^{15,16}

We suggest the correlations reflect causality: Payment arrears have a negative impact on the cash flow of companies, which therefore have difficulty in obtaining financing to continue their activity. The conclusion about causality is supported by the fact that when we lag the arrears figures by one quarter, it reduces the likelihood of an external macroeconomic shock first causing payment arrears and then directly causing financing difficulties and a decline in the real economy.

Figure 9: Payment Arrears and Financing Difficulties, by Company Size, 2010–16 (quarterly data)



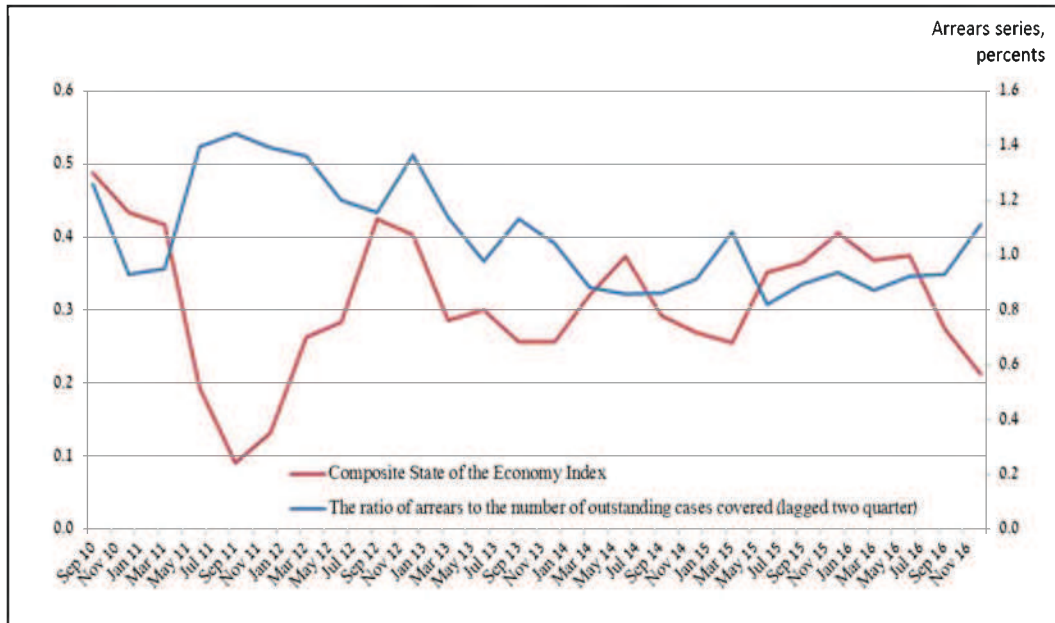
¹³ The logic for lagging the series is as follows: payment arrears have a negative impact on companies' cash flow and only afterwards on difficulty in obtaining financing to continue their activity. Alternatively, it is possible that the two series reflect the economic activity in the economy, but it is reasonable to assume that this will be reflected first in payment arrears and only later in financing difficulties among companies.

¹⁴ We also examined the series in the export transactions and obtained weaker results, but here, too, the correlations were not negligible.

¹⁵ At the monthly level, we obtain the highest correlation when the arrears is brought backward by six months.

¹⁶ The correlation coefficients between the changes in the series display the same directions, but they are not significant.

Figure 10: Payment Arrears and the Composite State of the Economy Index, 2010–16 (quarterly data)



In view of these tests, it can be said that the ratio of cases of arrears to total volume of active cover can potentially be used as a leading indicator of credit risk within the business sector (between two business sector concerns). This series is suitable for this purpose, not only because of its high correlation with real activity, but also because payment arrears and active insurance covers are immediately updated. It should be kept in mind, however, that this conclusion is based on a short sample and more work should be done to confirm it.

Buyers' Risk

In addition to the country rating, ICIC rates the buyers' risk of its policyholders based on information from its parent company and other sources. Figure 11 shows that the frequency of payment arrears increases as the buyer's rating (the risk) rises. It also shows that the probability distribution of the buyers is close to a normal distribution, with most of the buyers in the middle ratings. The risk in the insured transactions can be calculated by the weighted average of buyers' ratings. The weights are the **number** of active covers in each rating, or alternatively their **volume**. The weighted rating of transactions in Israel and abroad in 2010–16 is displayed in Figures 12 and 13.

Figure 11: Ratio of Payments in Arrears to Total Active Covers and the Probability Distribution of Buyers, by the Buyer's Rating, 2010–16 (average for the entire period)

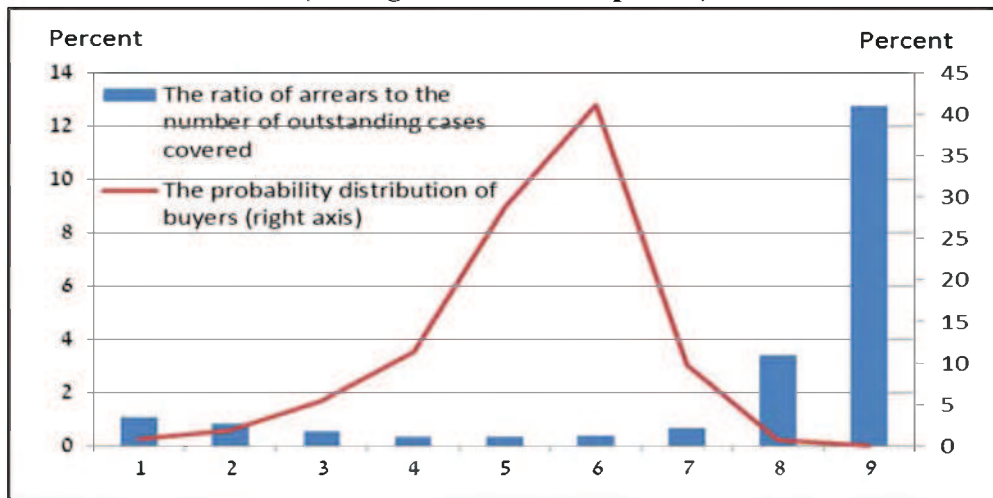


Figure 12: Weighted Average of the Buyer's Ratings, 2010–16 (excluding Israel, monthly data)

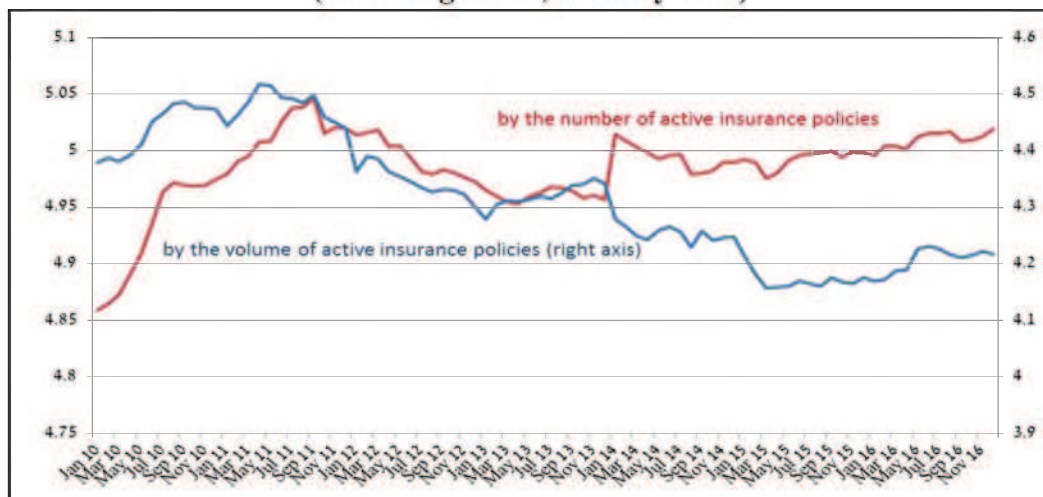


Figure 13: Weighted Average of the Buyer's Ratings, 2010–16 (Israel only, monthly data)

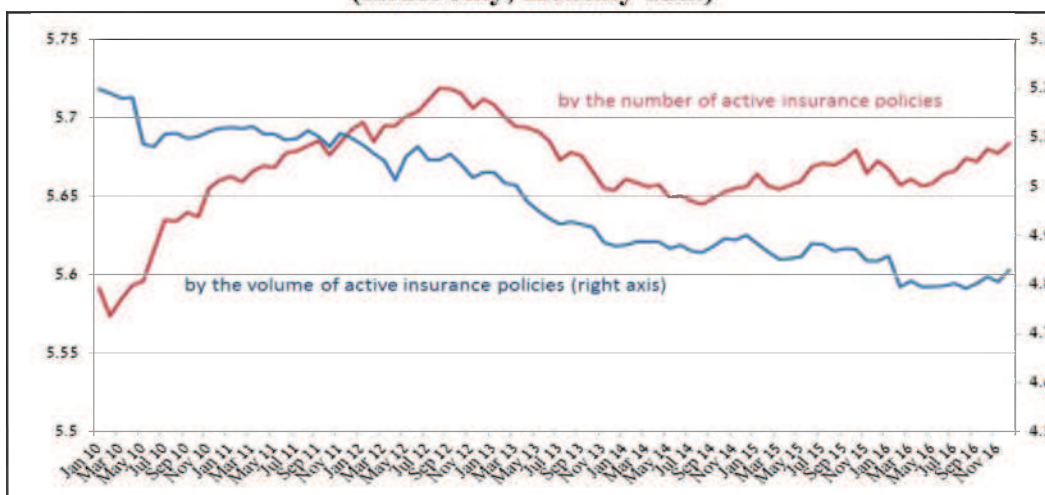


Figure 12 (excluding Israel) shows that the level of risk of transactions rose concurrently with the European sovereign debt crisis (2010–12). The weighted average using the number and weighted average using the volume display similar trends, but the level is lower in the second case, meaning that transactions with safe buyers feature a larger volume. Figure 13 (Israel) shows that the two averages involved display different trends: the trend of the risk weighted using the number of transactions is similar to the trend overseas, while the risk weighted using the volume displays a downtrend throughout the period. This downtrend may be due to the volume of risky transactions at the beginning of the period being higher than their number.

Throughout the period, the level of risk in Israel was higher than abroad (according to both weightings). The factors likely to explain this include: 1. The country risk premium is automatically added for buyers in Israel; 2. Policyholders are inclined to insure domestic transactions only if the buyer is risky; 3. A buyer from abroad must overcome import barriers in order to import, which makes the companies involved already less risky, while a domestic buyer faces no such obstacles; 4. The global market is larger, and with ICIC's expertise, a policyholder can select less risky customers in advance.

4. Analysis of the Factors Affecting the Acceptance Rate

4.1 Data and Estimation

As noted, we want to test which variables affect ICIC's acceptance of a request for credit insurance. The acceptance rate—the ratio of the approved insurance coverage to the coverage originally requested by the policyholder—will be the dependent variable. The figures in our possession display the entire process from the initial request submitted by the potential policyholder to the final response given by ICIC. The acceptance rate varies between 0 and 1, with 0 representing rejection of a request, 1 representing approval of the entire amount requested by the policyholder, and the values in the (0,1) interval representing partial approval. Since the process is likely to take several days, we decided to treat the various stages as part of the same process as long as they take place within 30 days, as ICIC reports that this is usually the maximum duration. For example, assume that an exporter submitted a request for a given amount, which was rejected, and then submitted a request for a different amount, which was accepted. In this case, the acceptance rate equals the approved final amount divided by the rejected initial amount, provided that 30 days did not pass between the initial request and the final approval. After making deductions according to these definitions, we obtained an acceptance rate for 181,121 cases.¹⁷

Table 2 and Figures 14 and 15 display the descriptive statistics of the acceptance rate, the average acceptance rate over time, and the average acceptance rate by country rating. It can be seen that the mean acceptance rate is 80 percent, while the median rate is 100 percent. In a large majority of cases—about 70 percent—ICIC approves the entire requested amount, while about 10 percent of the requests are completely rejected. In other words, only about

¹⁷ We tested another technical deduction—cases in which the coverage is automatically exchanged and the requested amount is identical to the amount for which approval is received, in which case the acceptance rate is ostensibly 100%. Omitting them reduces the number of cases of coverage with a complete acceptance rate to a relatively negligible extent. The other results below are also not affected by the omission.

20 percent of the requests are partially accepted and the probability distribution of their acceptance rate is displayed in Figure 16.

The acceptance rate shows no particular trend over time, but in the initial months of the period, there is a clear upward bias because the data file does not include coverage that was canceled or rejected three years or more before receiving the data. Furthermore, as expected, the acceptance rate declines as the country risk increases.

Table 2: Descriptive Statistics of the Acceptance Rate, 2010–16

Number of observations (policyholder-buyer): 181,121

	Acceptance Rate (in percent)
Mean	78.3
Maximum	100
Minimum	0
Median	100
Difference between the 75 th and 25 th percentile	39

Figure 14: Mean Acceptance Rate over Time, Israel and All Countries 2010–16

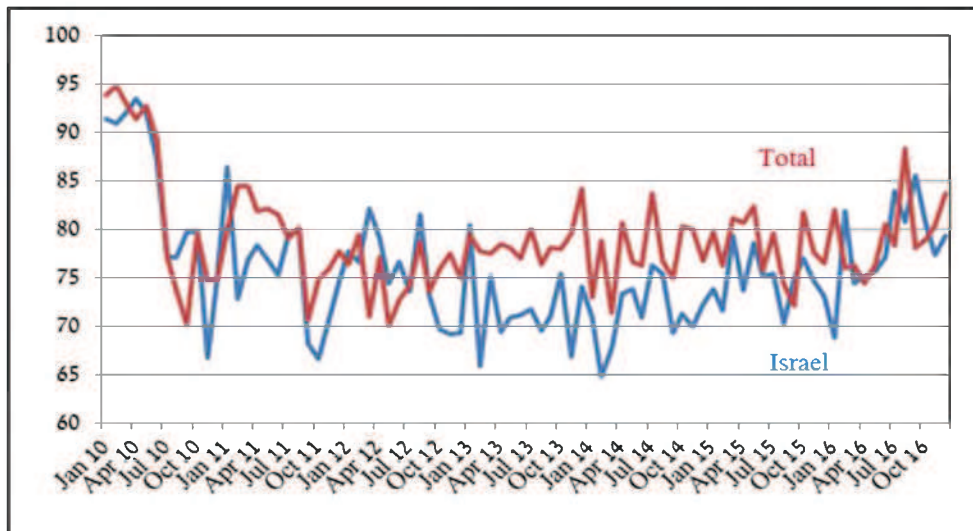


Figure 15: Mean Acceptance Rate, by Country Rating, 2010–16

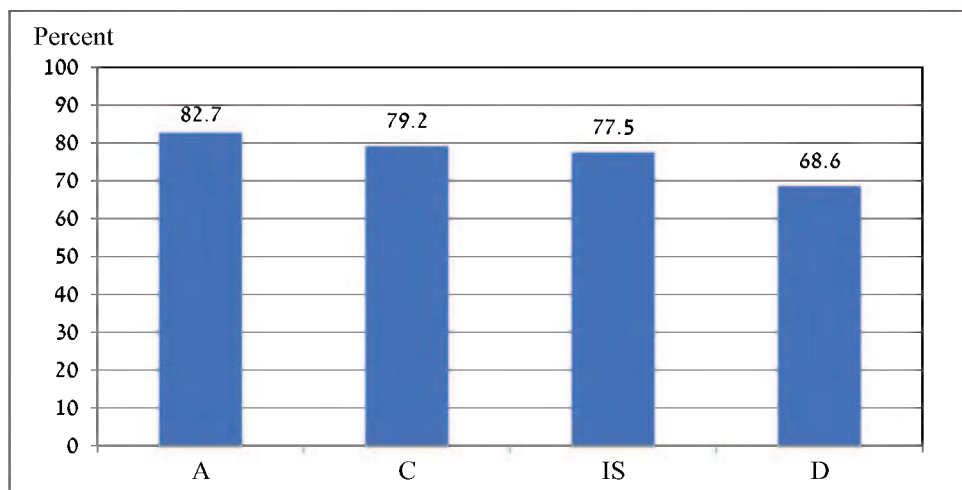
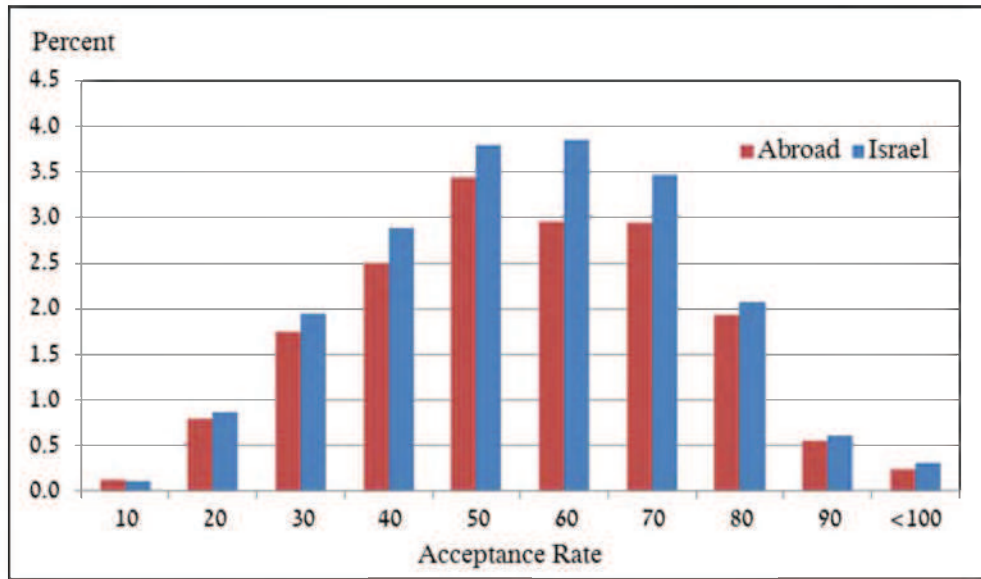


Figure 16: Probability Distribution of the Partial Acceptance Rate, Transactions in Israel and with Overseas, 2010–16



The characteristics of the policyholder and the customers will be used as explanatory variables. In order to control for environmental conditions, we will add macroeconomic variables. The regression equation we ran is as follows:

$$Y_{ijt} = \alpha + \beta X_{it} + \gamma Z_{jt} + \delta I_t + \rho M_t + \varepsilon_{ijt}$$

Where Y_{ijt} is the acceptance rate that policyholder i received for a request for coverage of a sale to buyer j at time t . The group of explanatory variables X specifies the exporter: its size is measured by the number or volume of outstanding cases covered, the diversity of its activity is measured according to the number of countries in which its buyers are located, and whether it is only an exporter or whether it only sells to the domestic market are both reflected in corresponding dummy variables. We possess no other data reflecting the policyholder's financial condition (such as leverage or profitability), but such data are not very important in explaining the acceptance rate, because the risk that the insurance company is incurring reflects the risk of the policyholder's buyer, not the risk of the policyholder itself. Z is the group of explanatory variables characterizing the buyer: the number of active covers, the number of cases of payment arrears out of the declared deliveries in the past year, and ICIC's rating of the buyer. To the group of explanatory variables we added a group of variables characterizing ICIC's exposure for each country: the number/volume of active covers in each country. The final group of variables, M , contains macroeconomic variables describing various aspects of the economic situation. We selected variables we believed to be relevant from the real and financial indicators appearing in Zalkinder (2010). These indicators are composed of the common factors of several economic series, particularly indices for the state of the global macroeconomy, the global financial market, the state of the domestic economy, the domestic financial market, domestic credit risk, and domestic financial institutions (the domestic variables are obviously suitable only for explaining the acceptance rate in transactions with buyers from Israel). From these, we selected the indicators for the state of the domestic and global macroeconomies and the state of the domestic and global financial markets. We also tested

the explanatory power of the Composite State of the Economy Index and the volume of world trade.¹⁸ The list of variables ultimately used in the estimations, together with explanations, appears in Table 3. The descriptive statistics and their correlations appear in Tables 1 and 2 of the appendix, respectively.

Table 3: List of Explanatory Variables

Group	Variable Name	Explanation
Policyholder	N_COVERAGE	Number of the exporter's active covers
	L_SUM_COVERAGE	Logarithm of the total volume of the exporter's active covers
	N_DESTINATIONS	Number of the exporter's destinations, by active covers
	LOCAL_AND_ABROAD	Dummy variable receiving the value 1 if the exporter sells in both Israel and abroad and the value 0 otherwise
	ABROAD	Dummy variable receiving the value 1 if the exporter sells only abroad and 0 otherwise
	YEARS_INSURED	The number of years that the exporter has been insured by the insurance company
Buyer	N_COVERAGE_BUYER	Number of active covers, by buyer
	L_SUM_COVERAGE_BUYER	Logarithm of the total volume of the buyer's active covers
	ARREARS	Number of cases in which the buyer was in payment arrears in a given month divided by the number of the shipments to the buyer in the past 12 months
	B_RATE_1-B_RATE10	Dummy variable for each buyer rating (1 represents the best rating)
Country	N_COVERAGE_COUNTRY	Number of active insurance covers, by country
	L_SUM_COVERAGE_COUNTRY	Logarithm of total volume of active covers of the country
Macroeconomic Variables	GMR	Global macroeconomic risk
	GFR	Global financial risk
	LMR	Local macroeconomic risk
	LFR	Local financial risk

¹⁸ The volume of world trade is excluded from the trend using an HP filter. Since it is a quarterly series, we used interpolation for the monthly level and then deducted the trend, but we also examined what is obtained when the trend is deducted first and interpolation is conducted afterward.

Since the dependent variable is censored (its values range from 0 to 100), the Tobit model should be used for estimating the model. Note, however, that in contrast to the results obtained from OLS, the estimates obtained from Tobit express the marginal effect of the explanatory variable on the latent and uncensored theoretical variable, not the marginal effect of the observed (censored) variable. Table 4 displays the results. Each of the first five columns appears a specification containing only one group of variables, while Column 6 displays the full specification.

Table 4 shows that there is a positive correlation between the exporter's size (measured by the number of the exporter's active covers) and the acceptance rate. It appears that the size increases the acceptance rate, because it reflects the policyholder's ability to select its customers and therefore its bargaining power. Geographic distribution of customers has a significant negative effect on the acceptance rate. Since the principle for ICIC's pricing is expressed in the acceptance rate, it can be concluded that this negative effect occurs because having many destinations incurs high costs.¹⁹ It is possible that a similar consideration is also reflected in the dummy variables representing the character of the policyholder's activity: if the policyholder sells both in Israel and abroad, it will increase its costs²⁰ in comparison with selling only in Israel, and the dummy variable "local and abroad" therefore has a significant negative effect in most cases. It is possible that a similar consideration is behind the significant positive effect of the dummy variable "abroad." A policyholder who sells exclusively abroad is probably exposed to better buyers (to an extent not fully expressed in the rating variables). It is also possible that such a policyholder makes a better selection of buyers than a policyholder who sells exclusively to the domestic market and therefore receives a higher acceptance rate. The table further shows that as expected, the number of years that the policyholder has been insured by the insurance company has a positive effect on the acceptance rate. The policyholder's variables therefore indicate that its identity affects the insurer: ICIC is not indifferent to the policyholder's experience, size, and the degree of familiarity with him in determining the acceptance rate. We now turn to interpreting the effect of the buyer's variables. As expected, the volume of past arrears in payments has a negative effect on the acceptance rate: a customer who has been in arrears in the past is perceived as riskier. The insurance company's total exposure to one buyer, a figure reflected in the total active covers for that buyer, has a significant positive effect on the full specification (Column 6), very likely due to the insurer's familiarity with that buyer.²¹

The country variables actually include only the volume of ICIC's exposure to buyers in that country as measured by the number of active covers in the buyer's country (or alternatively, in Column 7, according to the aggregate volume of coverage). In the full specification (and in the sensitivity tests below), we found that there is a significant negative effect, probably

¹⁹ The sensitivity tests below indicate that the effect is unequivocal in neither direction nor significance, and limited weight should therefore be given to the conclusions and the interpretation.

²⁰ Among other things, the costs occur because the insurance company must allocate more personnel, and more personnel with specific expertise. Similarly, it is possible that distribution of customers among many sectors also increases costs, because each underwriter in the company specializes in a different sector.

²¹ It may be claimed that the volume of total covers of the buyer has a positive effect because it reflects the buyer's size. The estimate for the size, however, is too crude: assuming that a very large company buys from only one policyholder, according to this estimate it will be considered smaller in comparison with a company that buys from two or more policyholders, even though the latter many be smaller. We therefore prefer the interpretation that refers to the experience and familiarity over the interpretation that refers to size.

indicating that ICIC wishes to avoid excessive exposure to one country. The acceptance rate therefore decreases as the number of cases covered in that country increases.

Of all the macroeconomic variables we tested, we have chosen to focus on two indicators reflecting the global real and financial situations (an increase in the values indicates greater problems), because both of these reflect macroeconomic effects likely to affect the global level of risk and therefore the acceptance rate. We find that as expected, problems in the real global situation have a strong and significant negative effect in all the specifications. The financial situation, on the other hand, has a significant positive effect, although it is weaker than the effect of the real situation.²² This is a surprising finding that is difficult to explain, but we will see later that it may be artificial and result from the attitude to both domestic and overseas buyers: when the population is restricted to buyers from abroad, the financial situation also has a significant negative effect.

The dummy variables for the buyer's rating, when the referent value is an unrated buyer, indicate a monotonic effect for almost all the ratings: an increase in the rating increases the acceptance rate. The slope of the effect decreases moderately in the four highest ratings, and then it becomes steeper until the lowest ratings. It should be noted that the country rating adds nothing, because the buyer's rating also reflects the rating of its country.

In Column 7, we replace the estimate for the sizes of the policyholder and the buyer and the country exposure: we switch from the number of active covers to their monetary volume (the natural logarithm of it). The change naturally affects the scope of the effect, since the measuring units are different. The directions and significance of the effect, however, do not change, except for the buyer's size, the effect of which is no longer significant. It is possible that this indicates that the degree of familiarity with the buyer—a variable that in our opinion underlies the positive effect on the acceptance rate—is not measured in the scope of the insurance coverage for that policyholder, but in the number of interactions that ICIC has with it, i.e., the number of policyholders with which that buyer does business.

We tested the possibility of adding fixed effects for the exporter and/or the buyer in order to see whether the results are obtained because of unobserved heterogeneity among the exporters and/or the buyers. When we broke down the variance into the variance within one unit (exporter or buyer) and the variance between the units, we found that the latter accounted for only 10 percent of the variance. This means that when we look at the exporter/buyer, the acceptance rate represents a low variance over time; most of the variance is due to variance **between** the exporters or buyers. If fixed effects are included in such a case, most of the variance in the dependent variable is lost and the model becomes almost useless—as we indeed found. Furthermore, we did not include time dummy variables, because we reflect the variable's effect through the macroeconomic variables.

As to the economic significance of the variables, it can be obtained by deriving the marginal effect of each explanatory variable when the other variables have a specific value,

²² Note that we also examined the average acceptance rate as a function of the global real situation and of only the global financial situation and found that the two variables have a non-significant negative effect (Table 3 in the Appendix). In this regression, we found a high serial correlation with the residuals, and when we added one lag of the dependent variable and two lags of it as an explanatory variable, we found that only one lag of the dependent variable had a significant effect. When we included three lags of the dependent variable together with the real and financial situation, however, we found that the real situation had a significant negative effect. In any case, in all of the specifications, problems in the real situation have a negative effect, while the direction of the financial situation's effect changes. We conclude from all this that the macroeconomic, real or financial situation, has some effect at the level of an individual cover, but at the aggregate level its explanatory power is probably limited.

such as their average value. This is because the Tobit model is non-linear. Furthermore, several such marginal effects can be derived and we will concentrate on the marginal effect of the censored dependent variable (the estimate obtained from the regression expresses the marginal effect of the theoretical latent and uncensored dependent variable).

When the coefficients are multiplied by the standard deviation of the continuous explanatory variables (and the rest of the explanatory variables are at their average values), we find that the volume of ICIC's exposure to the buyer's country (based on the number of active insurance covers for the buyer's country) has a far greater effect, and an increase of one standard deviation reduces the acceptance rate by 5.8 percentage points. In contrast, one standard deviation of the policyholder's size increases the acceptance rate by only 1.2 percentage points. The proportion of payment arrears in the buyer's total declarations has a relatively weak effect; an increase of one standard deviation reduces the acceptance rate by only 0.3 percentage points. The number of years that the policyholder has been insured also has a relatively weak effect; one standard deviation increases the acceptance rate by 0.4 percentage points. As for the macroeconomic variables, one standard deviation of the indicator for the real situation reduces the acceptance rate by 2 percentage points, while the positive effect of the indicator for the financial situation, a result we found difficult to explain, is very small: one standard deviation increases the acceptance rate by only 0.24 percentage points.

The nonlinear effect of the explanatory variables enables us to test how the marginal effect of a given explanatory variable is dependent on different values of another explanatory variable. To illustrate, we tested how the effect of the policyholder's size changes according to the buyer's ratings and found that the marginal effect increases with a worsening of the buyer's rating. This finding indicates that in activity with risky buyers, the policyholder's size receives greater weight in a decision about the acceptance rate. In other words, ICIC tends to rely on large policyholders in transactions with risky buyers, but when the buyer has a good rating, the policyholder's size plays a less significant role.

We also tested how the marginal effect of the number of cases of payments in arrears changes in accordance with the buyer's rating and found that it becomes more negative as the degree of risk incurred from the buyer increases. That is, when the buyer has a good rating, the number of cases of payments in arrears in the past has less effect on the acceptance rate. Since the number of cases of payments in arrears in the past indicates the buyer's past quality and the rating is designed to project the future, it can be stated that the riskier the buyer at present (i.e., the lower the buyer's rating), the greater the degree to which its past performance is also taken into account.

The explanatory power of the model according to pseudo R-squared increases significantly only when the buyer's rating is included but remains low even then (0.034). In other words, of the observed variables, the buyer's rating has a critical effect on ICIC's decision, because it includes most of the information about the buyer. As can be seen, however, the other variables in the model also have some effect, even if a marginal one. It should be noted that the models for estimating the probability of granting credit that we reviewed in Section 2 do not have high explanatory power, and our model therefore does not materially differ from them in this respect.

Table 4: Explaining the Acceptance Rate according to the Characteristics of the Policyholder, Buyer, Country, and Macroeconomic Variables							
	Dependent Variable: The Acceptance Rate						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
N_COVERAGE	0.031***				0.031***	0.014***	
L_SUM_COVERAGE	-0.002				-0.002	-0.002	3.567***
N_DESTINATIONS	-0.254***				-0.190***	-0.187***	-0.456
LOCAL_AND_ABROAD	-0.045				-0.049	-0.053	-0.044
ABROAD	-2.297				-0.181	-5.824***	-8.949***
YEARS_INSURED	-1.821				-1.826	-1.96	-1.911
ARREARS	1.681				11.850***	6.254**	7.330***
N_COVERAGE_BUYER	-1.874				-2.331	-2.593	-2.587
L_SUM_COVERAGE_BUYER	0.111				0.179**	0.267***	0.254***
N_COVERAGE_COUNTRY	-0.075				-0.073	-0.083	-0.083
L_SUM_COVERAGE_COUNTRY		-28.276***			-22.112***	-18.317***	-18.570***
GMR		-6.603			-6.407	-6.361	-6.372
GFR		1.100***			-0.314**	0.463***	
B_RATE_1		-0.154			-0.149	-0.157	-0.432
B_RATE_2			0.000***		0.002***	-0.004***	-0.374
B_RATE_3			0		0	0	-11.240***
B_RATE_4							-1.837
B_RATE_5					-18.118***	-51.633***	-38.722***
B_RATE_6					-2.606	-3.016	-2.711
B_RATE_7					9.796***	6.162**	7.118***
B_RATE_8					-2.408	-2.394	-2.394
B_RATE_9				171.651***	172.026***	164.253***	164.767***
B_RATE_10				-7.908	-7.852	-7.848	-7.856
CONSTANT				158.974***	157.621***	151.498***	152.384***
Country Dummy				-6.174	-6.138	-6.114	-6.121
Industry Dummy				129.402***	130.667***	125.517***	126.341***
Number of obs.				-4.611	-4.591	-4.586	-4.593
Pseudo R-squared				102.636***	101.222***	98.048***	99.087***
				-3.857	-3.846	-3.842	-3.847
				52.481***	48.475***	48.411***	48.673***
				-3.383	-3.373	-3.371	-3.374
				8.899***	1.36	2.418	2.127
				-3.317	-3.321	-3.317	-3.319
				-42.450***	-49.906***	-45.736***	-46.195***
				-3.47	-3.477	-3.471	-3.473
				-47.978***	-50.908***	-49.597***	-49.640***
				-3.838	-3.823	-3.824	-3.826
				-63.128***	-65.560***	-67.514***	-67.664***
				-5.065	-5.041	-5.016	-5.019
				-34.741***	-43.817***	-47.573***	-46.331***
				-5.122	-5.131	-5.079	-5.078
	183.933***	186.981***	187.311***	162.789***	149.888***	177.757***	338.001***
	-1.466	-1.123	-1.09	-3.234	-4.498	-16.161	-39.701
Country Dummy	No	No	No	No	No	Yes	Yes
Industry Dummy	No	No	No	No	No	Yes	Yes
Number of obs.	124,671	124,671	124,671	124,671	124,671	124,671	124,671
Pseudo R-squared	0.00091	0.00019	0.0001	0.02351	0.026	0.03385	0.03363

*** Significant at a 1% of significance, ** significant as a 5% level of significance, * significant at a 10% level of significance.

4.2 Sensitivity Tests

The results can be questioned with the assertions that the population is too heterogeneous and that an unsuitable methodology was employed. To test the robustness of the results, we conducted tests, the results of which appear in Table 5. For the sake of convenience, we display the results of the leading specification, taken from Column 6 in Table 4, in Column 1.

In Columns 2 and 3, we examined²³ whether the results change when the data are divided into covers for buyers exclusively in Israel (Column 2) and covers for buyers exclusively

²³ All of the estimations were conducted using the Tobit model unless stated otherwise.

abroad (Column 3). The biggest difference is in the effect of the policyholder's size: it has a very large effect in Israel, but its effect almost disappears when transactions with overseas buyers are involved. The geographic distribution of the policyholder's activity has a significant positive effect on the acceptance rate when transactions in Israel are involved but has no effect when transactions with overseas buyers are involved. For the population as a whole, the estimated effect is negative. In our opinion, this difference in results indicates that an unequivocal conclusion cannot be drawn about the direction of geographic dispersal's effect.

In contrast, the differential effect of the "local and abroad" variable is consistent with the interpretation we proposed above: when coverage for buyers in Israel is involved, the negative effect on the acceptance rate is triple the negative effect on the acceptance rate when overseas buyers are involved. It appears that ICIC is more familiar with customers in the global market (as it is officially part of the Euler Hermes company), therefore activity with both foreign and domestic buyers is not reflected in a significant increase in costs so it is rolled over onto the acceptance rate to a weaker extent. We found no significant differences in the effect of the number of years that the policyholder has been insured on the acceptance rate.

As for the buyer's variables, the size (based on the number of active covers) has a significant effect only when overseas buyers are involved. This, too, may be because ICIC is quite familiar with overseas buyers. As to the buyer's risk, it appears to be reflected differently for domestic buyers and overseas buyers. A domestic buyer's risk is reflected in both the number of past cases of payment arrears and the rating, both of which affect the acceptance rate in the expected directions. In contrast, an overseas buyer's risk is reflected solely in its rating. In our opinion, the logic behind this finding is that the information about an overseas buyer's risk is fully reflected in its rating. In contrast, since there is less experience with domestic buyers, ICIC also uses past cases of arrears to assess those buyers' degree of risk.

There is another difference in the effect of the macroeconomic variables: regarding overseas buyers, both the global real situation and the global financial market situation affect the acceptance rate, while regarding domestic buyers, the real situation in Israel affects the acceptance rate, but the financial market situation in Israel does not have a significant effect on it. We hypothesize that this is due to the fact that during the reported period, the two domestic variables are far more correlated than their global counterparts (see Table 4 in the appendix), and it is therefore possible that multicollinearity exists.

Column 4 describes the results of the equation we ran restricted to data beginning in April 2011. We ran this equation because if a cover was canceled or rejected more than three years before the data were obtained, it does not appear in the database. To illustrate, if a policyholder had an active cover in May 2010 or if a request for insurance cover was rejected, the cover will not appear in the data file. This results in an upward bias in the acceptance rate during the period before April 2011, because covers with an acceptance rate of 0 are not included in the database. It can be seen that the results are not very different from the results obtained with the original estimation.

Column 5 contains the results of the equation we ran restricted to the data on new policyholders (insured by the insurance company for less than six months). This specification is designed to test whether the insurance company behaves differently with new policyholders. The variables that do not appear in the specification, such as the number

of the exporter's covers, reflect the policyholder's history, which obviously does not exist in this case. The remaining variables (other than the buyer's size) have an effect in the same directions that they have in the basic regression, and in this specification as well it was found that both the global financial situation and the global real situation had an effect. As for the complementary group of this population—the policyholders who had been insured for over six months (Column 6)—it was found that the effects were very similar to the effects for the group containing all of the policyholders. This was also true of the group containing only the new buyers (Column 7). Column 7 also shows a stronger negative effect (in comparison with other specifications) of the number of active covers of customers from the buyer's country on the acceptance rate. This result reflects conservatism on the part of the insurance company: if a new customer (i.e., policyholder) is involved—a customer about whom there is less information—the total exposure to the buyer's country has a greater effect.

Column 8 displays the results after we estimated the original equation using the OLS method. As noted above, this method is unsuitable, because when the variable is censored, as in our case, the OLS estimates are not consistent and are downwardly biased. In any case, the estimation shows that the effect of most of the variables remains identical in both direction and significance.

In Column 9, we display the result from an OLS regression conducted only on observations in which the acceptance rate is neither 0 nor 100. As noted above, this is so in only 20 percent of the cases and the result obtained is very different for quite a few variables. Particularly prominent is the lack of effect of the buyer's rating. This is a surprising finding, given that this variable has hitherto remained stable in all specifications. We conclude from this that the explanatory variables have good explanatory power when ICIC decides whether to approve or reject a request. In intermediate cases, their power declines to some extent. It follows that ICIC focuses mainly on the decision of whether to approve or reject a request.

We also estimated the model using the probit method, but here the dependent variable is dichotomous: it receives the value 0 when the acceptance rate is equal to 0 and the value 1 otherwise (Column 10). This estimation reflects to some degree the insights from the two preceding regressions, because in its framework, we regard every approval, whether partial or complete, as a complete approval. We find that the directions of the effects are preserved and the explanatory power according to the pseudo R-squared increases significantly. It can be concluded from this that the explanatory variables explain mainly the variance involving the decision of whether or not to grant insurance. In other words, even though the acceptance rate is a continuous variable, the explanatory variables explain mainly the dichotomous decision.

The last estimation that we conducted uses the ordered logit method (Column 11). For this purpose, we allowed the dependent variable to receive three values: 0 when the acceptance rate is 0, 1 when the acceptance rate is partial, and 2 when the acceptance rate is full. The use of this method also has no substantial effect on the original results; the finding that the explanatory power is lower than the probit method strengthens the conclusion we presented above.²⁴

²⁴ Another method we tested is called zero-one inflated beta regression (Ospina and Ferrari, 2012). It is suitable for a situation in which many of the observations of the dependent variable receive the values 0 or 1, and in the intermediate range, there is a specific probability (normal, in our case). Even though most of the

Table 5: Explanation of the Acceptance Rate by Characteristics of the Policyholder, Buyer, Country, and Macroeconomic Variables – Sensitivity Tests

Dependent Variable: Acceptance Rate						
	(1)	(2)	(3)	(4)	(5)	(6)
	Basic Regression	Only Coverage in Israel	Only Coverage Abroad	Starting on April 2011	New Exporter (insured for less than 6 months)	Exporter with Seniority (insured for 6 months or more)
N_COVERAGE	0.014*** -0.002	0.084*** -0.005	-0.006* -0.003	0.016*** -0.003		0.019*** -0.002
N_DESTINATIONS	-0.187*** -0.053	0.409*** -0.104	0.015 -0.073	-0.264*** -0.058		-0.284*** -0.055
LOCAL_AND_ABROAD	-5.824*** -1.96	-15.592*** -1.98	-6.729*** -2.511	-6.522*** -2.109		-4.027* -2.081
ABROAD	6.254** -2.593			0.991 -2.848		10.629*** -2.753
YEARS_INSURED	0.267*** -0.083	-0.355*** -0.137	0.442*** -0.119	0.327*** -0.089		0.513*** -0.089
ARREARS	-18.317*** -6.361	-57.897*** -11.046	-0.947 -8.174	-27.917*** -7.563	-38.275** -16.447	-17.862*** -6.642
N_COVERAGE_BUYER	0.463*** -0.157	-0.16 -0.171	2.337*** -0.315	0.489*** -0.166	-0.202 -0.377	0.545*** -0.166
N_COVERAGE_COUNTRY	-0.004*** 0		-0.011** -0.005	-0.003*** -0.001	-0.005*** -0.001	-0.004*** 0
GMR	-51.633*** -3.016		-38.525*** -4.571	-50.332*** -3.279	-55.292*** -8.71	-48.929*** -3.164
GFR	6.162** -2.394		-26.968*** -3.534	19.414*** -2.534	-17.144*** -6.285	7.647*** -2.532
LMR		-22.753*** -5.336				
LFR		-0.68 -3.869				
B_RATE_1	164.253*** -7.848	227.165*** -34.974	180.560*** -9.245	165.761*** -8.436	198.915*** -38.048	164.477*** -8.125
B_RATE_2	151.498*** -6.114	170.119*** -16.264	169.986*** -7.391	154.998*** -6.627	119.079*** -16.219	152.401*** -6.406
B_RATE_3	125.517*** -4.586	89.810*** -9.726	148.354*** -5.697	132.995*** -5.053	101.735*** -11.805	126.754*** -4.819
B_RATE_4	98.048*** -3.842	64.917*** -6.635	118.406*** -4.98	106.770*** -4.258	75.710*** -9.604	98.828*** -4.046
B_RATE_5	48.411*** -3.371	12.894** -5.768	66.397*** -4.397	53.983*** -3.737	39.781*** -8.45	46.896*** -3.551
B_RATE_6	2.418 -3.317	-31.497*** -5.669	19.030*** -4.351	9.266** -3.675	7.136 -8.333	0.175 -3.494
B_RATE_7	-45.736*** -3.471	-70.870*** -5.813	-38.815*** -4.644	-40.802*** -3.826	-38.473*** -8.79	-47.540*** -3.655
B_RATE_8	-49.597*** -3.824	-80.008*** -6.515	-37.872*** -4.958	-44.725*** -4.216	-52.955*** -9.954	-50.736*** -4.02
B_RATE_9	-67.514*** -5.016	-88.403*** -8.145	-60.956*** -6.634	-63.210*** -5.541	-44.416*** -13.023	-70.148*** -5.261
B_RATE_10	-47.573*** -5.079	-75.004*** -6.859	-26.310*** -9.813	-47.149*** -5.643	-33.282*** -12.856	-48.997*** -5.333
CONSTANT	177.757*** -16.161	174.242*** -18.294	274.448*** -30.971	169.307*** -17	140.381*** -14.608	124.242*** -23.358
Country Dummy	Yes	No	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	124,671	55,013	69,658	105,595	12,160	116,406
Pseudo R-squared	0.034	0.026	0.045	0.034	0.045	0.034

*** Significant at a 1% of significance, ** significant as a 5% level of significance, * significant at a 10% level of significance.

results are consistent with those yielded by the other analysis, some are illogical, and we are therefore not displaying them here.

Table 5 (continuation): Explanation of the Acceptance Rate by Characteristics of the Policyholder, Buyer, Country, and Macroeconomic Variables – Sensitivity Tests					
	Dependent Variable: Acceptance Rate				
	(7)	(8)	(9)	(10)	(11)
	New Buyer	OLS Estimation	OLS at the (0,100) interval	Probit Estimation	ordered logit
N_COVERAGE	0.031***	0.003***	0.005***	0	0.0002***
	-0.005	0	-0.001	0	0
N_DESTINATIONS	-0.153	-0.030***	-0.049***	0.001	-0.0024***
	-0.115	-0.009	-0.013	0	-0.0006
LOCAL_AND_ABROAD	-8.747***	-1.018***	1.465***	-0.075***	-0.0719***
	-3.225	-0.339	-0.456	-0.018	-0.0231
ABROAD	3.577	0.511	1.065*	-0.049**	0.0802***
	-4.992	-0.445	-0.625	-0.024	-0.0306
YEARS_INSURED	-0.224	0.066**	0.088***	0.003***	0.0030***
	-0.176	-0.014	-0.02	-0.001	-0.001
ARREARS		-3.309***	-2.265	-0.140**	-0.1836**
		-1.115	-1.59	-0.056	-0.0755
N_COVERAGE_BUYER		0.098**	0.259***	0.002	0.0063***
		-0.027	-0.037	-0.001	-0.0019
N_COVERAGE_COUNTRY	-0.010***	-0.001***	-0.000***	-0.000***	-0.0000***
	0	0	0	0	0
GMR	-100.030***	-8.563***	-0.364	-0.374***	-0.6091***
	-6.243	-0.514	-0.717	-0.027	-0.0357
GFR	-37.396***	0.464	0.271	-0.065***	0.0879***
	-4.339	-0.415	-0.557	-0.022	-0.0284
LMR					
LMR					
LMR					
B_RATE_1	242.445***	19.411***	1.511	1.369**	2.0405***
	-26.332	-0.987	-2.204	-0.098	-0.1097
B_RATE_2	225.542***	19.020***	2.358	1.326**	1.8514***
	-15.55	-0.84	-1.674	-0.073	-0.082
B_RATE_3	221.593***	17.518***	2.440*	0.977**	1.5123***
	-11.176	-0.713	-1.259	-0.043	-0.0576
B_RATE_4	199.711***	15.063***	2.404**	0.815**	1.1473***
	-8.686	-0.644	-1.031	-0.034	-0.0462
B_RATE_5	159.185***	9.388**	1.558*	0.522**	0.5332***
	-6.136	-0.597	-0.905	-0.028	-0.0397
B_RATE_6	108.587***	1.504**	-0.917	0.197**	-0.0013
	-5.435	-0.594	-0.892	-0.028	-0.039
B_RATE_7	12.405**	-9.363***	-3.153***	-0.243***	-0.5307***
	-5.489	-0.626	-0.926	-0.028	-0.0406
B_RATE_8	-35.920***	-10.490***	-2.700**	-0.288**	-0.5792***
	-6.169	-0.696	-1.015	-0.031	-0.0446
B_RATE_9	9.567	-14.288***	-2.583**	-0.375**	-0.7815***
	-8.1	-0.939	-1.276	-0.04	-0.0581
B_RATE_10	21.098*	-9.077***	-2.885**	-0.223***	-0.5590***
	-11.23	-0.945	-1.243	-0.042	-0.0586
CONSTANT	167.605***	81.144***	53.487***	1.785**	
	-17.945	-2.762	-3.214	-0.237	
Country Dummy	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes
Number of obs.	28,964	124,671	20,770	124,506	124,671
Adjusted R-squared (or pseudo)	0.065	0.098	0.048	0.102	0.064

*** Significant at a 1% of significance, ** significant as a 5% level of significance, * significant at a 10% level of significance.

In summary, the robustness tests indicate that most of the results are not sensitive to the estimation methods required by the nature of the data but are sensitive when coverage of buyers in Israel is separated from coverage of overseas buyers. There were no substantial differences in the other subpopulations we tested. Furthermore, it appears that the quality of the model's goodness of fit increases in at least some of the sensitivity tests. An important conclusion emerges from the tests: most of the variance explained by the explanatory variables results from cases of a full acceptance rate. In the medium ranges, when the acceptance rate is partial, the explanatory variables have an effect, but its power is smaller.

5. Summary and Conclusion

There is little mention of credit insurance in economic literature and policy discussions. Thanks to the unique database that ICIC, the largest credit insurance company in Israel, placed at our disposal, we were able to describe the volume of insurance in Israel and specify it according to various cross sections. In exports, we found that 15 percent of them were covered by this insurance. We also mapped its geographic distribution by destination countries and risk levels. As for credit from local suppliers, this is the first time that we are getting a look at it at the micro level. We find a strong connection between the suppliers' credit risk and real activity. The high correlation and the fact that the credit risk series leads real activity make this series attractive as a leading indicator for real activity.

An analysis of the factors affecting ICIC's acceptance rate is very similar to an analysis of a credit request, which is also clear in the analysis results. We find that the size of the company, the geographic distribution of its activity, and the buyer's risk generate the main effect, but the real global situation is also expressed in the decision about the level of coverage. We also find that these factors affect mainly the decision of whether to accept the request in full or reject it altogether, while their effect on the intermediate ranges is smaller. The results obtained are robust in many sensitivity tests for both subpopulations and different methodologies, but they reveal differences between the considerations that determine the level of insurance coverage when a domestic buyer is involved and the considerations that determine it when an overseas buyer is involved. We believe that the explanation for this lies in differences in the attitude toward information about the buyer's risk.

Understanding the factors impacting the acceptance rate contributes greatly to an understanding of the process of granting credit insurance. Understanding the perception of the risk in the insurance company is likely to contribute to the development of policy tools for encouraging exports. If the government chooses to encourage exports by means of credit insurance assistance, then if it knows which factors affect the acceptance rate, it will be able to allocate resources in channels that will increase it, thereby encouraging potential exporters. It is obvious, however, that when we use credit insurance to encourage exports, we are assuming that it does indeed encourage exports and that this is economically effective. These assumptions should be confirmed with the help of research testing how credit insurance itself contributes to trade. Only partial research has been conducted in this area to date; additional evidence confirming the link and estimating the extent of the effect is needed.

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Appendix

Table 1
Descriptive statistics of the explanatory variables

Group	Variable	Explanation	Mean	Standard deviation	Minimum	Maximum
Dependent variable	ACCEPT_RATIO	Acceptance rate (0–100)	80.61	34.76	0	100
Insured entity	N_COVERAGE	Number of active covers of the exporter	407.86	499.44	1	2280
	L_SUM_COVERAGE	Log of total active covers of the exporter (in NIS)	17.21	1.88	0	20.8
	N_DESTINATIONS	Number of the exporter's destinations, by active covers	24.07	27.44	1	90
	LOCAL_AND_ABROAD	Does the exporter sell in Israel and abroad	0.55	0.50	0	1
	ABROAD	Does the exporter sell only abroad	0.18	0.38	0	1
	YEARS_INSURED	Number of years the exporter has been insured with the insurance company	11.1	8.51	0	29.2
Buyer	N_COVERAGE_BUYER	Number of active covers by buyer	4.04	3.82	1.00	59
	L_SUM_COVERAGE_BUYER	Log of total active covers of the buyer (in NIS)	12.82	1.64	0	18.9
	ARREARS	Number of buyer's arrears in a given month divided by the number of its shipments in the past 12 months	0.019	0.09	0	5.0
	B_RATE_1	Dummy variable for a rating of 1 (safest)	0.01	0.12	0	1
	B_RATE_2	Dummy variable for a rating of 2	0.02	0.15	0	1
	B_RATE_3	Dummy variable for a rating of 3	0.05	0.21	0	1
	B_RATE_4	Dummy variable for a rating of 4	0.10	0.29	0	1

	B_RATE_5	Dummy variable for a rating of 5	0.26	0.44	0	1
	B_RATE_6	Dummy variable for a rating of 6	0.31	0.46	0	1
	B_RATE_7	Dummy variable for a rating of 7	0.13	0.34	0	1
	B_RATE_8	Dummy variable for a rating of 8	0.06	0.23	0	1
	B_RATE_9	Dummy variable for a rating of 9	0.02	0.12	0	1
	B_RATE_10	Dummy variable for a rating of 10 (riskiest)	0.02	0.12	0	1
Buyer's country	N_COVERAGE_COUNTRY	Number of active covers by country	8,641.52	8,810.31	1	21,831
	L_SUM_COVERAGE_COUNTRY	Log of total active covers of the country (in NIS)	19.94	1.91	9.21	22.0
Macro variable	GMR	Global macro risk (0=low risk)	0.64	0.22	0.14	0.93
	GFR	Global financial risk (0=low risk)	0.45	0.23	0.00	0.90
	LMR	Local macro risk (0=low risk)	0.35	0.22	0.04	0.81
	LFR	Local financial risk (0=low risk)	0.55	0.16	0.10	0.84

Table 2
Correlations between the explanatory variables

	ACCEPT_RATIO	N_COVERAGE	N_DESTINATIONS	LOCAL_AND_ABOARD	ABROAD	L_SUM_COVERAGE	YEARS_INSURED	N_COVERAGE_BUYER	ARRARS	L_SUM_COVERAGE_BUYER	N_COVERAGE_COUNTRY	L_SUM_COVERAGE_COUNTRY
ACCEPT_RATIO	1											
N_COVERAGE	0.0440*	1										
N_DESTINATIONS	0.0776*	0.7854*	1									
LOCAL_AND_ABOARD	0.0016	0.3859*	0.6214*	1								
ABROAD	-0.0147*	-0.2561*	-0.2015*	0.4383*	1							
L_SUM_COVERAGE	0.0442*	0.7387*	0.7119*	0.3594*	-0.2504*	1						
YEARS_INSURED	0.0088*	0.2346*	0.3891*	0.0200*	-0.0902*	0.2766*	1					
N_COVERAGE_BUYER	0.0221*	-0.0473*	-0.0408*	0.0200*	-0.0588*	-0.0183*	-0.0112*	1				
ARRARS	-0.0148*	0.0630*	0.0940*	0.0632*	0.0029	0.0668*	0.0199*	-0.0328*	1			
L_SUM_COVERAGE_BUYER	0.0329*	0.0716*	0.1777*	0.1326*	0.0386*	0.1624*	0.0817*	0.6516*	0.0360*	1		
N_COVERAGE_COUNTRY	0.0283*	-0.2863*	-0.5759*	-0.3238*	-0.3724*	-0.3028*	-0.2477*	0.0966*	-0.0894*	-0.1984*	1	
L_SUM_COVERAGE_COUNTRY	0.0741*	-0.1859*	-0.4486*	-0.2564*	-0.2861*	-0.2099*	-0.2196*	-0.0566*	-0.0799*	-0.2596*	0.8110*	1
GMR	-0.0244*	0.0471*	0.0989*	0.0378*	0.0529*	0.0395*	-0.1076*	0.005	0.0080*	0.0365*	-0.1987*	-0.1026*
GFR	-0.0004	0.0154*	0.0023	-0.0133*	-0.005	0.0057*	0.0042	0.0039	-0.0224*	-0.0070*	0.0126*	0.0198*
LMR	-0.0353*	0.0307*	0.0370*	0.0176*	-0.0019	0.0427*	-0.0625*	0.0184*	-0.0474*	0.0176*	-0.0156*	0.0130*
LFR	-0.0289*	0.0106*	-0.001	0.0178*	-0.0202*	0.0108*	-0.0136*	0.0075*	0.0047	0.0784*	0.0445*	0.0324*
B_RATE_1	0.0645*	0.0378*	0.0682*	0.0441*	0.003	0.0450*	0.0147*	0.0252*	0.0202*	0.0732*	-0.0625*	-0.0270*
B_RATE_2	0.0688*	0.0597*	0.0892*	0.0680*	-0.0009	0.0502*	0.0218*	0.0330*	0.0330*	0.0784*	-0.0741*	-0.0352*
B_RATE_3	0.0866*	0.0503*	0.0944*	0.0629*	0.0345*	0.0592*	0.0177*	0.0251*	0.0183*	0.1011*	-0.1265*	-0.0759*
B_RATE_4	0.1053*	0.0200*	0.0463*	0.0297*	0.0485*	0.0329*	0.0160*	0.0987*	-0.0034	-0.0034	-0.0840*	-0.0626*
B_RATE_5	0.0941*	-0.0118*	0.0065*	0.0062*	0.0229*	-0.0062*	0.0142*	0.0140*	-0.0155*	0.0664*	-0.0237*	-0.0268*
B_RATE_6	-0.0351*	-0.0558*	-0.1062*	-0.0621*	-0.0638*	-0.0363*	-0.0248*	-0.0546*	-0.0351*	-0.1560*	0.1559*	0.1169*
B_RATE_7	-0.1500*	-0.0335*	-0.0885*	-0.0395*	-0.0233*	-0.0395*	-0.0249*	-0.0251*	0.0086*	-0.0233*	0.0790*	0.0290*
B_RATE_8	-0.1021*	0.0532*	0.0579*	0.0243*	0.0124*	0.0408*	0.0207*	-0.0385*	0.0254*	-0.0435*	-0.0651*	-0.0462*
B_RATE_9	-0.0663*	0.0047	-0.0073*	-0.0073*	0.0219*	0.0027	-0.0011	-0.0392*	0.0128*	-0.0452*	-0.0272*	0.001
B_RATE_10	-0.0400*	-0.0290*	-0.0538*	-0.0364*	-0.0332*	-0.0218*	-0.0246*	0.0480*	0.0175*	0.0195*	0.0728*	0.0677*

	ACCEPT_RATIO	GFR	LMR	LFR	B_RATE_1	B_RATE_2	B_RATE_3	B_RATE_4	B_RATE_5	B_RATE_6	B_RATE_7	B_RATE_8	B_RATE_9	B_RATE_10
ACCEPT_RATIO														
N_COVERAGE														
N_DESTINATIONS														
LOCAL_AND_ABOARD														
ABROAD														
L_SUM_COVERAGE														
YEARS_INSURED														
N_COVERAGE_BUYER														
ARRARS														
L_SUM_COVERAGE_BUYER														
N_COVERAGE_COUNTRY														
L_SUM_COVERAGE_COUNTRY														
GMR	1													
GFR	0.0573*	1												
LMR	0.5202*	0.4738*	1											
LFR	0.1449*	0.0071*	0.5315*	1										
B_RATE_1	0.0062*	-0.0147*	-0.0047	-0.0042	1									
B_RATE_2	0.0063*	-0.0109*	-0.0081*	-0.0181*	-0.0181*	1								
B_RATE_3	0.0175*	-0.0112*	-0.0016	-0.0029	-0.0284*	-0.0346*	1							
B_RATE_4	0.0191*	-0.0095*	-0.0012*	-0.0024	-0.0383*	-0.0502*	-0.0731*	1						
B_RATE_5	0.0120*	-0.0177*	-0.0003	-0.0073*	-0.0696*	-0.0912*	-0.1328*	-0.1929*	1					
B_RATE_6	-0.0883*	0.0154*	-0.0023	0.0087*	-0.0792*	-0.1038*	-0.1512*	-0.2195*	-0.3989*	1				
B_RATE_7	-0.0604*	0.0180*	-0.0023	0.0034	-0.0841*	-0.0804*	-0.1077*	-0.1777*	-0.2331*	-0.2841*	1			
B_RATE_8	0.0241*	0.0089*	0.0185	0.0048	-0.0284*	-0.0372*	-0.0542*	-0.0597*	-0.1430*	-0.1677*	-0.0947*	1		
B_RATE_9	0.0187*	0.0022	0.0102*	0.0005	-0.0186*	-0.0186*	-0.0414*	-0.0752*	-0.0855*	-0.0885*	-0.0486*	-0.0307*	1	
B_RATE_10	0.0247*	0.0059*	0.0074*	-0.0019	-0.0184*	-0.0263*	-0.0411*	-0.0746*	-0.0849*	-0.0494*	-0.0304*	-0.0160*	-0.0160*	1

An asterisk represents significance at the 5 percent level.

Table 3
The average acceptance rate as a function only of the macro variables

The dependent variable: Monthly average of the acceptance rate				
	(1)	(2)	(3)	(4)
(mean) GMR	-2.355	-2.234	-2.694	-3.236*
	-2.154	-1.7	-1.669	-1.653
(mean) GFR	-2.588	-0.168	0.403	1.151
	-2.032	-1.622	-1.599	-1.599
L. (mean) ACCEPT_RATIO		0.557***	0.384***	0.348***
		-0.088	-0.11	-0.112
L2. (mean) ACCEPT_RATIO			0.205*	0.181
			-0.104	-0.116
L3. (mean) ACCEPT_RATIO				-0.032
				-0.105
Constant	83.278***	37.100***	34.465***	41.874***
	-1.685	-7.365	-8.162	-8.784
Number of obs.	84	83	82	81
R-squared	0.03366	0.36375	0.35262	0.30229

*** Significant at a 1% of significance, ** significant as a 5% level of significance, * significant at a 10% level of significance.

Table 4
Correlations among the macro variables used in the regression

	GMR	GFR	LMR	LFR
GMR	1			
GFR	0.001	1		
LMR	0.091	-0.002	1	
LFR	0.408*	0.501*	0.530*	1

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