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Predictability Properties of the Goliath versus David Variable for European Asset Returns

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1. Introduction

One of the most treated and traditional subject in financial literature is stock return predictability. Many papers are written in which different variables are constructed and theories are made. Still, there is no clear agreement between researchers and financial experts about the ability of different models and variables to predict stock returns. Therefore, I want to make a contribution to the literature by researching a new variable that is recently constructed and examined in the United States.

My research will mainly be based on Jefferson Duarte and Nishad Kapadia's paper: 'Davids, Goliaths, and Business Cycles' (2014). In this paper the writers construct a simple variable that is called Goliath versus David (GVD). This variable reflects the annual change in weight of the stocks of the largest firms in the aggregate market portfolio. GVD seems able to predict market returns in the US and is apparently the best single predictor, even out of sample, in comparison to the traditional ones. Further, they found that GVD is the only single predictor that is also capable to predict some macro-economic variables. Later I will explain in more detail how this variable is constructed and what it will predict.

This theory that GVD predicts both market returns and macro-economic variables is based on the Financial Accelerator Hypothesis (FAH). This hypothesis describes the role of financial markets during macro-economic shocks. Bernanke and Gertler (1989) and also Kiyotaki and Moore (1997) modeled the FAH. They found that financial markets magnify aggregate economic shocks. This is based on the theory that it is harder for smaller, financially constrained, firms to access external finance during economic downturns and therefore their investments will be substantially lower. Size is used as a measure of financial constraints. This reduction in investments of these small, financial constrained firms will lead to lower aggregate investment and thereby amplifies the actual shock. Bernanke, Gertler and Gilchrist (1996) confirmed the FAH by researching differences of small and large firms during economic downturns. They found that smaller firms cut their investments more and also reduce their economic activity more than large firms. The reason why smaller firms have relatively harder times accessing external finance during recessions is, according to their paper, explained by the fact that agency costs of bankruptcy are higher for smaller firms in economic downturns when the probability of default is high. They found that, because of this agency costs, the effect is larger in recessions than it is during expansions.

In my research I want to examine if GVD is able to predict European market returns. The reason that I do this research in European countries is because Duarte and Kapadia did their research in the US and I think it is interesting to see how this constructed GVD performs in Europe. I want to know if the GVD forecasting ability is better than the traditional variables and the benchmarks chosen. Thus: Do European equity markets reflect the forecasting implications of the Financial Accelerator Hypothesis, using Duarte and Kapadia's Goliath versus David variable? This will be done in four Western European countries, namely: France, Germany, Italy and the United Kingdom. Those are all countries with different structured economies and differences with respect to large and small firms. Therefore it is interesting to find differences of the GVD variable in those countries.

In my research I want to focus on the predictability properties of the GVD variable on asset returns. Duarte and Kapadia did this for the US stock market and found that GVD is indeed able to predict market returns both in and out sample. Because this is a relative new variable in recent empirical research I think it is good to dig deeper in its properties. I want to start this by testing the variable in Europe, especially on European asset returns. Is its predictability as impressive as it seems to be in the United States? Does the FAH in Europe holds, and will thereby GVD act the same on European asset returns? Are there differences in several European countries? Are there differences between the United States and Europe with respect to GVD and how they act in different business cycles? These, and more, are all questions I will try to answer in my research.

The most important finding in this research is the fact that the constructed GVD variable is unable to forecast annual market returns, as a single predictor, in all four Western-European countries in my dataset. This holds in both cases when equally or value weighted annual market returns are used as dependent variable. It performs remarkably bad in-sample, in comparison to some of the benchmark predictors. Surprising is the negative beta that GVD has in most of the regression results, which implies a pro-cyclical equity risk premium. Further, I find that none of the components of GVD can forecast annual market returns, not even in combination with Fama and French' factor Small Minus Big (SMB). The out-of-sample (OOS) performance of GVD is not quite impressive. The calculated OOS R^2 of GVD is, in all four European countries, negative.

Some benchmark predictors perform well out-of-sample with sometimes extremely high OOS R^2. Yet I do find some predictability in the GVD variable, namely that GVD is able to forecast annual value weighted market returns of the middle and large companies in France with an positive beta, which implies a counter-cyclical relationship. Overall, the impressive forecasting ability of GVD that Duarte and Kapadia found in the United States, do not hold in the four Western-European countries in my dataset.

The contribution to the existing literature of this research is a broader and deeper view of this relatively new Goliath Versus David variable. This has been tested in the United States and therefore needed further attention, which I give by examining its properties in four Western-European countries.

The remainder of this paper is as follows: Chapter 2 describes the current state of the literature. Chapter 3 explains how the GVD is constructed. Chapter 4 describes the data used in this study and discusses the summary statistics. Chapter 5 illustrates the methodologies used in this study. Chapter 6 tests the forecasting ability of GVD in-sample. Chapter 7 tests the forecasting ability of GVD out-of-sample. Chapter 8 tests the GVD variable on different size based portfolios. Chapter 9 concludes.

2. Current state of literature

Perez-Quiros and Timermann (2000) examined the differences of small and large firms and they found that during macroeconomic downturns, both the risk and the expected return of small firms increases more than those of big firms. This is closely related to the Duarte and Kapadia paper. However, they extended the research and as a result they show that the difference in valuation between small and large firms, forecasts both aggregate market return and investment growth with the constructed GVD variable. Also, they show that the impact, as the FAH states, is stronger in economic downturns. But the most important thing that they examine are the forecasting implications of the FAH.

Duarte and Kapadia (2014) used all this material studied in de literature to construct a new variable based on the FAH. They tested if the constructed GVD variable is able to predict both market returns and macroeconomic variables with the knowledge of the FAH. So they linked financial markets with the real economy by this GVD variable. This is related to Cochrane (2005) who studied the relation between investment growth and market risk premium. Duarte and Kapadia (2014) also contributed to the famous Fama & French' risk factor SMB, since SMB is also a size related variable. The difference is that Fama & French focused only on returns of small and big firms. GVD is not only looking at returns but also at the change in market value of firms. They divide GVD into two parts, one for the price return and one for the equity issuance, which will be explained later in detail.

In earlier work Duarte and Kapadia (2013) used the GVD variable to predict both stock and bond returns. They claimed that "increases in the market value of large firms relative to small firms should signify a period of economic stress in which market discount rates are high". This is the main assumption in their paper that they use to construct a variable that is able to predict out of sample market returns. They also find that GVD has a rank correlation of -22% with GDP growth, which confirms the fact that GVD is able to predict both market returns and a macroeconomic variable. In this earlier work they focused more on the market returns of stocks and bonds and did not relate it to the FAH yet.

Duarte and Kapadia (2014) examined the GVD variable in the United States. They use the change in weight of the largest firms in the aggregate stock market in a 12 month period. They define "large firms" as the firms that have larger market value than the median market value in the dataset. The US has the largest stock market capitalization in the world, so the US is the most common market to examine the GVD. Given the properties of the GVD, it should go up in times of recession and down in times of economic wealth. According to Duarte and Kapadia, this goes through two channels. First the big, least financial constrained firms face a smaller decline in the market value of their capital when discount rates increase in recession. This leads to higher realized returns. Second, the big, least financial constrained firms face a smaller decline in the equity issuances during recessions. GVD reflects both of those effects. Later I will explain in more detail how this actually works.

In their paper they tested three forecasting implications of the Financial Accelerator Hypothesis with the own constructed GVD variable in the United States. First they found that GVD is the only single predictor of both aggregate market returns and aggregate investment growth. Also, the GVD seems to have an impressive forecasting performance. Second, they found that the economic effects are stronger during recessions than in good economic periods, which is in line with the FAH. And third, they found that the investments of smaller, more constrained firms are more sensitive to GVD than of large, less constrained firms. These findings are all in line with the Financial Accelerator Hypothesis.

The FAH states that there is a relationship between access to finance and investments. With this information, Kapadia and Duarte constructed their GVD variable which reflects this relationship, with the hypothesis that large firms have better access to external finance than small firms. Of course, there could be factors, other than size, that could explain the forecasting ability of GVD, even in the absence of financial constraints. Kapadia and Duarte tested two other hypotheses that could explain the forecasting ability of GVD, namely the cash flow hypothesis (CFH) and the growth options hypothesis (GOH).

The cash flow hypothesis reflects the relationship between size and cash flow of a firm. It states that smaller firms are more sensitive, in cash flow terms, than larger firms and therefore the GVD should go up in recessions and forecasts investment and countercyclical discount rates. Kapadia and Duarte tested if this CFH is true by examining whether the GVD forecasts differences in cash flows between small and large firms. Their results shows that GVD cannot significantly forecast ROA and therefore they reject the CFH.

The growth options hypothesis reflects the relationship between size and aggregate growth options. It states that smaller firms are more sensitive to changes in aggregate growth options. So, just as the CFH, GVD may, following this theory, forecast investment growth and countercyclical discount rates since investments leads to lower growth opportunities. Kapadia and Duarte cannot fully differentiate the GOH from the FAH but what they can prove is that the forecasting power of GVD is higher in economic downturns. This is due to the fact that during recessions, agency costs of bankruptcy are higher when probability of default is higher and therefore the absolute value of GVD is higher. It is not clear how the GOH would explain this phenomenon.

Since I use different Western European countries in my research, the current state of literature about those differences should be considered. Of course, there are studies regarding to differences in economic structure across countries in Europe. Despite of the European Union and the European Monetary Union, the countries that are part of it are still in some way independent economies with, often, their own currency and own national bank. There are a lot of properties of a country's economy that could have a possible effect on how GVD will behave. For example the distribution of firm capitalization in a country and the development of a country's financial market could have effect. But also the share that a government has in corporations and the influence of the banking sector, for access to external finance. For example, Faccio and Lang (2001) show that family controlled firms in Western Europe are associated with higher returns and higher valuation. Apparently, Italy has a lot of family owned firms. Therefore I expect that in Italy the GVD variable is less important because family owned firms are less dependent of aggregate market conditions and predict that the impact of the GVD is relatively small in Italy. The UK, in contrast, has much more widely hold firms. The UK looks like the United States in terms of financial market. Thus, I predict that the FAH holds in the UK and therefore that GVD is able to predict market returns, like it does in the United States. This makes sense since the UK has the most developed financial market in Europe. Desai, Gompers and Lerner (2003) found that political, legal and regulatory variables do not impact capital market development in the mature economies of Europe. So these factors should not influence GVD in terms of financial market development. A lot of very large companies are settled in Paris and also listed on Euronext Paris, which is the second largest stock market in Europe, after London. Therefore, I predict that the GVD variable in France shows lots of differences between small and big firms. Further, Germany has flexible regulations for small and median enterprises. Therefore, small companies could maybe have better access to external finance in Germany in comparison with the other countries in de dataset. This could lead to a smaller difference between large and small firms and therefore on the GVD variable. Also, it is known that Germany has an important and a big banking sector which could be a benefit for small companies and that is why the difference between large and small companies could be smaller in Germany.

3. GVD Variable

In this chapter the GVD variable will be explained.

Duarte and Kapadia's GVD is defined as follows:

$$GVD_t^{m_{t-\Delta t}} = \ ln\,(\frac{P_{m_{t-\Delta t},t}}{P_{M,t}}) - \ ln\,(\frac{P_{m_{t-\Delta t},t-\Delta t}}{P_{M,t-\Delta t}})$$

With:

$P_{m_{t-\Delta t},t}$ is the sum of the market capitalization at time *t* of the *m* biggest firms at time *t* - Δ*t*.

$P_{M,t}$ is the sum of the market capitalization at time *t* of the market portfolio.

$P_{m_{t-\Delta t},t-\Delta t}$ is the sum of the market capitalization at time *t* - Δ*t* of the *m* biggest firms at time *t* - Δ*t*.

$P_{M,t-\Delta t}$ is the sum of the market capitalization at time *t* - Δ*t* of the market portfolio.

Therefore, $GVD_t^{m_{t-\Delta t}}$ is the change in the log of the weight of the $m_{t-\Delta}$ biggest firms at time *t* - Δ*t* in the market portfolio.

This variable is not just the difference in return of the biggest firms and the market portfolio. It actually consists of two separate parts, namely a part that reflects the price return of the biggest firms relative to the market and a part for the net equity issuance of the biggest firms relative to the market. Kapadia and Duarte name this GVD_{OLD} and GVD_{NEW} respectively. $GVD_t^{m_{t-\Delta t}}$ can be rewritten in those parts as follows:

$$GVD_t^{m_{t-\Delta t}} = \left(ExR_t^{m_{t-\Delta t}} - \ ExR_t^M\right) + \left(G_t^{m_{t-\Delta t}} - \ G_t^M\right)$$

With:

$ExR_t^{m_{t-\Delta t}}$is the ex-dividend return between *t* and *t* - Δ*t* of the *m* biggest firms at time *t* - Δ*t*.

ExR_t^M is the ex-dividend return of the market portfolio at time *t*.

$G_t^{m_{t-\Delta t}}$ is the growth rate of the portfolio due to new stock issuances between *t* and *t* - Δ*t* of the *m* biggest firms at time *t* - Δ*t*.

G_t^M is the growth rate of the market portfolio due to new stock issuances at time *t*.

Therefore, $(ExR_t^{m_{t-\Delta t}} - ExR_t^M)$ is stated as GVD_{OLD} and $(G_t^{m_{t-\Delta t}} - G_t^M)$ as GVD_{NEW}.
So GVD_{NEW} is the capital-raising part and GVD_{OLD} is the price return part of GVD.

The period Δt is set to four quarters. So $GVD_t^{m_{t-\Delta t}}$ is equal to the one year change in the log of the weight of the m biggest firms in the market portfolio. $P_{m_{t-\Delta t},t}$ is equal to the firms at time t - Δt that have a market capitalization above the median at time t - Δt.

Since the focus is on market capitalization per firm, only the price return is considered. This does not mean that dividends do not play any role. Dividends can be seen as negative equity issuances and therefore they are more or less hidden in the growth part of GVD, namely GVD_{NEW}.

The Financial Accelerator Hypothesis is the theory behind this variable. It says that the small, financial constrained firms have a relatively harder time during economic downturns. This is due to the fact that those small firms have relatively limited access to external finance in comparison to the big firms and therefore have to cut their investments more. So following this theory GVD must go up in recessions because during that time, bigger firms "handle" recessions better that the small firms. So the weight of big firms increases during recessions and vice versa during expansions. The fact that during recessions bigger firms do better is implicitly explained by the "flight to quality" phenomenon, which states that investors invest in relatively safe assets during recessions and is reflected in the GVD variable. Financial markets are anticipating on a possible discount rate increase in periods of negative economic news. Therefore, as Kapadia and Duarte states, GVD may be better at predicting discount variation than macro-economic variables since GVD is a financial market variable that is available in real time.

4. Data and Summary Statistics

The data used to compute the GVD variable has been obtained from Thomson and Reuters Datastream. The market capitalization of each listed company in the selected country at the end of each quarter has been downloaded. The data reaches from the first quarter in 1973 until the second quarter of 2014. This is used to calculate all the elements needed for computing the GVD variable per quarter. Later, prices were downloaded at the end of the same quarters to calculate

GVD_{NEW} and GVD_{OLD} . Only ordinary stocks were picked. Both dead and alive companies have been used and therefore the number of shares in the dataset per country can vary. $m_{t-\Delta t}$ is equal to the number of firms that have market capitalization above the median at time t - Δt. So the firms with market capitalization above the median are considered as the big, least financial constrained firms and the firms with market capitalization below the median are considered as the small, financial constrained firms in the dataset. These are the same criteria that Fama and French use for their SMB variable and is extensively used in the literature.

Table 2 provides the summary statistics of the GVD variable per country. The mean of GVD is below zero in every country. This is due to the fact that smaller firms become more important in the equity market in the countries in the dataset. Another factor is that the absolute value of GVD variable is larger during expansions, which leads to negative means of GVD per country. Further, the table shows that the UK has the most constant GVD with the smallest standard deviation in comparison with the other countries. For example, UK's maximum is only 0,0052 while Italy's maximum is 0,0216.

Figure 1 shows the time series of the GVD variable per country. As shown, there are a lots of ups and downs in the GVD variable over time. A peak means that the large, less financial constrained firms, perform better than the market in terms of market value. During that time, the change in market value of the big firms rise more than the market. So, according to the FAH, a peak in GVD indicates a recession and vice versa. There are also other factors that could have an influence on GVD. For example if suddenly a lot of companies enter a market, the difference of market capitalization between the big firms and the total market between two points in time will be larger. This could lead to a very low GVD value. The number of firms per country are presented in figure 2. For example in France, before 1989, the stock market mainly used to work on auction and all the stock exchange transactions had to be made in the Palais. To catch up with other European stock markets, Paris decided to modernize the trading floor and opened the way for lots of new companies and investors. So in one quarter, the total number of firms in my dataset more than doubled. This is shown in figure 2. To avoid those extreme peaks in the GVD variable, which are not due to differences between small and large firms, I do not add those new companies to the total market capitalization until one year after their entry in my dataset. Since GVD is calculated as a one year difference, and is measured per quarter, I do not consider those new firms in these four quarters. After these four quarters, the new firms are included and therefore the extreme effects of the entry is avoided and GVD is clean from those new firms. This is also done in 1986 in Italy and in 1988 in Germany.

In Germany, the peak around 1975 is a good example of a high value of GVD that is due to a recession. The number of firms is constant in that period but GVD still reaches a high value. The oil crisis in 1975 is the explanation of this peak. Apparently, big firms did better during this recession and therefore the GVD reaches a positive value. The most recent financial crisis, started in 2008, is also shown by a peak in the GVD variable.

Further, the GVD in the UK is most constant and also the number of firms is most constant. Therefore, GVDUK is probably the most accurate predictor of market returns, which will be examined later. The figure of the GVD of the UK shows exactly the peaks that belong to recessions. Starting with the oil crisis around 1974, where GVD has the highest value in the time period. Next, the early 80's recession shows again a peak in GVD. This is also the case for the early 90's recession. And last but not least the financial crisis starting in 2008. Maybe the "Double Dip Recession" can be added to the list of recessions in the UK, also according to the GVD value around 2012. The lower values of GVD in the UK would signify good economic times. This is in line with the economic wealth in the middle and late 90's.

The Oil crisis in the 70's and the global financial crisis started in 2008 are in all four countries in the dataset clearly shown by a peak and a positive value of the GVD variable. Also often the early 90's crisis is highlighted in the GVD variable. The GVD value for each country is presented in one graph in figure 1. In that figure, it is clearly shown that the GVD variable in each country reflects the dot com bubble from the end of the 90's until 2000. During that period, financial markets did extremely well and especially, like the GVD reflects, the small companies. That is the reason why GVD presents very negative variables during that period. It is also clear that the negative values are much extremer than the positive values of the GVD.

In table 3, the summary statistics of GVD_{OLD} and GVD_{NEW} are presented. GVD_{OLD} is the part of GVD that stands for the difference of ex dividend return between the *m* biggest firms and the market. GVD_{NEW} is the part of GVD that stands for the difference of equity issuances between the *m* biggest firms and the market. The mean values of GVD_{OLD} for Italy, Germany and the UK are negative. Surprising is the positive mean value of GVD_{OLD} in France. This comes together with a very high standard deviation (0,30) that explains the variation in the GVD_{OLD} value in France. This big variation was also the case in the original GVD variable and therefore it is not totally surprising. GVD_{NEW} is the part of GVD that stands for the difference of equity issuances between the *m* biggest firms and the market. For GVD_{NEW}, the means are all negative and again France has very large peaks in the GVD_{NEW} variable. Also, again, the UK has the smallest variation in both GVD_{NEW} and GVD_{OLD} .

5. Methodology

GVD will be calculated per quarter from the first quarter of 1973 until the second quarter of 2014. This cross section calculated variable from market capitalizations in each quarter will be used to test on both equally weighted market equity returns and value weighted market equity returns. This will be done in all four Western European countries that are part of the dataset. The results will probably give enough reason to think about possible explanations why this variable give different results in the different Western European countries. First I will run an in sample forecast regressions for testing the single GVD variable in sample per country in the dataset. The following forecasting regression will be executed:

$$R_{t+\tau} = \alpha + \beta \, Predictor + \varepsilon_{t+\tau}$$

The dependent variable $R_{t+\tau}$ is the market equity return per country. This is calculated with data provided by Datastream. Datastream's Total Return Index (RI) assumes that dividends are reinvested to purchase additional units of an equity. So the RI of an equity shows a theoretical growth in value of that share. First, an equally weighted market return per country will be used as dependent variable, constructed by the average return of the market at each point in time. I will also test the GVD variable on value weighted market return per country, constructed by multiplying the relative market values with the returns of the firms, so I can examine if its forecasting ability is due to small or large firms. The regression will be a time series regression with Newey-West standard errors (with six lags). By using Newey-West standard errors, I follow

Ang and Bekeart (2007). They show that when using overlapping returns, what I do, the evidence of the forecasting ability depends on the type of standard error used. I will run this regression for yearly (τ = four quarters) forecasting periods with quarterly overlapping returns. I follow Kapadia and Duarte because as they also stated, a smaller period could introduce noise to GVD, which is unrelated to business cycle information. This regression will be executed with GVD but also with chosen benchmark predictors to compare its forecasting ability.

I will also test the components of GVD, namely GVD_{OLD} and GVD_{NEW}. These are the two parts of the GVD variable and I will run multiple multivariate regressions to check if the forecasting ability of GVD comes from one or both parts of the variable.

According to my theory, I predict that GVD will have a positive relation on next year's market return since I run a forecast regression, which according to the theory means that the expected next year's return will increase during a recession.

6. Forecasting ability of GVD in sample

In this chapter I will test if the constructed GVD variable is able to predict annual market returns in sample. This will be done in all four European countries in my dataset. The forecasting ability of GVD will also be compared with benchmark predictors, focusing on R^2**.** All the predictor variables are described in table 1. I will test the forecasting ability on both equally weighted returns per country as value weighted returns per country, to investigate where the possible forecasting ability of GVD comes from, small or large stocks. I will also run the regressions with the components of GVD and multivariate regressions with the benchmark predictors to examine if the information in GVD is already in the traditional benchmark predictors or not.

This forecast regression will be executed for annual forecasting periods, so τ will be equal to four quarters. I use Newey-West standard errors with six lags.

The results of the regression $R_{t+\tau} = \alpha + \beta\ Predictor + \varepsilon_{t+\tau}$ are shown in table 4.

Equally weighted market return

Table 4 shows the results of the forecasting regression. As this table shows, GVD is unable to significantly predict equally weighted annual market returns in any of the European countries in the dataset. Also, in all four countries, the beta of GVD is negative, which means that GVD has a negative effect on next period's aggregate returns. This is not in line with my prediction that positive aggregate market returns follow when large firms "outperformed" small firms in terms of market value. GVD behaves exactly the opposite. This negative beta means that there is a pro-cyclical relationship and I expected a intuitive counter-cyclical relationship. Further, The R^2 of the univariate regression of GVD on market returns is very low, which means that GVD describes a very small portion of the variance of annual equally weighted market returns. Only in Germany, the model with single predictor GVD reaches an in-sample R^2 of 3,55%, which is not bad but the GVD variable is statistically insignificant. The effect of GVD on next year's return is the smallest in Italy (Beta = -0.2958) and is the largest in the France (Beta = -1.1789).

When focusing on the benchmark variables, the conclusion can be made that there are some differences between the four Western-European countries. In comparison to GVD, the benchmark variables behave as they expect to do by the theory described in prior literature. For example in the UK, the Term-Spread has a statistical significant beta of 3.8541 on next year's equally weighted market return. This means that the expected return increases when the difference between the 3-month T-bill rate and the 10 year treasury rate increases. A way to measure the economic effect of a single predictor variable on annual equally weighted market returns is by multiplying its standard deviation with the coefficient of the regression. In case of the Term-Spread in the UK, the economic significance of 4.3766 (1.135578x3.854059) is impressive. The R^2 is 11.58% in the UK and this is the highest of the benchmark predictors. Again, all the benchmark predictors behave like the theory and are therefore less interesting for my research. I want to focus on the constructed GVD variable.

Value weighted market return

In this section, a regression with the constructed GVD variable on value weighted market returns will be executed to examine if the predictability changes if this value weighted market return is used. This could say something about the origin of the possible predictability of the GVD variable. Does it particularly predict the returns of large or small firms? The results are shown in table 5.

As table 5 presents, the predictive power of the GVD variable does not change if a value weighted portfolio is used instead of the equally weighted portfolio. The GVD is still unable to forecast annual market returns. This means that I do not find any differences between the small and large firms in this section. Later I will also construct different size based portfolios to get more insights in possible differences of the returns of small and large firms. The surprising negative relationship between expected return and GVD still holds when this portfolio is used except in the UK where GVD becomes positive. Although the R^2 of the single predictor model with GVD is only 0.74%.

No clear differences are noticed in the benchmark predictors when this value weighted market returns are used. The only difference is that most of the benchmark predictors become more statistically significant and therefore particularly forecast the returns of the large firms. Again the economic significance of the Term-Spread is impressive, for example in France one change in standard deviation of the Term-Spread will lead to a 14.4612 (1.910933x7.56761) change in the value weighted market return of France.

Components of GVD

In this section I want to examine if there is still some predictability hidden in the GVD variable. As stated earlier, GVD can be divided in two parts, namely GVD_{OLD} for the (ex-dividend) return part and GVD_{NEW} for the part of the growth in market capitalization due to new stock issuances. This growth part is implicitly calculated as the difference of GVD and GVD_{OLD}. Since there are some differences between the European countries in my dataset with respect to small and large firms and therefore to GVD, it is interesting to test from which part of GVD this comes from. It is also interesting to see how GVD_{OLD} and GVD_{NEW} will behave in all four countries, where GVD was not able to significantly forecast aggregate annual market returns. I expect that GVD_{OLD} and GVD_{NEW} are still not able to forecast market returns but maybe if I run multivariate regressions with both GVD_{NEW} and Fama & French' factor SMB, it will be able to forecast market returns. Further, I will test both GVD_{OLD} and GVD_{NEW} together and separate. SMB will also be tested as a single forecast variable of aggregate market returns. Kapadia and Duarte (2014) show that SMB is not able as a single predictor to significantly forecast aggregate market returns, but together with GVD_{NEW} it is. Further, in their paper they show that GVD_{NEW}, as a single predictor , does significantly forecast aggregate market returns in the US.

Table 6 shows the results of the regression with different components of GVD and Fama and French' factor SMB. Per country six regressions are executed with several combinations of variables and the annual value weighted market return as dependent variable. As expected, the components of GVD are unable to forecast market returns, since GVD is unable to forecast market returns, on its own, in any of the countries. Both GVD_{OLD} and GVD_{NEW} are unable to perform on their own and therefore the differences in the behavior between those components cannot be explained. There is one exception, namely in Germany. As regression 2 shows, GVD_{OLD} is statistically significant at the 5% level with a beta of -1.5713 when GVD_{OLD} and GVD_{NEW} are combined. The R^2 of 6.33% is also the highest of all those multivariate regressions. Again, they have negative betas and therefore the surprising pro-cyclical relation is confirmed.

SMB seems able to forecast value weighted market returns as a single predictor in the UK, France and Germany. This is not what I expected since prior research in the US showed that SMB does not forecast market returns in the US. Even in combination with GVD_{NEW}, SMB is able to forecast market returns. Yet, the economic and statistical significance decreases when this multivariate regression is executed. Another mark that has to be made is that the R^2 of the regressions with SMB in it are very low and therefore SMB does not seem a very powerful forecaster.

Multivariate forecasting

To examine if GVD contains information that is already in the traditional single predictors, I will run multivariate regressions to test how GVD will behave in the presence of other variables. The traditional single predictors that I use in this paper are the same as the benchmark predictors used earlier, namely the Term Spread, Dividend Yield, Book to Market ratio and the Price to Earnings ratio. The Term Spread is an interest rate variable and the other variables are valuation ratios. I will run those regressions in all four countries in my dataset. The results are shown in table 7.

Starting in the UK, GVD is unable to forecast value weighted annual market returns in any of the three multivariate regressions. The only significant variable is the Term-Spread, which is in both multivariate regressions able to statistical significantly forecast annual market returns. This is also the case in France. However, in Germany, GVD does not behave as expected. In the multivariate regression with both GVD and the valuation ratios (Dividend Yield, Book-to-Market ratio and Price to Earnings ratio), GVD seems able to statistical significantly forecast annual value weighted market returns in Germany , at the 1% level. Again, with a pro-cyclical Beta of -2.7202. The fact that it does forecast market returns in Germany is surprising since until this point, GVD was not able to do this.. An explanation of this can be that information of the GVD variable is hidden in some of the benchmark variables. In Italy, the variables that play a significant role in this multivariate forecast regression are the Term-Spread and the Book-to-Market ratio with both positive betas.

7. Forecasting ability of GVD out-of-sample

In this chapter the out-of-sample (OOS) forecasting ability of the GVD variable and the benchmark predictors will be tested. According to Goyal and Welch (2008), many market return predictors are not able to forecast market returns out-of-sample. They found that the forecasting ability of the "traditional" predictors are not stable over time. Their explanation for this is the oil crisis in the 1970s and therefore the predictive ability of those variables has diminished. They found that those traditional predictors are not able to predict market returns out-of-sample in the US. Therefore it is interesting for me to examine how GVD and the chosen benchmark variables perform in my time period and how they perform in my countries out-of-sample.

I follow Goyal and Welch (2008) to test the out-of-sample performance by expanding window estimation and report the OOS R^2. The evaluation period to estimate the parameters is the first quarter of 1973 until the last quarter of 1999. The remaining period, 2000 until the second quart of 2014, is used to measure the out-of-sample R^2, which is calculated as follows:

$$R^2_{OOS} = 1 - \frac{\sum_{t=1}^{T}(r_t - \hat{r}_t)^2}{\sum_{t=1}^{T}(r_t - \bar{r}_t)^2}$$

With:

r_t is the observed annual market return.

$\hat{r}_t$ is the estimated annual market return based on the predictor. This predictor parameter is calculated in the estimation window from 1973 until 1999.

$\bar{r}_t$ is the mean of the annual market return, calculated in the estimation window from 1973 until 1999.

T is the first quarter after the estimation window. In my case the first quarter of 2000.

Table 8 presents the results of the out-of-sample forecasting ability of GVD and the benchmark variables. This is done in the four European countries in my dataset. As the table presents, the OOS R^2 of GVD is negative in all the countries. This is not surprising since the R^2 of the single predictor model with GVD was very small in all four countries. In the UK, the BTM ratio and the P/E ratio perform both very well out-of-sample with an OOS R^2 of 13%. In France and Italy, the Dividend Yield reports the highest OOS R^2 of 9.43% and 9.51% respectively. The highest OOS R^2 measured in my sample is the 19.12% in Germany of the BTM ratio.

The results are quite surprising, because Goyal and Welch (2008) found in their sample and time period that none of the benchmark predictors is able to forecast market returns out of sample. In my dataset and time period, several single predictor variables have positive OOS R^2, but not the, in this paper examined, GVD variable.

8. Forecasting ability of GVD on size based portfolios

In chapter 5 I found that GVD is unable to significantly forecast annual market returns in the four European countries in my dataset. Further, I discovered that the forecasting ability of GVD does not change if a value weighted portfolio is used as dependent variable instead of an equally weighted portfolio.

To get even more insights in this relationship and differences I constructed four portfolios in each country sorted on size. This is done to get a more detailed picture of where its forecasting (in)ability comes from and to investigate if there are still differences between the countries with respect to the forecast (in)ability of GVD on different size based portfolios.

Table 9 presents the outcomes of forecasting regressions of GVD on size based market portfolios. As expected, in the UK, GVD is unable to significantly forecast returns of all size based portfolios. This is line with earlier results, when both the value and equally weighted portfolio as dependent variable were used. Focusing on France, the results are quite different. The R^2 for all the four regressions, are much higher than in the UK. Also, surprisingly, for portfolio 3, GVD seems able to forecast market returns at the 5% significance level with a beta of 1.2819. This means that there is a counter-cyclical relationship, in contrast to earlier results where pro-cyclical results are presented. Portfolio 3 includes the firms with middle to high market values. This means that, in France, the forecasting ability of GVD in particular arises from the middle and large firms. Although, portfolio 4, which includes the largest firms in France, does not forecast market returns. In Germany, the highest R^2 measured is 4,59%, which belongs to the portfolio with the largest firms in it. GVD in Italy, again, does not play a significant role in forecasting market returns even if the market is divided in four size based portfolios.

9. Conclusion

In this paper the predictability properties of a new variable, Goliath versus David (GVD), is tested on European asset returns . This new GVD variable is constructed by Duarte and Kapadia and represents the change in the log of the weight of the biggest firms in the market. In other words, it measures the relative valuation of big and small firms. This variable is based on the Financial Accelerator Hypothesis (FAH) which states that during recessions, it becomes harder for firms to access external finance and therefore they cut in their investments which will magnify the economic shock. The GVD variable is tested on four European countries, namely France, Germany, Italy and the UK. These four Western-European countries have all different properties and therefore it was interesting to see how GVD performs in those countries. GVD is compared with other single market predictors, like the Term Spread, Price-to-Earnings ratio, Book-to-Market Ratio and the Dividend Yield. Both in and out sample regressions are executed.

Several forecasting regressions are made with a forecasting period of one year. According to the results, GVD is unable to significantly forecast annual market returns, in sample, in all four European countries in the dataset. Surprising is the fact that GVD, in most of the regression results, has a negative beta. This implies a pro-cyclical equity risk premium, which is counter-intuitive and unexpected since Duarte and Kapadia found the exact opposite in the US. The forecast (in)ability of GVD does not change when an value weighted market returns are used as dependent variable. The traditional predictors perform better when value weighted market returns are used. This implies that their forecasting ability is in particular explained by the large firms. The constant impressive economic significance of the Term-Spread on market returns in all four countries is worth mentioning and it seems, overall, the most accurate and important forecast of market returns in this research.

The constructed GVD variable consists of two components, namely GVD_{OLD} and GVD_{NEW}, where GVD_{OLD} is the difference in price-return between big firms and the market. This part is related to Fama and French' factor SMB. GVD_{NEW} is the difference of equity issuances of big firms and the market. As prior research showed, SMB seems unable to significantly forecast market returns. My research shows contrary results. SMB, both as single predictor as in combination with GVD_{NEW} is able to significantly forecast annual market returns in the UK, France and Italy with the highest R^2 measured in France of 5.38%. Further, both GVD_{OLD} and GVD_{NEW} together and on their own unable to forecast annual market returns. The only exception is GVD_{OLD} in Germany that does forecast annual market returns at the 5% level in combination with GVD_{NEW}.

To examine if the forecasting (in)ability of GVD is due to other information that is already in the traditional single predictors, some multivariate regressions were executed. The outcome of these regressions showed some surprising results. First, the Term-Spread seems overall the most important forecaster in those multivariate regressions with often a very high beta. Second, the GVD variable is in the multivariate regression with both the interest and valuation variables the most accurate and statistically significant, at the 1% level, forecaster of annual market returns in Germany. An explanation of this can be the fact that GVD could include some information that is already in one or more of the traditional predictors.

An important aspect of the forecasting ability of a variable is the out-of-sample performance. This is tested by following Gaya and Welch, to report the out-of-sample R^2. This analysis shows that the out-of-sample forecasting ability of GVD is very bad. In all four European countries in the dataset, GVD reports negative OOS R^2. This was expected since the in sample R^2 of GVD was also low in all four European countries. The most impressive performance out-of-sample of the traditional predictors is the Book-to-Market ratio in Germany with an OOS R^2 of 19.12%. Further, the P/E ratio is quite impressive as well with an OOS R^2 of 13.36% in the UK. There are lots of differences in the out-of-sample performance between the four countries. Some of the traditional predictors perform well in some countries and at the same time perform poorly in other countries. There is no variable that has a stable out-of-sample performance in all four countries.

Another analysis done in this paper is creating four size based portfolios in each of the four European countries and test the GVD variable on these portfolios to examine if the forecast (in)ability arises more from small or big firms. The results show no clear trend in the performance of GVD in different size based portfolio. The only statistical significant result is that GVD forecast annual market returns of the middle/large firms at the 5% level in France.

Although, it is unable to forecast the returns of the biggest firms in France. I found here a positive beta of 1.2819, which implies an counter-cyclical relation which is more logical than pro-cyclical results founded earlier. Further GVD does not have a significant effect on any size based portfolio created in any of the other 3 countries

It is clear that, in this research, the forecasting ability of GVD is not so good. Since Duarte and Kapadia found the impressive forecasting ability of GVD in the US stock market, it will be interesting to examine how GVD behaves in other economic regions like Asia or in emergent markets. In my research I only focused on asset returns. Another interesting part is to dig deeper in the FAH in Europe and test if GVD is able to forecast some macro-economic variables like the investment growth per country.. Lots of research can be done with this GVD, since the variable is relatively new, and therefore I think it needs further attention in finance.

Table 1

List of variables used in this paper with the associated description of the abbreviation.

GVD	Goliath versus David, the change in the log of the weight of the $m_{t-\Delta}$ biggest firms at time t - Δt in the market portfolio. The definition of the biggest firms are the firms with market capitalization above the median at time t-12. The market portfolio is created by all ordinary shares listed in that specific country. GVD is calculated in each quarter from 1973 until the second quarter of 2014.
GVD_{OLD}	Part of GVD that is due to the difference in change in price returns of the past year of big firms and the market, calculated as the difference between the price return of the $m_{t-\Delta}$ biggest firms at time t - Δt and the market portfolio.
GVD_{NEW}	Part of GVD that is due to the difference in change in stock issuances of the past year of small and big firms calculated implicitly by the difference between GVD and GVD_{OLD}. Since the change in market value comes to two channels, namely the increase in price return or new stock issuances.
EQMKT	The equally weighted annual market equity return per country calculated by the average return of all firms at each point in time. The variable is calculated quarterly and therefore has overlap. Both the market values and the returns are obtained by Thomson and Reuters Datastream. Datastream's Total Return Index (RI) assumes that dividends are reinvested to purchase additional units of an equity. So the RI of an equity shows a theoretical growth in value of that share. This variable is calculated per country.
VALMKT	The value weighted annual market equity return per country, calculated by multiplying each company's relative market value with the return at each point in time. The variable is calculated quarterly and therefore has overlap. The company returns are obtained by Thomson and Reuters Datastream. Datastream's Total Return Index (RI) assumes that dividends are reinvested to purchase additional units of an equity. So the RI of an equity shows a theoretical growth in value of that share. This variable is calculated per country.

TS	Term Spread which is the annual difference between the 10year yield of a the country’s treasury note and the 3-month T-bill rate of that country. Both the 10 year treasury note and the 3-month T-bill rate information are obtained by Thomson and Reuters Datastream. This variable is calculated per country.
DY	Dividend Yield, which expresses the dividend per share as a percentage of the share price. Dividend yield information is obtained by Thomson and Reuters Datastream. This variable is calculated per country.
P/E	Price to Earnings ratio, which is the price of a company’s share divided by the earnings of that company. Price to Earnings information is obtained by Thomson and Reuters Datastream. This variable is calculated per country.
BTM	Book to Market ratio, which is the ratio of the book value of a company’s ordinary shares outstanding, divided by the market value of the common ordinary shares outstanding of that particular company. Book to Market information is obtained by Thomson and Reuters Datastream. This variable is calculated per country.
SMB	Fama & French factor Small minus Big, which is the return of the firms of a market value smaller than the median minus the return of the firms above the market value median. Returns are obtained by Thomson and Reuters Datastream. This variable is calculated per country.

Table 2

Summary Statistics GVD and benchmark variables

This table presents the summary statistics of the GVD variable and the other four benchmark predictors for each country in the dataset. The GVD is the 12 month change in the log weight of market capitalization of the *m* biggest firms in the market portfolio. The benchmark predictors are the Book-to-Market ratio (BTM), the Term Spread (TS), the Price-to-Earnings ratio (P/E) and the Dividend Yield (DY), which are described and explained in table 1. Per variable the number of observations, the mean, the standard deviation, the minimum and the maximum is reported. The results are discussed in the text.

	Observations	*Mean*	*Standard Deviation*	*Min*	*Max*
GVD UK	162	-0.02	0.03	-0.16	0.01
GVD GERMANY	162	-0.02	0.03	-0.15	0.02
GVD ITALY	162	-0.03	0.06	-0.38	0.02
GVD FRANCE	162	-0.03	0.04	-0.17	0.06
BTM UK	137	0.73	0.25	0.38	1.52
BTM GERMANY	137	0.61	0.18	0.34	1.25
BTM ITALY	137	0.79	0.24	0.39	1.47
BTM FRANCE	137	0.79	0.30	0.45	1.85
TS UK	138	0.01	0.02	-0.05	0.04
TS GERMANY	138	0.00	0.02	-0.07	0.03
TS ITALY	93	0.03	0.02	-0.01	0.07
TS FRANCE	117	0.01	0.01	-0.04	0.03
P/E UK	166	12.86	3.54	0.00	20.50
P/E GERMANY	166	18.88	5.15	0.00	31.55
P/E ITALY	166	36.67	37.83	0.00	165.20
P/E FRANCE	166	14.21	3.53	0.00	25.10
DY UK	166	4.41	1.79	2.09	13.22
DY GERMANY	166	2.75	0.66	1.62	5.50
DY ITALY	166	2.93	0.77	1.45	5.40
DY FRANCE	166	4.02	1.50	1.94	8.64

Table 3

Summary Statistics of GVD_{OLD} and GVD_{NEW}

This table presents the summary statistics of the 2 parts of the GVD variable, namely GVD_{OLD} and $GVD_{NEW.}$ GVD_{OLD} is the part of GVD that is due to the difference in change in returns of the past year of small and big firms, which is also called the "return part" of the GVD variable. GVD_{NEW} is the part of GVD that is due to the difference in change in equity issuances of the past year of small and big firms, which is also called the "capital raising part" of the GVD variable. Per variable the number of observations, the mean, the standard deviation, the minimum and the maximum is reported. The results are discussed in the text.

	Observations	***Mean***	***Standard Deviation***	***Min***	***Max***
GVDOLD UK	162	-0.004	0.07	-0.21	0.22
GVDOLD GERMANY	162	-0.003	0.14	-0.43	0.52
GVDOLD ITALY	162	-0.012	0.08	-0.24	0.20
GVDOLD FRANCE	162	0.008	0.30	-0.82	2.217
GVDNEW UK	162	-0.017	0.07	-2.24	0.75
GVDNEW GERMANY	162	-0.181	0.14	-0.54	0.42
GVDNEW ITALY	162	-0.020	0.10	-0.44	0.23
GVDNEW FRANCE	162	-0.039	0.31	-2.24	0.75

Table 4

Univariate prediction of annual equally weighted market returns per country with GVD and benchmark predictors

In this table the following forecasting regression is executed:

$$R_{t+\tau} = \alpha + \beta\, Predictor + \varepsilon_{t+\tau}$$

The dependent variable is the annual equally weighted market return per country. The independent variables are the GVD variable, the Term-Spread (TS), the Book-to-Market ratio (BTM), the Dividend Yield (DY) and the Price-to-Earnings ratio (P/E), which are described and explained in table 1. Reported are the Alpha of the forecasting regression, the Beta and the R-squared. The forecasting period is 4 quarters, so $\tau = 4$. The standard errors are Newey-West, with six lags. The *,** and *** represent the degree of statistical significance which * stands for the 10%, ** for the 5% and *** for the 1% significance level.

	UK			***ITALY***		
	α	***β***	***R²***	***α***	***β***	***R²***
GVD	0.1131***	-0.3745	0.0021	0.0688	-0.2958	0.0021
TS	0.0877***	3.8541***	0.1158	-0.0291	2.6545	0.0301
BTM	0.0625	0.0609	0.0062	-0.1697	0.3189	0.0461
DY	0.0415	0.0150	0.0136	-0.1617	0.0815*	0.0304
P/E	0.0327	0.0059	0.0084	0.1144*	-0.0010	0.0112

	FRANCE			***GERMANY***		
	α	***β***	***R²***	***α***	***β***	***R²***
GVD	0.1583***	-1.1789	0.0140	0.0421	-1.1626	0.0355
TS	0.1132*	3.7149	0.0172	0.0810	0.6483	0.0048
BTM	-0.0773	0.3183	0.0646	-0.0724	0.2494*	0.0413
DY	-0.1827	0.0908***	0.1246	-0.0140	0.0265	0.0066
P/E	0.6583***	-0.0338***	0.0943	0.0583	0.0001	0.0000

Table 5

Univariate prediction of annual value weighted market returns per country with GVD and benchmark predictors

In this table the following forecasting regression is executed:

$$R_{t+\tau} = \alpha + \beta\, Predictor + \varepsilon_{t+\tau}$$

The dependent variable is the annual value weighted market return per country. The independent variables are the GVD variable, the Term-Spread , the Book-to-Market ratio, the Dividend Yield and the Price-to-Earnings ratio which are described and explained in table 1. Reported are the Alpha of the forecasting regression, the Beta and the R-squared. The forecasting period is 4 quarters, so $\tau = 4$. The standard errors are Newey-West, with six lags. The *,** and *** represent the degree of statistical significance which * for the 10%, ** for the 5% and *** for the 1% significance level.

	UK			***ITALY***		
	α	***β***	***R²***	***α***	***β***	***R²***
GVD	1.7505***	0.7449	0.0074	0.1502**	-0.4927	0.0038
TS	0.1311***	2.0946**	0.0447	0.0015	4.3056	0.0613
BTM	-0.0340**	0.2378**	0.1233	-0.2269	0.5028**	0.0709
DY	0.1353*	0.0618***	0.2035	-0.1628	0.1103***	0.0367
P/E	0.3548***	-0.0168*	0.0596	0.1783**	-0.0005	0.0018
	FRANCE			***GERMANY***		
	α	***β***	***R²***	***α***	***β***	***R²***
GVD	0.1554	-0.3689	0.0026	0.1046***	-1.3333	0.0283
TS	0.0786	7.5676***	0.1238	0.1660***	2.3180*	0.0365
BTM	0.0396	0.1513	0.0285	-0.1461	0.4980***	0.0983
DY	-0.0594	0.0533**	0.0792	-0.0985	0.0809*	0.0375
P/E	0.4782***	-0.0227**	0.0802	0.2438*	-0.0063	0.0141

Table 6

Predicting annual value weighted market returns per country with components of GVD and SMB

This table represents the results of a regression that predicts the annual value weighted market return per country with the components of GVD and Fama and French' factor SMB. The dependent variable is the annual value weighted market return per country. The components GVD are GVD_{OLD} and GVD_{NEW}. SMB stands for Small minus Big and is the famous Fama and French factor. These variables are described and explained in table 1. Six regressions per country are executed with different variables and combinations of variables. The forecasting period is 4 quarters, so $\tau = 4$. The standard errors are Newey-West, with six lags. The *,** and *** represent the degree of statistical significance which * stands for the 10%, ** for the 5% and *** for the 1% significance level.

UK	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
α	0.1705***	0.1701***	0.1558***	0.1535***	0.1570***	0.1565***
GVD	0.7449					
GVD_{OLD}		0.8588	0.1917			
GVD_{NEW}		0.6993		-0.0670		-0.0304
SMB					0.0114***	0.0112**
R^2	0.0026	0.0094	0.0030	0.0004	0.0054	0.0059
FRANCE	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
α	0.1554	0.1551***	0.1668***	0.1641***	0.2155***	0.2140***
GVD	-0.3689					
GVD_{OLD}		-0.2860	0.0778			
GVD_{NEW}		-0.3634		-0.0821		-0.0256
SMB					0.4000**	0.3967**
R^2	0.0026	0.0100	0.0074	0.0084	0.0529	0.0538
ITALY	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
α	0.1502**	0.4293**	0.1723**	0.1584**	0.1645***	0.1616***
GVD	-0.4927					
GVD_{OLD}		-0.0632	0.4292			
GVD_{NEW}		-0.4894		-0.4479		-0.4600
SMB					-0.0128	0.0362
R^2	0.0038	0.0093	0.0031	0.0093	0.0000	0.0094
GERMANY	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
α	0.1046***	0.1078***	0.1335***	0.1398***	0.1366***	0.1433***
GVD	-1.3333					
GVD_{OLD}		-1.5713**	-0.3900			
GVD_{NEW}		-1.2066		0.3042		0.3021
SMB					0.0120***	0.0115**
R^2	0.0283	0.0633	0.0403	0.0250	0.0040	0.0287

Table 7

Multivariate Prediction of annual market returns per counry with GVD and benchmark predictors

This table represents a multivariate prediction of annual market return of the UK and French. The dependent variable is the value weighted annual market return per country. This regression is executed with GVD and the benchmark predictors, namely the Term-Spread, the Book-to-Market ratio, the Dividend Yield and the Price-to-Earnings ratio which are described and explained in table 1. This table presents 3 regressions with different combinations of the benchmark predictors and GVD. The benchmark predictors are divided into valuation ratio's and one interest rate variable. The forecasting period is 4 quarters, so $\tau = 4$. The standard errors are Newey-West, with six lags. The *,** and *** represent the degree of statistical significance which * stands for the 10%, ** for the 5% and *** for the 1% significance level.

UK	*(1)*	*(2)*	*(3)*
α	0.1340***	0.0631	0.0860
GVD	0.1106	-0.1844	-0.4209
TS	2.0608**		2.4331**
BTM		0.1719	0.0385
DY		0.0141	0.0337
P/E		-0.0037	-0.0092
R^2	0.0450	0.1299	0.1731
FRANCE	*(1)*	*(2)*	*(3)*
α	0.0780	0.2292	-0.4030
GVD	-0.0219	-0.8620	-1.1269
TS	7.5607**		6.6496***
BTM		-0.3137	0.1513
DY		0.0863	0.1205
P/E		-0.0120	-0.0029
R^2	0.1238	0.0697	0.2736

GERMANY	***(1)***	***(2)***	***(3)***
α	0.1441***	-0.4286	-0.4330
GVD	-0.8553	-2.7202***	-2.4990***
TS	2.0161		1.0174
BTM		0.6293*	0.5360
DY		0.0445	0.0677
P/E		0.0010	0.0015
R^2	0.0476	0.1986	0.2022
ITALY	***(1)***	***(2)***	***(3)***
α	-0.0325	-0.2695	-0.9300
GVD	-0.3443	-0.3258	-0.4202
TS	2.2110		7.0588**
BTM		0.2717	1.3883***
DY		0.0276	-0.1373
P/E		0.0019	0.0220
R^2	0.0371	0.0578	0.2166

Table 8

Out-of-sample univariate prediction with GVD and benchmark predictors on market returns in the UK and France

This table represents the out-of-sample performance of GVD and the benchmark variables. The dependent variable is the equally weighted annual market return per country. The benchmark variables are the Term-Spread, the Book-to-Market ratio, the Dividend Yield and the Price-to-Earnings ratio, which are described and explained in table 1. The out-of-sample R^2s are reported with use of expanding windows. For estimating the parameters for the model, the period 1973 until the last quarter of 1999 is used. The out-of-sample window is from 2000 until the second quarter of 2014.

UK	***OOS R^2***
GVD	-7.31%
TS	0.14%
BTM	13.31%
DY	-12.83%
P/E	13.36%
FRANCE	***OOS R^2***
GVD	-1.72%
TS	-1.00%
BTM	3.06%
DY	9.43%
P/E	5.20%
GERMANY	***OOS R^2***
GVD	-2.82%
TS	10.86%
BTM	19.12%
DY	3.00%
P/E	-1.60%
ITALY	***OOS R^2***
GVD	-3.66%
TS	-19.71%
BTM	-0.13%
DY	9.51%
P/E	-17.17%

Table 9

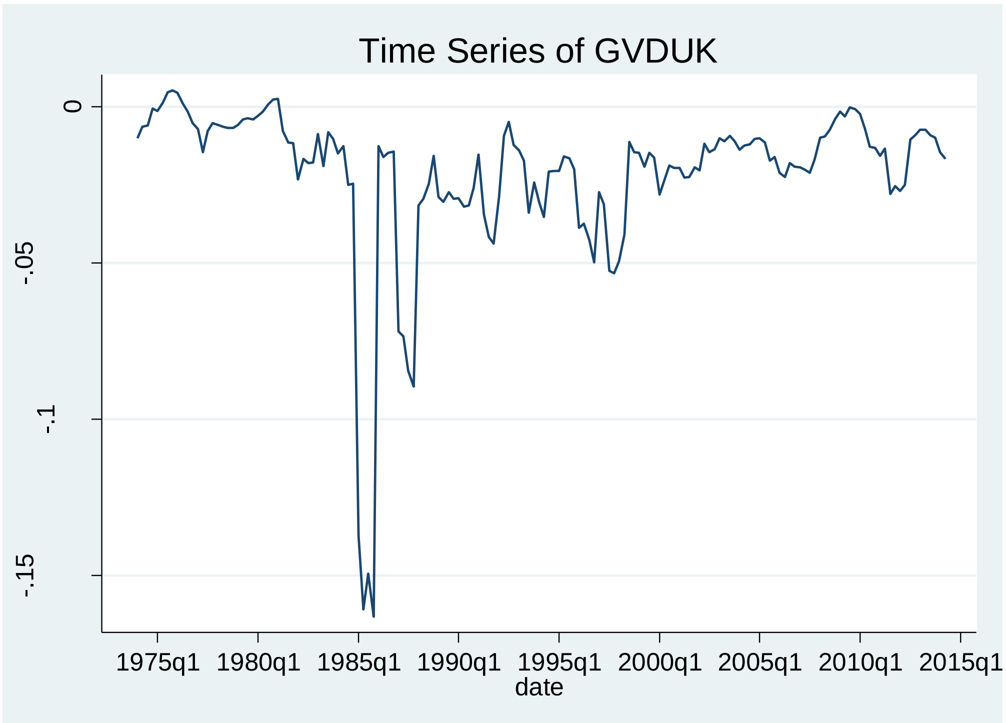
In-sample univariate prediction of portfolio annual market returns sorted on size with GVD

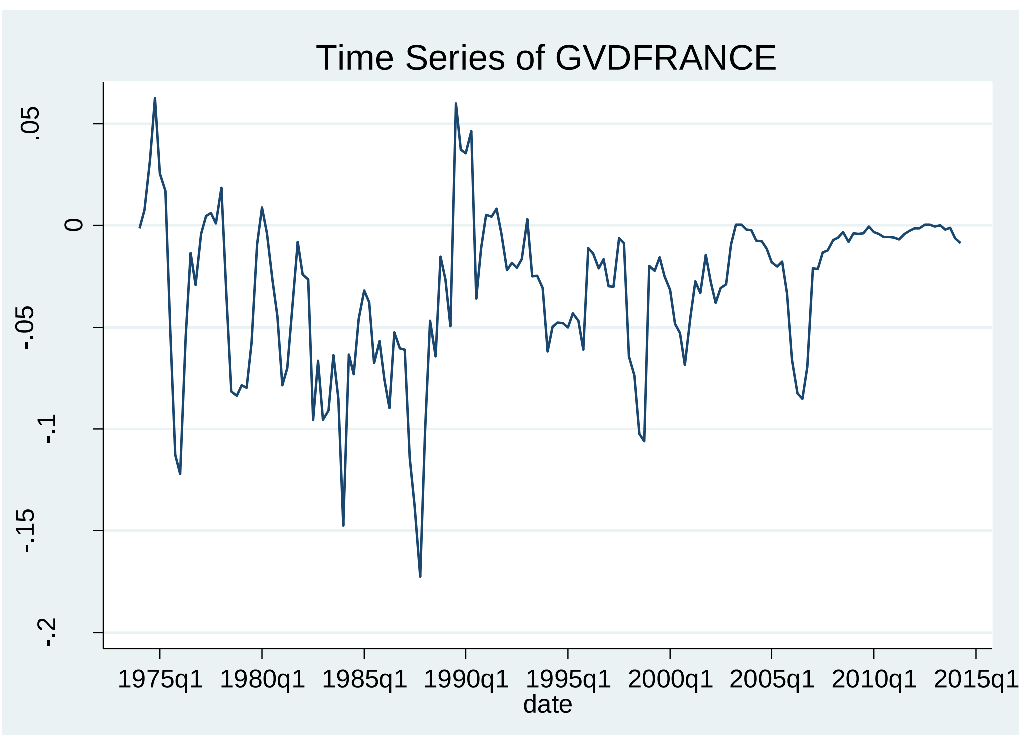
This table represents in sample forecast regressions on portfolios annual market returns with the constructed GVD variable. The portfolios are sorted on size. Portfolio 1 includes the firms with the smallest market capitalization and portfolio 4 includes the firms with the biggest market capitalization of the market. The regression is executed in the UK and France. Reported are the Alpha of the forecasting regression, the Beta and the R-squared. The forecasting period is 4 quarters, so $\tau = 4$. The standard errors are Newey-West, with six lags. The *,** and *** represent the degree of statistical significance which * for the 10%, ** for the 5% and *** for the 1% significance level.

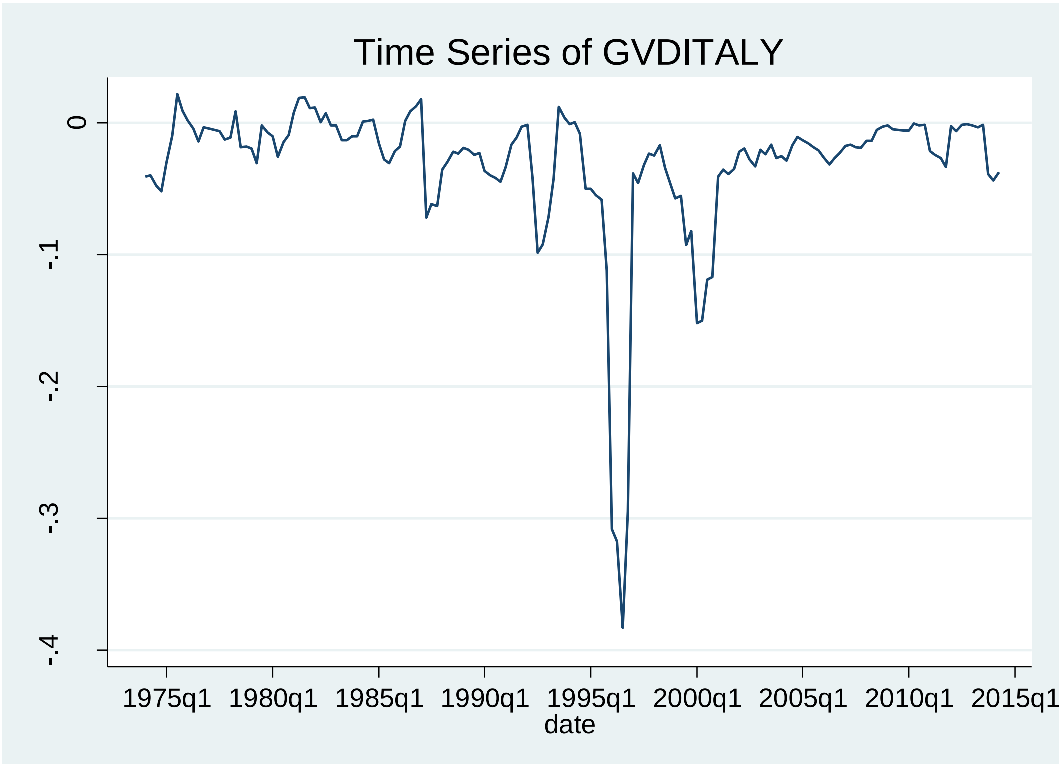
	UK			***FRANCE***		
	α	***β***	***R²***	***α***	***β***	***R²***
Portfolio1	0.1102*	0.0416	0.0000	0.2110*	3.1503	0.0374
Portfolio2	0.1826***	1.2223	0.0105	0.1650	1.1222	0.0180
Portfolio3	0.2400***	0.9298	0.0061	0.1687***	1.2819**	0.0450
Portfolio4	0.2681***	1.0875	0.0112	0.1695***	0.7197	0.0164
	GERMANY			***ITALY***		
	α	***β***	***R²***	***α***	***β***	***R²***
Portfolio1	0.9281	9.1020	0.0125	0.0723	0.0308	0.0000
Portfolio2	0.0780	0.4569	0.0031	0.1457**	0.3496	0.0027
Portfolio3	0.2996*	1.4591	0.0011	0.1367**	-0.0894	0.0002
Portfolio4	0.1121***	-0.9180	0.0259	0.1903***	-0.1418	0.0003

Figure 1

Time series of GVD per country from the first quarter of 1793 until the second quarter of 2014. The peaks should signify recessions and the troughs should signify expansions in that specific country according to the theory. Some of those specific events are discussed in the text.






Time Series of GVDITALY
0
-.1
-.2
-.3
-.4
1975q1
1980q1
1985q1
1990q1
1995q1
2000q1
2005q1
2010q1
2015q1
date

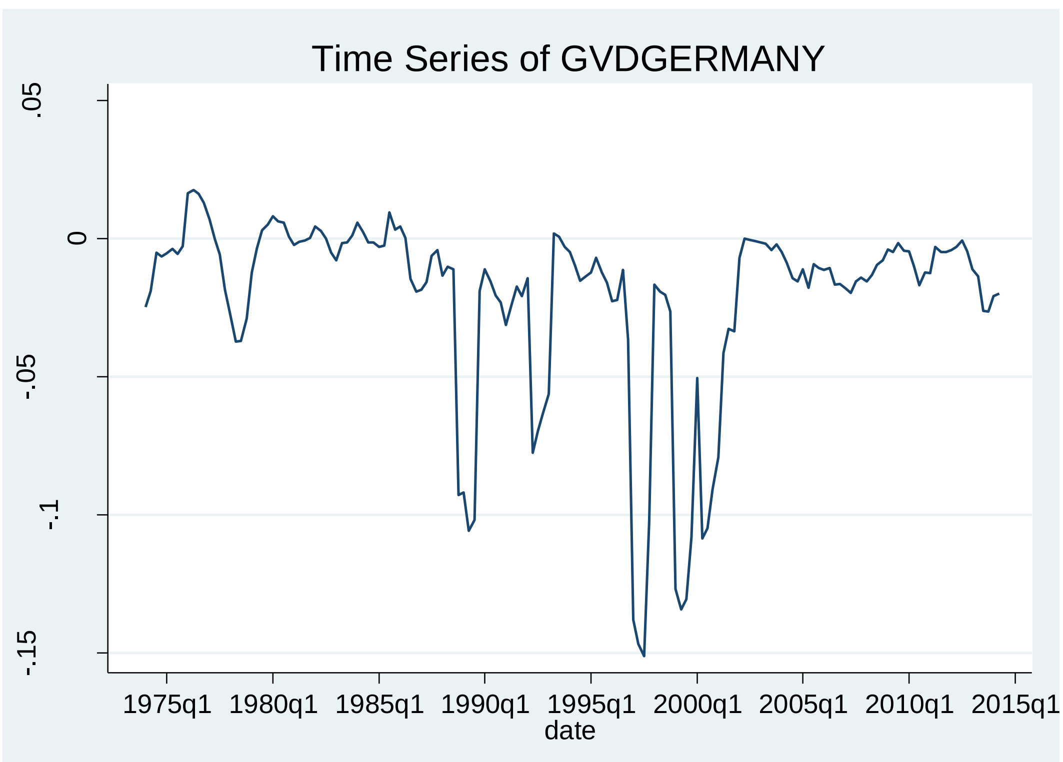

Time Series of GVDGERMANY
.05
0
-.05
-.1
-.15
1975q1
1980q1
1985q1
1990q1
1995q1
2000q1
2005q1
2010q1
2015q1
date

Figure 2

Time series of GVD of all countries in one figure from the first quarter of 1973 until the second quarter of 2014.

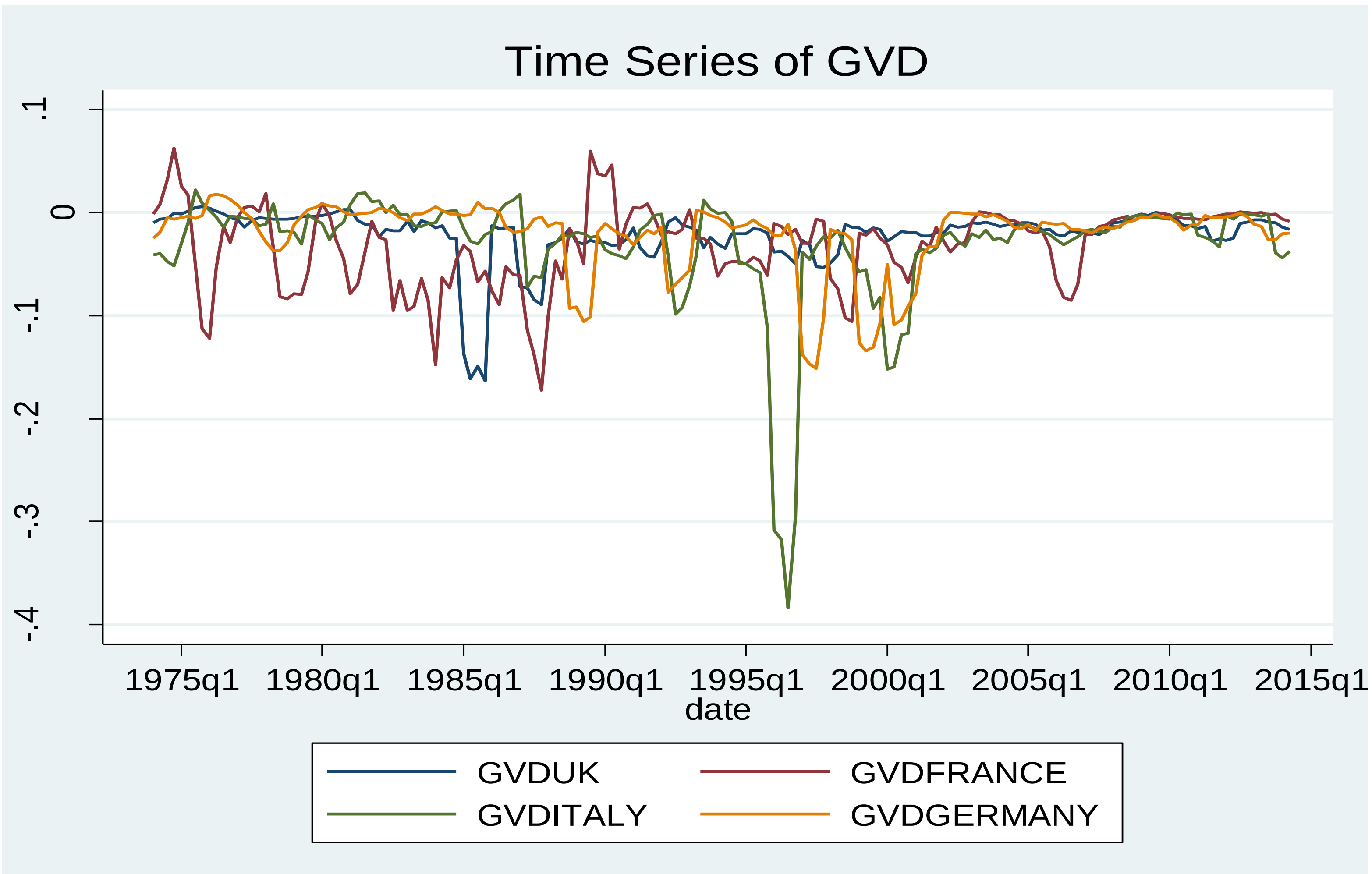
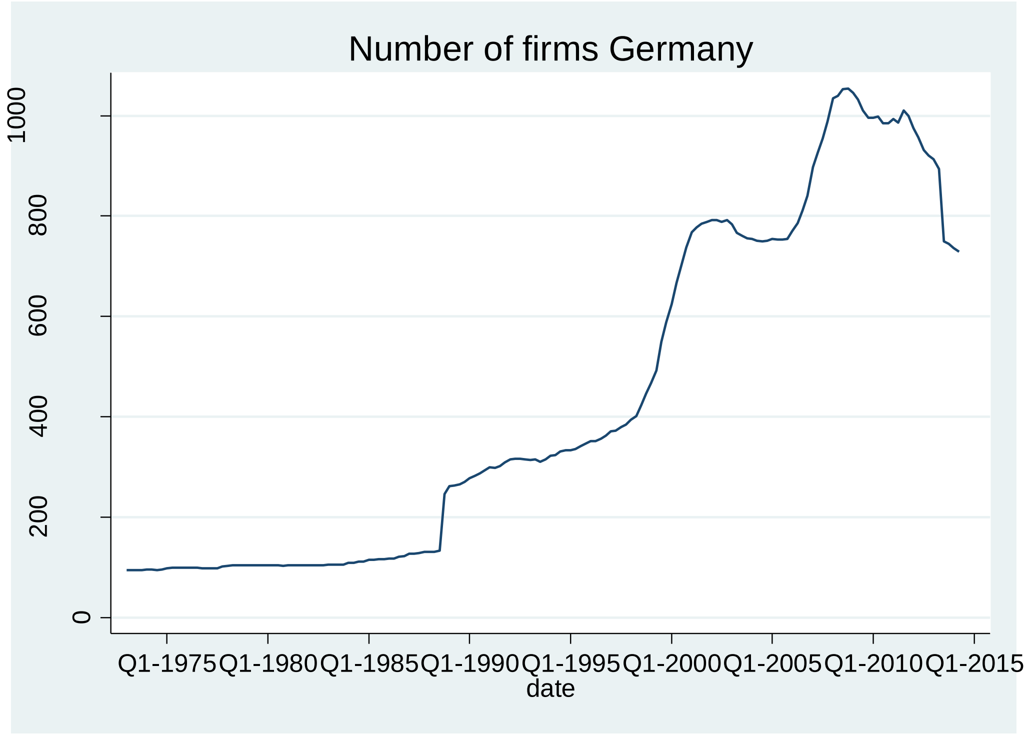
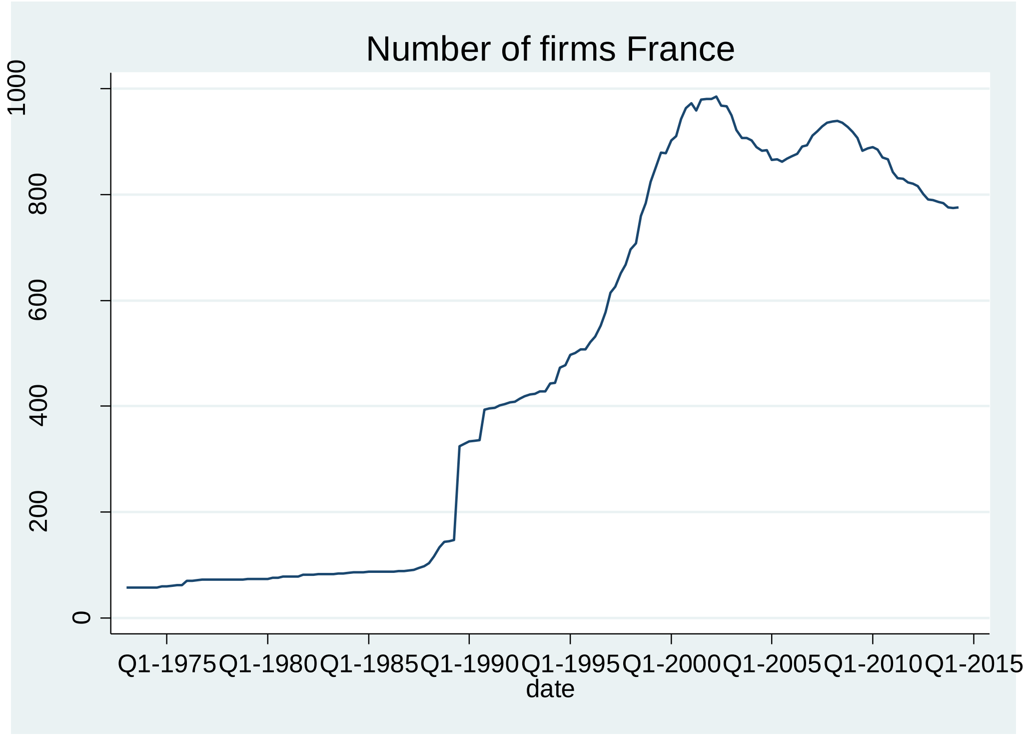
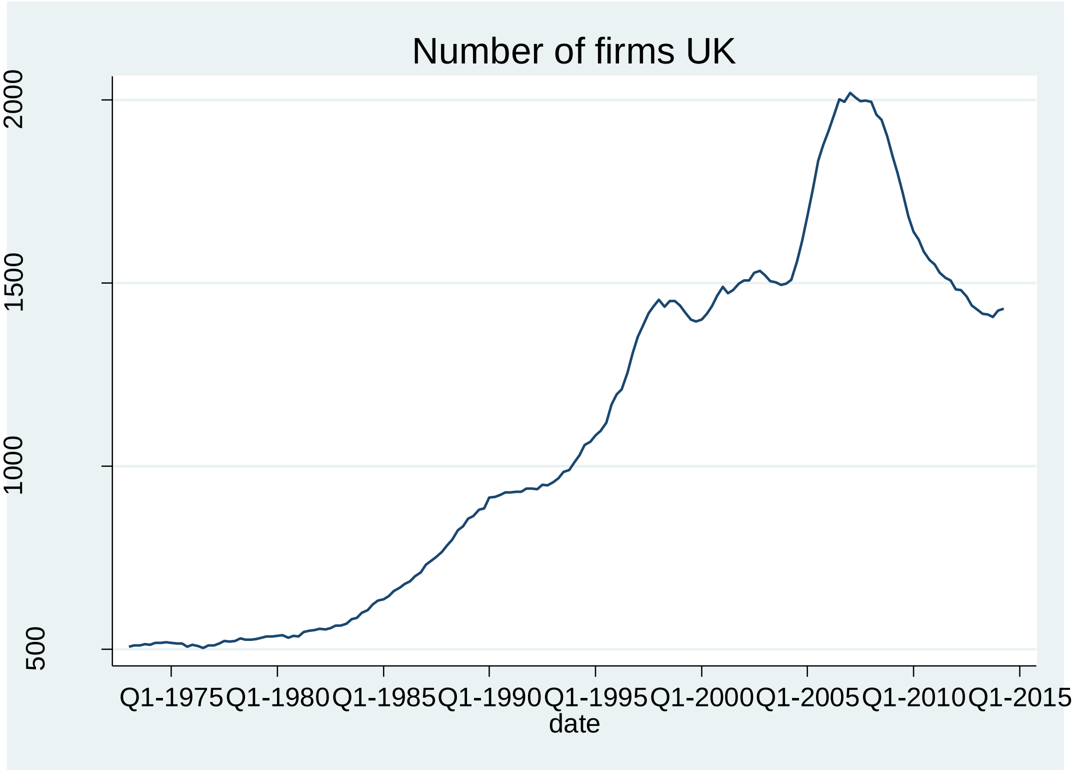


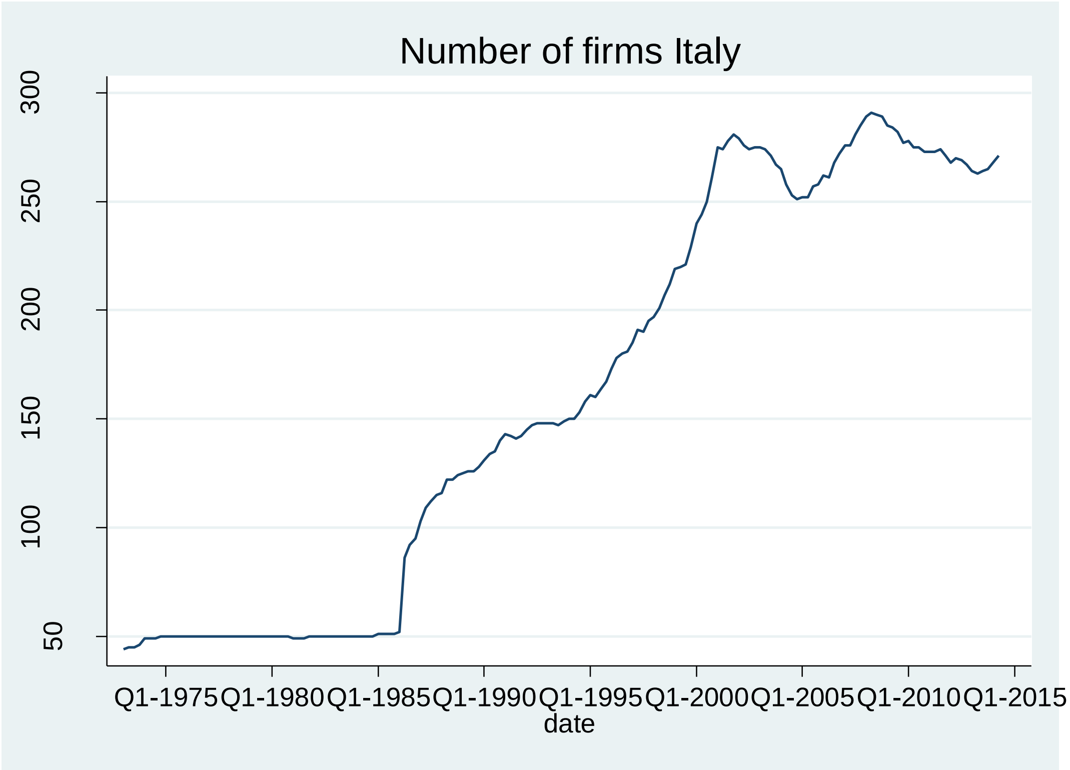
Figure 2

In this figure, the number of firms per country is presented from the first quarter of 1973 until the second quarter of 2014. The results are discussed in the text.






Number of firms UK
500
1000
1500
2000
Q1-1975 Q1-1980 Q1-1985 Q1-1990 Q1-1995 Q1-2000 Q1-2005 Q1-2010 Q1-2015
date


Number of firms Italy
50
100
150
200
250
300
Q1-1975 Q1-1980 Q1-1985 Q1-1990 Q1-1995 Q1-2000 Q1-2005 Q1-2010 Q1-2015
date

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