

Bris, Arturo; Koskinen, Yrjö; Nilsson, Mattias

Working Paper

The euro and corporate financing

Bank of Finland Research Discussion Papers, No. 6/2011

Provided in Cooperation with:

Bank of Finland, Helsinki

Suggested Citation: Bris, Arturo; Koskinen, Yrjö; Nilsson, Mattias (2011) : The euro and corporate financing, Bank of Finland Research Discussion Papers, No. 6/2011, ISBN 978-952-462-667-5, Bank of Finland, Helsinki, <https://nbn-resolving.de/urn:nbn:fi:bof-20140807274>

This Version is available at:

<https://hdl.handle.net/10419/212185>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Arturo Bris – Yrjö Koskinen – Mattias Nilsson

The euro and corporate financing



EUROJÄRJESTELMÄ
EUROSYSTEMET

Bank of Finland Research
Discussion Papers
6 • 2011

**Suomen Pankki
Bank of Finland
PO Box 160
FI-00101 HELSINKI
Finland
☎ +358 10 8311**

**<http://www.suomenpankki.fi/en>
E-mail: Research@bof.fi**



Arturo Bris* – Yrjö Koskinen** – Mattias Nilsson***

The euro and corporate financing

The views expressed in this paper are those of the authors and do not necessarily reflect the views of the Bank of Finland.

- * IMD and ECGI. Email address: arturo.bris@imd.ch.
- ** Corresponding author. Boston University and CEPR. Email address: yrjo@bu.edu.
- *** University of Colorado at Boulder. Email address: mattias.nilsson@colorado.edu.

The authors would like to thank Matthias Kahl, Pedro Matos, Raghu Rau and seminar participants at the Bank of Finland, Hanken/Helsinki School of Economics and Boston University for their helpful comments. The paper was started when Koskinen was visiting the Bank of Finland and he is grateful for the Bank's hospitality.

<http://www.suomenpankki.fi/en>

ISBN 978-952-462-666-8
ISSN 0785-3572
(print)

ISBN 978-952-462-667-5
ISSN 1456-6184
(online)

Helsinki 2011

The euro and corporate financing

Bank of Finland Research
Discussion Papers 6/2011

Arturo Bris – Yrjö Koskinen – Mattias Nilsson
Monetary Policy and Research Department

Abstract

In this paper we study how the introduction of the euro has affected corporate financing in Europe. We use firm-level data from eleven euro area countries as well as from a control group of five other European countries spanning the years 1991–2006. We show that firms from euro area countries that previously had weak currencies have increased both their equity and their debt financing compared to the control group. We also show that results are stronger for firms that hail from less financially developed euro area countries, and that large firms from industries that are dependent on external financing have increased their debt financing more. These results support the hypothesis that improved access to capital markets in the euro area has enabled increased external financing, especially debt financing.

Keywords: euro, external financing, supply of capital, financial development, financial dependence, financial integration

JEL classification numbers: F33, F36, G32

Euro ja yritysten rahoitus

Suomen Pankin keskustelualoitteita 6/2011

Arturo Bris – Yrjö Koskinen – Mattias Nilsson
Rahapolitiikka- ja tutkimusosasto

Tiivistelmä

Tässä työssä tutkitaan, kuinka euro on vaikuttanut yritysten rahoitukseen Euroopassa. Tutkimuksessa käytetään yritysdataa yhdestätoista euro-maasta. Kontrolliryhmänä viidestä muusta Euroopan maasta. Data kattaa vuodet 1991–2006. Tutkimuksessa osoitetaan, että heikkojen valuuttojen euro-maista tulevat yritykset ovat lisänneet sekä osake- että velkarahoitustaan kontrolliryhmään verrattuna. Tulos vahvistuu silloin, kun yritykset tulevat euro-maista, joissa rahoitusmarkkinat ovat olleet kehittymättömiä. Lisäksi suuryritykset, joiden teollisuusala on erityisen riippuvainen ulkoisesta rahoituksesta, ovat kasvattaneet velkarahoitustaan muita enemmän. Tulokset tukevat hypoteesia, jonka mukaan rahoituksen tarjonnan kasvu on lisännyt yritysten ulkoista rahoitusta, erityisesti velkarahoitusta.

Avainsanat: euro, ulkoinen rahoitus, rahoituksen tarjonta, rahoitusmarkkinoiden kehittyneisyys, riippuvuus rahoituksesta, rahoitusmarkkinoiden integraatio

JEL-luokittelu: F33, F36, G32

Contents

Abstract.....	3
Tiivistelmä (abstract in Finnish).....	4
1 Introduction.....	7
2 Related Literature.....	12
3 Financial Market Developments and Data Description	15
3.1 Financial Market Developments.....	15
3.2 Sample	16
3.3 Variables.....	18
4 The Euro and External Financing: Main Results	19
4.1 Empirical Methodology.....	19
4.2 Univariate results.....	21
4.3 Main Results.....	22
5 Financial Development and the Effect of the Euro on Financing Activities.....	25
6 External Finance Dependence and the Effect of the Euro on Financing Activities.....	28
7 Foreign Sales Exposure and the Effect of the Euro on Financing Activities.....	31
8 The Effect of the Euro on Asset Growth and Dividends	34
9 Conclusions	36
References.....	38
Figures	41
Tables.....	44
Appendix A.....	59
Appendix B.....	60
Appendix C.....	62

1. Introduction

The introduction of the euro as the common currency in Europe in 1999 was a monumental event whose economic and financial effects are widely debated. We aim to participate in this debate by examining if the euro has affected corporate financing choices in Europe. In particular, our objective is to study if the euro has increased the use of external financing for companies hailing from the euro-area compared to other European companies.

The use of external financing may increase if the demand for financing has increased, or if the supply of financing has improved. Previous research by Bris, Koskinen, and Nilsson (2006, 2009) show that the introduction of the euro resulted in increases in corporate valuations and investments for euro-area firms compared to other European firms. Corporate valuations increased because the cost of capital – both for debt and equity – decreased in euro-area compared to the countries that didn't adopt the euro as their currency. The decrease in cost of capital has then led to an increase in corporate investments. As a result of increased valuations and investments, it is reasonable to expect that the demand for external financing has increased in the euro-area compared to the countries that decided to stay out.

If there are no frictions in financial markets, companies are free to choose their amount of debt and equity financing given the prevailing market prices. However, this may not always be the case. Sometimes companies are not able to raise external financing even if they have profitable investment opportunities. In other words, companies may face financing constraints. After the introduction of the euro, issuing bonds has become a viable alternative to borrowing from banks, especially for large corporations. Thus the euro may have helped to alleviate financing constraints and increased external financing in that way. Interestingly, the size of the euro-area corporate bond markets has increased significantly, while bond markets elsewhere in

Europe have not grown correspondingly (see, e.g. Rajan and Zingales (2003), Pagano and von Thadden (2004), Lane (2008)). It is also possible that companies from outside of the euro area could take advantage of the expanded euro-denominated bond markets. If this were the case, then euro-area companies should not raise more debt financing compared to other European companies, controlling for factors that affect the demand for financing. However, we argue that non-euro firms may face additional international financing constraints when they are contemplating raising euro-denominated debt. For example firms coming from outside the euro-area could face constraints due to their limited amount of revenues denominated in euros. Consequently, non-euro firms may find it harder to issue euro-denominated bonds (for international financing constraints, see Caballero and Krishnamurthy (2001)).

The core of our empirical analysis consists of estimating regressions where the change in external financing, the change in debt or the change in external equity, all normalized by lagged assets, are the dependent variables. As explanatory variables we use measures of size, profitability, collateral together with Tobin's Q, and time dummies for firms in the euro area for the time the common currency has been in use. Because Tobin's Q is endogenous (as shown by Bris et al., 2009), we use the corresponding U.S. industry Q as an explanatory variable instead of the firm's own Q.

Our sample consists of 2,486 firms from 16 European countries in the period 1991-2006. In particular, we use corporate-level data from the eleven original countries that adopted the euro in 1999. As our control sample we use the three EU countries that did not adopt the euro - Denmark, Sweden, and the U.K. - as well as Norway and Switzerland. Using a control sample allows us to compute differences-in-differences estimators to measure the impact of the euro both cross-sectionally and in the time-series domain.

We show that the introduction of the euro has led to 4.0 percent yearly increase in external financing for companies from the euro-area, compared to companies from our control countries. The annual increase is 2 percent both for debt and external equity financing. When we split the sample of euro firms between firms in weak-euro countries - countries that suffered a currency crisis in the years before the introduction of the euro - and strong-euro countries, we find that for the weak euro-countries the annual increase in external financing is 7.7 percent, composed of 5.1 increase in debt financing and 2.6 percent increase in external equity financing. For strong-euro countries the increase in external financing is 2.4 percent per year, consisting mainly of an annual increase in external equity financing (1.8 percent).

This increase in external financing can either be attributed to increase in demand for financing or increase in supply. The results showing that firms from weak-euro countries have raised more external financing than firms from strong-euro countries is consistent with the explanation that demand for financing has increased, since Bris et al (2006, 2009) show that the weak-euro firms experienced higher increases in Q and in investment levels after the introduction of the euro. We also show that external financing has increased more after 2002, even though increase in valuations were highest in 1999 (Bris et al. 2009). If demand for financing were the sole factor contributing for greater use for external financing, firms would have raised more financing already in 1999-2002.

Thus explanations based on increased supply of financing are also plausible. We provide support for the supply channel by showing that the countries that were least financially developed measured by the size of their private bond markets before the introduction of the euro show the largest increases in external financing, especially in debt financing. This result, however, is conclusive evidence neither for increased demand for financing nor for increased

supply of financing, since the countries that tended to have weak currencies also had less developed financial markets.

To further examine if supply of financing is a major contributing factor for the increase in external financing in the euro-area, we classify industries to be dependent on external financing by measuring fraction of investments financed by external finance in corresponding industries in the U.S. between 1991 and 1997 (following the procedure of Rajan and Zingales, 1998). We then show that industries that are dependent on external financing have significantly increased their debt and equity financing compared to the control group after the introduction of the euro. The result holds for all euro-firms, but it is much stronger for firms from weak-euro countries (annual increase is 7.1 percent in debt financing and 3.3 percent in equity financing). We further examine the role of financial dependence by studying the interaction of size and financial dependence. We show that large firms that are dependent on external financing have increased debt financing more than other firms. This is a clear indication that the increased supply of financing has had a major impact on corporate financing in euro-countries, since we would have expected the effects to be larger for small firms, if the demand for financing were the only factor affecting financing decisions¹.

We also study how foreign sales affect external financing. Bris et al. (2009) show that companies that had negative exposure to currency depreciations experienced largest increases in valuations after the introduction of the euro. Those companies would typically have no or very little foreign sales. As expected, we show that companies with low foreign sales increase their debt financing the most. This result as such is consistent with increased demand for financing

¹ Bris et al. (2009) show that valuations increased more for small firms in the euro-area. This implies that small firms should have increased their use of external financing more.

hypothesis. However, we also interact foreign sales with size, and show that once again effects are stronger for large corporations. This implies that the supply channel is also important.

Finally, we confirm that increased external financing has consequently led to asset growth. External financing has been used to increase non-cash assets. Interestingly, cash holdings or dividends have not grown compared to non-euro firms. Firms that belong to industries that are more dependent on external financing have experienced higher growth in non-cash assets. Better access to financing has thus had real consequences. Consistent with the external financing results, the growth in non-cash assets has been faster during after 2002. Even though valuations increased immediately when euro was introduced, it seems to have taken some time before the institutional framework was ready to support increased firm growth.

As a summary, we provide evidence that the introduction of the euro has led to increase in external financing, especially for debt financing, among the euro-countries. Results are stronger for firm from those countries that previously had weak currencies and for firms that have the lowest foreign sales, supporting the hypothesis that increased external financing is due to stronger demand for financing. However, there is clear evidence that increased supply has been also a major contributing factor. Large firms, who supposedly have better access to syndicated loans and bond markets, have increased their debt financing more. Industries that are more dependent on external financing have increased their debt financing more. These findings support the hypothesis that the increased supply of financing has led to increased use of external financing among the euro-countries.

Next section reviews the literature. Section 3 describes the developments in European financial markets, the data sources, and the variables used in the paper. Section 4 discusses the methods and main results. Section 5 examines the role of financial development. Section 6

studies how dependence on external financing affects financing. Section 7 examines foreign sales and financing. Section 8 focuses on asset growth and Section 9 concludes.

2. Related Literature

There is a growing literature on euro and deepening financial integration it has fostered². Hardouvelis, Malliaropulos, and Priestley (2006) show that excess stock returns in the euro area have become more sensitive to common euro risk at the expense of country-specific risks³. As Stulz (1999) has pointed out, if the country-specific risk larger than the common euro-risk, financial integration should led to a decrease in the risk premium required by investors, and hence the cost of equity. Supporting evidence is provided by Hardouvelis, Malliaropulos, and Priestley (2007), who find evidence that the cost of equity has decreased in the euro area since the introduction of the euro, and that there is no similar reduction in cost of capital for those EU countries that that chose not to adopt the euro as their currency. Hassan (2010) shows that the cost of equity has decreased in euro-area for the non-tradable sector. Bris et al. (2009) find consistent evidence for cost of equity reduction using Tobin's Q-ratios: valuations measured using Q-ratios have increased after the introduction of the euro, especially for countries that devalued their currencies during the EMS-crisis of 1992-93. Bekaert, Harvey, Lundblad, and Siegel (2010) find no evidence that the euro has led to a decrease in valuation differentials for euro-countries compared to non-euro countries, but they show that there is a strong European

² For two recent comprehensive overviews on European financial integration, see Lane (2008), and Japelli and Pagano (2008). For overview of the macroeconomic effects of the euro, see Beetsma and Giuliodori (2010).

³ Capiello, Kadareja, and Manganelli (2009) show that comovements between European stock market returns have increased since 1999, implying increased stock market integration.

Union effect: bilateral valuation differentials are significantly lower for EU members than for non-members.

In addition, Bartram and Karolyi (2006) show that due to the introduction of the euro, the market risk has been significantly reduced implying that currency risks have been a major non-diversifiable risk in Europe prior to the euro. Hassan (2010) shows that real interest rates have declined in the euro-area, because bonds denominated in euro provide better insurance against consumption shocks than bonds issued in the legacy currencies would have provided. Corporate bond markets have also become more integrated and credit spreads have converged across the euro-area. Baele, Ferrando, Hördahl, Krylova, and Monnet (2004) show that since the adoption of the euro, the impact of country-factors in explaining credit spreads has become economically small and that credit spreads are more influenced by fundamental factors like ratings and maturity.

Transactions costs for buying euro-area assets have declined significantly since the introduction of the euro. Coeurdacier and Martin (2008) provide evidence that for all investors – no matter where they originate from – the costs for buying euro-area bonds and stocks have decreased by 14% and 17%, respectively. Inside the euro-area transactions costs have become lower by additional 10-17%. Lower transactions costs, in addition to the elimination of exchange rate risk within the euro area and currency matching rules for assets and liabilities becoming irrelevant within euro area, have resulted in dramatic increase in cross-border portfolio investments between euro-countries. The increase in portfolio investments is more pronounced for bonds ((Lane (2006), De Santis and Gerard (2006)), but cross-border holdings within euro-area have also increased significantly for equities (De Santis and Gerard (2006), Lane and Milesi-Ferretti (2007)). Bilateral bank holdings have also increased between euro-countries by

25-30% compared to other EU members, because of the elimination of currency risk within the euro-area (Kalemli-Ozcan, Papaioannou, and Peydro (2010)).

Euro-denominated corporate bond issuance activity has also increased significantly after the introduction of the euro (Rajan and Zingales (2003), Pagano and von Thadden (2004)). Right after the introduction of the euro non-financial corporations were the main issuers of bonds, but later on financial institutions have been responsible for the bulk of the issues. In international markets the increase in euro-denominated bond issues has at least partially been at the expense of dollar denominated bonds (Hale and Spiegel (2009)).

There is an emerging literature how changes in the supply of financing affect firms' financing choices. Faulkender and Petersen (2006) compare firms that have bond ratings – and thus access to bond markets – to firms that do not. They show that firms with bond ratings have 35% more debt in their capital structures, even after controlling for firm characteristics that typically explain firms' capital structure choices. Other recent papers that study the changes in the supply of financing are Leary (2009), Sufi (2009), and Lemmon and Roberts (2010). Leary finds that the emergence of market for certificate of deposits in 1961 and the resulting expansion in bank credit led to increased leverage for firms. Sufi shows that the introduction of syndicated loan ratings in 1995 led to increased borrowing by firms that obtained a rating. Lemmon and Roberts study the collapse of Drexel Burnham Lambert and the resultant decrease in high-yield bond financing and show that this resulted in decrease in financing and investments for those firms that were using high-yield debt financing. All these papers thus confirm empirically that the supply of financing matters and that corporate financing choices are not only determined by demand factors. Like Faulkender and Petersen (2006) and Lemmon and Roberts (2010) we show that even large corporations may face financing constraints and that access to bond markets

is a significant determinant in firms' financing choices. To our knowledge, our paper is the first one using international evidence to demonstrate that.

3. Financial Market Developments and Data Description

3.1. Financial Market Developments

The most significant change in euro-area financial markets since the introduction of the euro has been the growth of the corporate bond market. Figure 1 shows the outstanding stock of domestic debt securities issued by non-financial corporations measured in billions of US dollars (panel A) and as indexed values where 1998 (the last year prior to the euro) is given the values of 100 (panel B). According to Bank of International Settlements definitions, domestic securities are issued in domestic currency and targeted to domestic investors. All other securities are international securities. Prior to the introduction of the euro, the outstanding stock of domestic debt securities issued by corporations was about 200 billion USD for euro-countries. The outstanding stock started to grow rapidly after the common currency was introduced and the stock was 1.2 trillion dollars by the year 2006. Since the introduction of the euro, the size of the market has increased by 400%. The growth has been especially drastic for Germany. The outstanding stock for Germany was only 8.8 billion USD in 1998, but the stock exploded to 143 billion USD by 2006. Interestingly, there is basically no growth in domestic debt issuance for non-euro corporations, the stock has remained around 100 billion USD. The outstanding stock has even declined for the UK: in 1998 it was 31.8 billion USD, but in 2006 only 23.1 billion USD.

Figure 2 presents the evolution for international debt securities. Before the introduction of the euro, the US dollar was by far the most important currency for non-financial corporations in

international bond markets. About 2/3 of the total issue volume was denominated in US dollars (Gale and Spiegel, 2009). After 199 the euro became the most important currency for issuing bonds for non-financial corporations. Approximately 45% of the total issue volume has been denominated in euros since the introduction of the euro. In panel A we can see that stock of international debt securities was about 130 billion USD in 1998 for euro firms and 115 billion USD for non-euro firms. After that euro-firms begun to issue considerably more international debt securities reaching 562 billion USD in 2006. Non-euro firms also started to issue more international debt securities, but the growth rate was more modest. The stock for non-euro firms was 313 billion USD in 2006. From panel B we can see that the outstanding stock for international corporate issues grew by 330% for euro-firms and by 169% for non-euro firms from 1998 to 2006. Figure 3 presents the evolution of international syndicated credit facilities. The difference between euro- and non-euro countries has once again been significant. Since 2003 the growth was especially fast for euro-country syndicated loans.

3.2. *Sample*

The sample of firms used in this study is gathered from Worldscope and covers the period 1991- 2006. The sample includes firms from the eleven countries that first adopted the euro at its introduction in January 1999: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxemburg, the Netherlands, Portugal, and Spain. Our comparison sample of firms is drawn from three EU, non-euro countries (Denmark, Sweden, and the UK) as well as from Norway and Switzerland. We consider these five non-euro countries to constitute appropriate benchmark countries for an analysis of the impact of the euro on firms' financing activities. Denmark, Sweden, and the UK all opted out from joining EMU at the outset. Norway and Switzerland obviously cannot join EMU as non-EU countries, but at the same time they are

tightly integrated with the EU in many areas relevant to business thanks to geographical proximity and follow EU regulations because of the European Economic Area –agreement.⁴

As is standard in corporate finance research, we exclude financial firms (SIC codes 6000-6999). We also exclude firm-year observations missing any data in Worldscope needed to construct our outcome variables or full set of firm-level control variables. Furthermore, we exclude firm-year observations with zero sales or negative book values. Finally we require that the remaining firms appear in the sample for at least one year during 1991-1997 and at least one year during 1999-2006. This last requirement ensures that firms exist both before and after the introduction of the euro in January 1999. Firms that appear only in 1998 in the pre-euro period are excluded because by then it was clear that the euro would come to fruition, and that fact could have been a factor behind firms' decision to go public at the time. Because we do not require that the firms exist for the whole sample period of 1991-2006, we end up with an unbalanced panel of firms.

Our final sample consists of 2,486 firms (29,332 firm-year observations): 1,348 firms (16,098 firm-year observations) from the euro countries and 1,138 firms (13,834 firm-year observations) from the non-euro countries. Germany and France together contribute more than half of the firms to the euro sample (742 firms; 8,753 firm-year observations); whereas the UK dominates the non-euro sample with 696 firms (8,523 firm-year observations). Although firms Germany, France and the UK make up a majority of the sample, our results are robust to excluding these observations.

⁴ Greece was a non-euro, EU member at the time of the initial introduction of the euro and was actively looking to adopt the euro. However, because Greece did not fulfill the convergence criteria of the Maastricht treaty, the country did not officially adopt the euro until January 2001. We exclude Greece from the main analysis because it is difficult classifying Greece as either a non-euro or euro country in 1999 and 2000. We also exclude the new euro-members – Slovenia, Cyprus, Malta, and Slovakia – for the same reason and also for the reason that for these countries there are only very few post-euro observations.

3.3. Variables

Appendix A lists the full technical definitions of the variables used in this study and Appendix B presents summary statistics.

To capture firms financing activities we construct three different variables: *Net Debt Issues*, *Net Equity Issues*, and *Net External Finance*. *Net Debt Issues* is defined as the net change in the book value of total liabilities over a given year divided by the lagged book value of assets. Similarly, *Net Equity Issues* is defined as the net change in external equity divided by the lagged book value of assets. Depending on data availability, we calculate the net change in external equity any given year either as (i) reported proceeds from sales of common and preferred stock minus purchases and retirements of common and preferred stock, or as (ii) the change in the book value of common and preferred stock minus the change in retained earnings. Finally we define *Net External Finance* as the sum of *Net Debt Issues* and *Net Equity Issues*. Because the net debt and equity issues variables are expressed as fractions of the past period's assets, *Net External Finance* captures the net contribution of all external financing activities to asset growth. We winsorize the financing variables at the 1st and 99th percentiles to reduce the influence of extremely fast growing or shrinking firms (mainly caused by M&As and divestitures). Panel A of Appendix B show that over the entire time period we study, non-euro firms on average raise more external capital per year than euro firms (8.8% of previous year's assets vs. 7.5%). The larger external financing activity is due to larger debt issues as well as larger equity issues.

Regarding other firm characteristics used in this study, Panel A of Appendix B shows that euro firms on average have greater leverage (including more than twice as many observations with leverage over 90%), larger sales, lower growth opportunities (as measured by

median industry Q for corresponding US firms) , less collateral value, and somewhat greater profitability (EBITDA/assets).

Turning to some country characteristics, Panel B of Appendix B shows that euro countries on average grew faster during this time period than non-euro countries, although this is mainly due to Ireland. It is also notable that financial markets in the euro countries were on average relatively smaller than those in the non-euro countries. This is true regardless if we measure financial development by the outstanding value of private bond markets, the market capitalization of the stock market, or by the amount of private credit by banks and other financial institutions.

4. The Euro and External Financing: Main Results

4.1. Empirical Methodology

To analyze the impact of the formation of the euro on firm's external financing activities, we employ a standard difference-in-difference methodology. That is , we estimate the impact of the euro by comparing differences in financing activities before and after the euro for the firms in the euro countries and compare these differences with the comparable differences for a sample of firms from non-euro countries. More formally, for our sample in which firm i is observed annually at year t , we estimate the effect of the euro on financing variable y in OLS regressions of the following kind:

$$y_{it} = \alpha_i + \theta_t + \beta X_{it} + \delta EURO_{it} + \varepsilon_{it}, \quad (1)$$

where α_i is the fixed firm effect for firm i , θ_t is the fixed time effect for year t , X_{it} is a vector of time-varying control variables, $EURO_{it}$ is a dummy variable indicating whether or not the euro

was adopted by firm i 's country at time t , and ε_{it} is the residual. To control for serial dependence within a country, we estimate standard errors robust to clustering at the country level.

The fixed firm effects control for any unobserved constant factors that may influence firms' financing choices (this includes constant industry and country factors). The fixed time effects control for time trends common for both euro and non-euro firms. Because of the inclusion of these time dummies, the coefficient δ is the difference-in-difference estimator of the impact of the euro.

The dummy variable EURO in equation (1) is equal to 1 if the year is 1999 or later and the firm belongs to a country that adopted the euro, otherwise it is 0. As an alternative specification, we replace EURO with two dummies indicating firms in strong and weak euro countries, respectively, in the post-euro period. The weak euro countries are the euro countries that had to abandon their pegged exchange rates or devalue their currencies during the ERM crisis of 1992-93. We make the distinction between strong and weak euro countries since Bris et al (2006, 2009) show that the weak euro firms experienced higher increases in valuation and in investment levels after the introduction of the euro. They attributed these results to a removal of devaluation risk and resulting decrease in cost of capital. An alternative justification for classifying euro countries into weak and strong is that the classification may be a proxy for international financing constraints. Caballero and Krishnamurthy (2001) argue that firms may face two kinds of collateral constraints in borrowing: domestic and international constraints. Because of a history of devaluations, weak euro countries may face more stringent international financing constraints than strong euro countries do.

4.2. Univariate Results

Before turning to our regression analysis, we first present some univariate difference-in-difference results in Table I. For each of our three financing variables, we calculate an average for the pre-euro period and the post-euro period separately. We then calculate the difference between the post-euro and the pre-euro averages, which gives us a firm specific difference in means. The pre-and post euro individual firm averages as well as within-firm differences are then averaged across all firms in the euro countries and non-euro countries, respectively.

Panel A of Table I Table show that euro firms on average increase their yearly net external financing, expressed as a fraction of last year's assets, with 0.005 following the introduction of the euro. By contrast, non-euro firms' change in *Net External Finance* is - 0.055. The increase for euro firms is not statistically significant by itself, but the decline for non-euro firms and the difference-in-difference between euro and non-euro firms are both strongly statistically significant (at the 1%-level) according to t-tests. Looking at strong versus weak euro firms, we see that strong euro firms on average actually decrease their yearly external financing by -0.009 (not significant) whereas weak euro firms increase theirs by 0.041 (significant at 1%-level). However, the difference-in-difference between strong euro firms is still significant (at 1%-level). The difference-in-difference between weak and strong euro firms is also significant (at 5%- level).

Panels B and C show that the above pattern is repeated for *Net Debt Issues* and *Net Equity Issues*. Non-euro firms significantly decrease both debt and equity issues on average, whereas there is an (insignificant) increase in both for euro firms overall. The difference-in-difference between non-euro and euro firms is significant for both debt and equity issues. For weak vs. strong euro firms, we see that strong euro firms decrease their debt issues in absolute

terms, although their decrease is significantly less than the decrease for non-euro firms. By contrast weak euro firms significantly increase their debt issues. For equity issues there does not seem to be any difference between strong and weak euro firms; both groups register a marginal (insignificant) increase, and the change for both groups is significantly different from the change for non-euro-firms.

Overall, the univariate difference-in-difference evidence suggests that the euro has enabled euro firms to increase their external financing relative to non-euro firms. This seems to be particularly true for weak euro firms, who increase their financing also in absolute terms and not just relative to non-euro firms.

4.3. *Main Results*

We next estimate the regression outlined in Eq. (1) above. We run two different specifications of the regression model for each of three dependent variables (*Net External Finance*, *Net Debt Issues*, and *Net Equity Issues*) ; one with one single euro dummy, and one with different euro dummies for strong euro firms and weak euro firms, respectively. As control variables we use five different firm characteristics, all of which are lagged one year relative to our outcome variables: *US Industry Q*, *Log(sales)*, *EBITDA/Assets*, *Collateral/Assets*, and a dummy variable indicating whether leverage (expressed as total liabilities/assets) is above 90% [*I(Leverage>90%)*]. *US Industry Q* is our proxy for a firm's investment opportunities and is the median Q of US firms in the same two digit SIC code and year. We do not use firms' individual Q ratios because Bris et al (2009) show that they are affected by the introduction of the euro and are therefore endogenous in this setting. *Log(sales)* is our proxy for firm size and is calculated using sales in real USD. *EBITDA/Assets* is a measure of a firms operating profitability, and

Collateral/Assets is meant to capture the debt capacity of tangible assets. Versions of these four variables have previously been used by, e.g., Rajan and Zingales (1995) to explain firm's debt choices. We also add $I(\text{Leverage} > 90\%)$ as control variable based on the idea that firms with extreme leverage ratios have exhausted their debt capacity and are more or less forced to issue equity when they raise external capital.

We also add three country characteristics as control variables: *GDP Growth*, *Term Spread*, and *Change in USD Exchange rate*. *GDP Growth* (the real GDP growth rate) is included to capture differences in contemporaneous business cycles across countries and *Term Spread* (the 10-year government bond rate minus the 6-month t-bill rate) is included because it captures expectations of future growth and inflation, which can affect firms current financing decisions. Both of these variables are lagged one year relative to the outcome variables. *Change in USD Exchange rate*, defined as the percentage change in the domestic currency/USD exchange rate from the end of the previous year to the end of the current year, is included because the firm level accounting variables that form the basis for our outcome variables are measured in USD and we want to make sure that we capture actual firm decisions and not just differences in dollar value fluctuations across currencies.

Table II presents the main estimation results. We see that the introduction of the euro has lead to a statistically significant annual increase in external financing equal to 4.0 % of beginning-of-year assets for companies from the euro-area compared to companies from our control countries. The annual increase is 2% both for debt and external equity financing (significant at the 10% and 1%-levels, respectively). When we split the sample of euro firms between firms in weak-euro and strong-euro countries, we find that for the weak euro-countries the annual increase in external financing is 7.7% (significant at the 1%- level), composed of a 5.1

% increase in debt financing and 2.6 percent increase in external equity financing (both effects significant at the 1%-level). For strong-euro countries there is an increase in external financing is 2.4 percent per year, which is mainly due to a significant annual increase in external equity financing (1.8 percent). There is no significant effect of the euro on debt financing for strong euro firms. The larger increases in total external financing, as well as the larger increase in debt and equity issues for weak euro firms versus strong euro firms are all statistically significant at the 1% level.

The increase in external financing can either be attributed to increase in demand for financing or increase in supply. The results showing that firms from weak-euro countries have raised more external financing than firms from strong-euro countries is consistent with the explanation that demand for financing has increased, since Bris et al (2006, 2009) show that the weak-euro firms experienced higher increases in Q and in investment levels after the introduction of the euro. In Table III we further test this by splitting the post-euro time period into one earlier period 1999-2002- and one later period (2003-2006). If euro firms only increase external financing as a response to the beneficial impact of euro on demand factors - lower cost of capital and increased investment opportunities - we would expect a relatively immediate increase in external financing because such positive demand shocks have been immediately recognized by financial markets and incorporated in company valuations immediately when the euro was introduced (see Bris et al. (2009)). On the other hand, it takes a longer time for the institutions of financial markets to change and thus for supply factors to have an impact on financing decisions. Table III shows that the net external financing, net debt issues or net equity issues did not increase for euro-countries right after the introduction of the euro, as we would have expected if the demand for financing were the only factor influencing the financing

decisions. Rather, the increase in external financing happens during the years 2003-2006, supporting the hypothesis that changing financial institutions and resulting increase in the supply of financing were the main drivers.

In tables II and III we classified firms as weak or strong euro firms. The results in those tables could be due to the fact that firms from France, Germany, and the UK dominate the sample. In order to make sure that few large countries do not determine the results we present results by individual countries in Table IV. We use the UK as the benchmark, so all the results are relative to the UK results. The results are what we expect them to be. Firms from weak euro countries have increased both their debt and equity financing. The only exception is Ireland, where only debt financing has increased significantly. The Irish results are consistent with the findings of Bris et al (2009), who show that Ireland didn't experience any increase in corporate valuations after the introduction of the euro. The effects for strong euro countries are generally lower than the effects for weak euro countries. Among the control group only Denmark shows significant increases in debt and equity financing. Denmark is different from all other non-euro countries: it is the only non-euro country in our sample that has maintained a tight currency peg with respect to the euro. Thus it is not that surprising that Denmark is behaving like an euro country.

5. Financial Development and the Effect of the Euro on Financing Activities

Our main result in Table II that euro firms have increased their external financing is consistent with both an increase in firms' demand for financing, as well as with an increase in the supply of capital, which would allow previously financially constrained firms to raise more capital than in the past. In this section we investigate to what extent the level of domestic

financial development before the euro is related to the increase in external financing. To the extent that the existence of different currencies segments capital market due to exchange rate risk and transactions costs, it should follow that joining at currency union will lead to less segmentation and thus a potentially increased supply of capital. The effect of such an increase in the supply should be larger for firms in countries with less developed financial markets, since they would be relatively more financially constrained when financial markets are segmented (Guiso, Jappelli, Padua, and Pagano (2004)).

We test the impact of financial development on the financing choices of euro firms in the post-euro period by including three complementary measures for the pre-euro level of financial development that are each interacted with the euro dummy. The first measure is *Pre-Euro Private Bond Market Cap/ GDP*, defined as the outstanding total value of debt securities divided by GDP. This is a measure of the relative development of arms-length debt markets. The second measure is *Pre-Euro Private Credit/ GDP* which is equal to the value of outstanding credit to the private sector by financial institutions divided by the GDP. This measure is meant to capture the relative activity by financial intermediaries. Finally we include *Pre-Euro Stock Market Cap/GDP* size, which is equal to the aggregate market value of public stocks divided by GDP. This last measure is meant to capture the relative development of stock markets. The data on all three measures come from the widely used Worldbank Financial Development and Structure Database (see Beck, Demirgüç-Kunt and Levine (2000)). Each of the three measures is calculated as the within-country mean over 1991-1997 (see Panel B in Appendix B for summary statistics). We have to drop firms from Luxembourg from the analysis because data on private bond market size is not available in the database.

To accurately estimate the difference-in-difference effect of the interactions between the financial development measures and euro status, we also include each financial development measure's interaction with a dummy variable indicating whether the time period is post the introduction of the euro or not. Note that because the pre-euro financial development variables as we define them are constant throughout the whole sample period, they are perfectly collinear with the firm fixed effects and can therefore not be included by themselves in the regressions.

Table V presents the estimation results of the interactions between the pre-euro level of financial development and the dummy indicating a euro firm in the post-euro time period. Column (1) shows that positive effect of euro status on external financing is significantly decreasing in the relative pre-euro bond market size. Thus, firms in euro countries with the least developed debt securities markets increase their external finance the most. Looking at debt and equity issues in Columns (2) and (3), respectively, we see that the effect is only there for debt issues, which is what we would expect. The other two financial development variables have no significant impact on the effect of euro status on total external financing or separately on either debt or equity issues.

These results are not too surprising given the observed explosive growth of corporate bond markets in the euro area as a whole following the introduction of the euro. Firms in countries with previously limited debt securities markets were suddenly part of a larger pan-European market that was attracting a lot of capital, and our results suggest that this fact helped alleviate financial constraints they were facing prior to the euro. One caveat is in order, however. It is important to note that the level of financial development is strongly correlated with a country's status as a weak euro country (which is why we do not estimate any specifications with the strong and weak euro dummies in Table V). Thus, although the results are consistent with

the adaptation of the euro increasing the supply of capital and thereby reducing financial constraints, we cannot rule out that an increased demand for financing is partly responsible for the results, since we know from Bris et al (2006, 2009) that weak euro firms experienced the largest increases in valuations and investments following the introduction of the euro due to removal of devaluation risk and lower cost of capital. In the next section, we will further test the supply hypothesis by instead using an exogenous industry-level measure of financial constraints

6. External Finance Dependence and the Effect of the Euro on Financing Activities

To further examine if demand for or supply of financing is the main contributing factor for the increase in external financing, we follow Rajan and Zingales (1998) and classify industries' level of dependence on external financing by measuring the fraction of capital expenditures financed by external funds in corresponding industries in the U.S. between 1991 and 1997. Rajan and Zingales argue that because the United States have relatively frictionless financial markets, US industries external finance dependence is likely to capture the technological demand for external finance. For our purpose, the US industry external dependence provides us with an external finance dependence measure that is exogenous to the formation of EMU.

Specifically, we first match our sample industries to corresponding US industries based on two digit SEC codes. We then identify all US firms in corresponding industries over the 1991-1997 time period. For each industry-matched US firm, we calculate the individual fraction of capital expenditures financed by external funds as the sum of external financing (= capital expenditures minus net cash flow from operating activities) divided by the sum of capital expenditures over 1991-1997. We then calculate the median external finance dependence by

industry and use that as the overall measure of an industry's external finance dependence. Finally we classify an industry (and consequently any firm in this industry) as more external finance dependent if its industry has a higher external finance dependence than the median industry represented in the sample (external finance dependence = 0.211). Remaining industries are consequently labeled as less external finance dependent.

Table VI replicates our main analysis in Table II but splits the sample in two according to external finance dependence. Panel A shows the estimation results for the more external finance dependent subsample and Panel B shows the equivalent results for less external finance dependent subsample. We see that the effect of the euro on external financing activity is much larger in magnitude in more external finance dependent industries. In the more dependent sample, firms in the euro area on average increase *Net External Finance* by a statistically significant 5.4 percentage points more than non-euro firms following the introduction of the euro. In the less dependent sample, the equivalent increase is just over half in magnitude, 2.8 percentage points, and only significant at the 10%-level. When we distinguish between strong and weak euro firms, we see that weak euro firms in both subsamples increase their external financing more following the euro compared to strong euro firms. This is consistent with the results in Table II. More interestingly, we also find that the comparatively larger effect of euro membership in more external finance dependent industries hold not only for weak euro firms, but also for strong euro firms. In both cases, the effect of the euro in the less dependent sample is around 50% of the magnitude in the more dependent sample.

Looking at the results for *Net Debt Issues* and *Net Equity Issues* we see that the comparatively larger effect of the euro on total external financing is more due to a larger increase in debt issues than a larger increase in equity issues. In the more dependent sample, euro

membership increases *Net Debt Issues* with 3.1 percentage points versus an increase of 1.5 percentage points in the less dependent sample. For *Net Equity Issues* the increase is 2.1 percentage points in the more dependent sample versus 1.9 percentage points in the less dependent sample. When we distinguish between strong and weak euro firms, this pattern in results is more or less repeated

The results in Table VI show that the introduction of the euro membership have mattered more for more external finance dependent firms, which is consistent with supply of capital being important for financing decisions. We know that the aggregate value of debt securities markets and syndicated loan markets in the euro area has increased tremendously after the introduction of the euro (see, e.g. Pagano von Thadden (2004), Altunbas et al. (2009)). If the capital supply channel is behind the results in Table VI, it seems reasonable to believe that it is an increase in the supply of capital in precisely these debt markets that is the cause. Although we cannot observe where the debt firms raise comes from in our data, we can indirectly test this conjecture by analyzing the impact of the euro conditional on firm size. Smaller firms generally have less access to debt securities and syndicated loan markets. Thus, we would expect the effect of the euro to be greater for larger firms.

In Table VII, we split the sample between large and small firms and estimate our baseline regressions for each subsample. We first rank firms based on average yearly sales in real USD over the 1991-1997 time period. Next we designate firms as large if they have higher average sales than the sample median, otherwise they are classified as small. Panel A of Table VII displays the results for large firms and Panel B does the same for small firms. Consistent with our conjecture, we see that large euro firms have experienced a comparatively greater increase in

external financing following the introduction of the euro. Moreover, the difference relative to smaller euro firms seems to be due to greater debt financing.

Finally, in Table VIII, we divide the sample both according to external finance dependence and according to firm size. Hence, we end up with four subsamples. Panel A of Table VIII shows the result for large firms in more external finance dependent industries, Panel B shows the result for smaller firms in more dependent industries, Panel C shows the result for large firms in less external finance dependent industries, and finally Panel D shows the result for smaller firms in less dependent industries. Consistent with an increased supply of debt capital being an important factor behind our results, large euro firms that are dependent on external financing have increased external financing significantly more after the euro than other firms. The effect is concentrated on debt financing and there are no differences in external equity financing. Thus the evidence supports the conjecture that increased supply of credit through the bond and syndicated loan markets have enabled large financially dependent firms to raise more debt financing.

7. Foreign Sales Exposure and the Effect of the Euro on Financing Activities

Bris et al. (2009) show that companies from weak euro-countries that were harmed by currency devaluations experienced largest increases in Tobin's Q. They conclude that devaluation risk constituted a significant part of the cost of capital prior to the introduction of the euro. Elimination of devaluation risk would lead to lower cost of capital and increased demand for financing. However, devaluation risk could also be a proxy for international financing constraints. Firms that would be harmed by devaluations would find it more difficult to offer

credible collateral to foreign currency lenders and thus they could be shot out from international capital markets.

In order to measure which companies were harmed by devaluations, Bris et al. (2009) estimated exchange rate risk factor where negative currency exposure implied that a company would be harmed by a currency devaluation. Since exchange rate risk factor is unstable and hard to estimate with precision, we instead use the fraction foreign sales as a proxy for currency risk. We measure firms' foreign sales exposure by the within-firm average fraction of foreign sales over total sales during the 1991-1997 pre-euro time period.⁵ We then classify firms as having low foreign sales if the average fraction foreign sales is at or below the median for the whole sample; otherwise the firm is classified as having high foreign sales. The median fraction average pre-euro foreign sales is 32.05%; thus, firms classified as having high foreign sales sell an economically meaningful fraction of their output abroad.

Table IX displays the results of estimating our baseline regression separately for low and high foreign sales firms; Panel A presents results for low foreign sales firms and Panel B presents results for high foreign sales firms. We see that euro firms in both groups significantly increase their external financing relative to comparable non-euro firms. However, euro firms with low foreign sales increase their external financing comparatively more than euro firms with high foreign sales. This difference is mainly due to weak euro firms with low foreign sales increasing their debt financing with a magnitude that is twice as high as that of weak euro firms with high foreign sales. Interestingly, we see that when it comes to equity financing, euro firms with high foreign sales increase their equity financing marginally more than euro firms with low foreign sales.

⁵ Foreign sales is calculated as the sum of exports (Worldscope item#07161) and international sales, i.e. sales generated by foreign operations (Worldscope item #07101).

To the extent that the fraction foreign sales is a proxy for exchange rate exposure, our results are consistent with the view that devaluation risk lead to international financial constraints, since the euro firms increasing their external financing the most are domestically oriented firms in weak euro countries (where the devaluation risk is the highest). Thus this result is consistent with our results on external finance dependence. Because firms in the low foreign sales group still can have a fairly substantial amount of sales abroad, we test the robustness of this result by comparing firms with zero foreign sales to all other firms. Appendix C presents the results from this split. As we can see, the result becomes even stronger although the number of observations in the zero foreign sales groups is significantly lower. Both weak and strong euro firms with zero foreign sales significantly increase debt financing relative to comparable non-euro firms, but weak euro firms increase debt financing more than strong euro firms in this group. More importantly, the euro firms with no foreign sales increase debt at a magnitude that is around twice as large as that for corresponding weak and strong euro firms with a least some foreign sales.

To shed light on whether the above results really reflect a capital supply effect rather than a firm demand effect, we further split both the low foreign sales group and the high foreign sales into two based on firm size, similar to what we did when analyzing the impact of external finance dependence. Table X presents the results from the baseline regressions separately for each of the four sub-groups. Panels A and B present results for large and small firms with low foreign sales, respectively. Panels C and D present results for large and small firms with high foreign sales, respectively. We see that large euro firms with low foreign sales increase external financing the most, whereas small euro firms with high foreign sales increase external financing the least. The increase in external financing among large euro firms with low foreign sales is

driven by an increase in debt financing by weak euro firms. Large euro firms with high foreign sales do increase their financing significantly (see Panel C), but the increase is smaller in magnitude than that of small euro firms with low foreign sales (see Panel B). For both of these two sub-groups, equity financing contributes relatively more to the overall increase in external financing among euro firms compared to the group of large firms with low foreign sales. Because we argue large firms benefit relatively more from an increased supply of arms-length debt capital, we view the results in Table X as further evidence on the importance of the supply of capital for firms' external financing activities.

8. The Effect of the Euro on Asset Growth and Dividends

So far we have documented a significant increase in external financing among euro firms following the introduction of the euro, in particular among firms from countries that suffered devaluations during the ERM crisis (i.e. the weak euro countries). In this section we analyze what these new funds have been used for. In principal, new external funds would have to be used for asset growth or to increase the payout to shareholders. Given the magnitude of the increase in financing, it is reasonable to expect that most of the funds have been used for asset growth. However, the type of asset growth should be able to tell us more about why the euro has facilitated an increase in external financing. If the euro has permanently increased the supply of capital and lowered the cost of capital we would expect firms to mainly use any new funds raised to invest in productive assets. However, to the extent that firms believe the "euro effect" is temporary, we would expect firms to take the opportunity to increase their cash holdings to save for the future when financing conditions are expected to return to normal.

In Table XI we analyze to what extent the documented increase in external financing due to the euro is connected to asset growth versus an increase in dividends, and also whether we see a growth in non-cash assets versus cash holdings. To capture asset growth we use the variable Change in Assets, defined as the change in the total book value of assets during the year divided by the beginning-of-year book value of assets. This variable is thus the regular growth rate in total assets. Growth in non-cash assets is captured by the variable Change in Non-Cash Assets, defined as the change in non-cash assets (=total assets minus cash and short-term investments) over the year divided by the beginning-of-year book value of assets. The growth rate in non-cash assets is thus expressed as a fraction of all assets. Similarly the growth in cash holdings is measured by Change in Cash Holdings, defined as the change in cash and short-term investments over the year divided by the beginning-of-year book value of assets. Finally we measure dividends as dividends paid over the year divided by the beginning-of-year book value of assets. All four of these dependent variables are winsorized at their 1st and 99th percentile values. In each regression of Table XI we included the same set of independent variables used in the external financing regressions (see Table II) .

Panel A of Table XI presents the regression results for the full sample of firms. Not surprisingly, we see that the increase in external financing is mirrored by a similar significant increase in total assets. The euro does not seem to have any effect on dividends paid by firms. Moreover, we see that the whole increase in total assets is due to a significant increase in non-cash assets; there is no significant effect on cash holdings. This result suggests that firms expect the positive effects of the euro to be permanent. The results in Panel A are consistent an increase in the supply of capital, but also with firms reacting to an increase in investment opportunities (demand effect). We know from Table VI that euro firms in more external finance dependent

industries increased their external financing comparatively more, which support that an increase in the supply of capital is an important driver of the overall results. In Panels B and C of Table XI we similarly split the firms depending on external finance dependence to check that the external financing results also carry over to asset growth. Panel B presents the results for more external finance dependent industries, and Panel C presents results for less external finance dependent industries. Not surprisingly, we do get similar results. It is euro firms, in particular weak euro firms that have increased non-cash assets the most following the introduction of the euro. In Panel D we split the post-euro time to early (1999-2002) and late (2003-2006) time periods. Consistent with the financing results, firms have increased their non-cash assets more during the latter period.

9. Conclusions

We provide evidence that the introduction of the euro has led to an increase in external financing, especially an increase in debt financing, among euro-countries. Results are stronger for firms from countries that previously had weak currencies and for firms that have the lowest foreign sales. Although these results are consistent with an increased demand for financing among euro firms, it can also be argued that history of devaluations or low foreign sales are also proxies for international financial constraints. Eliminating currency risks thus could lead to increased availability of financing.

We also find more direct evidence that increased supply has been a major contributing factor in explaining increased use of external financing. Firms that were likely to be financially constrained prior to the introduction of the euro should experience the largest increases in external financing. Supporting this hypothesis, we find that firms in euro countries that had less

developed bond markets before the euro have increased their external financing more; and that firms in industries that are more dependent on external financing have increased their debt financing more. Further supporting the hypothesis that increased supply has been a major factor in increasing the use of external financing, we find that large firms, who supposedly have better access to syndicated loans and bond markets, have increased their debt financing more. In particular, the effects are the strongest for large firms in industries that are more external finance dependent.

To the extent that increased availability of external financing leads to more investments, firms in the euro-area should grow faster than firms in other European countries. Our paper provides an explanation why the euro was deemed to be a disappointment at first: it took several years after the introduction of the euro to build infrastructure that could support increased financing and investment. After 2002 the euro finally started to produce tangible benefits. It remains to be seen if firms are better able to weather the current crisis inside the euro area or if it would have been better to stay with an independent currency. This task is left for further research.

References

- Altunbas, Yener, Kara Alper, and David Marques-Ibanez (2009), "Large Debt Financing: Syndicated Loans versus Corporate Bonds", European Central Bank Working Paper No. 1028.
- Baele, Lieven, Annalisa Ferrando, Peter Hördahl, Elizaveta Krylova, and Cyril Monnet (2004), "Measuring European Financial Integration", *Oxford Review of Economic Policy* 20: 509-530.
- Beck, Thorsten, Asli Demirgüç-Kunt and Ross Levine (2000), "A New Database on Financial Development and Structure", *World Bank Economic Review* 14, 597-605.
- Beetsma, Roel, and Massimo Giuliodori (2010), "The Macroeconomic Costs and Benefits of the EMU and Other Monetary Unions: An Overview of Recent Research", *Journal of Economic Literature* 48, 603-641.
- Bekaert, Geert, Campbell R. Harvey, Christian T. Lundblad, and Stephan Siegel (2010), "The European Union, the Euro, and Equity Market Integration", working paper.
- Bris, Arturo, Yrjo Koskinen, and Mattias Nilsson (2006), "The Real Effects of the Euro: Evidence from Corporate Investments", *Review of Finance* 10 (1), 1-37.
- Bris, Arturo, Yrjo Koskinen, and Mattias Nilsson (2009), "The Euro and Corporate Valuations", *Review of Financial Studies* 22:8, 3171-3209.
- Caballero, Ricardo J. and Arvind Krishnamurthy (2001), "International and Domestic Collateral Constraints in a Model of Emerging Market Crisis", *Journal of Monetary Economics* 48, 513-548.
- Cappiello, Lorenzo, Arjan Kadareja, and Simone Manganelli (2008), "The Impact of the Euro on Equity Markets: A Country and Sector Decomposition", *Journal of Financial and Quantitative Analysis*, forthcoming.
- Coeurdacier, Nicolas and Philippe Martin (2008), "The Geography of Asset Trade and the Euro: Insiders and Outsiders", *Journal of the Japanese and International Economies*, forthcoming.
- De Santis, Roberto A. and Bruno Gerard (2006), "Financial Integration, International Portfolio Choice and the European Monetary Union", European Central Bank Working Paper No. 626.
- Faulkender, Michael and Mitchell Petersen, 2006, "Does the Source of Capital Affect Capital Structure?", *Review of Financial Studies* 19 (1), 45-79.
- Guiso, Luigi, Tullio Jappelli, Mario Padula, and Marco Pagano (2004), "Financial Market Integration and Economic Growth in the EU", *Economic Policy* 40.
- Hale, Galina and Mark M. Spiegel (2009), "Who Drove the Boom in Euro-Dominated Bond Issues?", Federal Reserve Bank of San Francisco Working Paper No. 2008-20.

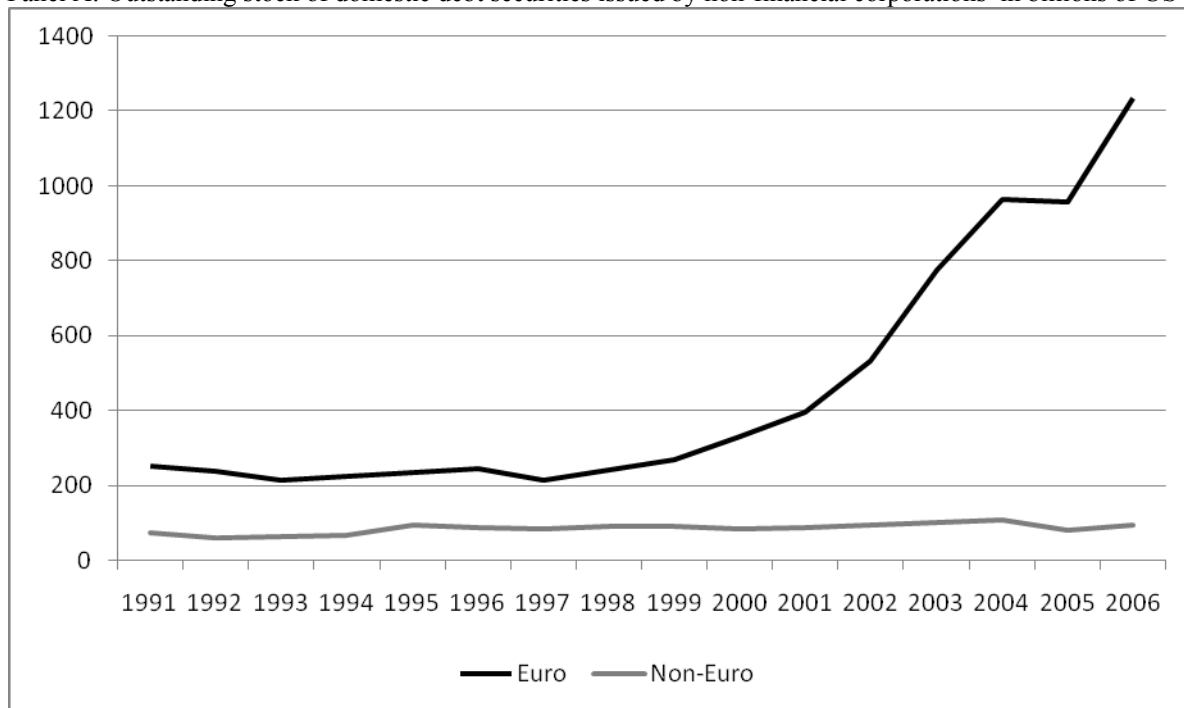
- Hardouvelis, Gikas A., Dimitrios Malliaropoulos, and Richard Priestley (2006), “EMU and European Stock Market Integration”, *Journal of Business* 79 (1), 365–392.
- Hardouvelis, Gikas A., Dimitrios Malliaropoulos, and Richard Priestley (2007), “The Impact of EMU on the Equity Cost of Capital”, *Journal of International Money and Finance* 26, 305-327.
- Hasan, Tarek A. (2010), “Country Size, Currency Unions, and International Asset Returns”, working paper.
- Japelli, Tullio and Marco Pagano (2008), “Financial Market Integration under EMU”, CEPR Discussion Paper No. 791.
- Kalemli-Ozcan, Sebnem, Elias Papaioannou, and Jose-Luis Peydro (2010), “What Lies Beneath the Euro’s Effect on Financial Integration? Currency Risk, Legal Harmonization, or Trade?”, working paper no. 1216, European Central Bank.
- Lane, Philip R. (2006), “Global Bond Portfolios and EMU”, *International Journal of Central Banking* 2, 1-23.
- Lane, Philip R. (2008), “EMU and Financial Integration”, IIS Discussion Paper No. 272.
- Lane, Philip R. and Gian Maria Milesi-Ferretti (2007), “The International Equity Holdings of Euro Area Investors”, in *The Importance of the External Dimension for the Euro Area: Trade, Capital Flows, and International Macroeconomic Linkages*, Robert Anderton and Filippo di Mauro, eds., Cambridge University Press.
- Leary, Mark T. (2009), “Bank Loan Supply, Lender Choice, and Corporate Capital Structure”, *Journal of Finance* 64 (3), 1143-1185.
- Lemmon, Michael and Michael Roberts (2010), “The Response of Corporate Financing and Investment to Changes in the Supply of Credit”, *Journal of Financial and Quantitative Analysis*, forthcoming.
- Pagano, Marco and Ernst-Ludwig von Thadden (2004), “The European Bond Markets under EMU,” *Oxford Review of Economic Policy* 20 (4), 531-554.
- Rajan, Raghuram G., and Luigi Zingales (1995), “What Do We Know About Capital Structure? Some Evidence from International Data,” *Journal of Finance* 50, 1421-1460.
- Rajan, Raghuram G. and Luigi Zingales (1998), “Financial Dependence and Growth,” *American Economic Review* 88 (3), 559-587.
- Rajan, Raghuram G. and Luigi Zingales (2003), “Banks and Markets: The Changing Character of European Finance,” European Central Bank 2nd Annual Conference.

Rajan, Raghuram G. and Luigi Zingales (2003), “Banks and Markets. The Changing Character of European Finance,” in *The Transformation of the European Financial System*, Vitor Gaspar, Philipp Hartmann and Olaf Sleijpen, eds., European Central Bank.

Stulz, René (1999), “Globalization of Equity Markets and the Cost of Capital,” *Journal of Applied Corporate Finance* 12 (3), Fall, 8-25.

Sufi, Amir (2009), “The Real Effects of Debt Certification: Evidence from the Introduction of Bank Loan Ratings”, *Review of Financial Studies* 22 (4), 1659-1691.

Panel A: Outstanding stock of domestic debt securities issued by non-financial corporations in billions of US dollar



Panel B: Indexed values of outstanding stock of domestic debt securities issued by non-financial corporations (1998=100)

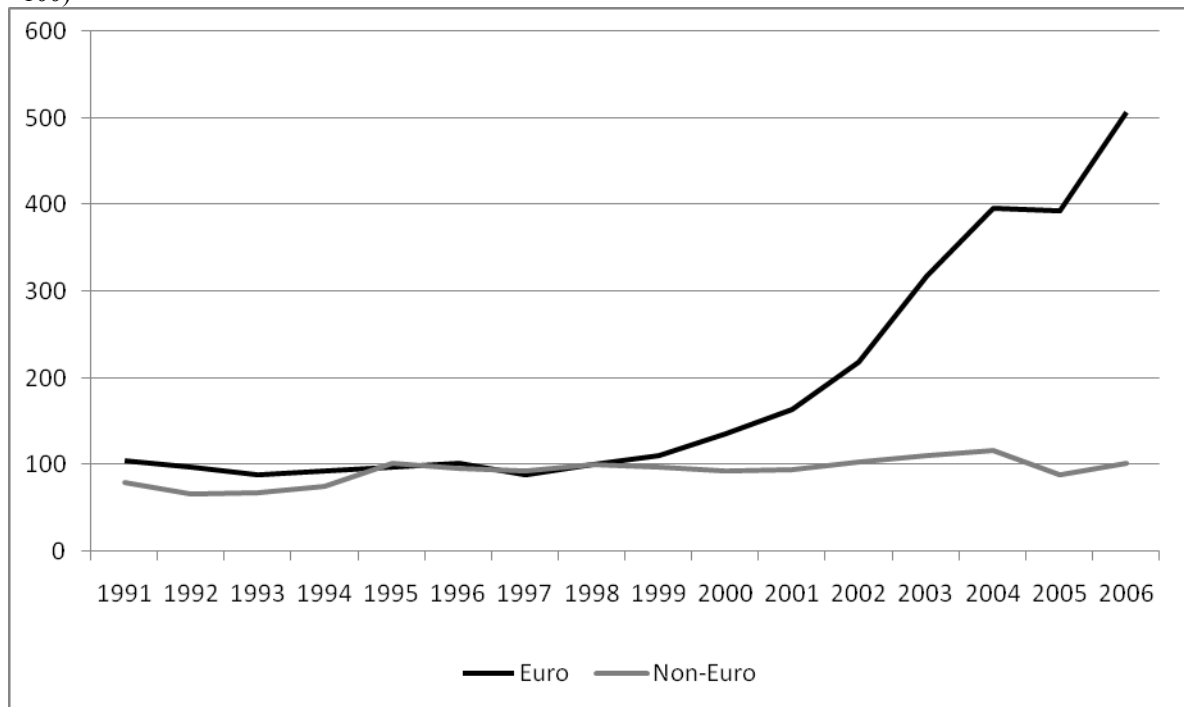
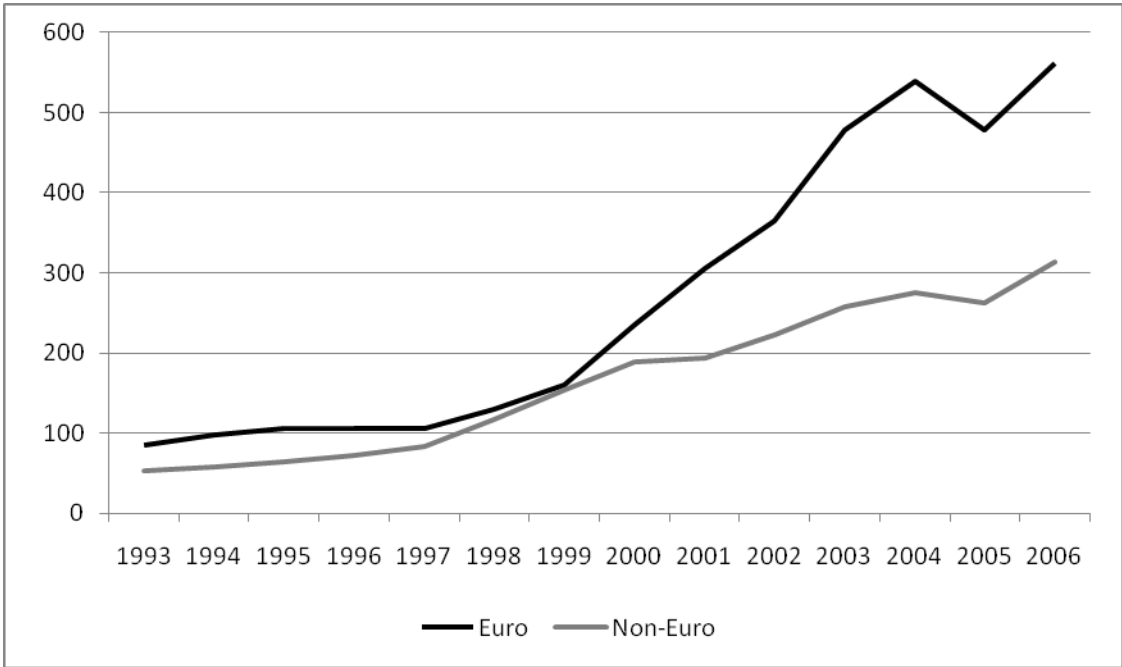


Figure 1. The figure shows the evolution of the outstanding stock (face value) of domestic debt securities issued by non-financial corporations over 1991-2006 for euro countries and non-euro countries, respectively. Panel A shows the amounts outstanding and Panel B show indexed values with 1998=100. The data is from Bank of International Settlements. The stocks of securities are measured in nominal USD.

Panel A: Outstanding stock of international debt securities issued by non-financial corporations in billions of US dollar



Panel B: Indexed values of outstanding stock of international debt securities issued by financial institutions (1998=100)

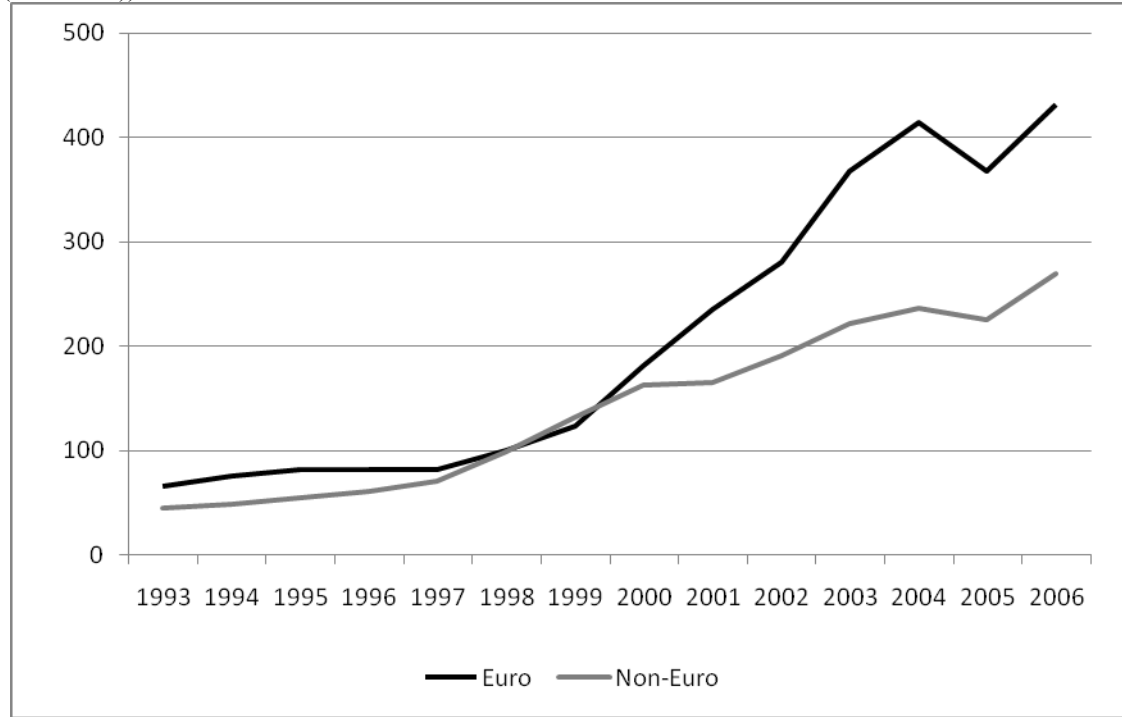
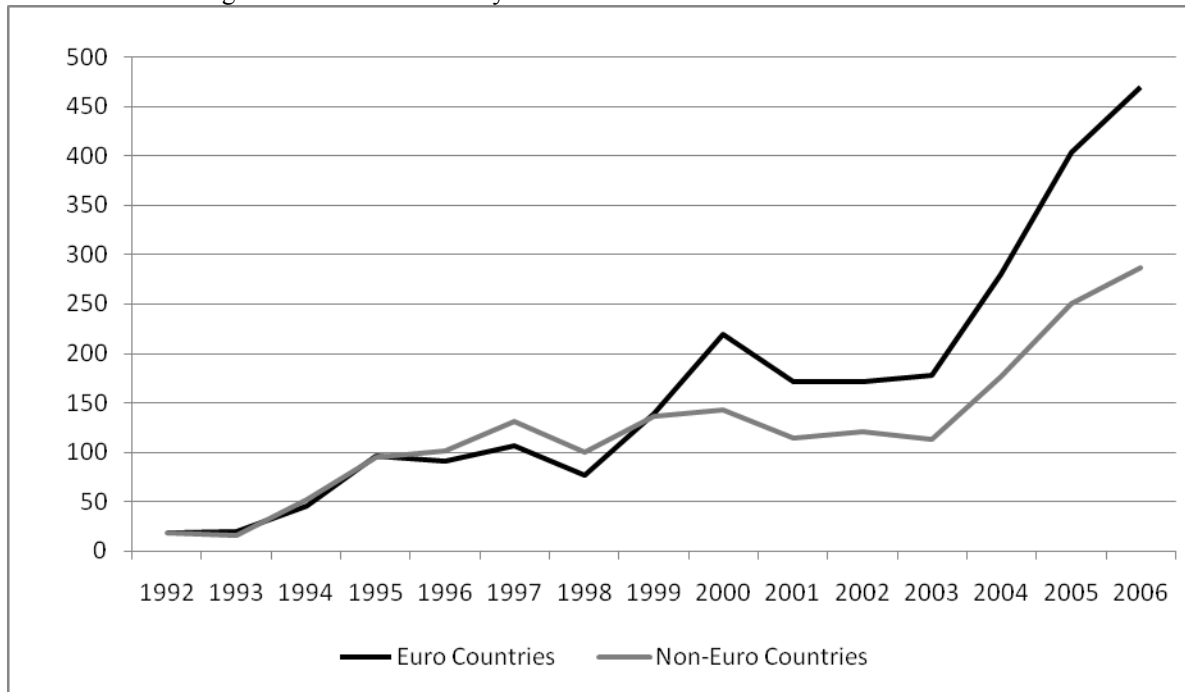


Figure 2. The figure shows the evolution of the outstanding stock (face value) of international debt securities issued by non-financial corporations over 1993-2006. Panel A shows the amounts outstanding and Panel B show indexed values with 1998=100. The data is from Bank of International Settlements. The stocks of securities are measured in nominal USD.

Panel A: Outstanding stock of international syndicated credit facilities in billions of US dollar



Panel B: Indexed values of outstanding stock of international syndicated credit facilities (1998=100)

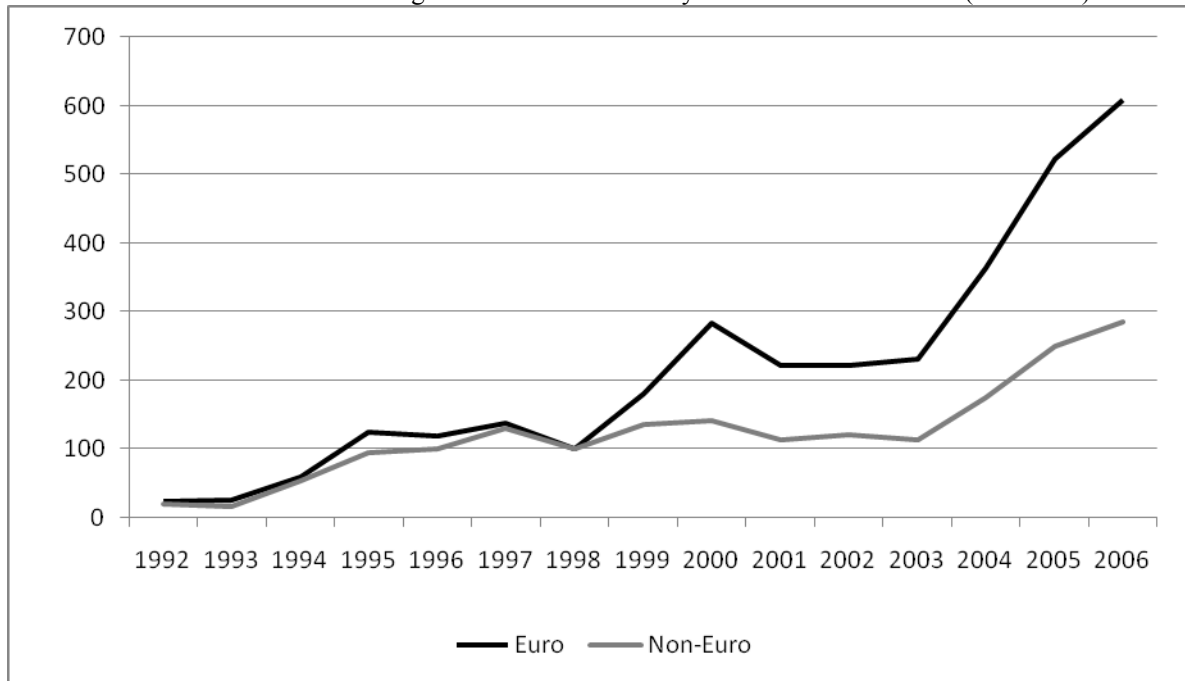


Figure 3. The figure shows the evolution of signed international syndicated credit facilities (both corporate and financial borrowers) over 1991-2006 for euro countries and non-euro countries, respectively. Panel A shows the amounts outstanding and Panel B show indexed values with 1998=100. The data is from Bank of International Settlements. The credit facilities are measured in nominal USD.

Table I. Financing activity before and after the introduction of the euro

The sample is an unbalanced panel of firms from eleven Euro-countries (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain) and five Non-euro countries (Denmark, Norway, Sweden, Switzerland, and UK) over the time period 1991-2006. The post-euro time period is defined as the years 1999-2006. See Appendix A for variable definitions.

Panel A: Net External Finance

	# of firms	Average Net External Finance			
		Pre-euro time period	Post-euro time period	Difference (Post-euro – Pre-euro)	T-test of difference
Euro countries	1,348	0.075	0.079	0.005	0.85
Strong euro countries	967	0.077	0.068	-0.009	1.53
Weak euro countries	381	0.067	0.108	0.041	3.37***
Non-euro countries	1,138	0.128	0.073	-0.055	8.17***
<i>T-test of difference:</i>					
Euro vs. non-euro countries		7.19***	0.91	6.83***	
Strong-euro vs. non-euro countries		6.53***	0.73	5.00***	
Weak euro vs. non-euro countries		5.74***	3.55***	6.91***	
Strong- vs. weak-euro countries		1.04	4.20***	3.70**	

Panel B: Net Debt Issues

	# of firms	Average Net Debt Issues			
		Pre-euro time period	Post-euro time period	Difference (Post-euro – Pre-euro)	T-test of difference
Euro countries	1,348	0.053	0.057	0.003	0.82
Strong euro countries	967	0.057	0.048	-0.008	1.72*
Weak euro countries	381	0.045	0.078	0.033	3.92***
Non-euro countries	1,138	0.080	0.051	-0.029	6.09***
<i>T-test of difference:</i>					
Euro vs. non-euro countries		5.31***	1.28	5.08***	
Strong-euro vs. non-euro countries		4.37***	0.77	3.03***	
Weak euro vs. non-euro countries		4.94***	3.95***	6.39***	
Strong- vs. weak-euro countries		1.73*	4.22***	4.26***	

Panel C: Net Equity Issues

	# of firms	Average Net Equity Issues			
		Pre-euro time period	Post-euro time period	Difference (Post-euro – Pre-euro)	T-test of difference
Euro countries	1,348	0.018	0.021	0.003	1.60
Strong euro countries	967	0.018	0.019	0.002	0.82
Weak euro countries	381	0.019	0.026	0.007	1.51
Non-euro countries	1,138	0.042	0.019	-0.023	8.46***
<i>T-test of difference:</i>					
Euro vs. non-euro countries		8.19***	0.73	7.87***	
Strong-euro vs. non-euro countries		8.24***	0.49	7.31***	
Weak euro vs. non-euro countries		5.28***	1.83*	5.78***	
Strong- vs. weak-euro countries		0.48	2.00**	1.03**	

Table II. The Effect of the Euro on Financing Activities

The sample is an unbalanced panel of firms from eleven Euro-countries (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain) and five Non-euro countries (Denmark, Norway, Sweden, Switzerland, and UK) over the time period 1991-2006. The post-euro time period is defined as the years 1999-2006. See Appendix A for other variable definitions. Standard errors clustered at the country level are reported within brackets. * and **, indicates significance at the 5%, and 1%-levels, respectively.

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>I</i> (Euro Country) x <i>I</i> (Post-Euro)	0.040** [0.015]		0.021* [0.012]		0.020*** [0.004]	
<i>I</i> (Strong Euro Country) x <i>I</i> (Post-Euro)		0.024* [0.013]		0.009 [0.010]		0.018*** [0.004]
<i>I</i> (Weak Euro Country) x <i>I</i> (Post-Euro)		0.077*** [0.019]		0.051*** [0.014]		0.026*** [0.006]
U.S. Industry Q	0.080*** [0.009]	0.080*** [0.009]	0.042*** [0.006]	0.042*** [0.006]	0.030*** [0.004]	0.030*** [0.004]
Log(Sales)	-0.111*** [0.009]	-0.112*** [0.009]	-0.074*** [0.004]	-0.075*** [0.004]	-0.029*** [0.006]	-0.030*** [0.006]
EBITDA/Assets	0.534*** [0.085]	0.533*** [0.084]	0.403*** [0.025]	0.402*** [0.025]	0.119 [0.076]	0.118 [0.076]
Collateral/Assets	0.001 [0.025]	-0.001 [0.026]	-0.009 [0.016]	-0.011 [0.016]	0.007 [0.011]	0.006 [0.011]
<i>I</i> (Leverage>90%)	-0.086*** [0.017]	-0.087*** [0.017]	-0.097*** [0.017]	-0.098*** [0.017]	0.020** [0.008]	0.020** [0.008]
GDP Growth	1.324*** [0.249]	1.248*** [0.226]	1.188*** [0.201]	1.128*** [0.185]	0.125* [0.071]	0.112 [0.072]
Term Spread	-0.008** [0.003]	-0.008** [0.003]	-0.006** [0.002]	-0.006** [0.002]	-0.002 [0.001]	-0.002 [0.001]
Change in USD Exchange Rate	-0.234*** [0.063]	-0.249*** [0.067]	-0.225*** [0.052]	-0.237*** [0.056]	-0.019 [0.022]	-0.022 [0.022]
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.27	0.27	0.24	0.24	0.22	0.22
Number of Firm-Year Observations	29,332	29,332	29,332	29,332	29,332	29,332
Number of Firms	2,486	2,486	2,486	2,486	2,486	2,486

Table III. The Effect of the Euro on Financing Activities: Early versus later time period effects

The sample is an unbalanced panel of firms from eleven Euro-countries (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain) and five Non-euro countries (Denmark, Norway, Sweden, Switzerland, and UK) over the time period 1991-2006. To gauge whether the impact of the euro on financing activities is transitory or more long-term, the post-euro time period is broken up in two time periods, 1999-2002, and 2003-2006, respectively. The same set of control variables as in Table II are included but not explicitly reported to conserve space. Full results are available from the authors upon request. See Appendix A for other variable definitions. Standard errors clustered at the country level are reported within brackets. * and ** indicates significance at the 5%, and 1%-levels, respectively.

Explanatory variable:	Dependent variable:					
	Net External Finance			Net Equity Issues		
	(1)	(2)	(3)	(4)	(5)	(6)
$I(\text{Euro Country}) \times I(\text{Post-Euro}, 1999-2002)$	0.012 [0.016]	-0.001 [0.015]	0.006 [0.012]	-0.006 [0.011]	0.008 [0.006]	0.006 [0.006]
$I(\text{Euro Country}) \times I(\text{Post-Euro}, 2003-2006)$	0.082*** [0.019]	0.064*** [0.015]	0.044*** [0.013]	0.031** [0.011]	0.039*** [0.006]	0.035*** [0.006]
$I(\text{Strong Euro Country}) \times I(\text{Post-Euro}, 1999-2002)$				0.035** [0.013]		0.010 [0.007]
$I(\text{Strong Euro Country}) \times I(\text{Post-Euro}, 2003-2006)$				0.073*** [0.018]		0.049*** [0.008]
$I(\text{Weak Euro Country}) \times I(\text{Post-Euro}, 1999-2002)$						
$I(\text{Weak Euro Country}) \times I(\text{Post-Euro}, 2003-2006)$						
Control Variables	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.27	0.27	0.24	0.24	0.22	0.22
Number of Firm-Year Observations	29,332	29,332	29,332	29,332	29,332	29,332
Number of Firms	2,486	2,486	2,486	2,486	2,486	2,486

Table IV. The Effect of the Euro on Financing Activities : Individual country results

The sample is an unbalanced panel of firms from eleven Euro-countries (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain) and five Non-euro countries (Denmark, Norway, Sweden, Switzerland, and UK) over the time period 1991-2006. The post-euro time period is defined as the years 1999-2006. Note that firms from United Kingdom constitute the benchmark sample in this table. The same set of control variables as in Table II are included but not explicitly reported to conserve space. Full results are available from the authors upon request. See Appendix A for other variable definitions. Standard errors clustered at the country level are reported within brackets. * and **, indicates significance at the 5%, and 1%-levels, respectively.

Explanatory variable:	Dependent variable:		
	Net External	Net Debt Issues	Net Equity Issues
	Finance	(3)	(5)
<i>I</i> (Austria) x <i>I</i> (Post-Euro)	0.012** [0.005]	-0.006* [0.003]	0.022*** [0.002]
<i>I</i> (Belgium) x <i>I</i> (Post-Euro)	0.018*** [0.004]	0.001 [0.003]	0.025*** [0.002]
<i>I</i> (Finland) x <i>I</i> (Post-Euro)	0.057*** [0.004]	0.036*** [0.002]	0.021*** [0.002]
<i>I</i> (France) x <i>I</i> (Post-Euro)	0.043*** [0.005]	0.025*** [0.004]	0.018*** [0.002]
<i>I</i> (Germany) x <i>I</i> (Post-Euro)	0.012* [0.005]	-0.000 [0.004]	0.015*** [0.003]
<i>I</i> (Ireland) x <i>I</i> (Post-Euro)	0.008 [0.008]	0.010** [0.004]	-0.002 [0.004]
<i>I</i> (Italy) x <i>I</i> (Post-Euro)	0.089*** [0.006]	0.058*** [0.004]	0.037*** [0.003]
<i>I</i> (Luxembourg) x <i>I</i> (Post-Euro)	0.110*** [0.004]	0.061*** [0.003]	0.035*** [0.002]
<i>I</i> (Netherlands) x <i>I</i> (Post-Euro)	0.063*** [0.004]	0.037*** [0.004]	0.028*** [0.003]
<i>I</i> (Portugal) x <i>I</i> (Post-Euro)	0.061*** [0.008]	0.038*** [0.007]	0.019*** [0.004]
<i>I</i> (Spain) x <i>I</i> (Post-Euro)	0.139*** [0.006]	0.097*** [0.004]	0.037*** [0.003]
<i>I</i> (Denmark) x <i>I</i> (Post-Euro)	0.066*** [0.006]	0.048*** [0.005]	0.015*** [0.003]
<i>I</i> (Norway) x <i>I</i> (Post-Euro)	0.006 [0.006]	-0.002 [0.005]	0.009** [0.003]
<i>I</i> (Sweden) x <i>I</i> (Post-Euro)	-0.017*** [0.006]	0.002 [0.003]	-0.018*** [0.003]
<i>I</i> (Switzerland) x <i>I</i> (Post-Euro)	-0.003 [0.006]	-0.006 [0.005]	0.003 [0.003]
Control Variables, Year Dummies and Fixed Firm Effects	YES	YES	YES
R ²	0.27	0.24	0.22
Number of Firm-Year Observations	29,332	29,332	29,332
Number of Firms	2,486	2,486	2,486

Table V. Pre-Euro Financial Development and the Effect of the Euro on Financing Activities

The sample is an unbalanced panel of firms from ten Euro-countries (Austria, Belgium, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, and Spain) and five Non-euro countries (Denmark, Norway, Sweden, Switzerland, and UK) over the time period 1991-2006. The post-euro time period is defined as the years 1999-2006. The same set of control variables as in Table II are included but not explicitly reported to conserve space. Full results are available from the authors upon request. See Appendix A for other variable definitions. Standard errors clustered at the country level are reported within brackets. * and **, indicates significance at the 5%, and 1%-levels, respectively.

Explanatory variable:	Dependent Variable:		
	Net External Finance	Net Debt Issues	Net Equity Issues
	(1)	(2)	(3)
$I(\text{Euro Country}) \times I(\text{Post-Euro})$	0.096* [0.050]	0.070** [0.032]	0.027 [0.022]
$I(\text{Euro Country}) \times \text{Pre-Euro Priv. Bond Market Size/GDP} \times I(\text{Post-Euro})$	-0.155** [0.070]	-0.118** [0.053]	-0.028 [0.019]
$\text{Pre-Euro Private Bond Market Size/GDP} \times I(\text{Post-Euro})$	0.046** [0.017]	0.037*** [0.007]	0.008 [0.012]
$I(\text{Euro Country}) \times \text{Pre-Euro Stock Market Cap/GDP} \times I(\text{Post-Euro})$	0.064 [0.084]	0.065 [0.060]	-0.004 [0.029]
$\text{Pre-Euro Stock Market Cap/GDP} \times I(\text{Post-Euro})$	0.027 [0.022]	0.016*** [0.005]	0.009 [0.018]
$I(\text{Euro Country}) \times \text{Pre-Euro Private Credit/GDP} \times I(\text{Post-Euro})$	-0.015 [0.057]	-0.026 [0.039]	0.009 [0.024]
$\text{Pre-Euro Private Credit/GDP} \times I(\text{Post-Euro})$	-0.062*** [0.019]	-0.042*** [0.005]	-0.016 [0.015]
Control Variables	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES
R ²	0.27	0.24	0.22
Number of Firm-Year Observations	29,858	29,858	29,858
Number of Firms	2,480	2,480	2,480

Table VI. External Finance Dependence and the Effect of the Euro on Financing Activities

The sample is an unbalanced panel of firms from eleven Euro-countries (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain) and five Non-euro countries (Denmark, Norway, Sweden, Switzerland, and UK) over the time period 1991-2006. The post-euro time period is defined as the years 1999-2006. Panel A presents results for firm in more external finance dependent industries, and Panel B presents results for firms in less external finance dependent industries. Following Rajan and Zingales (1998), external finance dependence is defined as the average fraction of capital expenditures not financed with internal funds for U.S. firms in the same industry during 1991-1997. An industry (and consequently any firm in this industry) is then classified as more external finance dependent if its industry has a higher external finance dependence than the median industry represented in the sample. The same set of control variables as in Table II are included but not explicitly reported to conserve space. Full results are available from the authors upon request. See Appendix A for other variable definitions. Standard errors clustered at the country level are reported within brackets. * and **, indicates significance at the 5%, and 1%-levels, respectively

Panel A: More External Finance Dependent Industries

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>I</i> (Euro Country) x <i>I</i> (Post-Euro)	0.054*** [0.018]		0.031* [0.015]		0.021*** [0.004]	
<i>I</i> (Strong Euro Country) x <i>I</i> (Post-Euro)		0.034** [0.015]		0.015 [0.012]		0.017*** [0.004]
<i>I</i> (Weak Euro Country) x <i>I</i> (Post-Euro)		0.107*** [0.027]		0.073*** [0.018]		0.032*** [0.008]
Control Variables,	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.28	0.28	0.24	0.24	0.22	0.23
Number of Firm-Year Observations	14,574	14,574	14,574	14,574	14,574	14,574
Number of Firms	1,254	1,254	1,254	1,254	1,254	1,254

Panel B: Less External Finance Dependent Industries

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>I</i> (Euro Country) x <i>I</i> (Post-Euro)	0.028* [0.015]		0.015 [0.010]		0.019*** [0.005]	
<i>I</i> (Strong Euro Country) x <i>I</i> (Post-Euro)		0.016 [0.013]		0.005 [0.009]		0.018*** [0.005]
<i>I</i> (Weak Euro Country) x <i>I</i> (Post-Euro)		0.056*** [0.016]		0.037*** [0.012]		0.021*** [0.006]
Control Variables,	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.26	0.26	0.23	0.23	0.21	0.21
Number of Firm-Year Observations	15,358	15,358	15,358	15,358	15,358	15,358
Number of Firms	1,254	1,254	1,254	1,254	1,254	1,254

Table VII. Firm Size and the Effect of the Euro on Financing Activities

The sample is an unbalanced panel of from eleven Euro-countries (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain) and five Non-euro countries (Denmark, Norway, Sweden, Switzerland, and UK) over the time period 1991-2006. The post-euro time period is defined as the years 1999-2006. Firms are classified into large and small firms based on the following: (i) First we calculate each individual firm's average sales in inflation-adjusted USD in the time period 1991-1997. (ii) Second, we classify a firm as large if this average is above the corresponding median for all sample firms; otherwise it is classified as small. Panel A presents results for large firms and Panel B present results for small firms. The same set of control variables as in Table II are included but not explicitly reported to conserve space. See Appendix A for variable definitions. Standard errors clustered at the country level are reported within brackets. * and **, indicates significance at the 5%, and 1%-levels, respectively.

Panel A: Large firms

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>I</i> (Euro Country) x <i>I</i> (Post-Euro)	0.052*** [0.015]		0.031** [0.012]		0.021*** [0.004]	
<i>I</i> (Strong Euro Country) x <i>I</i> (Post-Euro)		0.037*** [0.012]		0.017* [0.009]		0.021*** [0.004]
<i>I</i> (Weak Euro Country) x <i>I</i> (Post-Euro)		0.087*** [0.020]		0.064*** [0.015]		0.022*** [0.005]
Control Variables,	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.30	0.30	0.28	0.28	0.20	0.20
Number of Firm-Year Observations	15,782	15,782	15,782	15,782	15,782	15,782
Number of Firms	1,243	1,243	1,243	1,243	1,243	1,243

Panel B: Small firms

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>I</i> (Euro Country) x <i>I</i> (Post-Euro)	0.030 [0.018]		0.014 [0.013]		0.019*** [0.006]	
<i>I</i> (Strong Euro Country) x <i>I</i> (Post-Euro)		0.014 [0.016]		0.004 [0.013]		0.013*** [0.004]
<i>I</i> (Weak Euro Country) x <i>I</i> (Post-Euro)		0.071*** [0.024]		0.041** [0.015]		0.032*** [0.010]
Control Variables,	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.26	0.26	0.21	0.21	0.23	0.23
Number of Firm-Year Observations	14,150	14,150	14,150	14,150	14,150	14,150
Number of Firms	1,243	1,243	1,243	1,243	1,243	1,243

Table VIII. Firm Size, External Finance Dependence and the Effect of the Euro on Financing Activities

The sample is an unbalanced panel of firms from eleven Euro-countries (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain) and five Non-euro countries (Denmark, Norway, Sweden, Switzerland, and UK) over the time period 1991-2006. The post-euro time period is defined as the years 1999-2006. Firms are classified into large and small firms based on the following: (i) First we calculate each individual firm's average sales in inflation-adjusted USD in the time period 1991-1997. (ii) Second, we classify a firm as large if this average is above the corresponding median for all sample firms; otherwise it is classified as small. Following Rajan and Zingales (1998), external finance dependence is defined as the average fraction of capital expenditures not financed with internal funds for U.S. firms in the same industry during 1991-1997. An industry (and consequently any firm in this industry) is then classified as more external finance dependent if its industry has a higher external finance dependence than the median industry represented in the sample. The results for large firms conditional on their external finance dependence are presented in Panels A and C. The results for small firms conditional on their external finance dependence are presented in Panels B and D. The same set of control variables as in Table II are included but not explicitly reported to conserve space. Full results are available from the authors upon request. See Appendix A for other variable definitions. Standard errors clustered at the country level are reported within brackets. * and **, indicates significance at the 5%, and 1%-levels, respectively

Panel A: Large Firms in More External Finance Dependent Industries

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>I</i> (Euro Country) x <i>I</i> (Post-Euro)	0.074*** [0.019]		0.048*** [0.015]		0.022*** [0.004]	
<i>I</i> (Strong Euro Country) x <i>I</i> (Post-Euro)		0.056*** [0.015]		0.032** [0.011]		0.021*** [0.004]
<i>I</i> (Weak Euro Country) x <i>I</i> (Post-Euro)		0.124*** [0.028]		0.095*** [0.021]		0.026*** [0.007]
Control Variables,	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.32	0.32	0.29	0.30	0.22	0.22
Number of Firm-Year Observations	7,284	7,284	7,284	7,284	7,284	7,284
Number of Firms	573	573	573	573	573	573

Panel B: Small Firms in More External Finance Dependent Industries

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>I</i> (Euro Country) x <i>I</i> (Post-Euro)	0.037* [0.020]		0.017 [0.016]		0.019** [0.007]	
<i>I</i> (Strong Euro Country) x <i>I</i> (Post-Euro)		0.015 [0.019]		0.001 [0.016]		0.012* [0.006]
<i>I</i> (Weak Euro Country) x <i>I</i> (Post-Euro)		0.092** [0.037]		0.056** [0.022]		0.037** [0.015]
Control Variables,	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.26	0.26	0.22	0.22	0.23	0.23
Number of Firm-Year Observations	7,290	7,290	7,290	7,290	7,290	7,290
Number of Firms	659	659	659	659	659	659

Panel C: Large Firms in Less External Finance Dependent Industries

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>I</i> (Euro Country) x <i>I</i> (Post-Euro)	0.034** [0.015]		0.017 [0.012]		0.020*** [0.005]	
<i>I</i> (Strong Euro Country) x <i>I</i> (Post-Euro)		0.021 [0.013]		0.004 [0.010]		0.020*** [0.006]
<i>I</i> (Weak Euro Country) x <i>I</i> (Post-Euro)		0.062*** [0.019]		0.044** [0.016]		0.018*** [0.005]
Control Variables,	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.28	0.28	0.25	0.26	0.19	0.19
Number of Firm-Year Observations	8,498	8,498	8,498	8,498	8,498	8,498
Number of Firms	670	670	670	670	670	670

Panel D: Small Firms in Less External Finance Dependent Industries

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>I</i> (Euro Country) x <i>I</i> (Post-Euro)	0.027 [0.020]		0.014 [0.013]		0.018** [0.006]	
<i>I</i> (Strong Euro Country) x <i>I</i> (Post-Euro)		0.016 [0.019]		0.008 [0.013]		0.015** [0.006]
<i>I</i> (Weak Euro Country) x <i>I</i> (Post-Euro)		0.054** [0.021]		0.030** [0.013]		0.027*** [0.008]
Control Variables,	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.26	0.26	0.23	0.23	0.21	0.21
Number of Firm-Year Observations	6,599	6,599	6,599	6,599	6,599	6,599
Number of Firms	561	561	561	561	561	561

Table IX. Foreign Sales and the Effect of the Euro on Financing Activities

The sample is an unbalanced panel of firms from eleven Euro-countries (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain) and five Non-euro countries (Denmark, Norway, Sweden, Switzerland, and UK) over the time period 1991-2006. The post-euro time period is defined as the years 1999-2006. We split firms into two groups depending on their pre-euro level of foreign sales. Panel A reports results for firms with low pre-euro fraction foreign sales, defined as firms whose average fraction foreign sales over 1991-1997 is \leq the median for all sample firms. Panel B reports results for firms with low pre-euro fraction foreign sales, defined as firms whose average fraction foreign sales over 1991-1997 is $>$ the median for all sample firms. The same set of control variables as in Table II are included but not explicitly reported to conserve space. See Appendix A for variable definitions. Standard errors clustered at the country level are reported within brackets. * and **, indicates significance at the 5%, and 1%-levels, respectively.

Panel A: Firms with Low Pre-Euro Fraction Foreign Sales

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
$I(\text{Euro Country}) \times I(\text{Post-Euro})$	0.050** [0.017]		0.035** [0.014]		0.015*** [0.004]	
$I(\text{Strong Euro Country}) \times I(\text{Post-Euro})$		0.031* [0.016]		0.021 [0.012]		0.011** [0.005]
$I(\text{Weak Euro Country}) \times I(\text{Post-Euro})$		0.095*** [0.021]		0.069*** [0.017]		0.024*** [0.007]
Control Variables,	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.27	0.27	0.24	0.24	0.21	0.21
Number of Firm-Year Observations	12,786	12,786	12,786	12,786	12,786	12,786
Number of Firms	1,041	1,041	1,041	1,041	1,041	1,041

Panel B: Firms with High Pre-Euro Fraction Foreign Sales

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
$I(\text{Euro Country}) \times I(\text{Post-Euro})$	0.031* [0.015]		0.014 [0.011]		0.019*** [0.005]	
$I(\text{Strong Euro Country}) \times I(\text{Post-Euro})$		0.025 [0.015]		0.007 [0.011]		0.020*** [0.005]
$I(\text{Weak Euro Country}) \times I(\text{Post-Euro})$		0.047** [0.020]		0.033*** [0.011]		0.018* [0.008]
Control Variables,	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.28	0.28	0.25	0.25	0.20	0.20
Number of Firm-Year Observations	13,207	13,207	13,207	13,207	13,207	13,207
Number of Firms	1,041	1,041	1,041	1,041	1,041	1,041

Table X. Firm Size, Foreign Sales, and the Effect of the Euro on Financing Activities

The sample is an unbalanced panel of firms from eleven Euro-countries (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain) and five Non-euro countries (Denmark, Norway, Sweden, Switzerland, and UK) over the time period 1991-2006. The post-euro time period is defined as the years 1999-2006. Firms are classified into large and small firms based on the following: (i) First we calculate each individual firm's average sales in inflation-adjusted USD in the time period 1991-1997. (ii) Second, we classify a firm as large if this average is above the corresponding median for all sample firms; otherwise it is classified as small. We also split firms into two groups depending on their pre-euro level of foreign sales: Firms with low pre-euro fraction foreign sales are defined as firms whose average fraction foreign sales over 1991-1997 is \leq the median for all sample firms, otherwise it is classified as having high foreign sales. The results for large firms conditional on level of foreign sales are presented in Panels A and C, The results for small firms conditional on their level of foreign sales are presented in Panels B and D. The same set of control variables as in Table II are included but not explicitly reported to conserve space. Full results are available from the authors upon request. See Appendix A for other variable definitions. Standard errors clustered at the country level are reported within brackets. * and **, indicates significance at the 5%, and 1%-levels, respectively

Panel A: Large Firms with Low Pre-Euro Fraction Foreign Sales

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>I</i> (Euro Country) x <i>I</i> (Post-Euro)	0.057** [0.023]		0.040** [0.018]		0.016** [0.006]	
<i>I</i> (Strong Euro Country) x <i>I</i> (Post-Euro)		0.033 [0.019]		0.018 [0.012]		0.016* [0.008]
<i>I</i> (Weak Euro Country) x <i>I</i> (Post-Euro)		0.106*** [0.028]		0.086*** [0.021]		0.017*** [0.005]
Control Variables,	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.29	0.30	0.27	0.28	0.23	0.23
Number of Firm-Year Observations	5,560	5,560	5,560	5,560	5,560	5,560
Number of Firms	444	444	444	444	444	444

Panel B: Small Firms with Low Pre-Euro Fraction Foreign Sales

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>I</i> (Euro Country) x <i>I</i> (Post-Euro)	0.046** [0.018]		0.033* [0.017]		0.015*** [0.004]	
<i>I</i> (Strong Euro Country) x <i>I</i> (Post-Euro)		0.031 [0.020]		0.025 [0.019]		0.008 [0.005]
<i>I</i> (Weak Euro Country) x <i>I</i> (Post-Euro)		0.088*** [0.029]		0.054** [0.020]		0.036** [0.013]
Control Variables,	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.26	0.26	0.23	0.23	0.21	0.21
Number of Firm-Year Observations	7,226	7,226	7,226	7,226	7,226	7,226
Number of Firms	597	597	597	597	597	597

Panel C: Large Firms with High Pre-Euro Fraction Foreign Sales

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>I</i> (Euro Country) x <i>I</i> (Post-Euro)	0.044*** [0.011]		0.024** [0.010]		0.020*** [0.004]	
<i>I</i> (Strong Euro Country) x <i>I</i> (Post-Euro)		0.038*** [0.012]		0.018 [0.011]		0.019*** [0.004]
<i>I</i> (Weak Euro Country) x <i>I</i> (Post-Euro)		0.061*** [0.015]		0.041** [0.014]		0.022*** [0.005]
Control Variables,	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.30	0.30	0.28	0.28	0.18	0.18
Number of Firm-Year Observations	8,868	8,868	8,868	8,868	8,868	8,868
Number of Firms	678	678	678	678	678	678

Panel D: Small Firms with High Pre-Euro Fraction Foreign Sales

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>I</i> (Euro Country) x <i>I</i> (Post-Euro)	0.009 [0.023]		0.001 [0.013]		0.014 [0.009]	
<i>I</i> (Strong Euro Country) x <i>I</i> (Post-Euro)		0.003 [0.021]		-0.009 [0.013]		0.017** [0.007]
<i>I</i> (Weak Euro Country) x <i>I</i> (Post-Euro)		0.025 [0.045]		0.029 [0.020]		0.006 [0.021]
Control Variables,	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.25	0.25	0.21	0.21	0.22	0.22
Number of Firm-Year Observations	4,339	4,339	4,339	4,339	4,339	4,339
Number of Firms	363	363	363	363	363	363

Table XI: The Effect of the Euro on Change in Assets and Dividends

The sample is an unbalanced panel of firms from eleven Euro-countries (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain) and five Non-euro countries (Denmark, Norway, Sweden, Switzerland, and UK) over the time period 1991-2006. The post-euro time period is defined as the years 1999-2006. Panel A presents results for the full sample. Panel B presents results for firm in more external finance dependent industries, and Panel C presents results for firms in less external finance dependent industries. Following Rajan and Zingales (1998), external finance dependence is defined as the average fraction of capital expenditures not financed with internal funds for U.S. firms in the same industry during 1991-1997. An industry (and consequently any firm in this industry) is then classified as more external finance dependent if its industry has a higher external finance dependence than the median industry represented in the sample. For a Panels B and C the same set of control variables as in Panel A are included but not explicitly reported to conserve space. See Appendix A for variable definitions. Standard errors clustered at the country level are reported within brackets. * and **, indicates significance at the 5%, and 1%-levels, respectively.

Explanatory variable:	Dependent variable:							
	Change in Total Assets (1)	Change in Non-Cash Assets (2)	Change in Cash Assets (3)	Change in Cash Holdings (4)	Change in Cash Holdings (5)	Dividends/ (6)	Lagged Assets (7)	Lagged Assets (8)
$I(\text{Euro Country}) \times I(\text{Post-Euro})$	0.037* [0.018]	0.023 [0.016]	0.038** [0.017]	0.025 [0.016]	-0.000 [0.003]	-0.001 [0.002]	0.002 [0.003]	0.001 [0.002]
$I(\text{Strong Euro Country}) \times I(\text{Post-Euro})$		0.071*** [0.022]		0.070*** [0.019]		0.002 [0.004]		0.005 [0.004]
$I(\text{Weak Euro Country}) \times I(\text{Post-Euro})$		0.091*** [0.010]	0.068*** [0.007]	0.068*** [0.007]	0.015*** [0.002]	0.015*** [0.002]	0.001** [0.000]	0.001** [0.000]
U.S. Industry Q	-0.117*** [0.006]	-0.118*** [0.006]	-0.103*** [0.007]	-0.104*** [0.007]	-0.013*** [0.002]	-0.013*** [0.002]	-0.002*** [0.001]	-0.002*** [0.001]
Log(Sales)	0.650*** [0.035]	0.649*** [0.034]	0.634*** [0.036]	0.633*** [0.035]	0.021 [0.015]	0.021 [0.015]	0.077*** [0.005]	0.077*** [0.005]
EBITDA/Assets	0.019 [0.023]	0.017 [0.024]	-0.102*** [0.024]	-0.104*** [0.024]	0.103*** [0.017]	0.103*** [0.017]	-0.010*** [0.003]	-0.010*** [0.003]
Collateral/Assets	-0.038 [0.032]	-0.038 [0.032]	-0.032 [0.035]	-0.032 [0.035]	-0.003 [0.003]	-0.003 [0.003]	-0.001 [0.001]	-0.001 [0.001]
$I(\text{Leverage} > 90\%)$	1.631*** [0.295]	1.560*** [0.275]	1.661*** [0.279]	1.596*** [0.262]	-0.026 [0.044]	-0.030 [0.043]	0.071* [0.039]	0.066* [0.034]
Term Spread	-0.015*** [0.005]	-0.016*** [0.005]	-0.014*** [0.005]	-0.014*** [0.005]	-0.001 [0.001]	-0.001 [0.001]	-0.001 [0.000]	-0.001 [0.000]
Change in USD Exchange Rate	-0.293*** [0.068]	-0.307*** [0.071]	-0.303*** [0.058]	-0.316*** [0.060]	-0.004 [0.012]	-0.004 [0.013]	-0.002 [0.002]	-0.003 [0.002]
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES	YES	YES
R ²	0.30	0.30	0.30	0.30	0.10	0.10	0.66	0.66
Number of Firm-Year Observations	29,932	29,932	29,809	29,809	29,809	29,809	29,357	29,357

	2,486	2,486	2,477	2,477	2,477	2,477	2,472	2,472
Number of Firms								
Panel B: More External Finance Dependent Industries								

Explanatory variable:	Dependent variable:							
	Change in Total Assets (1)	Change in Total Assets (2)	Change in Non-Cash Assets (3)	Change in Non-Cash Assets (4)	Change in Cash Holdings (5)	Change in Cash Holdings (6)	Dividends/ Lagged Assets (7)	Dividends/ Lagged Assets (8)
$I(\text{Euro Country}) \times I(\text{Post-Euro})$	0.050** [0.019]		0.052*** [0.018]		-0.000 [0.004]		0.002 [0.003]	
$I(\text{Strong Euro Country}) \times I(\text{Post-Euro})$		0.031* [0.017]		0.035** [0.016]		-0.001 [0.004]		0.001 [0.003]
$I(\text{Weak Euro Country}) \times I(\text{Post-Euro})$		0.099*** [0.026]		0.099*** [0.021]		0.002 [0.006]		0.005 [0.004]
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES	YES	YES
R ²	0.29	0.29	0.30	0.30	0.10	0.10	0.67	0.67
Number of Firm-Year Observations	14,574	14,574	14,481	14,481	14,481	14,481	14,301	14,301
Number of Firms	1,232	1,232	1,232	1,225	1,225	1,225	1,224	1,224

Explanatory variable:	Dependent variable:							
	Change in Total Assets (1)	Change in Total Assets (2)	Change in Non-Cash Assets (3)	Change in Non-Cash Assets (4)	Change in Cash Holdings (5)	Change in Cash Holdings (6)	Dividends/ Lagged Assets (7)	Dividends/ Lagged Assets (8)
$I(\text{Euro Country}) \times I(\text{Post-Euro})$	0.029 [0.020]		0.027 [0.020]		0.001 [0.002]		0.003 [0.003]	
$I(\text{Strong Euro Country}) \times I(\text{Post-Euro})$		0.017 [0.019]		0.017 [0.019]		0.000 [0.002]		0.002 [0.003]
$I(\text{Weak Euro Country}) \times I(\text{Post-Euro})$		0.054** [0.023]		0.050** [0.021]		0.003 [0.004]		0.005 [0.004]
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES	YES	YES
R ²	0.30	0.30	0.30	0.30	0.10	0.10	0.64	0.64
Number of Firm-Year Observations	15,358	15,358	15,328	15,328	15,328	15,328	15,056	15,056
Number of Firms	1,254	1,254	1,252	1,252	1,252	1,252	1,248	1,248

Panel C: Early versus later time period effects

Explanatory variable:	Dependent variable:							
	Change in Total Assets		Change in Non-Cash Assets		Change in Cash Holdings		Dividends/ Lagged Assets	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>I</i> (Euro Country) x <i>I</i> (Post-Euro, 1999-2002)	0.011 [0.017]		0.011 [0.017]		0.000 [0.003]		0.002 [0.002]	
<i>I</i> (Euro Country) x <i>I</i> (Post-Euro, 2003-2006)	0.075** [0.026]		0.078*** [0.023]		-0.001 [0.003]		0.004 [0.004]	
<i>I</i> (Strong Euro Country) x <i>I</i> (Post-Euro, 1999-2002)		-0.002 [0.017]		-0.002 [0.017]		-0.001 [0.003]		0.001 [0.002]
<i>I</i> (Strong Euro Country) x <i>I</i> (Post-Euro, 2003-2006)		0.061** [0.024]		0.065*** [0.021]		-0.002 [0.004]		0.002 [0.003]
<i>I</i> (Weak Euro Country) x <i>I</i> (Post-Euro, 1999-2002)		0.045** [0.021]		0.043** [0.018]		0.002 [0.005]		0.003 [0.003]
<i>I</i> (Weak Euro Country) x <i>I</i> (Post-Euro, 2003-2006)		0.109*** [0.031]		0.108*** [0.027]		0.001 [0.004]		0.008 [0.006]
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES	YES	YES
R ²	0.30	0.30	0.30	0.30	0.10	0.10	0.66	0.66
Number of Firm-Year Observations	29,932	29,932	29,809	29,809	29,809	29,809	29,357	29,357
Number of Firms	2,486	2,486	2,477	2,477	2,477	2,477	2,472	2,472

Appendix A. Variable definitions

Variable	Definition (item # refers to Worldscope field)
Net Debt Issues	$[\text{Total liabilities}_t (\text{item \#03351}) - \text{total liabilities}_{t-1}] \div \text{total assets}_{t-1} (\text{item\# 02999})$.
Net Equity Issues	Depending on data availability this variable is calculated as either: (i) $[\text{proceeds from common and preferred stock issues (item \#04251)} - \text{purchases and retirements of common and preferred shares (item \#04751)}] \div \text{total assets}_{t-1} (\text{item\# 02999})$. or (ii) $[\text{book value of common equity}_t (\text{item \#03501}) + \text{preferred stock}_t (\text{item \#03451}) - \text{retained earnings}_t (\text{item \#03495}) - (\text{book value of common equity}_{t-1} + \text{preferred stock}_{t-1} - \text{retained earnings}_{t-1})] \div \text{total assets}_{t-1}$.
Net External Finance	The sum of net debt and equity issues as defined above.
$I(\text{Euro Country})_{it}$	Indicator variable =1 if the firm comes from Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, or Spain; zero otherwise
$I(\text{Strong Euro Country})$	Indicator variable =1 if the firm comes from Austria, Belgium, France, Germany, Luxembourg, or the Netherlands, Portugal; zero otherwise
$I(\text{Weak Euro Country})$	Indicator variable =1 if the firm comes from Finland, Ireland, Italy, , Portugal, or Spain; zero otherwise
$I(\text{Post Euro})$	Indicator variable =1 if the time period is 1999-2006; zero otherwise
US industry Q	The median US firm Q in each two-digit SIC code industry, calculated using all US firms with available data on Tobin's Q in Compustat. Tobin's Q is calculated as $[\text{the book value of assets} - \text{the book value of equity} + \text{market value of equity}] \div \text{book value of total assets}$. This variable is lagged one year.
Log (Sales)	The natural logarithm of net sales (item # 01001) expressed in real USD (baseline year = 2000). This variable is lagged one year and Winsorized at the 1 st and 99 th percentile.
EBITDA/assets	Earnings before interest, taxes, and depreciation and amortization (item #18198 or, alternatively, item #18191 + item #01151) \div total assets (item #02999). This variable is lagged one year and Winsorized at the 1 st and 99 th percentile.
Collateral/assets	$[\text{Net property, plant, and equipment (item \#02501)} + \text{inventories (item \#02101)}] \div \text{book value of total assets (item \#02999)}$. This variable is lagged one year and Winsorized at the 1 st and 99 th percentile..
Leverage	$\text{Total liabilities (item \#03351)} \div \text{Total assets (item \#02999)}$. This variable is lagged one year.
$I(\text{Leverage}>90\%)$	Indicator variable =1 if leverage >90%; zero otherwise. This variable is lagged one year.
GDP Growth	Individual country real GDP growth (in USD terms). This variable is lagged one year.
Term spread	Difference in yields between 10 year government bond and 6 month treasury bill for each individual sample country. This variable is lagged one year.
Change in USD Exchange Rate	$[\text{Domestic currency/USD end-of-year exchange rate in year } t - \text{domestic currency/USD end-of-year exchange rate in year } t-1] \div \text{domestic currency/USD end-of-year exchange rate in year } t-1$.
Pre-Euro Private Bond Market Cap/GDP	Outstanding value of domestic private debt securities \div GDP. The variable is the average value over 1991-1997 for each sample country. ^a
Pre-Euro Stock Market Cap/GDP	Stock market capitalization \div GDP. The variable is the average value over 1991-1997 for each sample country. ^a
Pre-Euro Private Credit/GDP	Private credit by deposit money banks and other financial institutions \div GDP. The variable is the average value over 1991-1997 for each sample country. ^a
Change in Total Assets	$[\text{Total assets}_t (\text{item \#02999}) - \text{total assets}_{t-1}] \div \text{total assets}_{t-1}$.
Change in Cash Holdings	$[\text{Cash and short term investments}_t (\text{item \#02001}) - \text{cash and short term investments}_{t-1}] \div \text{total assets}_{t-1} (\text{item\# 02999})$.
Change in Non-Cash Assets	Change in Total Assets - Change in Cash Holdings
Dividends/ Lagged Assets	$\text{Dividends paid}_t (\text{item \#04551}) \div \text{total assets}_{t-1} (\text{item\# 02999})$.

^a Source: Worldbank (see Thorsten Beck, Asli Demirgüç-Kunt and Ross Levine, (2000), "A New Database on Financial Development and Structure," World Bank Economic Review 14, 597-605.)

Appendix B. Summary statistics

This table presents average values for firm and country characteristics by country and EMU membership status (euro vs. non-euro countries). The sample is an unbalanced panel of 2,632 firms (31,527 firm-years) from eleven Euro-countries and five Non-euro countries with data available in Worldscope over the time period 1991-2006. See Appendix A for variable definitions.

Panel A: Firm characteristics

Country	# firms	# firm-year observations	Firm characteristic									
			Net External Finance	Net Debt Issues	Net Equity Issues	U.S. Industry Q	Log(Sales)	EBITDA/Assets	Collateral/Assets	Leverage	Leverage >90%	
Austria	59	662	0.058	0.049	0.006	1.33	19.3	0.112	0.532	0.601	0.024	
Belgium	37	418	0.070	0.052	0.017	1.45	20.3	0.132	0.494	0.642	0.041	
Finland	76	975	0.049	0.034	0.015	1.45	19.4	0.138	0.510	0.530	0.005	
France	366	4,257	0.082	0.052	0.029	1.51	19.7	0.124	0.390	0.600	0.020	
Germany	376	4,496	0.056	0.044	0.010	1.46	19.8	0.134	0.524	0.647	0.038	
Ireland	37	471	0.140	0.085	0.049	1.43	19.3	0.102	0.545	0.529	0.008	
Italy	114	1,438	0.072	0.053	0.016	1.42	20.0	0.112	0.435	0.590	0.019	
Luxembourg	6	74	0.101	0.058	0.044	1.41	20.4	0.148	0.524	0.453	0.000	
Netherlands	123	1,527	0.089	0.068	0.021	1.49	20.1	0.150	0.510	0.612	0.011	
Portugal	55	575	0.099	0.073	0.023	1.47	18.8	0.115	0.527	0.587	0.012	
Spain	99	1,205	0.103	0.075	0.024	1.43	19.8	0.117	0.527	0.553	0.016	
All euro countries	1,348	16,098	0.075	0.054	0.020	1.46	19.7	0.127	0.479	0.604	0.023	
Denmark	120	1,454	0.062	0.051	0.010	1.52	18.9	0.124	0.536	0.549	0.006	
Norway	76	830	0.103	0.074	0.027	1.47	19.0	0.116	0.501	0.571	0.016	
Sweden	116	1,360	0.083	0.051	0.028	1.53	19.7	0.119	0.485	0.560	0.003	
Switzerland	128	1,667	0.040	0.031	0.010	1.53	19.9	0.114	0.522	0.563	0.010	
United Kingdom	696	8,523	0.101	0.065	0.031	1.50	19.1	0.122	0.527	0.511	0.011	
All non-euro countries	1,138	13,834	0.088	0.059	0.026	1.51	19.2	0.121	0.522	0.530	0.010	
All countries	2,486	29,332	0.081	0.056	0.023	1.48	19.5	0.124	0.499	0.570	0.017	

^a For these variables the number of firms and/or firm-year observations are somewhat fewer in certain countries due to missing data

Panel B: Country characteristics

Country	# Country-year observations	Country characteristic						
		GDP Growth	Term Spread	Change in USD Exchange Rate	Pre-Euro Market Cap/ GDP	Private Bond Market Cap/ GDP	Pre-Euro Stock Market Cap/GDP	Pre-Euro Private Credit/GDP
Austria	16	0.023	1.21	0.007	0.280	0.121	0.912	
Belgium	16	0.020	1.31	0.007	0.525	0.363	0.666	
Finland	16	0.021	1.38	-0.004	0.352	0.296	0.742	
France	16	0.019	0.83	0.008	0.505	0.326	0.884	
Germany	16	0.018	1.05	0.007	0.475	0.232	0.978	
Ireland	16	0.067	0.52	0.003	0.037	0.464	0.672	
Italy	16	0.014	1.15	-0.008	0.304	0.163	0.562	
Luxembourg	16	0.047	0.60	0.007	N/A	1.241	0.982	
Netherlands	16	0.026	1.17	0.007	0.266	0.675	1.340	
Portugal	16	0.023	0.32	-0.001	0.103	0.156	0.637	
Spain	16	0.030	0.79	-0.009	0.151	0.291	0.747	
All euro countries	176	0.028	0.94	0.002	0.300	0.393	0.834	
Denmark	16	0.021	0.73	0.007	0.966	0.326	0.352	
Norway	16	0.031	0.31	0.002	0.207	0.256	0.881	
Sweden	16	0.021	0.81	-0.003	0.538	0.599	1.177	
Switzerland	16	0.013	0.76	0.008	0.521	1.120	1.600	
United Kingdom	16	0.023	0.07	0.005	0.135	1.128	1.101	
All non-euro countries	80	0.022	0.53	0.004	0.474	0.686	1.022	
All countries	256	0.026	0.81	0.003	0.358	0.485	0.893	

Appendix C. Foreign Sales and the Effect of the Euro on Financing Activities: Purely Domestic Firms vs. Others

The sample is an unbalanced panel of firms from eleven Euro-countries (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain) and five Non-euro countries (Denmark, Norway, Sweden, Switzerland, and UK) over the time period 1991-2006. The post-euro time period is defined as the years 1999-2006. We split firms into two groups depending on their pre-euro level of foreign sales. Panel A reports results for purely domestic firms, defined as firms whose average fraction foreign sales over 1991-1997 is zero. Panel B reports results for firms with at least some pre-euro foreign sales, defined as firms whose average fraction foreign sales over 1991-1997 is > zero.. The same set of control variables as in Table II are included but not explicitly reported to conserve space. See Appendix A for variable definitions. Standard errors clustered at the country level are reported within brackets. * and **, indicates significance at the 5%, and 1%-levels, respectively.

Panel A: Purely Domestic Firms

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
$I(\text{Euro Country}) \times I(\text{Post-Euro})$	0.072** [0.026]		0.060** [0.021]		0.010 [0.007]	
$I(\text{Strong Euro Country}) \times I(\text{Post-Euro})$		0.059** [0.026]		0.050** [0.021]		0.008 [0.006]
$I(\text{Weak Euro Country}) \times I(\text{Post-Euro})$		0.098*** [0.029]		0.082*** [0.024]		0.015 [0.017]
Control Variables,	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.27	0.27	0.24	0.24	0.22	0.22
Number of Firm-Year Observations	3,658	3,658	3,658	3,658	3,658	3,658
Number of Firms	305	305	305	305	305	305

Panel B: Firms with at least Some Foreign Sales

Explanatory variable:	Dependent variable:					
	Net External Finance		Net Debt Issues		Net Equity Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
$I(\text{Euro Country}) \times I(\text{Post-Euro})$	0.038** [0.016]		0.020 [0.012]		0.020*** [0.004]	
$I(\text{Strong Euro Country}) \times I(\text{Post-Euro})$		0.026 [0.015]		0.009 [0.012]		0.019*** [0.004]
$I(\text{Weak Euro Country}) \times I(\text{Post-Euro})$		0.069*** [0.018]		0.048*** [0.012]		0.024*** [0.006]
Control Variables,	YES	YES	YES	YES	YES	YES
Year Dummies and Fixed Firm Effects	YES	YES	YES	YES	YES	YES
R ²	0.27	0.28	0.25	0.25	0.21	0.21
Number of Firm-Year Observations	22,235	22,235	22,235	22,235	22,235	22,235
Number of Firms	1,777	1,777	1,777	1,777	1,777	1,777

**BANK OF FINLAND RESEARCH
DISCUSSION PAPERS**

ISSN 0785-3572, print; ISSN 1456-6184, online

- 1/2011 Hanna Freystätter **Financial factors in the boom-bust episode in Finland in the late 1980s and early 1990s.** 2011. 39 p. ISBN 978-952-462-653-8, print; ISBN 978-952-462-654-5, online.
- 2/2011 Marko Melolinna **What explains risk premia in crude oil futures?** 2011. 37 p. ISBN 978-952-462-658-3, print; ISBN 978-952-462-659-0, online.
- 3/2011 Harry Leinonen **Debit card interchange fees generally lead to cash-promoting cross-subsidisation.** 2011. 37 p. ISBN 978-952-462-660-6, print; ISBN 978-952-462-661-3, online.
- 4/2011 Yiwei Fang – Bill Francis – Iftekhar Hasan – Haizhi Wang **Product market relationships and cost of bank loans: evidence from strategic alliances.** 2011. 39 p. ISBN 978-952-462-662-0, print; ISBN 978-952-462-663-7, online.
- 5/2011 Yiwei Fang – Iftekhar Hasan – Katherin Marton **Bank efficiency in transition economies: recent evidence from South-Eastern Europe.** 2011. 40 p. ISBN 978-952-462-664-4, print; ISBN 978-952-462-665-1, online.
- 6/2011 Arturo Bris – Yrjö Koskinen – Mattias Nilsson **The euro and corporate financing.** 2011. 63 p. ISBN 978-952-462-666-8, print; ISBN 978-952-462-667-5, online.

Suomen Pankki
Bank of Finland
P.O.Box 160
FI-00101 HELSINKI
Finland



.2343