

Trade Credit and Bank Credit Crunches: Evidence for Spanish Firms from the Global Banking Crisis

Juan Carlos Molina Pérez

Master Thesis CEMFI

June, 2012

CEMFI

Casado del Alisal 5; 28014 Madrid

Tel. (+34) 914 290 551. Fax (+34) 914 291 056

Internet: www.cemfi.es

This paper is a revised version of the Master's Thesis presented in the partial fulfillment of the 2010-2012 Master in Economics and Finance at the Centro de Estudios Monetarios y Financieros (CEMFI). Firstly, I am very grateful to my thesis adviser, Javier Suárez, for his exceptional supervision. I also appreciate useful comments and suggestions from all the faculty at CEMFI during the workshop session and the final presentation. I would also thank my classmates, Anna and Joaquín, who saved my life many times during these two tough years. I thank my family and friends, for their unconditional support, and finally I would like to thank that very special person who always encouraged me to work hard and do my best, Dani. All errors and omissions are exclusively my own.

Master Thesis, CEMFI
June, 2012

Trade Credit and Bank Credit Crunches: Evidence for Spanish Firms from the Global Banking Crisis

Abstract

This project uses Spanish data for firms from 1994 to 2010 to analyse the patterns and determinants of the trade credit received and given by Spanish firms for a wide period of time that includes that financial crisis. Additionally, following Garcia-Appendini and Montoriol-Garriga (2011), I will use a differences-in-differences approach to identify whether firms with a better liquidity position (higher external financial dependence) prior to 2007 increased their extension (use) of trade credit to compensate the effect of the contraction in the supply of bank credit in the first years of the crisis.

Juan Carlos Molina Pérez
juankar.mp19@gmail.com

1 Introduction

The banking sector plays a key role in most economies transferring funds from savers to borrowers. Banks provide funds to firms and households, so that investment and consumption can be made without exclusively relying on internal funds. Although it is not the only source of external finance, bank credit is one of the most important ones. But, what happens when banks cannot fulfill this important function? What happens when firms are not able to borrow from banks due to an external shock that it is not related to the former?

This is one of the two aspects that we focus on this paper. The first one is how firms react to an external shock that presumably affected banks' lending capacity in the first place, the 2007 financial crisis. To be able to find evidence of a bank credit crunch, our main variable of interest is one close substitute for bank credit, trade credit. This type of credit is the one that is given by suppliers to their clients in the form of the deferment of the payment for the delivered goods by the supplier. Thus, firms can pay for the goods to their suppliers after they receive them. Despite the fact that this form of financing is much more expensive than bank credit (Wilner, 2000), it is widely used by firms. In 2010, trade credit extended ("Accounts Receivable") accounted for almost 30% of the firms' total financial assets, whereas trade credit used ("Accounts Payable") accounted for almost 20% of the total financial liabilities.

The second aspect that we focus on is to study the evolution and patterns of trade credit in Spain in the last 15 years. Specifically, we will try to understand how both aspects of trade credit have evolved during this period, which ends with the global banking crisis. Another important aspect of our study is to get to know the most important determinants for both Accounts Receivable and Accounts Payable in Spanish firms.

In section 2, we will review the previous literature regarding trade credit, commenting on the classic papers, on the most recent ones that are very close to this one and the contribution of this work. First, we will mention the reason for which firms use trade credit, reason that is related to the advantages of trade credit over bank finance: information acquisition, monitoring the buyer and greater efficiency in liquidation. After commenting on these aspects of trade credit, we will focus on the recent evidence of bank finance during the current financial crisis. Then, we will mention two papers that are very related to this work and highlight the differences between these papers and this work. The contribution of this paper relies on those differences.

In section 3, we will describe the empirical strategy we are going to use, define our main variables and the regression equations that we are going to perform. First we will define our baseline equations that contain our dependent variables: Accounts Receivable and Accounts Payable scaled by Sales and Purchases respectively. We call these ratios AR and AP . Then we will define all the variables

appearing in those equations. After that, we will mention the estimation methods, which are *OLS* and *FE*.

Section 4 describes the data and the filters we have applied to clean it from inconsistencies and outliers. We eliminate firms in the *utilities* sector and observations with negative or zero Assets, negative or zero Operating Revenues, negative or zero Cash and Short Term Financial Assets, and observations where the sum of Short Term Financial Assets and Cash is higher than the Assets. Then we eliminate observations where the assets growth rate is higher than one and observations where the sales growth or assets growth rate is less than -0.8. We drop observations with negative *AR* or *AP*, observations where *AR* is more than one and observations where *AP* is more than five. We also eliminate observations where firms have experienced a merge, split or cession and observations where the ratio between Equity and Assets is less than -1. Then we eliminate firms where the sector is missing and observations where the observations for the next year and the previous year are missing. Finally, we eliminate firms with less than three valid observations over the whole period of analysis.

In section 5 we start describing our Accounts Receivable results. Firstly we describe our baseline results, which have year, size and sector dummies as well as the control variables and the interaction terms between the crisis years and our financial slack variable, which is liquidity. Then we will add more interaction terms to our baseline results. After that, we will split the sample by size and have two subsamples. We will perform the same regression as our baseline one and analyse the results. Finally in this section, we will change our specification and instead of considering liquidity as our financial slack variable, we will consider excess liquidity as it, which is defined as the difference between the actual and predicted liquidity. We calculate the predicted liquidity using many variables, which are described in the Appendix.

Section 6 is similar to the previous one. In this section we describe our Accounts Payable results. First, we will describe our baseline results using some financial slack variable. Unfortunately, the interaction terms between this variable and the crisis years are not statistically significant and what we do next is to change our specification, considering more candidates for the financial slack variable. Since results do not change, we do not consider any financial slack variable and just perform the regression with all the candidates as controls. Finally, we describe and interpret the results for Accounts Payable.

Last, section 7 concludes with a brief summary of the work and the most important conclusions about the paper.

2 Previous Literature

Trade credit is an important source of finance, especially for medium and small firms. The literature about trade credit is vast and always starts by asking the same question: why does trade credit exist when there are specialized institutions for this particular purpose (*i.e.* banks)? The answer relies on its advantages over other sources of finance and, most notably, over bank finance: information acquisition, monitoring the buyer and greater efficiency in liquidation (Petersen and Rajan, 1997). Firstly, suppliers are better at monitoring their customers than banks are since, over the course of the relationship between supplier and customer, the former is very likely to know how good or bad is the business' condition of the latter (Smith, 1987). Secondly, suppliers can threaten firms to stop providing goods if debts are not paid. This threat is more credible if the supplier has more clients than this particular firm. The stronger the relationship between supplier and client is, the more harmful would be the loss experienced by the firm if the supplier stops providing the goods (Cuñat, 2007). Lastly, in the case of default, the supplier may have an advantage in recovering its debt from the debtor either by repossessing unused inventory or by his access to an industry network where he could sell the liquidated assets of his former client.

The financial crisis that started in 2007 has provided a new perspective of analysing the degree of substitutability between bank lending and other sources of external finance. It is commonly admitted that the crisis has provoked a bank credit crunch and several researchers are using the start of the crisis (or some of its landmarks) as an exogenous and unexpected shock to bank credit supply. Ivashina and Scharfstein (2010) show that new lending in 2008 was significantly lower than new lending in 2007 and that the decline in new loans accelerated during the banking panic (fourth quarter of 2008). Becker and Ivashina (2011) consider bonds as substitutes for bank lending. They find that conditioning on the issuance of new debt, an abnormal number of firms switched from bank loans to bonds, which is consistent with a bank credit supply contraction.

There are two papers that are closely related to this one. Garcia-Appendini and Montoriol-Garriga (2011) study how trade credit varies with the credit crunch originated by the financial crisis. They focus on large US firms and use a differences-in-differences strategy to find whether firms with higher (lower) liquidity positions before the crisis increased (decreased) the trade credit extended to other firms. They exclude firms with market capitalization less than \$50 million or whose book value of assets is less than \$10 million and those displaying asset or sales growth exceeding 100%. The other related paper is by Carbó-Valverde, Rodríguez-Fernández and Udell (2012), who study whether during the financial crisis trade credit provided an alternative source of external finance to SMEs in Spain. All firms they use for their analysis are below 40€ million in total assets. They use a disequilibrium model to identify firms that are credit constrained and find that they make greater use of trade credit ("Accounts Payable") in the crisis. Our paper will integrate the both aspects of trade credit, trade credit extended and trade credit used. Additionally, we will use a sample of

small, medium and large Spanish firms from 1994 to 2010. We will follow Garcia-Appendini and Montoriol Garriga in using a differences-in-differences approach, as detailed in the next section.

3 Empirical Strategy

We will measure the trade credit given by firms as Accounts Receivable and trade credit taken by firms as Accounts Payable and will scale them by Sales and Purchases respectively so as to facilitate the comparisons across firms of different sizes. Thus, these two ratios, Accounts Receivable over Sales (*AR*) and Accounts Payable over Purchases (*AP*), will be our dependent variables. Our two baseline equations will be as follows:

$$AR_{it} = \alpha_0 + \alpha_1' X_{it} + \sum_{s=1994}^{2010} \gamma_s^{AR} y_{st} + \sum_{s=2008}^{2010} \delta_s^{AR} FS_{it}^{AR} y_{st} + \varepsilon_{it}$$

$$AP_{it} = \beta_0 + \beta_1' Z_{it} + \sum_{s=1994}^{2010} \gamma_s^{AP} y_{st} + \sum_{s=2008}^{2010} \delta_s^{AP} FS_{it}^{AP} y_{st} + \omega_{it}$$

$$\text{where } y_{st} = \begin{cases} 1 & \text{if } s = t \\ 0 & \text{if } s \neq t \end{cases}$$

In the first equation, α_0 is the intercept; α_1 is a vector of coefficients associated with the vector of control variables X_{it} , vector which includes, among other variables, industry and size dummies (unless the equation is estimated with fixed effects). The variable y_{st} is a year dummy that takes value one for the year we are analysing. The year dummies coefficients are γ_s^{AR} and coefficients of the interaction terms between the crisis years and our financial slack variable for *AR*, FS_{it}^{AR} , are δ_s^{AR} . Similarly for the second regression, these terms are β_0 , which is the intercept, β_1 , the vector of coefficients associated with the vector of control variables Z_{it} , γ_s^{AP} , the crisis dummy year coefficients and δ_s^{AP} , the coefficients of the interaction terms between the crisis years and our financial slack variable for *AP*, FS_{it}^{AP} .

The financial slack variable represents the idea of a financial constraint and it is interacted with the crisis years (2008, 2009 and 2010). This interaction tries to capture the idea that firms might react in a different manner when the crisis arrives, presumably in 2008, and the difference in the reaction among firms might be due to the financial position of the firm just before the beginning of the crisis. Several variables will be considered for both equations, but we have one good candidate for each equation: Liquidity for the *AR* regression and External Finance Dependence (*EFD*) for the *AP* regression.

Regarding the first equation, the idea of having liquidity as a proxy for the financial position is that liquid firms might react differently than non-liquid firms and thus the trade credit extended by

these two types of firms might be different when the crisis arrives. We expect that the increase in trade credit extended for firms with more levels of liquidity just before the crisis is higher than this increase for firms with less liquidity. For the second equation, we consider the variable *EFD*. This variable captures the idea of depending on external sources of finance to do investment decisions. Firms with more *EFD* might react differently when taking trade credit when the crisis arrives. We expect that the increase of trade credit taken is higher for firms with more needs of external finance than this increase for firms with less need of external finance in the crisis years. However, if one (or both) variable does not work, several more specifications could be performed.

Finally, we will estimate both regressions with two different estimation methods: Ordinary Least Squares (*OLS*) and Fixed Effects (*FE*). In the first estimation method we will have, as explained above, some control variables, year, size and sector industry dummies, and the three interaction terms between our slack variable and the crisis years. All the controls will be lagged one period in order to reduce multicollineality and reverse causality problems. For the second estimation method, regressors with no or very little variation over time (size and industry sector dummies) are excluded.

4 Data

The data we will use is from the Central de Balances, a department of the Bank of Spain that collects economic and financial information about Spanish firms. Particularly, we will use data coming from the *questionnaires* that firms voluntarily fill in and submit to the Central de Balances every year. The more relevant information to our study comes from the yearly Balance Sheet and the Income Statement of the firms in the database. This database includes firms filling in the so-called full *questionnaire* as well as those filling in the *reduced questionnaire*, which is filled in by firms with, on average, less than 100 employees during the previous year. We have data from 1993 to 2010. This data does not include firms from the financial, insurance and public sectors.

Our initial sample consists of 163,481 observations from 33,321 firms for the period 1993-2010. However we perform several filters to clean the data from inconsistencies and outliers. We exclude *public utilities*, *i.e.*, those firms in Water Transportation, Water Services, Gas Services and Electric Services industries. This is done because these types of firms are either heavily regulated or government-owned. Additionally, we eliminate observations of firms with negative or zero Assets, negative or zero Operating Revenues, negative or zero Cash and Short Term Financial Assets, and observations where the sum of Short Term Financial Assets and Cash is higher than the Assets.

Then we eliminate observations where the growth rate of Assets is more than one, since these are most likely to correspond to firms that have merged or experienced other significant restructuring

and for which the regressors at $t - 1$ might explain badly AR or AP at t . We also eliminate observations where this same rate or the growth rate of Sales is less than -0.8 since these are most likely to be firms in the process of liquidation or division of Assets.

From this point, we will work with two different samples: one for AR and one for AP . For the first sample, we eliminate observations where AR is negative or more than one. When applying the last filter, we drop about 1% of the observations that we had in the sample at that time. For the second sample, we eliminate observations where AP is negative or more than 5, filter which eliminates also the 1% of the remaining observations when that filter was applied.

Next, for each sample we also eliminate observations for years in which we directly know that firms have experienced a merge, split or cession. We also drop observations where the ratio between Equity and Assets is less than -1 because we want to eliminate firms that are about to become bankrupt. When we apply this filter for the both samples, we eliminate 0.3% of the observations. If we had applied the filter using -0.5 instead of -1, the percentage of deleted observations would have been very similar, 0.6%. One could argue that the filter should be 0, instead of -1 or -0.5, but applying this filter would have eliminated almost 3% of the observations. First, deleted observations would have been too many for this filter, and most importantly, we would have dropped observations where we would not have been taking into account the future value of the firm. There could be firms whose future Equity value is positive and thus are worth being kept in our samples.

Then we eliminate firms where the sector is missing and observations where the observations for the next year and the previous year are missing, because, as we have mentioned, regressors at $t - 1$ are going to explain our dependent variables at t , so if we only have information at t , but not at $t - 1$, we will not be able to do our analysis. Finally, we eliminate firms with less than three valid observations over the whole period of analysis, although this is not a filter *per se*, because if we do not perform this filter, our regressions will omit firms with less than three observations in time.

Our final sample for AR consist of 93,091 observations from 11,483 firms for the period 1994-2010, whereas for AP consist of 82,393 observations from 10,061 firms for the same period. This is the starting point for the regressions we are about to perform. Tables A.1 and A.4 in the Appendix show the main descriptive statistics for both samples, AR and AP , of our analysis.

Finally, as we are going to analyse not only how trade credit varies during the crisis, but also the determinants and patterns of it, we will have firms whose observations do not correspond to the crisis years. This worth mentioning because one could think of eliminating firms in which we do not have observations for the crisis years, but, as one of our main objectives is to analyse the determinants of trade credit during the whole period, we will keep this kind of firms.

5 Accounts Receivable

In this section, we will describe all the results concerning the first regression, *AR*. The equation in Section 3 constitutes our baseline regression. After this, we will expand this equation and will include more terms. Specifically, we will include the interaction between our financial slack variable (liquidity), the crisis years and a size dummy (that takes value one for large firms and zero for small firms) and we will interact these three terms first two by two and then the three of them simultaneously. We define small firms as firms with less than 250 employees and large firms as firms with 250 or more employees.

After doing this, we will split the sample in two, according to size: one sample will consist of small firms and one of large firms. Finally in this section, we will change the financial slack variable and instead of liquidity, we will look at the excess liquidity, which is the difference between actual and predicted liquidity.

5.1 Baseline results

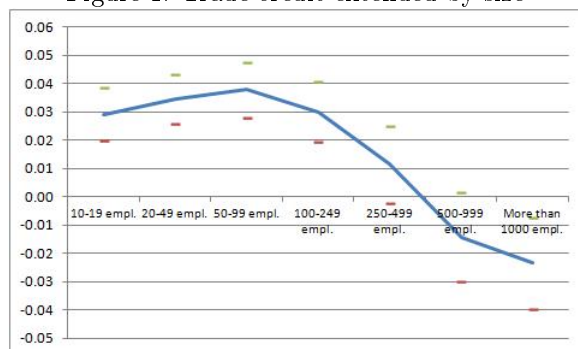
Columns 1 and 2 of Table 1 describe our baseline results. In column 1 we use an *OLS* method, whereas in column 2 we use a *FE* method. Regressors used in the two methods are not the same. In column 2, we do not use regressors that have little or no variation over time. Hence, we do not use industry sector dummies and size dummies. Firstly, we will start by describing the results obtained in column 1 and then we will go to the results in column 2.

When we perform the basic regression using the *OLS* method, we see that there are some industries that extend more trade credit than others. Industries with high trade credit extended are Mining, Manufacturing, Construction, Communication, Professional Services and Personal Services. Among those, Construction and Communication are the ones that extend more trade credit. Industries that extend low trade credit are Agriculture, Wholesale and Retail, Transportation, Hotels, Real State, Educational Services, Health Services and Recreation Services, with Hotels, Education Services and Recreation Services being the ones that extend less trade credit.

Figure 1 shows the pattern of *AR* according to size, with the 95% confidence intervals. We can see that small firms give more trade credit than large firms. Trade credit extended by firms increases with size up to firms that have between 50 and 99 employees. From this point, trade credit decreases with size. Thus, it is clear that large firms extend less trade credit than small firms and that medium firms are the ones that extend the most trade credit.

Next we will analyse the regressors. For this equation, we have the following regressors: Age, Sales Growth, Net Profit Margin, Short Time Liabilities, Equity, Tangible Assets and Liquidity.

Figure 1: Trade credit extended by size



The last four regressors are scaled by Assets¹. All these controls are lagged one period in order to reduce a possible multicollinearity problem. All of them, but Tangible Assets, are statistically significant at 1%. Age and Net Profit Margin are positive, but very close to 0. The coefficients are 0.0005 and 0.0009 respectively. Sales Growth and Liquidity have negative coefficients, -0.0127 and -0.1556 respectively, meaning that firms with high sales growth and more liquid firms extend less trade credit: an increase in Sales Growth by 1% reduces *AR* by 0.01%, while an increase in 1% of Liquidity reduces *AR* in 0.15%. The other two statistically significant regressors have positive coefficients: 0.13 for Short Term Liabilities and 0.0975 for Equity, meaning that firms with more short term debt and firms with more Equity (both as a percentage of the Total Assets) extend more trade credit.

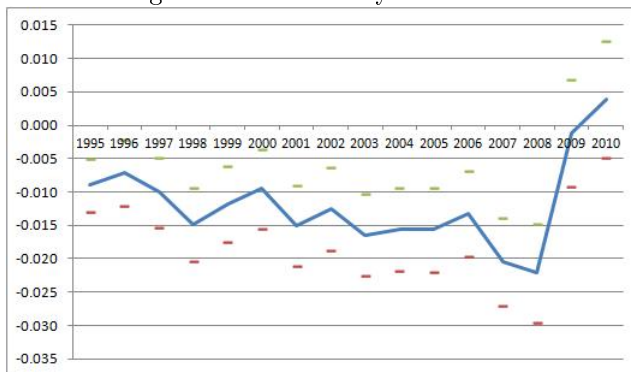
Now we will look at the coefficients of the year dummies. Figure 2 shows us that the evolution of these coefficients was stable and did not present too much variation until 2008, year in which clearly the coefficient started to increase. From 2008 to 2010, the increase in coefficients was 2.6%, so it seems that the crisis starting in 2008 has had some effect on the provision of trade credit given by firms.

Up to this point, we know that firms extended more trade credit in the following cases: firms in the Construction and Communication industry sectors, small and medium firms, firms with low sales growth, firms with low liquidity, firms with high Short Term Liabilities, firms with high Equity and all firms from 2008.

Now let us analyse the interaction terms. We see that in column 1 the three interaction terms between the crisis years and liquidity are positive. This means that, although liquidity has a negative effect on *AR*, this negative effect becomes less negative during the crisis. Also we know that the crisis years have had a positive effect on *AR*, but this effect is higher for more liquid firms. Thus, the

¹To see the exact definition of these variables, see the Appendix.

Figure 2: Year dummy coefficients



increase in trade credit extended is higher for firms with more liquidity. For example, the interaction coefficient for 2008 is 0.0559. This means that if firm A has 10% more liquidity than firm B, the former will increase (decrease) their trade credit extended 0.56% more (less) than the latter will do in 2008. This finding is consistent with the hypothesis that firms with high levels of pre-crisis liquidity act as substitutes for banks when the crisis arrives. But is this positive effect of liquidity on AR when the crisis arrives high enough to offset the total negative effect? To see the answer, the have to look at the marginal effect of liquidity on AR during the crisis years. In the years previous to the crisis, where we do not have any interaction terms, this effect is -0.1556. When the crisis arrives in 2008, this effect becomes less negative, -0.0997 and the same number is -0.1128 and -0.1063 for 2009 and 2010 respectively. Hence, liquidity still has a negative impact on AR , even in the crisis years. But this effect decreases considerably during them.

Now we turn to the analysis of the FE method and its similarities with the OLS results. Regarding the year dummies, we can see that the pattern is very similar, being more or less estable from the beginning of the period up to 2008, year in which the coefficients increase considerably. In this case from 2008 to 2010 we have an increase of 2.23%, very close to the one we had in the OLS method, which was 2.6%. From this result, we can claim the trade credit has increased from the beginning of the crisis to 2010. This constitutes our first robust result, that is, a result that is corroborated by both methods of estimation.

When we evaluate the regressors, we see that we only have two statistically significant ones, both consistent with the findings in the OLS method. Firstly, we see that Sales Growth is statistically significant, with a coefficient of -0.0062. This number is consistent with the one found in column 1 and, although it is as half as the one in column 1, both have the same sign. Secondly, a similar situation arises when we look at the liquidity regressor: it has the same sign as the one found in column 1 and it is much lower (-0.0457, whereas the one found in column 1 was -0.1556). Thus, we can claim, regarding the regressors, that firms with high liquidity and firms with more sales

growth extend less trade credit than other firms. These results are confirmed by both *OLS* and *FE* methods.

Finally, we know that liquidity has a negative effect on *AR*. But, does this effect vary with the level of liquidity? That is, does having more liquidity intensify or soften the negative effect that liquidity has on *AR*? To answer this question, we have to look again at the interaction terms. Out of the three terms, only the one corresponding to the year 2008 is positive and statistically significant. This means that having more liquidity makes the negative effect of liquidity on *AR* less intense. So the higher the liquidity is, the more *AR* increases (or the less it decreases), whereas this cannot be said for 2009 and 2010. In 2008, if a firm A has 10% more liquidity than firm B, *AR* in firm A will increase the trade credit extended 0.16% more (or will decrease 0.16% less) when the crisis arrives. For 2009 and 2010 we cannot say this and the effect of liquidity on *AR* is only given by the regressor liquidity in our regression. Is the total negative effect of liquidity on *AR* offset by the positive interaction term? Once again, we have to look at the marginal effect. In the years where there is no significant interaction term, that is, in all but in 2008, the negative effect is -0.0457. But in 2008 this effect is reduced up to -0.0296. After observing both results, we can say that only in 2008 the negative effect of liquidity on *AR* has become less negative.

Summarising these results, we can say that firms with more liquidity and higher sales growth extend less liquidity than others. Regarding the first result, we can think of this as the fact that firms that have more liquidity do not want to extend too much trade credit because they want to protect themselves against negative shocks that might arise. This is consistent with one of Keynes' motives for demand of liquidity, that says that firms demand liquidity *to provide for contingencies requiring sudden expenditure and for unforeseen opportunities of advantageous purchases, and also to hold an asset of which the value is fixed in terms of money to meet a subsequent liability fixed in terms of money, are further motives for holding cash*². This interpretation is consistent with the fact that the fixed effect estimator of liquidity is negative, which tells us that the same firm reduces their trade credit extended when it has more liquidity than before.

About the second result, firms with higher sales growth extend less trade credit. We could interpret sales growth as a proxy for past performance: the higher the sales growth is, the better the performance of the firm. Thus, if the clients of the firm are doing very well in their activities, the firm is probably going to sale more to them. And since the clients are doing very well too, they are not going to need much trade credit, since they will prefer to pay at the moment of the transaction if they can. Thus, with a good past performance of the firm and its clients, trade credit is going to decrease with sales growth. Another possible interpretation is that firms that have high sales growth have more growth opportunities as well. Thus, firms with more growth opportunities will be able to choose who to supply to, since they have a wide variety of clients where to choose from.

²Keynes, J. (1936). "The General Theory of Employment, Interest and Money", chap. 15.

And the supplier will choose firms that tend to pay with cash, instead of firms that use trade credit.

Finally, our last result that is robust under both methods of estimation is the interaction coefficient between liquidity and the year 2008. This coefficient, as seen above, is statistically significant and positive under both *OLS* and *FE*. One possible interpretation of this result could be that firms, at the start of the crisis, decide to extend more trade credit than before if they have lots of liquidity, thinking that this crisis is going to be temporary and thus they do not mind increasing their trade credit provision. However, as the crisis becomes deeper and firms get to know that it is going to last very long, they decide to stop acting as bank substitutes and that is why they do not do the same in the following years, 2009 and 2010.

Table 1: Trade credit extended by firms

	(1)		(2)	
Constant	0.1168***	(6.82)	0.2581***	(22.91)
Year 1995	-0.0090***	(-4.45)	-0.0089***	(-5.21)
Year 1996	-0.0072***	(-2.84)	-0.0088***	(-4.28)
Year 1997	-0.0100***	(-3.77)	-0.0098***	(-4.53)
Year 1998	-0.1486***	(-5.32)	-0.0126***	(-5.47)
Year 1999	-0.0118***	(-4.04)	-0.0103***	(-4.19)
Year 2000	-0.0095***	(-3.15)	-0.0070***	(-2.76)
Year 2001	-0.0151***	(-4.92)	-0.0096***	(-3.59)
Year 2002	-0.0125***	(-3.94)	-0.0041	(-1.44)
Year 2003	-0.0164***	(-5.18)	-0.0062**	(-2.15)
Year 2004	-0.0156***	(-4.90)	-0.0063**	(-2.11)
Year 2005	-0.0156***	(-4.85)	-0.0046	(-1.51)
Year 2006	-0.0132***	(-4.04)	-0.0018	(-0.57)
Year 2007	-0.0204***	(-6.08)	-0.0084***	(-2.59)
Year 2008	-0.0221***	(-5.82)	-0.0044	(-1.23)
Year 2009	-0.0011	(-0.28)	0.0139***	(3.66)
Year 2010	0.0039	(0.87)	0.0179***	(4.43)
Agriculture	-0.0568***	(-3.30)		
Mining	0.0414*	(1.76)		
Manufacturing	0.0165	(1.11)		
Construction	0.0859***	(5.50)		
Wholesale and retail	-0.0395***	(-2.62)		
Transportation	-0.0238	(-1.50)		

(continue on the next page)

(comes from the previous page)

Hotels	-0.1174***	(-7.63)		
Communication	0.0780***	(4.25)		
Real state	-0.0725***	(-4.55)		
Professional services	0.0351**	(2.11)		
Personal services	0.0301*	(1.79)		
Educational services	-0.1135***	(-4.90)		
Health services	-0.0531***	(-2.68)		
Recreation services	-0.1297***	(-6.54)		
Between 10 and 19 empl.	0.0292***	(6.18)		
Between 20 and 49 empl.	0.0346***	(7.60)		
Between 50 and 99 empl.	0.0378***	(7.70)		
Between 100 and 249 empl.	0.0299***	(5.53)		
Between 250 and 499 empl.	0.0115*	(1.66)		
Between 500 and 999 empl.	-0.0142*	(-1.76)		
1000 or more empl.	-0.0235***	(-2.83)		
Age	0.0006***	(7.39)	-0.0001	(-0.46)
Sales growth	-0.0127***	(-7.72)	-0.0062***	(-4.48)
Net profit margin	0.0009***	(3.20)	0.0001	(0.85)
Short term liab. / assets	0.1304***	(14.80)	-0.0082	(-1.20)
Equity / assets	0.0975***	(12.40)	0.0055	(0.80)
Tangible assets / assets	-0.0077	(-1.16)	0.0016*	(1.66)
Liquidity	-0.1556***	(-17.3)	-0.0457***	(-6.93)
Large firm (size dummy)			-0.0075***	(-2.79)
Liquidity * year 2008	0.0559***	(4.42)	0.0160*	(1.76)
Liquidity * year 2009	0.0428***	(3.15)	-0.0075	(-0.67)
Liquidity * year 2010	0.0494***	(3.32)	-0.0059	(-0.49)
<hr/>				
Estimation method	OLS		FE	
R-squared	0.1462		0.0003	
Observations	79,124		79,124	
Firms	11,843		11,843	

This table presents estimates from an unbalanced panel regressions explaining firm-level annual trade credit provided for the period 1994-2010. The dependent variable is accounts receivable over sales. The first column shows the estimates using OLS and the second column using FE. Liquidity is calculated as the sum of Cash and Short Term Financial Assets scaled by Total Assets. All controls are lagged one period. Standard errors in parenthesis, next to the coefficients. ***, ** and * indicates significance at 1%, 5% and 10% respectively.

Now we move to Table 2. They show us the results of the regression when we interact liquidity, which is our financial slack variable, the crisis years and a size dummy, which takes value 1 for large firms. What is the idea of interacting a size dummy with liquidity and the crisis years? As explained above, we have interacted liquidity with the crisis years because more liquid firms might react differently from less liquid firms, extending more or less trade credit, when the crisis arrives. Using the same argument, we can think of this size dummy as a way to capture the idea that large firms might react differently depending on liquidity when the crisis arrives. It is claimed that large firms are likely to have access to more sources of finance than small firms. Specifically we will find out whether large liquid firms extend more or less trade credit than small liquid firms and how this varies when the crisis arrives. As before, firstly we will describe the results from the first column, which uses an *OLS* method, and compare them to our baseline results and highlight the possible differences that we might find and then we will do the same for results from the second column, which uses a *FE* method.

Results in column 1 show that we do not find many differences regarding the industry sectors: Sectors that extend more trade credit are the same ones found in our baseline results, whereas sectors that extend less trade credit are the same too. When we look at the evolution of the coefficients of the year dummies of trade credit, results do not change compared to the baseline results: from 2008 to 2010 these coefficients increased by 3%, a quantity very close to the one found in our baseline results.

Regarding the regressors, we can see that again results do not change compared to column 1 from Table 1. Age and Net Profit Margin are very close to zero, Short Time Liabilities and Equity are positive and statistically significant, with coefficients 0.1422 and 0.1062, very close to the ones found in the baseline results, meaning that firms with high Equity and firms with high Short Term Liabilities extend more trade credit. Finally, the same happens with Liquidity and Sales Growth: they are statistically significant at 1% and have the same sign and magnitude as the baseline results: -0.1556 and -0.0135 respectively. In this type of specification we do not have six size dummies, but only one. The corresponding regressor is negative and statistically significant: -0.0139, meaning that, *ceteris paribus*, a large firm gives 1.39% less trade credit than a small firm. This is consistent with our results that small firms give more trade credit than large ones.

Now we turn to the interaction terms: the three interaction terms between liquidity and the crisis years are higher than the ones found in our baseline regression, meaning the same that what we have explained above only that the negative effect of liquidity on *AR* will be more reduced since we have higher interaction coefficients. For example this effect will be -0.0887 for 2008, -0.1094 for 2009 and -0.1039 for 2010. But the interpretation of these coefficients is quite similar to the one given for Table 1.

Out of the new interaction terms, only two are statistically significant: First, the interaction term between liquidity and size is negative. We know that liquidity has a negative effect on AR . How does this effect vary when the firm is large? This effect is given by the coefficient of the interaction term between liquidity and size. Thus, as this term is negative, large firms have a more negative effect of liquidity on trade credit than small firms. To see this, we can calculate the effect of liquidity on AR for both types of firms. For 2008, this effect is -0.1314 for large firms, whereas it is -0.0887 for small firms. This is consistent with the fact that both liquidity and large size have a negative effect on AR and that in Figure 1 we saw that large firms extend less trade credit. Second, the interaction term between the crisis year and the size large dummy is positive. How do we interpret this effect? We know that the crisis has a positive effect on AR . This effect is reinforced if the firm is large. That is, the crisis in 2008 has a more positive effect on large firms than on small firms.

In column 2, we have the results for the FE method. The year dummies present the same pattern, being stable until 2008, year in which it increases. From 2008 to 2010, the year dummy coefficients of trade credit extended increases in 2.56%, result very similar to the previous ones. Regarding the regressors, we have that Sales Growth and Liquidity are the only ones that are statistically significant and both have the same magnitude as the baseline results: -0.0063 for Sales Growth and -0.0402 for Liquidity. Thus, once more, these two regressors are the only ones significant in the FE method. In all the cases analysed, we have that these regressors are statistically significant and are both negative, implying that firms with high liquidity and firms with high sales growth extend less trade credit.

Regarding the interaction terms, results are very similar to the ones found in column 2 from Table 1 and column 1. Out of the three interaction coefficients between the crisis years and liquidity, only the 2008 coefficient is statistically significant, as in the baseline results and both are almost equal. Out of the new interaction terms, only two are statistically significant, the same ones as in column 1: the interaction coefficient between liquidity and size and the interaction coefficient between liquidity and size. When we ask ourselves how AR varies with liquidity, we get the same answer. The partial derivative of AR with respect to liquidity is, in 2008, which is the only year in which the interaction terms are statistically significant, -0.05 for large firms and -0.0242 for small firms, suggesting the same result we have got in this section: large firms extend less trade credit than small firms. However, what is the effect of the crisis year 2008 on AR depending on size? The answer is given by the interaction term between size and the crisis year 2008, which is positive, meaning that in 2008, large firms increase, with respect to themselves, more the trade credit given (or they decrease less) than small firms.

Table 2: Trade credit extended by firm and size

	(1)		(2)	
Constant	0.1354***	(8.00)	0.2310***	(39.89)
Year 1995	-0.0088***	(-4.33)	-0.0087***	(-5.05)
Year 1996	-0.0071***	(-2.81)	-0.0086***	(-4.20)
Year 1997	-0.0099***	(-3.72)	-0.0098***	(-4.51)
Year 1998	-0.0143***	(-5.12)	-0.0128***	(-5.55)
Year 1999	-0.0108***	(-3.70)	-0.0108***	(-4.41)
Year 2000	-0.0083***	(-2.76)	-0.0080***	(-3.16)
Year 2001	-0.0140***	(-4.55)	-0.0108***	(-4.11)
Year 2002	-0.0115***	(-3.61)	-0.0055**	(-1.98)
Year 2003	-0.0155***	(-4.89)	-0.0077***	(-2.74)
Year 2004	-0.0143***	(-4.49)	-0.0078***	(-2.71)
Year 2005	-0.0147***	(-4.56)	-0.0062**	(-2.10)
Year 2006	-0.0128***	(-3.90)	-0.0034	(-1.11)
Year 2007	-0.0206***	(-6.14)	-0.0100***	(-3.21)
Year 2008	-0.0289***	(-6.81)	-0.0129***	(-3.33)
Year 2009	-0.0052	(-1.13)	0.0091**	(2.15)
Year 2010	0.0011	(0.22)	0.0127***	(2.77)
Agriculture	-0.0577***	(-3.30)		
Mining	0.0427*	(1.81)		
Manufacturing	0.0201	(1.33)		
Construction	0.0851***	(5.40)		
Wholesale and retail	-0.0407***	(-2.67)		
Transportation	-0.0233	(-1.45)		
Hotels	-0.1126***	(-7.26)		
Communication	0.0776***	(4.23)		
Real state	-0.0905***	(-5.70)		
Professional services	0.0322*	(1.93)		
Personal services	0.0255	(1.51)		
Educational services	-0.1059***	(-4.60)		
Health services	-0.0518**	(-2.56)		
Recreation services	-0.1247***	(-6.28)		
Age	0.0006***	(7.24)	-0.0001	(-0.53)
Sales growth	-0.0135***	(-8.12)	-0.0063***	(-4.54)

(continue on the next page)

(comes from the previous page)

Net profit margin	0.0010***	(3.16)	0.0001	(0.80)
Short term liab. / assets	0.1422***	(16.26)	-0.0100	(-1.45)
Equity / assets	0.1062***	(13.50)	0.0071	(1.03)
Tangible assets / assets	-0.0071	(-1.12)	0.0017*	(1.78)
Liquidity	-0.1556***	(-15.9)	-0.0402***	(-5.39)
Large firm (size dummy)	-0.0139***	(-3.33)	0.0015	(0.34)
Liquidity * large	-0.0427**	(-2.31)	-0.0257**	(-2.06)
Liquidity * year 2008	0.0669***	(4.49)	0.0160*	(1.76)
Liquidity * year 2009	0.0462***	(2.93)	-0.0075	(-0.67)
Liquidity * year 2010	0.0517***	(3.05)	-0.0059	(-0.49)
Year 2008 * large	0.0187***	(3.14)	0.0214***	(4.48)
Year 2009 * large	0.0070	(1.02)	0.0083	(1.58)
Year 2010 * large	0.0021	(0.26)	0.0114	(1.60)
Liquidity * large * y. 2008	-0.0099	(-0.36)	-0.0036	(-0.17)
Liquidity * large * y. 2009	0.0202	(0.67)	0.0278	(1.17)
Liquidity * large * y. 2010	0.0191	(0.56)	0.0077	(0.30)

Estimation method	OLS	FE
R-squared	0.1387	0.0026
Observations	79,124	79,124
Firms	11,843	11,843

This table presents estimates from an unbalanced panel regressions explaining firm-level annual trade credit provided for the period 1994-2010. The dependent variable is accounts receivable over sales. The first column shows the estimates using OLS and the second column using FE. Large is a dummy variable that takes value one for firms with 250 or more employees. Liquidity is calculated as the sum of Cash and Short Term Financial Assets scaled by Total Assets. All controls are lagged one period. Standard errors in parenthesis, next to the coefficients. ***, ** and * indicates significance at 1%, 5% and 10% respectively.

5.2 Results by size

Now we have splitted the sample in two subsamples: the first has firms with less than 250 employees, which constitutes 85% of the original sample, while the second subsample has firms with 250 or more employees. Table 3 shows us the results for both subsamples using the *OLS* and the *FE* methods. As mentioned above, the idea of splitting the sample by size is that large liquid firms might react differently from small liquid firms when the crisis arrives. Also, this distinction

is important because in general large firms have less financial constraints than small firms since the former can rely on sources of external finance that the latter cannot.

Regarding the industry sectors, all sectors in both subsample have the same sign as our baseline results, but four of them: Mining, Manufacturing, Real State and Education, which although they are consistent with the baseline results in the small subsample, they are not in the large sample. About the evolution of the trade credit coefficients over the last years in the whole sample we have that, from 2008 to 2010, the coefficients increase by 2.6%. Does this increase vary when we consider only small firms or only large firms? The answer is that it does. For the small subsample, they increase from 2008 to 2010 by about 2.9%, whereas for the large subsample, it does by much lower, 1.1%. Thus, the crisis years affect more small firms in the sense that the dummy year coefficients increase in small firms three times more than large firms. Note that this is not inconsistent with what we have explained in the previous section. Trade credit increases in 2008 more in large firms than in small ones, but the overall increase of trade credit over all the crisis period is much more in small firms.

Regarding the regressors, we have that Age is very close to zero in both samples, while Net Profit Margin is not consistent in any subsample. Tangible assets is another inconsistent regressor: it is positive for both subsamples under *OLS*, but negative for both under *FE*. Short term liabilities is another example of this case. Equity is an interesting regressor. For small firms, it seems that it is consistent under both *OLS* and *FE*. The coefficients are 0.1 and 0.01 and are statistically significant, meaning that for small firms the higher the equity a firm has, the more trade credit they extend. However, this is not the case for large firms, since the *FE* coefficient is negative, and the *OLS* coefficient is very close to zero, 0.0013.

As expected, both Sales Growth and Liquidity are the only regressors that are statistically significant and consistent under both methods of estimation for both samples. The coefficients for Sales Growth are -0.012 and -0.005 for small firms and -0.01 and 0.018 for large firms. For Liquidity, these numbers are -0.171, -0.037, -0.19 and -0.048. Thus, for Sales Growth the effect is similar for both subsamples, whereas for Liquidity the effect is slightly stronger (more negative) for large firms.

When we look at the interaction terms in both samples, we see that results found in the previous part only hold for the small subsample, since the coefficients are quite similar and have the same significance. For the *OLS* regression (column 1), we see that all the interaction terms are statistically significant and slightly higher than the baseline results, whereas for the *FE* regression, only the 2008 coefficient is statistically significant. For the large sample, on the other hand, only the 2010 interaction coefficient is statistically significant under *OLS*, but the rest are not. So, all the results and interpretations commented before are also valid for small firms, whereas for large firms we do not see any similar pattern.

Why could the baseline results be only applied to small firms and not to large ones? One possible interpretation could be this one: let us consider the case of a large firm that is the supplier. If this firm has a small firm as a client, the supplier will have more bargaining power, since it is large and it is less dependent on its client than its client is on the supplier. On the other hand, the small firm has little bargaining power and does not have too many options and thus it has to accept the conditions of the large firm. Now, if the large supplier firm has another large firm as a client, what would happen when the supplier does not want to provide trade credit but the client wants to take it? It will depend on the bargaining power of the firms. But assuming that the provider does not want to extend trade credit, as the client is a large firm, it can have access to other sources of external finance. However, this situation does not happen when we consider a small or medium firm as a supplier. As they do not have many clients, they could be more dependent on their clients than large firms are. Thus, when the client is a large firm, the supplier has to extend more trade credit even it does not want to.

Table 3: Trade credit extended by size

	(1)		(2)		(3)		(4)	
Constant	0.1362***	(7.97)	0.2204***	(32.19)	0.1609***	(2.88)	0.2388***	(18.05)
Year 1995	-0.0086***	(-3.81)	-0.0084***	(-4.36)	-0.0080	(-1.64)	-0.0091***	(-2.55)
Year 1996	-0.0056**	(-2.00)	-0.0082***	(-3.57)	-0.0130**	(-2.02)	-0.0096**	(-2.11)
Year 1997	-0.0073**	(-2.50)	-0.0078***	(-3.25)	-0.0213***	(-3.27)	-0.0207***	(-4.23)
Year 1998	-0.0122***	(-4.03)	-0.0100***	(-3.96)	-0.0251***	(-3.34)	-0.0269***	(-4.69)
Year 1999	-0.0101***	(-3.19)	-0.0084***	(-3.12)	-0.0177**	(-2.27)	-0.0200***	(-3.40)
Year 2000	-0.0068**	(-2.06)	-0.0044	(-1.60)	-0.0198**	(-2.43)	-0.0267***	(-4.34)
Year 2001	-0.0123***	(-3.69)	-0.0069**	(-2.40)	-0.0290***	(-3.44)	-0.0301***	(-4.77)
Year 2002	-0.0095***	(-2.77)	0.0004	(0.13)	-0.0285***	(-3.40)	-0.0305***	(-4.53)
Year 2003	-0.0128***	(-3.72)	0.0025	(0.81)	-0.0349***	(-4.17)	-0.0347***	(-5.22)
Year 2004	-0.0126***	(-3.64)	-0.0034	(-1.06)	-0.0313***	(-3.68)	-0.0298***	(-4.42)
Year 2005	-0.0122***	(-3.46)	-0.0007	(-0.20)	-0.0371***	(-4.41)	-0.0311***	(-4.61)
Year 2006	-0.0095***	(-2.63)	0.0024	(0.71)	-0.0353***	(-4.35)	-0.0288***	(-4.31)
Year 2007	-0.0175***	(-4.76)	-0.0052	(-1.49)	-0.0354***	(-4.19)	-0.0300***	(-4.39)
Year 2008	-0.0246***	(-5.90)	-0.0061	(-1.56)	-0.0057	(-0.60)	0.0011	(0.15)
Year 2009	-0.0019	(-0.41)	0.0145***	(3.46)	0.0009	(0.09)	0.0029	(0.38)
Year 2010	0.0044	(0.88)	0.0191***	(4.20)	-0.0050	(-0.46)	0.0020	(0.25)
Agriculture	-0.0554***	(-3.15)			-0.0103*	(-1.85)		
Mining	0.0549**	(2.27)			-0.0418	(-0.68)		
Manufacturing	0.0177	(1.18)			-0.0134	(-0.26)		

(continue on the next page)

(comes from the previous page)

Construction	0.0652***	(4.18)			0.2300***	(4.27)		
Wholesale and retail	-0.0410***	(-2.71)			-0.0777	(-1.48)		
Transportation	-0.0142	(-0.88)			-0.0765	(-1.44)		
Hotels	-0.1197***	(-7.72)			-0.0861	(-1.63)		
Communication	0.0738***	(3.75)			0.0609	(1.14)		
Real state	-0.0740***	(-4.65)			0.1032	(1.20)		
Professional services	0.0191	(1.14)			0.1158**	(2.12)		
Personal services	0.0185	(1.04)			0.0577	(1.08)		
Educational services	-0.1233***	(-5.43)			0.0382	(0.49)		
Health services	-0.0631***	(-2.95)			-0.0273	(-0.48)		
Recreation services	-0.1295***	(-6.32)			-0.1539***	(-2.74)		
Between 10-19 empl.	0.0276***	(5.91)						
Between 20-49 empl.	0.0336***	(7.44)						
Between 50-99 empl.	0.0374***	(7.67)						
Between 100-249 empl.	0.0290***	(5.34)						
Between 250-499 empl.					0.0428***	(4.86)		
Between 500-999 empl.					0.0121	(1.40)		
Age	0.0005***	(6.14)	-0.0001	(-0.60)	0.0001***	(5.55)	0.0002**	(2.03)
Sales growth	-0.0119***	(-7.10)	-0.0053***	(-3.72)	-0.0099***	(-3.64)	-0.0176***	(-3.78)
Net profit margin	0.0010***	(2.75)	0.0001	(0.74)	-0.0142	(-1.47)	-0.0138	(-1.65)
Short term liab. / assets	0.1169***	(12.82)	-0.0076	(-1.02)	0.0713***	(5.87)	-0.0089	(-0.55)
Equity / assets	0.1008***	(12.43)	0.0132*	(1.76)	0.0254***	(3.57)	-0.0323*	(-1.89)
Tangible assets / assets	-0.0369***	(-6.19)	0.0161***	(2.93)	-0.0013	(-0.86)	0.0010***	(4.68)
Liquidity	-0.1714***	(-18.7)	-0.0373***	(-5.05)	-0.1897***	(-11.3)	-0.0477***	(-2.58)
Liquidity * year 2008	0.0627***	(4.58)	0.0209*	(1.86)	-0.0020	(-0.06)	-0.0210	(1.02)
Liquidity * year 2009	0.0419***	(2.88)	-0.0123	(-1.00)	0.0510	(1.42)	0.0228	(0.96)
Liquidity * year 2010	0.0449***	(2.84)	-0.0092	(-0.68)	0.0792**	(2.04)	0.0196	(0.68)
Estimation method	OLS		FE		OLS		FE	
R-squared	0.1422		0.0001		0.3091		0.0196	
Observations	69,000		69,000		9,460		9,460	
Firms	10,325		10,325		1,531		1,531	

This table presents estimates from an unbalanced panel regressions explaining firm-level annual trade credit provided for the period 1994-2010. The dependent variable is accounts receivable over sales. Columns 1 and 2 present the results for the small subsample and columns 3 and 4 for the large one. Columns 1 and 3 show the estimates using OLS and the columns 2 and 4 using FE. Large is a dummy variable that takes one for firms with 250 or more employees. Liquidity is calculated as the sum of Cash and Short Term Financial Assets scaled by Total Assets. All controls are lagged one period. Standard errors in parenthesis, next to the coefficients. ***, ** and * indicates significance at 1%, 5% and 10% respectively.

5.3 Excess liquidity as financial slack variable

Now we are going to change the definition of our financial slack variable. Instead of considering liquidity as our financial slack variable, we will consider excess liquidity, that is, the difference between the actual and predicted liquidity. First of all, we will predict liquidity using year dummies, from 1994 to 2010, six sector dummies, industry sector dummies and some regressors. Among the last group, we have Tangible Assets, Long Term Financial Assets, Inventories, Net Working Capital, Short Term Liabilities, Long Term Liabilities, Cash Flow, Purchases, Sales and a dividend dummy, which takes value one when the firm has paid dividends³. However, as liquidity should take values between zero and one, so should predicted liquidity and thus we replace negative values of predicted liquidity with zero and values that are more than one with one. Thus, as liquidity, predicted liquidity only takes values between zero and one. After doing the prediction of liquidity, we calculate excess liquidity as the difference of the actual liquidity and this predicted liquidity.

Table 3 shows the regression using the *OLS* and the *FE* methods. In column 1 we find the coefficients of the *OLS* regression method, while in the column 2 we find the *FE* coefficients. As column 1 shows, results do not change considerably when we change the financial slack variable.

When we look at the regressors, we see that again Sales Growth and Excess Liquidity, in this case, have the same sign as the baseline results and are both statistically significant. The first coefficient is -0.0119, coefficient which was -0.0129 for the baseline results, that is, very similar. However, we do see that the Excess Liquidity coefficient is much higher than the Liquidity coefficient, being -0.2015 and -0.1556 respectively. This suggests that having more liquidity and more excess liquidity makes firms extend less credit, but the effect of having more excess liquidity is much stronger, about 33% higher than having more liquidity.

Now we will comment on the interaction terms. From column 1 we see that these terms are higher than the ones found in the baseline results. Thus, the reduction in the negative effect of liquidity on *AR* when the crisis arrives is higher in this case than in the baseline results. However, the negative effect of liquidity alone is higher. Thus, before the arrival of the crisis liquidity has a effect of -0.2015 and is reduced by 0.0787 when the crisis arrives in 2008. Hence, in 2008 liquidity only has a negative effect of -0.1228.

Column 2 shows us the results for the *FE* estimation method. The results are very similar to the ones found in the baseline regression and to the ones found in column 1. Sales Growth and Excess Liquidity are the only statistically significant regressors and they have the same sign and are of the same magnitude as the ones found in the baseline regression: -0.0062 and -0.0508. The only interaction term that is statistically significant is the interaction term between excess liquidity

³See the Appendix for the exact definition of the variables.

and the crisis year 2008, it is 0.0209, a little bit higher than the one found in the baseline result, 0.016. Thus, we conclude that results are quite similar when we consider excess liquidity instead of liquidity as our financial slack variable. This could be seen as a robustness check for our baseline results.

Table 4: Trade credit extended using excess liquidity as financial slack variable

	(1)		(2)	
Constant	0.0838***	(4.78)	0.2421***	(18.42)
Year 1996	-0.0001	(-0.9750)	0.0028*	(1.66)
Year 1997	0.0013	(0.53)	0.0008	(0.43)
Year 1998	-0.0052*	(-1.95)	-0.0029	(-1.37)
Year 1999	-0.0033	(-1.17)	0.0016	(0.67)
Year 2000	-0.0029	(-0.98)	0.0013	(0.52)
Year 2001	-0.0068**	(-2.20)	-0.0014	(-0.55)
Year 2002	-0.0026	(-0.83)	0.0065**	(2.32)
Year 2003	-0.0064**	(-2.02)	0.0040	(1.39)
Year 2004	-0.0056*	(-1.78)	0.0049	(1.67)
Year 2005	-0.0066**	(-2.08)	0.0045	(1.53)
Year 2006	-0.0034	(-1.05)	0.0098***	(3.13)
Year 2007	-0.0122***	(-3.70)	0.0003	(0.10)
Year 2008	-0.0059*	(-1.75)	0.0062*	(1.86)
Year 2009	0.0094***	(2.63)	0.0222***	(6.35)
Year 2010	0.0145***	(3.82)	0.0245***	(6.83)
Agriculture	-0.0438**	(-2.48)		
Mining	0.0491**	(1.96)		
Manufacturing	0.0279*	(1.85)		
Construction	0.1011***	(6.34)		
Wholesale and retail	-0.0250	(-1.63)		
Transportation	-0.0191	(-1.18)		
Hotels	-0.1160***	(-7.42)		
Communication	0.0769***	(4.08)		
Real state	-0.0703***	(-4.32)		
Professional services	0.0308*	(1.79)		
Personal services	0.0289*	(1.68)		
Educational services	-0.1219***	(-5.05)		
Health services	-0.0515**	(-2.45)		

(continue on the next page)

(comes from the previous page)

Recreation services	-0.1294***	(-6.20)		
Between 10 and 19 empl.	0.0310***	(6.22)		
Between 20 and 49 empl.	0.0400***	(8.33)		
Between 50 and 99 empl.	0.0434***	(8.42)		
Between 100 and 249 empl.	0.0361***	(6.33)		
Between 250 and 499 empl.	0.0181**	(2.50)		
Between 500 and 999 empl.	-0.0093	(-1.10)		
1000 or more empl.	-0.0185**	(-2.12)		
Age	0.0006***	(7.22)	0.0001	(0.30)
Sales growth	-0.0119***	(-5.49)	-0.0062***	(-3.37)
Net profit margin	0.0008***	(3.78)	0.0001	(0.31)
Short term liabilities / assets	0.1181***	(12.10)	-0.0059	(-0.75)
Equity / assets	0.0914***	(10.63)	0.0077	(0.99)
Tangible assets / assets	-0.0078	(-1.13)	0.0013*	(1.84)
Excess Liquidity	-0.2015***	(-18.3)	-0.0508***	(-7.34)
Large (size dummy)			-0.0079**	(-2.56)
Excess liquidity * year 2008	0.0785***	(4.78)	0.0209*	(1.84)
Excess liquidity * year 2009	0.0595***	(3.65)	-0.0081	(-0.62)
Excess liquidity * year 2010	0.0600***	(3.40)	-0.0025	(-0.19)
Estimation method	OLS		FE	
R-squared	0.1636		0.0002	
Observations	65,131		65,131	
Firms	11,337		11,337	

This table presents estimates from an unbalanced panel regressions explaining firm-level annual trade credit provided for the period 1994-2010. The dependent variable is accounts receivable over sales. The first column shows the estimates using OLS and the second column using FE. Excess liquidity is the difference between actual and predicted liquidity. All controls are lagged one period. Standard errors in parenthesis, next to the coefficients. ***, ** and * indicates significance at 1%, 5% and 10% respectively.

5.4 Final and concluding remarks about AR

Now that we have described all the results concerning *AR*, we will proceed to briefly summarize them.

The first interesting remark about trade credit extended by firms is that it has significantly increased since the crisis years and this increase has been more pronounced in small firms, although in 2008 the increase was higher in large firms, as the interaction coefficient between the large size dummy and the crisis year 2008 proves.

The second fact is that large firms extend less trade credit than small ones. It has been proven by the figure of the trade credit according to size, in which we see that trade credit is increasing up to firms with 49 employees at most and from this point, trade credit starts to decrease with size. This can be seen in when we use liquidity and excess liquidity as our slack variable. Also, the large size dummy proves this as well, being negative.

Sales Growth and Liquidity as a regressor are both negative and statistically significant in all the specifications, meaning that firms with high sales growth and firms with high liquidity extend less trade credit than their counterparts. One reason could be that firms that grow a lot can *afford* to select their clients, and thus selling to the ones that need less trade credit. Firms with high liquidity might want to preserve it, maybe because they want to do investments projects that require a lot of trade credit or maybe because they are in a sector that demands lots of liquidity or maybe because they demand liquidity to protect themselves against negative external shocks.

Finally, regarding the interaction terms, we see that in general the interaction term between liquidity and the crisis years are statistically significant and positive, meaning that, although liquidity has a negative effect on trade credit extended, this effect becomes less negative (it could even become positive but this is not the case) in the crisis years. Thus the increase in trade credit extended when the crisis arrives is higher for more liquid firms. This is consistent with the hypothesis that suppliers act as banks when the crisis arrives. However this effect is only for 2008, since in all the specifications the interaction term is statistically significant for the whole sample. This could tell us that suppliers are willing to extend more trade credit at the beginning of the crisis, thinking that this crisis is temporary, but when suppliers see how deep the crisis is, they possibly decide to stop behaving like banks. This could be the reason for which in 2009 and in 2010 we do not see a significant interaction term for both *OLS* and *FE*.

When we split the sample by size, the interaction terms are statistically significant only for small firms, meaning that all the interpretations given in our baseline results can only be applied to small firms. Regarding the other interaction terms, only the interaction terms between liquidity and large size dummy and between large size dummy and the crisis year 2008 are statistically significant. The first one is negative, meaning that the negative effect of liquidity on trade credit is more intense, or more negative, for large firms. The second one is positive, meaning that the positive effect of the crisis in 2008 on trade credit is higher for large firms.

6 Accounts Payable

In this section, we will comment on all the results concerning Accounts Payable, our second equation. We will start by defining our financial slack variable, external finance dependence (*EFD*) and performing the regression. After that, we will try more specifications in order to get a full analysis of how firms behave with respect to taking trade credit when the crisis arrives.

6.1 External finance dependence as slack variable

Our dependent variable is *AP* and we will regress it on some controls, year dummies, industry dummies, size dummies, our financial slack variable and the interaction between this slack variable and the crisis years. All controls, as always, are lagged one period to reduce a possible multicollineality problem. Our financial slack variable, *EFD*, is defined as the difference of capital expenditures and cash flow scaled by capital assets. That is, the proportion of new investments that are not covered by the cash flow over the actual capital assets. We define capital expenditures as the increase in capital assets from the previous to the actual year.

Columns 1 and 2 of Table 5 show us the results for *EFD* as our slack variable. In column 1, which gives us our *OLS* results, we see that some industries take more trade credit than others. Among the former we have Mining, Construction, Transportation, Communication, Real State, Professional Services, Personal Services, Educational Services and Recreation Services, with Construction and Mining being the ones that takes the most trade credit. In the group of firms that take less trade credit we have Agriculture, Manufacturing, Wholesale and Retail, Hotels and Health Services.

Unlike Accounts Receivable, Accounts Payable does not vary significantly with size. There is not a clear pattern of how *AP* varies according to the size of the firm. In Figure 3 we can see this feature of the data. In Figure 4 we can see the coefficients of the year dummies of trade credit taken during the last years, we see that they are very stable until the arrival of the crisis: from 2008 to 2010 they increase 4.05%. However, the biggest increase is from 2008 to 2009: 0.0584, whilst from 2009 to 2010 it decreases a little bit. Hence, we can say that the arrival of the crisis has had an impact of the use of trade credit.

Regarding the controls, we see that only three of them are statistically significant: Sales Growth, Long Term Liabilities and Equity⁴. The coefficients of the regressors are -0.0249, -0.1798 and -0.3223 respectively, meaning that firms with high sales growth, firms with more long term debt and firms with more equity take less trade credit. *EFD* as a regressor is also statistically significant and is positive, but very close to zero. This tells us that firms that rely more on external finance take more trade credit.

⁴To see the exact definition of the variables, see the Appendix.

Figure 3: Trade credit taken by size

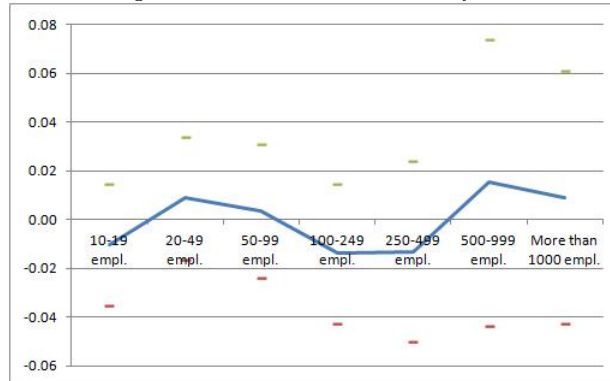
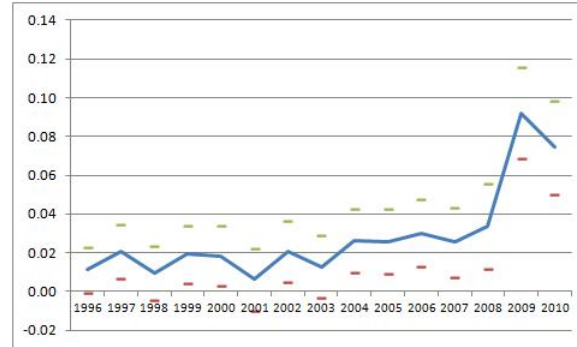


Figure 4: Evolution of trade credit taken over the years



Now let us look at the interaction terms. Unfortunately, none of them is statistically significant, meaning that when the crisis arrives, the fact of relying more or less on external finance does not affect the take of trade credit.

Column 2 shows us the same result but using a *FE* method. The basic results do not change: the evolution of trade credit taking is similar over the years, increasing from 2008 to 2009 6.12%, and after that decreasing a little bit. Controls are consistent with what we found in Colum 2: Sales Growth, Long Term Liabilities and Equity are statistically significant and negative. Finally, *EFD* as a lagged control is not longer statistically significant, although the number is very close to zero, as it was in column 1. Again, no interaction terms are significant, meaning that indeed the fact of depending more on external sources of finance does not make firms take more or less trade credit when the crisis arrives.

Thus we have that the control variables that affect the use of trade credit are Sales Growth, Long Term Debt and Equity, all of them negatively. Now let us turn to the interpretation of these

coefficients. Firstly, firms with high sales growth are likely to be expanding and growing and that type of firms is not short of funds. It is logical then that these firms take less trade credit, since the more you growth, the more liquidity you should have and then the less trade credit you should take. Secondly, suppliers might not want to extend trade credit to firms that have too much long term debt. So there is a clear negative relationship between long term debt and use of trade credit, mainly because suppliers will not provide trade credit to this type of firms. Finally although the coefficients of the Equity variable is negative and statistically significant, there is no clear relationship between equity and trade credit use.

Table 5: Trade credit taken by firms using EFD as FSV

	(1)		(2)	
Constant	0.5222***	(9.80)	0.5055***	(10.37)
Year 1996	0.0112*	(1.87)	0.0112**	(2.28)
Year 1997	0.0207***	(2.95)	0.0163***	(2.67)
Year 1998	0.0096	(1.36)	0.0119*	(1.81)
Year 1999	0.0192***	(2.57)	0.0185***	(2.57)
Year 2000	0.0185**	(2.30)	0.0262***	(3.24)
Year 2001	0.0063	(0.77)	0.0201**	(2.31)
Year 2002	0.0207**	(2.52)	0.0311***	(3.33)
Year 2003	0.0128	(1.55)	0.0236**	(2.29)
Year 2004	0.0262***	(3.10)	0.0386***	(3.47)
Year 2005	0.0259***	(3.05)	0.0120***	(2.92)
Year 2006	0.0302***	(3.46)	0.0411***	(3.23)
Year 2007	0.0255***	(2.77)	0.0359***	(2.63)
Year 2008	0.0338***	(3.03)	0.0523***	(3.32)
Year 2009	0.0921***	(7.65)	0.1135***	(6.54)
Year 2010	0.0742***	(6.03)	0.1069***	(5.82)
Agriculture	-0.0073	(-1.35)		
Mining	0.2725***	(3.66)		
Manufacturing	-0.0659	(-1.35)		
Construction	0.4010***	(7.54)		
Wholesale and retail	-0.2022***	(-4.16)		
Transportation	0.0660	(1.11)		
Hotels	-0.0552	(-1.09)		
Communication	0.2194***	(3.53)		
Real state	0.0448	(0.66)		

(continue on the next page)

(comes from the previous page)

Professional services	0.2650***	(3.76)		
Personal services	0.1052*	(1.76)		
Educational services	0.0464	(0.38)		
Health services	-0.0223	(-0.35)		
Recreation services	0.0135	(0.17)		
Between 10 and 19 empl.	-0.0103	(-0.81)		
Between 20 and 49 empl.	0.0089	(0.69)		
Between 50 and 99 empl.	0.0037	(0.27)		
Between 100 and 249 empl.	-0.0138	(-0.94)		
Between 250 and 499 empl.	-0.0130	(-0.69)		
Between 500 and 999 empl.	0.0152	(0.51)		
1000 or more empl.	0.0092	(0.35)		
Age	0.0004	(1.41)	-0.0001	(-0.08)
Sales growth	-0.0249***	(-2.87)	-0.0247***	(-2.77)
Net profit margin	-0.0012	(-0.22)	-0.0077**	(-2.19)
Long term liabilities / assets	-0.1798***	(-5.79)	-0.0941***	(-3.61)
Equity / assets	-0.3223***	(-17.1)	-0.1566***	(-7.58)
Current assets / assets	0.0112	(0.54)	-0.0198	(-0.85)
Slack variable	0.0039**	(2.26)	0.0015	(0.54)
Large firm (size dummy)			0.0104*	(-1.90)
Slack variable * year 2008	-0.0051	(-1.03)	0.0003	(0.07)
Slack variable* year 2009	-0.0026	(-0.38)	-0.0028	(-0.56)
Slack variable* year 2010	-0.0022	(-0.37)	0.0048	(0.82)
Estimation method	OLS		FE	
R-squared	0.1739		0.0114	
Observations	55,705		55,705	
Firms	9,602		9,602	

This table presents estimates from an unbalanced panel regressions explaining firm-level annual trade credit use for the period 1994-2010. The dependent variable is accounts payable over purchases. The first column shows the estimates using OLS and the second column using FE. EFD is calculated as the difference between capital investments, measured as the increase of capital assets from one year to another, and the cash flow, measure as EBIDTA, scaled by capital assets. All controls are lagged one period. Standard errors in parenthesis, next to the coefficients. ***, ** and * indicates significance at 1%, 5% and 10% respectively.

6.2 Other variables as financial slack variable

Now we change our financial slack variable and consider Short Term Banks Borrowings. Why do we do this? Firms that have high short term bank debt might increase their trade credit position when the crisis arrives.

Results are very similar to the ones found using *EFD* as our slack variable. Columns 1 and 2 of Table 6 show the results. When we analyse the results of column 1, the regression using an *OLS* method, we see that results for size and industry sectors are very similar to column 1 of Table 5. The same happens with controls: Sales Growth, Long Term Liabilities and Equity are the only statistically significant controls, all negative (the coefficients are -0.0269, -0.25 and -0.41 respectively). Short term bank debt as a lagged control is statistically significant and negative, with a coefficient of -0.3, meaning that if short term bank debt increases 1%, trade credit taken the next year decreases by -0.3%. When we look at the interaction terms, again we find that none of them is statistically significant.

Now we look at the *FE* results. The evolution of the dummy years coefficients over the last years is very similar to the one that has been described: stable until 2008, where it increases a lot from 2008 to 2009. The regressors that are statistically significant are the same and have the same sign and none of the interaction term is statistically significant.

Summarising these results, there are not many differences between results in the previous part and results in this part. The only interesting variable in this part is the financial slack variable as a regressor. There could be two explanations for this. First, as we know, bank credit and trade credit are two substitute sources of external finance. Thus, if a firm takes more bank credit, the next year that firm will need less external finance, and hence, it will take less trade credit. Another explanation, which can be complemented with the previous one, is that the higher the debt a firm has, the less likely the provider is willing to extend trade credit to the firm, because the firm is more leveraged.

After this specification, we have tried more variables as our financial slack variable, but unsuccessfully. These variables are Long Term Bank Borrowings and Financial Expenses. Results were the same, specially with the interaction terms between the slack variable and the crisis years being not significant, meaning that none of these variable influences the use of trade credit when the crisis arrives.

Table 6: Trade credit taken by firms using short term bank debt as FSV

	(1)		(2)	
Constant	0.6091***	(12.10)	0.5481***	(11.99)
Year 1996	-0.0020	(-0.36)	-0.0045	(-0.95)
Year 1997	0.0050	(0.77)	0.0039	(0.66)
Year 1998	-0.0002	(-0.02)	-0.0063	(-0.99)
Year 1999	0.0043	(0.63)	0.0002	(0.02)
Year 2000	0.0021	(0.28)	0.0054	(0.72)
Year 2001	-0.0031	(-0.41)	-0.0040	(-0.49)
Year 2002	0.0062	(0.83)	0.0045	(0.50)
Year 2003	-0.0005	(-0.07)	-0.0001	(-0.01)
Year 2004	0.0118	(1.50)	0.0102	(0.97)
Year 2005	0.0108	(1.37)	0.0087	(0.77)
Year 2006	0.0135*	(1.66)	0.0105	(0.87)
Year 2007	0.0091	(1.05)	0.0087	(0.67)
Year 2008	0.0285**	(2.36)	0.0406***	(2.58)
Year 2009	0.0840***	(6.56)	0.0950***	(5.55)
Year 2010	0.0685***	(4.97)	0.0786***	(4.29)
Agriculture	-0.0592	(-1.16)		
Mining	0.2585***	(3.65)		
Manufacturing	-0.0550	(-1.21)		
Construction	0.3831***	(7.75)		
Wholesale and retail	-0.1958***	(-4.30)		
Transportation	0.0805	(1.44)		
Hotels	-0.0678	(-1.43)		
Communication	0.2203***	(3.82)		
Real state	0.0435	(0.71)		
Professional services	0.2737***	(4.15)		
Personal services	0.0929*	(1.69)		
Educational services	0.0368	(0.33)		
Health services	-0.0062	(-0.10)		
Recreation services	0.0027	(0.04)		
Between 10 and 19 empl.	0.0011	(0.09)		
Between 20 and 49 empl.	0.0216*	(1.87)		
Between 50 and 99 empl.	0.0163	(1.29)		

(continue on the next page)

(comes from the previous page)

Between 100 and 249 empl.	-0.0077	(-0.57)		
Between 250 and 499 empl.	-0.0076	(-0.67)		
Between 500 and 999 empl.	0.0129	(0.47)		
1000 or more empl.	0.0002	(0.01)		
Age	0.0004*	(1.94)	0.0013*	(1.65)
Sales growth	-0.0269***	(-4.04)	-0.0181***	(-3.40)
Net profit margin	0.0011	(1.31)	-0.0006	(-0.63)
Long term liabilities / assets	-0.2500***	(-8.44)	-0.1380***	(-5.48)
Equity / assets	-0.4155***	(-19.6)	-0.2174***	(-10.3)
Current assets / assets	-0.0089	(-0.49)	-0.0501**	(-2.41)
Slack variable	-0.3003***	(-11.6)	-0.1301***	(-5.12)
Large firm (size dummy)			-0.0163*	(-1.79)
Slack variable * year 2008	-0.0762	(-1.44)	-0.1214	(-1.31)
Slack variable* year 2009	0.0198	(0.28)	-0.0286	(-0.53)
Slack variable* year 2010	-0.0119	(-0.15)	0.0080	(0.12)

Estimation method	OLS	FE
R-squared	0.1704	0.0017
Observations	68,250	68,250
Firms	9,946	9,946

This table presents estimates from an unbalanced panel regressions explaining firm-level annual trade credit use for the period 1994-2010. The dependent variable is accounts payable over purchases. The first column shows the estimates using OLS and the second column using FE. Short term bank debt is scaled by total assets. All controls are lagged one period. Standard errors in parenthesis, next to the coefficients. ***, ** and * indicates significance at 1%, 5% and 10% respectively.

6.3 Accounts Payable without a financial slack variable

Finally, we regress AP on the year dummies, size dummies, industry dummies and the controls. But instead of putting the same controls, we add the variables that we have tried as financial slack to our controls and again we lagged all controls one period. No interaction term between the crisis years and a financial slack variable is considered in this case. Table 7 gives us the result of that regression. There are no significant changes regarding industry sectors and the year dummy coefficients of trade credit taken. In both columns, using an *OLS* and a *FE* method, we see that

the coefficients of the year dummies are pretty stable until 2008, where it increases by about 6% in column 1 and by 6.5% in column 2. This is consistent with the results we have been getting. In column 1 we see that again there is not a clear relationship between trade credit taken and size.

When we look at the regressors, we see that the three that were statistically significant in our previous result remain being like that. Sales Growth, Long Term Liabilities and Equity are statistically significant in both columns, which constitute our main result of the *AP* regression. They are respectively -0.3, -0.36 and -0.53 for the first column and -0.026, -0.277 and -0.349 for the second column. As always, results under the *FE* method gives us lower coefficients for our regressors. However, there is one additional regressor that is statistically significant and it was not in the previous cases: current assets. This regressor is statistically significant and negative under both *OLS* and *FE*, meaning that when a firm has more current assets, it takes less trade credit. How can we interpret this? We could think of this as when the firm has more current assets, that is, assets in the short term, the firm is more liquid. And thus, when this is the case, the firm is less willing to take trade credit.

Now let us look at the control variables that were previously used as financial slack variables. The only two that are statistically significant under *OLS* are Short Term Bank Debt and Financial Expenses, meaning that if we compare two firms whose these two variables are different, firms with higher Short Term Bank Debt and firms with higher Financial Expenses are going to take less trade credit. These could be seen again as the fact that bank debt and trade credit are substitutes, meaning that the more short term bank debt a firm has, the less trade credit the firm is going to take. The interpretation for the other variable could be seen in a similar way, since Financial Expenses are expenses that firms pay for interest for loans or for credit, which mostly come from bank debt. However, under *FE* none of these controls are statistically significant, meaning that when firms increase their Financial Expenses or Short Term Bank Debt with respect to themselves, trade credit extended is not going to increase, nor decrease.

Table 7: Trade credit taken by firms without slack variable

	(1)		(2)	
Constant	0.7265***	(12.94)	0.6319***	(20.87)
Year 1996	0.0109*	(1.84)	0.0112**	(2.35)
Year 1997	0.0186***	(2.66)	0.0159***	(2.63)
Year 1998	0.0009	(0.12)	0.0091	(1.39)
Year 1999	0.0068	(0.87)	0.0147**	(2.03)
Year 2000	0.0023	(0.28)	0.0207***	(2.56)
Year 2001	-0.0084	(-1.01)	0.0148*	(1.70)

(continue on the next page)

(comes from the previous page)

Year 2002	0.0070	(0.84)	0.0264***	(2.80)
Year 2003	-0.0022	(-0.26)	0.0186*	(1.80)
Year 2004	0.0105	(1.20)	0.0337***	(3.01)
Year 2005	0.0071	(0.80)	0.0282**	(2.35)
Year 2006	0.0012	(1.27)	0.0344***	(2.69)
Year 2007	0.0072	(0.75)	0.0294**	(2.13)
Year 2008	0.0223**	(2.10)	0.0449***	(2.92)
Year 2009	0.0810***	(7.04)	0.1102***	(6.49)
Year 2010	0.0574***	(4.68)	0.0986***	(5.36)
Agriculture	-0.0808	(-1.49)		
Mining	0.2677***	(3.61)		
Manufacturing	-0.0620	(-1.28)		
Construction	0.3955***	(7.50)		
Wholesale and retail	-0.2162***	(-4.48)		
Transportation	0.0686	(1.17)		
Hotels	-0.0681	(-1.35)		
Communication	0.2226***	(3.60)		
Real state	0.0459	(0.68)		
Professional services	0.2604***	(3.71)		
Personal services	0.1394**	(2.33)		
Educational services	0.0551	(0.45)		
Health services	-0.0237	(-0.37)		
Recreation services	0.0025	(0.03)		
Between 10 and 19 empl.	-0.0001	(-0.01)		
Between 20 and 49 empl.	0.0222*	(1.77)		
Between 50 and 99 empl.	0.0201	(1.47)		
Between 100 and 249 empl.	0.0002	(0.01)		
Between 250 and 499 empl.	-0.0055	(-0.29)		
Between 500 and 999 empl.	0.0127	(0.43)		
1000 or more empl.	-0.0028	(-0.11)		
Age	0.0004	(1.49)	-0.0001	(-0.10)
Sales growth	-0.0304***	(-3.48)	-0.0259***	(-2.91)
Net profit margin	-0.0001	(-0.01)	-0.0066*	(-1.66)
Long term liabilities / assets	-0.3558***	(-7.79)	-0.2770***	(-7.97)

(continue on the next page)

(comes from the previous page)

Equity / assets	-0.5338***	(-19.1)	-0.3494***	(-14.0)
Current assets / assets	-0.0981***	(-3.91)	-0.2005***	(-7.52)
EFD	0.0014	(0.79)	-0.0006	(-0.43)
ST Bank Debt	-0.1980***	(-6.97)	-0.0113	(-0.38)
LT Bank Debt	0.0337	(0.72)	-0.0113	(0.32)
Financial Expenses	-0.7629***	(-5.92)	-0.0987	(-1.14)

Estimation method	OLS	FE
R-squared	0.1857	0.0147
Observations	55,705	55,705
Firms	9,602	9,602

This table presents estimates from an unbalanced panel regressions explaining firm-level annual trade credit use for the period 1994-2010. The dependent variable is accounts payable over purchases. The first column shows the estimates using OLS and the second column using FE. All controls are lagged one period. Standard errors in parenthesis, next to the coefficients. ***, ** and * indicates significance at 1%, 5% and 10% respectively.

6.4 Final and concluding remarks about AP

For *AP*, we start by considering External Finance Dependence as our financial slack variable. We find that there is not clear pattern of how trade credit taken and size vary. Regarding the regressors, we find that Sales Growth, Equity and Long Term Liabilities are negative and statistically significant under both *OLS* and *FE*. Firstly, firms with high sales growth are likely to be expanding and growing and these firms have liquidity and thus take less trade credit. Secondly, suppliers might not want to extend trade credit to firms that have too much long term debt. Finally although the coefficients of the Equity variable is negative and statistically significant, there is no clear relationship between equity and trade credit use. In this same regression, no interaction term is significant, and we proceed to change our financial slack variable.

Then, we consider Short Term Bank Debt as a financial slack variable, because perhaps firms with more short term bank debt are willing to take more trade credit when the crisis arrives. Unfortunately, results do not change. The interaction terms remain being not statistically significant. After that, we try with Financial Expenses and Long Term Bank Debt as financial slack variables, unsuccessfully.

Finally, we perform the regression with the size, year and sector dummies and all the control

variables, but adding as controls the variables we tried as financial slack variables. Regarding the controls, we see that the same three that are statistically significant in all the regression remain being that: Sales Growth, Equity and Long Term Liabilites. However we find another variable that is statistically significant: Current Assets. We could interpret this as the fact that firms with higher current assets are firms with high liquidity. They can liquidate easily their current assets (Inventories, Accounts Receivable) so that they are liquid. And firms with high levels of liquidity are going to take less trade credit.

The big puzzle in Accounts Payable is the absence of a variable that changes the willingness to take trade credit when the crisis arrives, unlike Accounts Receivable in which we do have this variable (in fact, we have two: liquidity and excess liquidity). One possible explanation for this fact is that in the trade credit market, supply dominates demand in the sense that when a provider is willing to give trade credit, the client is going to accept it, but the opposite is not necessarily true. Clients with needs of trade credit are not necessarily going to be able to take trade credit, since the supplier might be reluctant to extend it. Even more, the mere willingness to take trade credit might be a negative signal to the supplier, since this could be interpret as if the firm were doing badly in the market.

7 Conclusions

What happens when banks cannot lend to an external shock in their credit supply? This is one of the two concerns of the paper and to be able to study it, we analyse one close substitute for bank credit, trade credit. This type of credit is the credit given by suppliers to customers in the form of the deferment of the payment for the delivered goods, so that firms pay their supplier some time after they have received the goods. The other important aspect that we want to analyse is the determinants, pattern and evolution of trade credit in Spain during the last 15 years.

We have reviewed the previous literature regarding trade credit, commenting on the classic papers, on the most recent ones that are very close to this one and the contribution of this work. Also, we have described our empirical strategy, defined our main variables and the regression equations that we are going to perform. First we define our baseline equations that contain our dependent variables: Accounts Receivable and Accounts Payable scaled by Sales and Purchases respectively. We call these ratios AR and AP . Then we will define all the variables appearing in those equations. After that, we will mention the estimation methods, which are OLS and FE . We have also described the data and the filters we have applied to clean the data from inconsistencies. We drop firms in the *utilities* sector and observations with negative or zero Assets, negative or zero Operating Revenues, negative or zero Cash and Short Term Financial Assets, and observations where the sum of Short

Term Financial Assets and Cash is higher than the Assets. Then we eliminate observations where the assets growth rate is higher than one and observations where the sales growth or assets growth rate is less than -0.8. We drop observations with negative AR or AP , observations where AR is more than one and observations where AP is more than five. We also eliminate observations where firms have experienced a merge, split or cession and observations where the ratio between Equity and Assets is less than -1. Then we eliminate firms where the sector is missing and observations where the observations for the next year and the previous year are missing. Finally, we eliminate firms with less than three valid observations over the whole period of analysis.

The first interesting remark about AR is that trade credit extended by firms has significantly increased since the crisis years and this increase has been more pronounced in small firms, although in 2008 the increase was higher in large firms, as the interaction coefficient between the large size dummy and the crisis year 2008 proves. Also large firms extend less trade credit than small ones, since trade credit increases with size until firms with 49 employees at most and from this point, trade credit starts to decrease with size. This can be seen in when we use liquidity and excess liquidity as our slack variable. Also, the large size dummy proves this as well, being negative.

Sales Growth and Liquidity are both negative and statistically significant in all the specifications, meaning that firms with high sales growth and firms with high liquidity extend less trade credit than their counterparts. One reason could be that firms that grow a lot can get to select their clients, and thus selling to the ones that need less trade credit. Firms with high liquidity might want to preserve it, maybe because they demand liquidity to protect themselves against negative external shocks.

Finally, regarding the interaction terms, we see that in general the interaction term between liquidity and the crisis years are statistically significant and positive, meaning that, although liquidity has a negative effect on trade credit extended, this effect becomes less negative in the crisis years. Thus the increase in trade credit extended when the crisis arrives is higher for more liquid firms. This is consistent with the hypothesis that suppliers act as banks in the crisis years. However this effect is only for 2008, since in all the specifications the interaction term is statistically significant for the whole sample, meaning that suppliers are willing to extend more trade credit at the beginning of the crisis, thinking that this crisis is just temporary, but when providers see how deep and intense the crisis is probably going to be, they possibly decide to stop behaving like they have behave since the beginning of the crisis. This could be the reason for which in 2009 and in 2010 we do not see a significant interaction term for both OLS and FE .

When we split the sample by size, the interaction terms are statistically significant only for small firms, meaning that all the interpretations given in our baseline results can only be applied to small firms. Regarding the other interaction terms, only the interaction terms between liquidity and large

size dummy and between large size dummy and the crisis year 2008 are statistically significant. The first one is negative, meaning that the negative effect of liquidity on trade credit is more intense, or more negative, for large firms. The second one is positive, meaning that the positive effect of the crisis in 2008 on trade credit is higher for large firms. Finally for AR , when we change our financial slack variable and consider excess liquidity, which is the difference between actual and predicted liquidity, we see no major changes. This change could be interpreted as a robustness check.

Finally, in the last part, when we comment on the AP results, we start by using External Finance Dependence as our financial slack variable. We find that there is not clear pattern of how trade credit taken and size vary. Regarding the regressors, we find that Sales Growth and Long Term Liabilities are negative and statistically significant under both OLS and FE . Firstly, firms with high sales growth are likely to be expanding and growing and these firms have liquidity and thus take less trade credit. Secondly, suppliers might not want to extend trade credit to firms that have too much long term debt. In this same regression, no interaction term is significant, and we proceed to change our financial slack variable.

After that, we consider Short Term Bank Debt as a financial slack variable, because perhaps firms with more short term bank debt are willing to take more trade credit when the crisis arrives. Unfortunately, results do not change. The interaction terms remain being not statistically significant. After that, we try with Financial Expenses and Long Term Bank Debt as financial slack variables, unsuccessfully.

Finally, we perform the regression with the size, year and sector dummies and all the control variables, but adding as controls the variables we tried as financial slack variables. Regarding the controls, we see that the same three that are statistically significant in all the regression remain being that: Sales Growth, Equity and Long Term Liabilities. However we find another variable that is statistically significant: Current Assets. We could interpret this as the fact that firms with higher current assets are firms with high liquidity. They can liquidate easily their current assets (Inventories, Accounts Receivable) so that they are liquid. And firms with high levels of liquidity are going to take less trade credit.

The big puzzle in Accounts Payable is the absence of a variable that changes the willingness to take trade credit when the crisis arrives, unlike Accounts Receivable in which we do have this variable. One possible explanation for this fact is that in the trade credit market, supply dominates demand in the sense that when a provider is willing to give trade credit, the client is going to accept it, but the opposite is not necessarily true. Clients with needs of trade credit are not necessarily going to be able to take trade credit, since the supplier might be reluctant to extend it. Even more, the mere willingness to take trade credit might be a negative signal to the supplier, since this could be interpreted as if the firm were doing badly in the market.

References

- Becker, B., and V. Ivashina (2011). “Cyclicality of Credit Supply: Firm Level Evidence,” Harvard Business School Working Paper no. 10-107, August.
- Carbó-Valverde, S., F. Rodríguez-Fernández, and G. Udell (2012). “Trade Credit, the Financial Crisis, and Firm Access to Finance,” Mimeo, Universidad de Granada.
- Cuñat, V. (2007). “Trade Credit: Suppliers as Debt Collectors and Insurance Providers,” *Review of Financial Studies*, 20, pp. 491-527.
- Garcia-Appendini, E., and J. Montoriol-Garriga (2011). “Firms as Liquidity Providers: Evidence from the 2007-2008 Financial Crisis,” Carefin, Università Bocconi Working Paper no. 5/11, June.
- Ivashina, V., and D. Scharfstein (2010). “Bank lending during the Financial Crisis of 2008,” *Journal of Financial Economics*, 97, pp. 319-338.
- Petersen, M., and R. Rajan (1997). “Trade Credit: Theories and Evidence,” *Review of Financial Studies*, 10, pp. 661-691.
- Rajan, R., and L. Zingales (1998). “Financial Dependence and Growth,” *American Economic Review*, 88, pp. 559-586.
- Smith, J. (1987). “Trade Credit and Informational Asymmetry,” *Journal of Finance*, 4, pp. 863-872.
- Wilner, B. (2000). “The Exploitation of Relationships in Financial Distress: The Case of Trade Credit,” *Journal of Finance*, 55, pp. 153-178.

Appendix

A Data

The data of this work comes from the Central de Balances, a department of the bank of Spain. All the variables have been taken from the balance sheet and income statement. We define in the following table our variables.

We have data from four different questionnaires. Two are the questionnaires corresponding to the 1990 Accounting Plan and the other two are from the 2007 Account Plan and in both plans we have a normal and a reduced *questionnaires*. Firstly, we list the variables (in Spanish, as we got them), from the questionnaires from the first plan, and then the ones from the second plan. After that, we list how we transform the variables and how we homogeneized them. Finally we list our main variables and their definitions.

Table A.1: Variables coming from the 1990 Questionnaires	
Code	Name of the variable (in Spanish)
c019	Inmovilizado
c020	Gastos de establecimiento
c021	Inmovilizaciones inmateriales netas
c022	Total provisiones del Inmovilizado Inmaterial
c023	Inmovilizaciones materiales netas
c024	Provisiones del inmovilizado material
c025	Inmovilizaciones financieras netas
c026	Valores de renta fija
c027	Créditos a largo plazo
c028	Provisiones para insolvencias de créditos
c029	Acciones propias (a largo plazo)
c030	Deudores por operaciones de tráfico a l. p. (netos de provisiones)
c031	Deudores por operaciones con empresas del grupo y asoci. (netos)
c032	Deudores por operaciones de tráfico
c033	Prov. para insolv. deudores por operaciones de tráfico a largo plazo
c034	Gastos a distribuir en varios ejercicios
c035	Activo circulante
c036	Accionistas por desembolsos exigidos
c037	Existencias (netas de provisiones)
c038	Mercaderías, materias primas y otros aprovisionamientos
c039	Ptos. terminados, semiterminados, en curso, subproductos y residuos
c040	Anticipos a proveedores
c041	Provisión por depreciación de existencias
c042	Deudores (netos de provisiones)
c043	Empresas del grupo y asociadas, deudores (netos de provisiones)
c044	Clientes por ventas y prestaciones de servicios

(continue on the next page)

(comes from the previous page)

c045	Deudores varios y otras cuentas deudoras
c046	Hacienda Pública y Organismos de la Seguridad Social deudores
c047	Provisión para insolvencias de clientes
c048	Provisión para insolvencias de deudores
c049	Inversiones financieras temporales netas
c050	Otros valores de renta fija
c051	Créditos a corto plazo
c052	Provisiones por depreciación de valores negociables
c053	Provisiones para insolvencias de créditos
c054	Acciones propias (a corto plazo)
c055	Deudas comerciales contraídas con las Administraciones Públicas
c056	Tesorería
c057	Ajustes por periodificación y cuentas diversas
c058	Fondos propios
c059	Ingresos a distribuir en varios ejercicios
c060	Provisiones para riesgos y gastos (largo plazo)
c061	Acreedores a largo plazo
c062	Deudas con empresas del grupo y asociadas
c063	Emisiones de oblig. y otros valores negociables (incluye pagarés l.p.)
c064	Deudas con entidades de crédito (incluye deudas por leasing)
c065	Otras deudas a largo plazo
c066	Acreedores por operaciones de tráfico a largo plazo
c067	Acreedores a corto plazo
c068	Deudas con empresas del grupo y asociadas a corto plazo
c069	Emisiones de obligaciones y otros valores negoc(incluye págares a cpl)
c070	Deudas con entidades de crédito
c071	Proveedores
c072	Otros acreedores comerciales
c073	Provisiones para riesgos y gastos a corto plazo
c074	Reducción de existencias (productos terminados y en curso)
c075	Aprovisionamientos
c076	Consumo de mercaderías, materias primas y otras materias consumibles
c077	Compras netas
c078	Compras netas en España
c079	Gastos de personal
c080	Dotaciones para amortizaciones
c081	Variación de provisiones de tráfico y pérdidas de créditos
c082	Otros gastos de explotación
c083	Gastos financieros y gastos asimilados
c084	Intereses de obligaciones y bonos
c085	Intereses de préstamos y otras deudas
c086	Intereses por descuento de efectos
c087	Variación de provisiones de inversiones financieras
c088	Diferencias negativas de cambio
c089	Variación de provisiones de inmovilizado

(continue on the next page)

(comes from the previous page)

c090	Pérdidas del inmovilizado
c091	Pérdidas en operaciones con acciones y obligaciones propias
c092	Gastos extraordinarios
c093	Gastos y pérdidas de otros ejercicios
c094	Impuesto sobre beneficios
c095	Resultado del ejercicio (beneficio)
c096	Importe neto de la cifra de negocios
c097	Importe neto de la cifra de negocios en España
c098	Aumento de existencias (productos terminados y en curso)
c099	Gastos de establecimiento y formalización de deudas activados
c100	Trabajos realizados por la empresa para el inmovilizado
c101	Otros ingresos de explotación
c102	Ingresos financieros
c103	Diferencias positivas de cambio
c104	Beneficios en enajenación de inmovilizado
c105	Beneficios en operaciones con acciones y obligaciones propias
c106	Subvenciones de capital transferidas al ejercicio
c107	Ingresos extraordinarios
c108	Ingresos y beneficios de otros ejercicios
c109	Resultado del ejercicio (Pérdidas)
c112	Clientes (netos de provisiones) de empresas del grupo y asociadas
c113	Clientes netos de prov. no pertenecientes a empresas del grupo y asociadas
c114	Inversiones financieras temporales en valores de renta fija del ejercicio
c115	Creditos a corto plazo y otras inversiones financieras temporales del ejercicio
c116	Deudas con entidades de crédito a largo plazo, incluido leasing
c117	Deudas con entidades de crédito a CP, incluido leasing
c118	Proveedores
c119	Resto de acreedores a corto plazo sin coste financiero
c120	Resto de acreedores a CP con coste financiero
c121	Consumos de explotación
c122	Compras netas
c123	Compras netas en España
c124	Variac.de existenc.de mercaderías,mmpp y otras materias consumibles
c125	Trabaj.realizados por otras empres.(incorporados al proceso product.)
c126	Variac.de pto terminad.,semiterminad,en curso,subproduct.y residuos
c127	Intereses por financiación recibida (incluye descuento de efectos)
c128	Otros ingresos de explotación

Table A.2: Variables coming from the 2007 Questionnaires

Code	Name of the variable (in Spanish)
c019	Inmovilizado intangible
c020	Inmovilizado material
c021	Inversiones inmobiliarias
c022	Inversiones en empresas del grupo y asociadas a largo plazo
c023	Créditos a empresas en empresas grupo y asociadas lp Año
c024	Inversiones financieras a largo plazo Año
c025	Créditos a terceros lp
c026	Valores representativos de deuda lp
c027	Activos por impuesto diferido
c028	Deudores comerciales no corrientes
c029	Activos no corrientes mantenidos para la venta
c030	Existencias
c031	Comerciales
c032	Materias primas y otros aprovisionamientos
c033	Productos en curso
c034	Productos terminados
c035	Subproductos, residuos y materiales recuperados
c036	Anticipos a proveedores
c037	Deudores comerciales y otras cuentas a cobrar
c038	Clientes por ventas y prestaciones de servicios
c039	Clientes empresas del grupo y asociadas
c040	Deudores varios
c041	Otros créditos con las Administraciones públicas
c042	Inversiones en empresas del grupo y asociadas a corto plazo
c043	Créditos a empresas en empresas grupo y asociadas cp
c044	Inversiones financieras a corto plazo
c045	Créditos a empresas cp
c046	Valores representativos de deuda cp
c047	Periodificaciones a corto plazo
c048	Efectivo y otros activos líquidos equivalentes
c049	Tesorería
c050	Deterioro de valor del inmovilizado material
c051	Deterioro de valor de las inversiones inmobiliarias
c052	Deterioro de valor de las existencias
c053	Deterioro de valor de créditos comerciales (corto y largo plazo)
c054	Importe bruto del saldo con clientes que no residen en España
c055	Importe bruto del saldo con clientes que son Administraciones Públicas
c056	Fondos propios
c057	Ajustes por cambios de valor
c058	Subvenciones, donaciones y legados recibidos
c059	Provisiones a largo plazo
c060	Deudas a largo plazo

(continue on the next page)

(comes from the previous page)

c061	Obligaciones y otros valores negociables lp
c062	Deudas con entidades de crédito lp
c063	Acreedores por arrendamiento financiero lp
c064	Derivados lp
c065	Otros pasivos financieros lp
c066	Deudas con empresas del grupo y asociadas a largo plazo
c067	Pasivos por impuesto diferido
c068	Periodificaciones a largo plazo
c069	Acreedores comerciales no corrientes
c070	Deuda con características especiales a largo plazo
c071	Pasivos vinculados con activos no corrientes mantenidos para la venta
c072	Provisiones a corto plazo
c073	Deudas a corto plazo
c074	Obligaciones y otros valores negociables cp
c075	Deudas con entidades de crédito cp
c076	Acreedores por arrendamiento financiero cp
c077	Derivados cp
c078	Otros pasivos financieros cp
c079	Deudas con empresas del grupo y asociadas a corto plazo
c080	Acreedores comerciales y otras cuentas a pagar
c081	Proveedores
c082	Proveedores, empresas del grupo y asociadas
c083	Acreedores varios
c084	Otras deudas con las Administraciones Públicas
c085	Periodificaciones a corto plazo
c086	Deuda con características especiales a corto plazo
c087	Importe del saldo con proveedores que no residen en España
c088	Importe neto de la cifra de negocios
c089	Ventas
c090	Prestaciones de servicios
c091	Variación de existencias de productos terminados y en curso de fabricación
c092	Trabajos realizados por la empresa para su activo
c093	Aprovisionamientos
c094	Consumo de mercaderías
c095	Consumo de materias primas y otras materias consumibles
c096	Otros ingresos de explotación
c097	Gastos de personal
c098	Otros gastos de explotación
c099	Amortización del inmovilizado
c100	Imputación de subvenciones de inmovilizado no financiero y otras
c101	Excesos de provisiones
c102	Deterioro y resultado por enajenaciones del inmovilizado
c103	Diferencia negativa de combinaciones de negocio
c104	Otros resultados
c105	Ingresos financieros

(continue on the next page)

(comes from the previous page)

c106	Gastos financieros
c107	Gastos financieros por deudas con terceros
c108	Variación de valor razonable en instrumentos financieros
c109	Diferencias de cambio
c110	Deterioro y resultado por enajenaciones de instrumentos financieros
c111	Otros ingresos y gastos de carácter financiero
c112	Impuestos sobre beneficios
c113	Resultado del ejercicio precedentes de operaciones interrumpidas neto de impuestos
c114	RESULTADO DEL EJERCICIO
c115	Importe neto de la cifra de negocios en España
c116	Compras de mercaderías, materias primas y otras materias consumibles, netas de devoluciones
c117	Compras en España
c118	Gastos financieros por deudas con terceros. Intereses por financiación recibida
c119	Gastos financieros por deudas con terceros. Otros gastos financieros
c120	Clientes por ventas y prestaciones de servicios (largo plazo y corto plazo)
c121	Otros deudores
c122	Importe neto de créditos a empresas a largo y corto plazo
c123	Existencias netas. Comerciales, materias primas y otros aprovisionamientos
c124	Existencias netas. Productos en curso, terminados, subproductos y otros
c125	Otras deudas a lp
c126	Otras deudas a corto plazo
c127	Proveedores
c128	Otros acreedores
c129	Intereses por financiación recibida (cues. Reducido)

Table A.3: Variables and definitions

Variable	Definition
AR	Accounts receivable / Sales
AP	Accounts payable / Purchases
LIQ	(Cash + Short term financial assets) / Total assets
Size	Natural log of the number of employees
Age	Actual year - first year
Net profit margin	EBIDTA / Total operating revenues
Sales growth	Growth rate of sales
Assets growth	Growth rate of total assets
Short term liabilities over assets	Short term liabilities / Total assets
Long term liabilities over assets	Long term liabilities / Total assets
Tangible assets over assets	Tangibles assets / (Total assets - Accounts Receivable)
Equity over assets	Equity / Total assets OR (Total assets - Total liabilities) / Total assets
Current assets over assets	Assets in the short
EFD	[(Capital assets at t - Capital assets at t-1) - EBIDTA] / Capital assets at t
Short term bank borrowings	Short term bank debt / Total assets
Long term bank borrowings	Long term bank debt / Total assets
Financial Expenses	Financial expenses (including interest payments) / Total assets

NAME IN THE QUESTIONNAIRE (in Spanish)	FINAL NAME	Table A.4			Questionnaire from the 1990 Accounting Plan			Questionnaire from the 2007 Accounting Plan		
		Final code	Normal questionnaire	Reduced questionnaire	Final code	Normal questionnaire	Reduced questionnaire			
Inmovilizaciones inmateriales netas	Intang. Assets	c021	c021	c021	c130	c019+c021	c019+c021			
Inmovilizaciones materiales netas	Tang. Assets	c023	c023	c023	c020	c020	c020			
Inmovilizaciones financieras netas	LT Financ. Assets	c025	c025	c025	c131	c022+c024	c022+c024			
Activos por impuesto diferido	Other Assets	-	-	-	c027	c027	c027			
Deudores por operac. de tráfico a LP	LT Debtors	c030	c030	c030	c028	c028	c028			
Activo No corriente	Fixed Assets	c133			c132					
Existencias	Inventories	c037	c037	c037	c030	c030	c030			
Mercaderías, materias primas, ...	Goods	c038	c038	c038	c133	c031+c032	c123			
Productos terminados, ...	FinalGoods	c039	c039	c039	c134	c033+c034+c035	c124			
Deudores a corto plazo	STDebtors	c042	c042	c042	c037	c037	c037			
Clientes	AR	c134	c044	c112+c113	c135	c038+c039	c120			
Deudores que no son clientes	Other Debtors	c135	c042-c044	c042-c112-c113	c136	c037-c038-c039	c037-c120			
Inversiones financieras temporales netas	ST Financ. Assets	c049	c049	c049	c137	c042+c044	c042+c044			
Tesorería	Cash	c056	c056	c056	c048	c048	c048			
Activos no corrientes para la venta	Assets For Sale	-	-	-	c029	c029	c029			
Ajustes por periodificación	Adjustments	c057	c057	c057	c047	c047	c047			
Activo Corriente	Current Assets	c136			c138					
Total Activo	ASSETS	ACT			c139					
Patrimonio Neto	EQUITY	EQ			c140	c056+c057+c058	c056+c057+c058			
Provisiones a largo plazo	LTProvisions	c060	c060	c060	c059	c059	c059			
Provisiones a corto plazo	STProvisions	c073	c073	c073	c072	c072	c072			
Total Provisiones	PROVISIONS	c138			c141					
Acreedores a largo plazo	Fixed Liabilities	c061	c061	c061	c142	c060+c066+c067+c068+c069+c070	c066			
Deudas con empresas del grupo	LTCRBorrow	c062	c062	c062	c066	c066	c066			
Deudas con entidades de crédito	LTBanksBorrow	c139	c064	c116	c062	c062	c062			
Otras deudas a largo plazo	OtherLTDebt	c140	c061-c062-c064	c061-c062-c116	c143	c142-c066-c062	c142-c066-c062			
Acreedores a corto plazo	Current Liabilities	c067	c067	c067	c144	c071+c073+c079+c080+c085+c086	c079			
Deudas con empresas del grupo	STGRBorrow	c068	c068	c068	c079	c079	c079			
Deudas con entidades de crédito	STBanksBorrow	c141	c070	c117	c075	c075	c075			
Proveedores	AP	c142	c071	c118	c145	c081+c082	c127			
Otras deudas a corto plazo	Other ST Debt	c143	c067-c068-c070-c071	c067-c068-c117-c118	c146	c144-c079-c075-c145				
Total Pasivo	LIABILITIES	PAS			c147					

NAME IN THE QUESTIONNAIRE (in Spanish)	FINAL NAME	Questionnaire from the 1990 Accounting Plan			Questionnaire from the 2007 Accounting Plan		
		Final code	Normal questionnaire	Reduced questionnaire	Final code	Normal questionnaire	Reduced questionnaire
Importe neto de la cifra de negocios	Sales	c096	c096	c096	c088	c088	c088
Importe neto de la cifra de negocios en España	SalesSpain	c097	c097	c097	c115	c115	c115
Otros ingresos de explotación	OtherOperRevenues	c144	c101	c128-c100	c096	c096	c096
Beneficios en enajenación del inmovilizado	OtherRevenues	c104	c104	c104	-	-	-
Ingresos extraordinarios	ExtraordRevenues	c108	c108	c108	-	-	-
INGRESOS TOTALES DE EXPLOTACIÓN	OPERATING_REVENUES	c145			c148		
Aprovisionamientos	CostsSoldGoods	c146	c075	c121-c126	c149	-c093	-c093
Compras netas	Purchases	c077	c077	c077	c164	-c116	-c116
Compras netas en España	PurchasesSpain	c078	c078	c078	c150	-c117	-c117
Gastos de personal	SalariesWages	c079	c079	c079	c151	-c097	-c097
Otros gastos de explotación	OtherOperExpenses	c082	c082	c082	c152	-c098	-c098
Pérdidas del inmovilizado	OtherExpenses	c090	c090	c090	c153	-c102	-c102
Gastos extraordinarios	ExtraordExpenses	c092	c092	c092	-	-	-
GASTOS TOTALES DE EXPLOTACIÓN	OPERATING_EXPENSES	c148			c154		
EBIDTA	EBIDTA	c149			c155		
Ingresos financieros	FinancRevenues	c102	c102	c102	c105	c105	c105
Diferencias positivas de cambio	ExchangeRateRevenues	c103	c103	c103	c109	c109	c109
Beneficios en operaciones con acciones	OtherFinancRevenues	c105	c105	c105	c110	c110	c110
INGRESOS FINANCIEROS TOTALES	FINANCIAL_REVENUES	c150			c156		
Gastos financieros y gastos asimilados	FinancExpenses	c083	c083	c083	c157	-c106	-c106
Gastos por intereses	InterestsExpenses	c151	c084+c085+c086	c127	c158	-c118	-c129
Diferencias negativas de cambio	ExchangeRateExpenses	c088	c088	c088	-	-	-
Pérdidas en operaciones con acciones	OtherFinancExpenses	c091	c091	c091	c159	-c111	-c111
GASTOS FINANCIEROS TOTALES	FINANCIAL_EXPENSES	c152			c160		
Resultado Financiero	FINANC_LOSS_PROFIT	c153			c161		
Earnings After Interests	EAI	c154			c162		
Impuesto sobre beneficios	Taxes	c094			c112		
Resultado del ejercicio	LOSS_PROFITS	c155			c114		
Importe de la aplicación de dividendos	DividendPayments	c156			c163		

B Predicting Liquidity

To calculate predicted liquidity, we run a regression with liquidity over total assets as a dependent variable. We consider as regressors size dummies, year dummies, sector dummies and some control variables. Here we present the results of the regression.

Table B.1: Predicting liquidity

Constant	0.1230***	(5.82)
Year 1995	-0.0034**	(-1.99)
Year 1996	-0.0051**	(-2.37)
Year 1997	-0.0018	(-0.77)
Year 1998	0.0008	(0.34)
Year 1999	0.0070***	(2.62)
Year 2000	0.0048*	(1.70)
Year 2001	-0.0015	(0.52)
Year 2002	-0.0009	(-0.31)
Year 2003	-0.0008	(-0.28)
Year 2004	0.0011	(0.39)
Year 2005	0.0037	(1.25)
Year 2006	0.0052*	(1.75)
Year 2007	0.0089***	(2.84)
Year 2008	0.0206***	(6.40)
Year 2009	0.0406***	(11.63)
Year 2010	0.0454***	(12.06)
Agriculture	-0.0523***	(-2.95)
Mining	-0.0033	(-0.13)
Manufacturing	-0.0436***	(-2.66)
Construction	0.0270	(-1.61)
Wholesale and retail	-0.0470***	(-2.71)
Transportation	-0.0161	(-0.94)
Hotels	0.0086	(0.49)
Communication	0.0070	(0.37)
Real state	-0.0467***	(-2.60)
Professional services	0.0248	(1.38)
Personal services	0.0258	(1.33)
Educational services	0.0406	(1.38)

(continue on the next page)

(comes from the previous page)

Health services	0.0212	(0.86)
Recreation services	-0.0027	(-0.13)
Between 10 and 19 empl.	-0.0324***	(-5.84)
Between 20 and 49 empl.	-0.0562***	(-10.5)
Between 50 and 99 empl.	-0.0687***	(-12.3)
Between 100 and 249 empl.	-0.0783***	(-13.5)
Between 250 and 499 empl.	-0.0837***	(-12.4)
Between 500 and 999 empl.	-0.0796***	(-9.61)
1000 or more empl.	-0.0867***	(-11.1)
Tangible assets / assets	0.0570***	(5.30)
Long term financial assets / assets	0.1181***	(7.94)
Inventories / assets	-0.0851***	(-9.31)
Net working capital / assets	0.1078***	(8.38)
Short term liabilities / assets	0.1223***	(8.93)
Long term liabilities / assets	-0.0763***	(-6.94)
Cash flow / assets	0.1015***	(8.30)
Purchases / assets	0.0078*	(1.83)
Sales / assets	0.0006	(0.28)
Dividend Payments	0.0013	(0.95)
<hr/>		
Estimation method	OLS	
R-squared	0.1497	
Observations	79,092	
Firms	11,841	

This table presents estimates from an unbalanced panel regressions explaining liquidity for the period 1994-2010. The dependent variable is the sum of cash and short term financial assets scaled by total assets. All controls are lagged one period and are scaled by assets minus accounts receivable. Standard errors in parenthesis, next to the coefficients. ***, ** and * indicates significance at 1%, 5% and 10% respectively.

After doing this, we predict liquidity with all the regressors. Then if predicted liquidity is more than one, we change it to one; and if predicted liquidity is negative, we change the value to zero, since predicted liquidity should be also take values between zero and one. After that, we calculate excess liquidity as the difference between actual and predicted liquidity.

C Descriptive Statistics for the Samples

Table C.1: Descriptive Statistics for AR

variable	N	mean	p25	p50	p75	sd	min	max
AR	93,091	0.2175	0.0779	0.1982	0.3153	0.1735	0	1
LIQ	93,091	0.1347	0.0222	0.0708	0.1839	0.1646	0	1
Age	93,091	23.1335	12	19	29	18.236	0	221
size	93,091	3.7251	2.7726	3.6376	4.5951	1.6584	0	11.2145
Net Profit Margin	93,091	0.0677	0.0274	0.0713	0.1430	3.0097	-725.2500	37.8439
Sales Growth	93,091	0.0891	-0.0573	0.0447	0.1556	0.4624	-0.7992	10
Assets Growth	93,091	0.0702	-0.0431	0.0431	0.1595	0.2073	-0.7995	1
ST Liabilities over Assets	93,091	0.4428	0.2523	0.4347	0.6196	0.2420	-0.3947	1.9888
LT Liabilities over Assets	93,091	0.1215	0.0002	0.0468	0.1743	0.1732	-0.0535	1.7542
Tang Assets over Assets (w/o TC)	93,090	0.3510	0.1275	0.3063	0.5345	0.5797	-129.0000	83.1667
Equity over Assets	93,091	0.4256	0.2341	0.4059	0.6133	0.2575	-1	1.2895
Current Assets over Assets	93,091	0.6378	0.4683	0.6874	0.8529	0.2610	0.0002	1

Table C.2: Descriptive Statistics for the small sample

variable	N	mean	p25	p50	p75	sd	min	max
AR	81,525	0.2191	0.0787	0.2010	0.3172	0.1742	0	1
LIQ	81,525	0.1376	0.0235	0.0728	0.1871	0.1672	0	1
Age	81,525	21.9045	12	18	27	16.74519	0	221
size	81,525	3.3040	2.6391	3.4340	4.1744	1.2513	0	5.5175
Net Profit Margin	81,525	0.0667	0.0274	0.0719	0.1459	3.2147	-725.2500	37.8439
Sales Growth	81,525	0.0904	-0.0644	0.0416	0.1572	0.4848	-0.7992	10
Assets Growth	81,525	0.0695	-0.0457	0.0412	0.1602	0.2108	-0.7995	1
ST Liabilities over Assets	81,525	0.4390	0.2458	0.4315	0.6176	0.2440	-0.3947	1.9888
LT Liabilities over Assets	81,525	0.1224	0.0000	0.0473	0.1761	0.1745	-0.0535	1.7542
Tang Assets over Assets (w/o TC)	81,525	0.3485	0.1223	0.3009	0.5335	0.2644	-0.7707	6.7039
Equity over Assets	81,525	0.4315	0.2366	0.4104	0.6228	0.2591	-1	1.2895
Current Assets over Assets	81,525	0.6459	0.4804	0.6995	0.8614	0.2621	0.0002	1

Table C.3: Descriptive Statistics for the large sample

variable	N	mean	p25	p50	p75	sd	min	max
AR	11,566	0.2064	0.0724	0.1811	0.2976	0.1682	0	0.9977
LIQ	11,566	0.1140	0.0141	0.0562	0.1615	0.1432	0	0.9679
Age	11,566	31.7962	14	26	41	24.79135	1	219
size	11,566	6.6934	5.9108	6.4077	7.2269	1.0193	5.521461	11.2145
Net Profit Margin	11,566	0.0753	0.0272	0.0678	0.1270	0.2588	-18.7001	0.8240
Sales Growth	11,566	0.0797	-0.0151	0.0608	0.1454	0.2533	-0.7953	7.6581
Assets Growth	11,566	0.0752	-0.0245	0.0563	0.1555	0.1805	-0.7324	0.9923
ST Liabilities over Assets	11,566	0.4698	0.2956	0.4556	0.6329	0.2256	0.0004	1.8052
LT Liabilities over Assets	11,566	0.1149	0.0026	0.0435	0.1621	0.1640	0.0000	1.6435
Tang Assets over Assets (w/o TC)	11,565	0.3682	0.1690	0.3412	0.5390	1.4872	-129.0000	83.1667
Equity over Assets	11,566	0.3843	0.2197	0.3758	0.5511	0.2414	-0.9808356	0.9990
Current Assets over Assets	11,566	0.5810	0.4011	0.6044	0.7780	0.2460	0.0041	1

Table C.4: Descriptive Statistics for AP

variable	N	mean	p25	p50	p75	sd	min	max
AP	80,945	0.3776	0.1327	0.2620	0.4304	0.4820	0	5
EFD	67,714	-0.8203	-0.8690	-0.3553	-0.0919	1.9362	-20	5
ST Banks Borrowings Ratio	80,945	0.1099	0	0.0488	0.1782	0.1398	-0.0978	1.3921
LT Banks Borrowings Ratio	80,945	0.0788	0	0.0129	0.1075	0.1309	-0.0535	1.6391
Financial Expenses Ratio	80,945	0.0232	0.0060	0.0163	0.0313	0.0274	-0.7058	1.2258
Age	80,945	23.6493	12	20	30	17.67155	0	221
size	80,945	3.8870	2.9444	3.7136	4.6634	1.5290	0	11.1328
Net Profit Margin	80,945	0.0550	0.0276	0.0679	0.1291	3.1824	-725.2500	6.1837
Sales Growth	80,945	0.0821	-0.0560	0.0457	0.1553	0.4112	-0.7992	9.9246
Assets Growth	80,945	0.0723	-0.0413	0.0465	0.1608	0.2023	-0.7995	1
ST Liabilities over Assets	80,945	0.4569	0.2776	0.4486	0.6253	0.2311	0	1.9788
LT Liabilities over Assets	80,945	0.1141	0.0006	0.0469	0.1658	0.1592	-0.0535	1.6869
Tang Assets over Assets (w/o TC)	80,945	0.3480	0.1402	0.3089	0.5208	0.6073	-129	83.1667
Equity over Assets	80,945	0.4197	0.2354	0.4006	0.5997	0.2471	-0.9845	1
Current Assets over Assets	80,945	0.6540	0.4998	0.6950	0.8490	0.2387	0.0018	1