PROSPERITY IN A LOW INTEREST ENVIRONMENT

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Julia Knolle, M.Sc.
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Erstgutachter:	Prof. Dr. Stefan Homburg Institut für Öffentliche Finanzen Wirtschaftswissenschaftliche Fakultät der Gottfried Wilhelm Leibniz Universität Hannover
Zweitgutachter:	Prof. Dr. Johann-Matthias Graf von der Schulenburg Institut für Versicherungsbetriebslehre Wirtschaftswissenschaftliche Fakultät der Gottfried Wilhelm Leibniz Universität Hannover

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Abstract

Persistently low interest rates in several advanced economies during the past decade have puzzled economists. Explanations on what caused them and what could or even should be done in light of such rates abound. One of the most prominent narratives is the so-called "secular stagnation hypothesis". According to this theory, low interest rates indicate a lack of profitable investment opportunities. If left unchecked, this leads to high unemployment and stunted growth for the economies in question. This has caused several economists to call for government interventions in order to close the presumed gap between investment and saving. However, these gloomy predictions are in stark contrast to the actual economic development observed over the past decade, which featured record-lows in unemployment, continuing growth, and more or less steady capital investment levels.

The ongoing debate focuses mainly on interest rates on debt instruments. The cost of equity is often overlooked, even though it is a significant source of financing for firms. This thesis addresses this shortcoming by taking into account both cost components. Instead of approximating the marginal productivity of capital using interest on government bonds, a new measure based on the Weighted Average Cost of Capital (WACC) is employed. The WACC – a widely used instrument from the field of finance – takes both equity and debt into account and constitutes a hurdle rate for firms' investment decisions. Using proprietary data from Bloomberg, an analysis covering all OECD countries ranging from 2000-2017 is undertaken, including over 25,000 firms. The results are striking: while the cost of debt has declined over the course of the timeline, the cost of equity has remained stable or even increased, keeping the overall WACC constant. This stresses the importance of distinguishing between different sources of financing to get a comprehensive picture. The approach introduced here is thus able to shed new light on different aspects of the current low interest environment.

Keywords: Low Interest Environment, Marginal Productivity of Capital, Investment, Weighted Average Cost of Capital, WACC, Secular Stagnation, Equity Premium Puzzle

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List of Acronyms

ADR	American Depository Receipts
BDR	Brazilian Depository Receipts
CAPM	Capital Asset Pricing Model
e.g.	Latin: “exempli gratia”, meaning “for example”
ECB	European Central Bank
et al.	Latin: “et alii”/“et aliae”, meaning “and others”
EU	European Union
FRED	Federal Reserve Economic Data
G20	Group of 20
G7	Group of 7
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GICS	Global Industry Classification Standard
GIIPS	Greece, Italy, Ireland, Portugal, Spain
i.e.	Latin: “id est”, meaning “that is to say”
IAS	International Accounting Standards
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
IT	Information Technology
NBER	National Bureau of Economic Research
NIPA	National Income and Product Accounts
OECD	Organisation for Economic Co-operation and Development
PE	Preferred Equity
QE	Quantitative Easing
UK	United Kingdom
US	United States
WACC	Weighted Average Cost of Capital

1 Introduction

Public opinion always wants "easy money," that is, low interest rates.
– Ludwig von Mises[1]

In several advanced economies, the past decade was defined by exceptionally low nominal interest rates. This trend covers interbank rates, interest rates on government bonds, and interest rates on loans to consumers as well as non-financial corporations.[2] Governments, institutions, and households eager to borrow money benefit from this development, which significantly pushes down financing costs. For example, according to the Bundesbank, the decrease in interest expenses by the German government that is attributed to the decline in interest rates amounts to over €400 billion between 2008 and 2019.[3] However, this perspective neglects that every borrower needs a lender, and the borrower's gain is the lender's loss. This is crucial for institutions such as insurance companies and pension funds, which are required to hold assets whose yields have decreased notably. Households also face downsides, as the interest income that they used to collect on their banking accounts first diminished, followed by the widespread introduction of (higher) management fees imposed by banks.[4] It is inevitable that low interest rates produce both winners and losers. But the same is true for high interest rates, which simply reverse the roles. An assessment whether low or high interest rates are preferable per se requires a look at the bigger picture. Indeed, as will be discussed, some economists have argued that low interest rates are inherently problematic. To understand this argument, it is essential to consider what interest rates represent, how they are determined, and how they in turn affect the economy.

One of the first lessons for each student of macroeconomics is that, in a competitive equilibrium, the expected real interest rate, denoted here as r^e, equals the marginal productivity of capital:

$$\frac{\partial F}{\partial K} = r^e.$$

The left-hand side of this equation drives investment and determines the path of the capital stock K, which in turn affects output. The marginal productivity of capital itself is not observable. By contrast, the right-hand side is observable and can thus be used to approximate the marginal productivity of cap-

[1] Mises (1976, p. 114).
[2] See Figure A.1 in the appendix.
[3] See Seibel (2020).
[4] See Brei et al. (2019).

ital. Traditionally, yields on long-term government bonds from advanced economies are employed as a proxy, as they are considered to be safe assets. Assuming that the above equation holds, the presence of declining interest rates for these assets suggests that the marginal productivity of capital has decreased. In other words: opportunities for profitable investments are diminishing, and economic prosperity is threatened.

A similar line of argument, posing that the decline of different interest rates points to economic decay, rests on the notion of a natural equilibrium rate of interest. Such a rate was first introduced by Wicksell (1898). Woodford (2003) defines it as the rate that equates investment and savings and keeps prices stable with output at its potential. If market rates deviate from the natural rate, this results in insufficient paths for output and inflation.[5] In recent years, several economists have argued that this natural rate has become negative, and, due to the zero lower bound on nominal interest rates and with low inflation rates, real rates are not able to track the natural rate appropriately.[6] According to these authors, the main forces pushing down the natural interest rate stem from demographic changes and technological advances, which have led to an overabundance of saving and a lower demand for investment.[7] In addition to changes in the determinants of investment and saving, this assessment is based on the evolution of government bond yields[8], which have declined since the 1980s, as well as anecdotal evidence.[9] Summers (2013) resurrects the notion of the so-called "secular stagnation hypothesis" that goes back to Hansen (1939).[10] This theory paints a rather dire picture for the economy: high unemployment, deflation, unsatisfactory investment opportunities, and sluggish (if any) growth. The only way to prevent this, according to Summers, is to engage in government spending, thus increasing investment and pushing up the natural rate of interest. With interest rates on government bonds at low levels, such an intervention would be comparatively cheap.[11]

As convincing as some of the arguments brought forward by these authors may be at first glance, they have to be evaluated based on empirical facts. If the marginal productivity is truly low, one would expect the economies in question to show signs of economic decline by now. Table 1.1 presents a few

[5] See Borio et al. (2019, p. 1).

[6] See Summers (2015), Weizsäcker (2014), Lane (2019), Gourinchas and Rey (2019), Jordà and Taylor (2019).

[7] See Gordon (2012) for an analysis of the role of technological advances.

[8] The focus is mainly on United States (US) government bonds.

[9] Summers points to technology companies such as Apple or Google as well as Silicon Valley start-ups, arguing that the former do not know where to invest their "excess cash", while the latter profit from cheaper infrastructure and face only a fraction of the costs to get started compared to their predecessors. From this, he infers a general reduction in investment demand, see Summers (2015, p. 62).

[10] See Backhouse and Boianovsky (2016) for an overview of the concept of secular stagnation and its re-elaboration and transformation over time since Hansen first introduced the idea.

[11] See also Blanchard (2019). Blanchard concedes that safe interest rates alone cannot predict the welfare effects of public debt and while he stresses that he is not necessarily arguing for increased government spending, his main result is that currently public debt comes at a lower cost than usual.

key economic indicators as of December 2019, covering four large economies with exceptionally low interest rates over the past decade.[12]

Country	Interest Rate	Inflation Rate	Unemployment Rate
Germany	–0.3	1.5	3.2
Japan	–0.03	0.8	2.2
United Kingdom	0.8	1.4	3.7
United States	1.9	2.3	3.5

Table 1.1: Economic Indicators, December 2019. Source: OECD <https://stats.oecd.org/>, series long-term interest rates; consumer price indices (all items); harmonized unemployment rates (total, all persons). Retrieved 15. April 2020.

The findings are contrary to what the secular stagnation hypothesis would predict. Unemployment is astonishingly low[13] and there are no signs of deflation. Average real growth rates between 2010 and 2018 ranged from 0.8% (Japan) to 1.9% (US), which is neither particularly high nor alarmingly low. How can this be reconciled with the theories mentioned above? The short answer: interest rates on government bonds do not properly approximate the marginal productivity of capital, or put differently:[14]

$$\frac{\partial F}{\partial K} > r^e.$$

Among the first rebukes of Summers' secular stagnation scenario was a short essay by Gomme et al. (2015). They show that (i) returns on productive capital and returns on government debt are not moving in tandem, that (ii) returns on productive capital calculated from National Income and Product Accounts (NIPA) have not declined, and that (iii) private investment is above trend, disproving the allegation of lacking profitable investment opportunities. Borio et al. (2019) show that between 1870–2016, commonly acknowledged saving-investment determinants cannot reliably explain the evolution of real interest rates.[15] Mayer and Schnabl (2019) find no robust link between demographic changes and household savings rates.[16] All of these results call into question one of the pillars that Summers' line of argument rests on. As for the other pillar, the evolution of real interest rates, it has been shown that while it is true that these rates have steadily declined since the mid-1980s, negative real interest rates are in fact not an unusual phenomenon. Borio et al. (2019) reveal that in their sam-

[12] This assessment is based on Homburg (2017, p. 80), who investigates what he refers to as "benign liquidity traps". He defines such a state as a generally sound economic development combined with low interest rates and an ineffectiveness of the central banks' expansive monetary policies to produce inflation.

[13] The US unemployment level even reached a 50–year low in 2019, see Council of Economic Advisers (2019).

[14] This is similar to equation (60) in Homburg (2017, p. 85), which includes depreciation.

[15] See Borio et al. (2019, pp. 6–11).

[16] See Mayer and Schnabl (2019, pp. 13–15).

ple from 1870–2016, short-term and long-term real rates have repeatedly reached low levels and even turned negative, proving that this is not a unique feature.[17] They criticize that most discussions and inferences of natural rates of interest disregard the financial sector altogether—after all, market rates are set there.[18] A recently published study by Jordà, Knoll, et al. (2019) goes even further in posing that the "...puzzle may well be why the safe rate was so high in the mid-1980s rather than why it has declined ever since."[19] The study introduces a novel and comprehensive data set on the returns of different asset classes, covering bills, bonds, equity, and housing. The authors also acknowledge the fact that safe rates are currently not far off their historical average. Their results highlight the importance of distinguishing between different assets when determining the return on capital. From this and with returns on risky investments at persistently high levels, they, too, conclude that there is no convincing support for the secular stagnation hypothesis.[20]

Nonetheless, the narrative of a possible secular stagnation still dominates economic discussions surrounding the persistent low interest environment. Even though real interest rates have been low in the past, they have never been so present in academia as well as public discourse.[21] One possible explanation is that in previous episodes of low or negative real rates, for example in the 1970s, these rates resulted from high inflation rates alongside high nominal interest rates. From a theoretical point of view, this should not make a difference because real interest rates drive investment decisions. However, the public perception could very well differ. The central question remains whether the secular stagnation hypothesis holds up, or if part of its appeal is simply due to the narrow focus on government bonds over the last couple of decades, fitting the narrative of ever decreasing interest rates.

Against this background, this thesis aims to tackle the relationship between the marginal productivity of capital and the current low interest rate environment from a novel point of view. It contributes to the existing literature by introducing an established measure from financial accounting into a macroeconomic context, and subsequently putting this measure to the test empirically. The central premise goes back to the core of the underlying macroeconomic theory and combines it with a real-world, market-based understanding of financing. The argument runs as follows: the marginal productivity of capital measures the return an investment has to yield in order to break even. Therefore, for investors, the return on an investment will be measured against their financing costs. Clearly, this is not the interbank

[17] See Borio et al. (2019, p. 6). Homer and Sylla (2005) provide an overview on the history of interest rates reaching back several millennia. A more recent study by Schmelzing (2020) covers the evolution of interest rates from 1318–2018. While their findings shine a light on many interesting aspects of interest rates, their usefulness is limited for the current discussion due to the insufficient comparability of the data considered.

[18] See Borio et al. (2019, p. 17).

[19] Jordà, Knoll, et al. (2019, p. 1229).

[20] See Jordà, Knoll, et al. (2019, p. 1286).

[21] This is also captured by Feenberg et al. (2018, p. 2) in their observation that the "... perception that interest rates have been unusually low, perhaps because short-term yields have hit their nominal bound of zero, is also pervasive among journalists, foreign financial and non-financial policy makers, retail and professional investors—and academics."

rate, but it is also not the rate on government bonds, as firms typically do not have access to this rate. Oftentimes, firms will employ the so-called *Weighted Average Cost of Capital* as a threshold, and only investments exceeding this rate will be undertaken. Thus, it corresponds to the return of the marginal investment project. Adjustments for taxes and inflation are necessary to convert this measure from the field of financial accounting to an economic variable. The result yields a valid proxy for the marginal productivity of capital. Based on this concept, an analysis covering all 35 OECD countries between 2000–2017 will be undertaken, comprised of more than 25,000 listed firms in total. The necessary data are taken from Bloomberg Financial Services[22]. The resulting analysis, the first of its kind on this scale, allows for a global assessment of the capital costs of firms and reveals how these may have been influenced by the low interest environment.

The thesis proceeds as follows. Chapter 2 introduces the concept of the Weighted Average Cost of Capital in detail and provides information on its derivation by Bloomberg. Chapter 3 gives a step-by-step overview of the data cleaning and adjustment process. The results are presented in Chapter 4, focusing on a few selected countries as well as the main finding, an assessment of the global evolution of the cost of capital. In addition, the firms were divided and subsequently analyzed by industry sector. Chapter 5 concludes.

[22] Referred to as "Bloomberg" in the following.

2 Weighted Average Cost of Capital

This chapter introduces the concept of the *Weighted Average Cost of Capital*, or *WACC*. First, a short overview of its role in capital budgeting is given. The second part of this chapter describes the components of the WACC in more detail, since they are the basis for the analysis in Chapter 4. The individual components will be presented as they can be found in the literature from a theoretical point of view. Relevant reservations and challenges that pertain to the WACC calculation will be addressed. After laying the theoretical foundation, the application of the WACC concept deserves a closer look. The data used in the analysis is provided by Bloomberg's financial database. Bloomberg uses information taken from financial statements as well as real-time market prices to calculate the WACC for a large portion of their listed securities. The details of this hands-on application of the WACC concept will form the final part of this chapter.

2.1 Capital Budgeting

Whenever a firm or business wants to generate output, it cannot expect to achieve this out of thin air. Some sort of financial capital is essential in starting and maintaining a business. There are various sources through which financial capital can be obtained. Financing is usually categorized into either debt or equity financing. Additionally, one can differentiate between short, medium, or long term commitments.

Debt financing occurs any time a firm sells a fixed income product such as a bond or takes out a loan. The money obtained this way usually has to be paid back with interest within a time frame that is agreed upon in advance. Contributors of equity financing acquire a share of the company and thus a claim on the company's profits. Equity is a residual item on the balance sheet and since shareholders hold a claim on this residual rather than the firm's free cash flow there is a greater risk attached to holding shares compared to holding a company's bonds. Hence, shareholders demand a higher return on their investment due to their increased risk exposure than lenders of debt do. It is because of this that equity financing is typically more expensive than debt financing.[23] From the firm's perspective, equity

[23] See Brealey et al. (2014, p. 221).

financing is nonetheless desirable because it comes without an obligation to pay back the money at a specific point in time.

Generally, firms will be financed by both debt and equity instruments, though the ratio might differ depending on the industry or type of firm. Adding up the market value of both equity and debt yields a company's financial capital. This financial capital is used to finance the business. Maximizing the shareholder's value is of great importance to a firm. Any investment a company wishes to undertake should in theory contribute to this goal. Consequently, any project should be evaluated based on the cost of the overall capital. If the return of an investment fails to exceed the cost of the capital needed to finance it, the project will diminish the firm's value rather than raise it and should not be undertaken. For this assessment to be possible, the cost of capital has to be determined. The common approach used in this context is known as the Weighted Average Cost of Capital, commonly referred to by the acronym WACC.

The first systematic presentation of the WACC concept can be traced back to Dean in 1951.[24] Since then, an extensive literature on the concept itself, its applicability and role in capital budgeting as well as valuation of firms has been published.[25] Several other important contributions in the capital budgeting and finance literature have been incorporated into the WACC calculation. The most important addition to the WACC concept was the introduction of the *Capital Asset Pricing Model (CAPM)* in the 1960s.[26] It is used to determine the cost of equity. To this day, the WACC concept and the CAPM are employed by a large number of companies to track their cost of capital.[27] The key role of the WACC is to provide a benchmark for investment decisions, often called a "hurdle rate", that a project's return has to surpass in order for the project to be accepted. One caveat should be mentioned at this point: The literature on this—which applies to articles published early on[28] as well as contemporary text books[29] used to teach the concept to students—qualifies the WACC measure as an appropriate tool solely for projects of average risk. In order to accurately assess the profitability of a project, every investment and every division of the firm need their very own calculation of the WACC. The former is needed to take into account the different risk profiles, while the latter acknowledges that departments within a firm can vary with respect to the risk and type of capital employed. However, this would constitute an additional effort to an extent that seems impractical and would not guarantee a completely reliable estimate, as certain aspects such as the risk profile of a project can vary over time if they are known at

[24] See Dean (1951a, pp. 44–48) and Dean (1951b, pp. 575–576).
[25] See for example: Modigliani and Miller (1958); Reilly and Wecker (1973); Arditti (1973); Linke and Kim (1974); Myers (1974); Nantell and Carlson (1975); Grüninger and Kind (2013); Koziol (2014); Krüger et al. (2015).
[26] A leading figure in its development was Sharpe (1964).
[27] According to a survey on capital budgeting techniques conducted by Graham and Harvey (2001, p. 201) among US firms, 73.5% of respondents employ the CAPM to estimate their cost of equity. Brounen et al. (2004, p. 84) also identify the CAPM to be the most popular method for selected European countries.
[28] See Reilly and Wecker (1973).
[29] See Brealey et al. (2014, p. 480).

all. Thus, due to practical reasons, companies usually only calculate the WACC for the entire company or individual departments and use risk adjustments on this benchmark when deemed necessary.[30]

Due to these oversimplifications, the WACC concept is not without critics. Clearly, a company-wide WACC applied to all projects will not be able to reliably assess the cost of capital. Even when risk adjustments are used, these are again subject to certain assumptions that can very well be challenged. Why then even look at a concept so inherently prone to flaws? First, as was already pointed out, certain information needed to provide an exact estimate of the cost of capital are next to impossible to come by. In such a case, it is better to attempt to find a reasonable estimate rather than give up on the calculation altogether. Second, a rough estimate is often enough for a first assessment of whether or not an investment should be undertaken. A more elaborate calculation might be carried out for projects whose rate of return and cost of capital are almost identical at a first glance. However, if a first rough estimate already produces a rate of return that clearly exceeds (falls short of) the WACC, a more detailed calculation is highly unlikely to alter the result in such a way that the investment is then rejected (approved). A slightly more accurate estimate does not justify the additional effort put into the process.

In addition, the main argument for using WACC data regardless of potential shortcomings in terms of accuracy runs as follows: even if the WACC fails to capture the final cost of an investment, it does not matter for the purpose of this analysis. As long as decision makers use the WACC as a benchmark, it will be the relevant indicator driving investment behavior. Therefore, it is the appropriate tool to analyze capital productivity for firms, irrespective of theoretical issues with the method.

2.2 Weighted Average Cost of Capital – Theoretical Background

The standard textbook[31] WACC formula takes the following form:

$$WACC = r^E w^E + r^D w^D (1 - \tau), \tag{2.1}$$

where r is the return on capital and w the weight of equity (E) and debt (D), while τ denotes the corporate tax rate. Some companies also explicitly include *preferred equity* as a third source of capital. For now, preferred equity will be ignored as it plays no role for most companies and only a minor one for those that do account for it.[32] The WACC formula assumes a corporate tax system in which the cost of debt, i.e. interest, is deductible while the cost of equity is not. For most countries, this is in

[30] Graham and Harvey (2001, pp. 206–209) find that 58.8% of their US-sample employ company-wide evaluation rates instead of project-specific rates. Brounen et al. (2004, pp. 86–91) also confirm a preference of this rate over more elaborate schemes in their study of European companies.

[31] See Brealey et al. (2014, pp. 479–481).

[32] In the following analysis, preferred equity will be dropped from the data set. This will be discussed in more detail in Chapter 3.

accordance with the tax code. However, for countries with an allowance for corporate equity[33], the standard formula does not lead to correct approximations of the cost of capital. Despite this, firms commonly use it without modifications.

Most textbooks refer to this rate as an "after-tax rate" due to the inclusion of the tax effect on the cost of debt.[34] However, from an economic point of view and following the reasoning of Schreiber (2017), this is not truly an after-tax rate because it neglects the personal taxes levied on the capital investors. When assessing the true cost of capital, e.g. for determining the optimal ratio of debt vs. equity financing, it is necessary to "follow the money" until it is back in the hands of the original investor. When this is not done and the effects of certain properties of the tax system aren't included, the resulting estimate of the cost of capital does not reflect the true economic cost of capital. Schreiber (2017) for example identifies a "corporate tax wedge" as part of the difference between the return on capital before and after taxes.[35] This corporate tax wedge arises when companies do not incorporate the personal taxes levied on their shareholders, for example due to the sheer number of owners from different countries with varying tax regimes, which can complicate an appropriate inclusion to a prohibiting extent.

As long as taxes levied on the capital investors are the same for equity and debt financing, it leaves the relative cost of one compared to the other unchanged, and thus does not affect the ratio between these two types of financing. However, once interest paid on loans and dividends paid to shareholders are treated differently at the personal level, the WACC formula does not properly capture the true cost of the two sources of capital. This is an important aspect when considering the amount of equity and debt financing a firm wants to utilize. Not knowing the true ratio of the cost might keep firms from choosing their optimal level of leverage. In this context, two concepts that are part of a number of tax codes should be mentioned that call the WACC into question as a tool to evaluate the true cost of capital using the formula (2.1) above: shareholder relief and long-term capital gains taxation. By crediting taxes paid at the corporate level on the personal tax liability, the former eliminates the double taxation of dividends that occurs in the classical system. The latter addresses tax-induced incentives to favor capital gains over dividends, as they are economically equivalent. Both of these result in differences in the taxation of bondholders and shareholders that would not be reflected in the WACC formula.

In principal, companies would have to take all of these issues into account when calculating the true cost of capital employed. But as was already mentioned, doing so is not always straightforward. A firm with shareholders all around the globe might not be aware of each shareholder's place of residence, let

[33] An example for this is the "Notional Interest Deduction" regime in Belgium from 2006 on.
[34] See for example Brealey et al. (2014, p. 225).
[35] See Schreiber (2017, p. 729).

alone their personal tax rates. Thus, firms neglect this part of the calculation.[36] Instead, they assume that shareholders and bondholders already incorporate their personal tax rate into the return that they demand.[37] This ensures that the WACC formula presented above accurately captures the relative cost of equity and debt financing at the firm level, enabling the firm to determine the optimal leverage ratio.[38] This assumption will be made here as well.

The only inclusion of the tax system thus remains the term $(1-\tau)$ in the WACC formula, reflecting the tax shield that results from the fact that interest paid on loans can be deducted from a firm's revenue. Incorporating the fact that equity and debt costs are not treated equally when it comes to taxes can be done in one of two ways. Soldofsky and Olive (1974) discuss the two options. The first is reducing the cost of debt by multiplying it with the corporate tax factor $(1-\tau)$ as is done in formula (2.1). This reflects the notion that the tax shield can be viewed as savings for the company. Additionally, stressing this view can serve as an argument to make external funding more attractive. The second option would be to step up the cost of equity instead by dividing it by the corporate tax factor. This approach will be referred to as the *Before-Tax WACC* in the following:

$$WACC^{BT} = \frac{r^E w^E}{(1-\tau)} + r^D w^D \tag{2.2}$$

Using this method exposes the investment's pre-tax return needed to satisfy the demand of capital investors. Soldofsky and Olive (1974) argue that this approach is superior to the first due to two reasons: First, the company will have to pay the full agreed upon amount of interest to the lenders of capital. Second, on the equity side, because the cost of equity will be subject to being taxed at the firm level before being paid out in dividends, the return an investment earns will have to be high enough to account for these taxes.[39]

Ultimately, both approaches are valid and should yield the same result when it comes to investment decisions as long as the computation of the rate of return of the investment in question considers income taxes in a parallel way. In the first case, income taxes should be subtracted when computing the rate of return of a project. If the Before-Tax WACC are employed, income taxes should consequently be included in the rate of return calculation. The ratio of the cost of debt and equity financing is the same regardless of the chosen approach. Therefore, the optimal leverage ratio chosen by the firm will be un-

[36] Husmann et al. (2006) develop a generalized WACC calculation for the purpose of firm valuation that includes personal taxes and can be applied to any tax system. This may yield additional insights into how the different tax systems affect the cost of capital. However, it is not appropriate for the analysis in this paper as long as firms don't incorporate such a method into their own calculations.

[37] See Schreiber (2017, p. 729).

[38] This runs contrary to the famous proposal by Modigliani and Miller (1958), according to which the ratio of the different sources of financing is irrelevant to the total cost, which renders the search for the "optimal" leverage ratio unnecessary. This hypothesis only holds due to strict assumptions, such as frictionless markets and a world without taxes, and can thus not be applied for actual capital budgeting decisions.

[39] See Soldofsky and Olive (1974, pp. 316–319).

affected by the choice of WACC concept in this regard. As was mentioned when introducing formula (2.1), the dominant calculation method introduced in textbooks—and thus used in practice—steps down the cost of debt by the corporate tax factor. Some firms additionally disclose their Before-Tax WACC. In line with the recommendation of Soldofsky and Olive (1974), the analysis in this thesis will focus on the Before-Tax WACC. However, the main reason for this decision is not a semantic one, but a direct result of the underlying research objective. The aim of the examination of firms' cost of capital is to find an approximation of the overall marginal productivity of capital. This basic economic concept by definition considers a "before tax" world. It will also be expressed in real rather than nominal terms, making a further adjustment for inflation expectations necessary. This will be considered in more detail in section 4.1.2.

For an accurate assessment of the cost of capital, one would be interested in future values for all components of the WACC, as the firm will need to repay the capital raised in the future. Consequently, a forward-looking approach would be more appropriate. However, lacking certainty about what the future of the company and the market hold, companies frequently turn to historical evidence. This guarantees greater transparency and eliminates the need for further assumptions.[40]

To determine the weight of equity and debt, it is common to use market values.[41] Market values are used rather than book values because they reflect more accurately what investors expect to earn on an investment. For the equity value this means multiplying the number of shares outstanding by their price to get the market capitalization of the firm and using this value for the weight of equity. For many firms, this differs greatly from equity values inferred from accounting values. For debt financing, not all debt instruments used by a firm are tradable and thus the market value is much closer to the book value. For companies that do use tradable debt instruments, the book value is still an acceptable proxy for firms that are not in financial distress.[42] In practice, it is common to therefore use book values for the debt and market values for the equity portion of total capital.

The cost of debt, or interest rate, can be inferred from the interest payments made divided by the amount of debt. For debt instruments, the interest rate is agreed upon in advance and is thus known to the investor and the firm. Estimating the cost of equity is not as simple, as shareholders do not explicitly demand a specific return the same way bondholders or creditors would. Shareholders implicitly reveal their required return by either buying, holding, or selling a company's stock. The cost of equity thus

[40] See Lehmann (2019, p. 5).
[41] See Población García (2017, p. 347), Häcker and Ernst (2017, p. 547), or Ernst et al. (2018, p. 45).
[42] It has been shown that firms with a higher ex ante credit risk prefer loan financing, see Berlin and Mester (1992), while firms with a high credit quality regularly emit bonds to raise money, see Denis and Mihov (2003).

reflects the return it takes to satisfy shareholders enough for them to want to purchase and hold the shares. The standard method to estimate this is the aforementioned CAPM that is mainly attributed to Sharpe (1964). It establishes the following formula to determine a firm's cost of equity:

$$r^E = r^f + (E(r^M) - r^f) * \beta, \tag{2.3}$$

where r^f is the risk-free rate, $E(r^M)$ is the expected market return of the entire portfolio and β is a factor that measures how closely the return of a firm moves with the market return. Mathematically, β is defined as the covariance between a stock's return and the market return divided by the variance of the market return. The more values are used in its calculation, the more accurately it portrays the firm's relationship with the market. The coefficient β generally measures the percentage change in the price of an equity given a 1% change in the benchmark index. Therefore, a β of 1 means the security moves concurrently with the market. Another way to put this would be that the security has average (meaning: compared to the market) risk and adding it to the market portfolio will not affect the overall risk. A β value above 1 indicates that the security reacts stronger than the market and is hence riskier, while a β below 1 suggests a more subdued reaction. A β of 0 is associated with risk-free investments. A negative β would indicate that a security always moves counter cyclically to the market and therefore acts as a hedge against the risk of the market portfolio. The possibility of negative β values is sometimes discussed in financial circles, though oftentimes more out of interest than out of actual experience with persistent negative β values. The CAPM is widely criticized and has been shown to be unreliable e.g. in forecasting stock returns or estimating risk adequate discount rates.[43] Nonetheless, due to its simplicity, it is still the most widely used concept.[44] Therefore, as was argued above, it is the relevant benchmark model regardless of its accuracy.

2.3 Bloomberg's WACC Approach

The data used in the analysis in Chapter 4 is taken from Bloomberg.[45] This section describes how Bloomberg applies the WACC concept. In addition to collecting accounting data from financial statements and real-time trading data, Bloomberg also performs its own calculations and estimations for values that are of interest to financial professionals. The WACC, as a standard instrument often employed in the valuation of firms, is among the approximately 40,000 data fields provided by Bloomberg.

[43] For an overview of the shortcomings of the CAPM, see Fama and French (2003).

[44] Other models that are frequently employed are the Fama-French Three-factor model (Fama and French (1993)) and the Carhart Four-factor-model (Carhart (1997)).

[45] Bloomberg Professional Services was founded in the early 1980s and has since provided subscribers with access to an ever growing financial database. It has become a major source of economic and financial information that financial professionals and institutions rely upon for their analyses. Customers mainly include investment or commercial banks, investment firms, and brokerage companies. Access to the so-called Bloomberg-Terminal enables these firms to monitor fundamental data on more than 85,000 listed companies across more than 115 countries, currently covering 99% of market capitalization in global equity markets.

Bloomberg Financial Services is as of now the only database that comprises a consistent calculation of WACC as well as its components for a large number of firms located in various places around the globe. Real-time values as well as historic ones are accessible. First historic datapoints are available on a quarterly and semiannual basis from 2000 on, though values for all periods are only available for a minority of the companies.[46]

When examining how Bloomberg applies the basic WACC concept presented above, the first feature that should be noted is that preferred equity (*PE*) is included as a third source of capital in the calculation of Bloomberg's $WACC^B$:

$$WACC^B = r^E w^E + r^D w^D (1 - \tau) + r^{PE} w^{PE}. \tag{2.4}$$

The weights are determined in accordance with theory: Market capitalization values are used to determine the amount of equity, while accounting values are used for debt as well as preferred equity. The latter two are taken directly from the financial statement analysis as they are explicitly stated there. The amount of debt is differentiated between short-term debt (maturity ≤ 1 year) and long-term debt (maturity > 1 year). Short-term debt includes repurchase agreements of treasury bills or other short term securities.

For the cost of equity, the CAPM is employed, meaning that the cost of equity is determined according to formula (2.3). As the risk-free rate, Bloomberg generally uses the 10–year government bond yield of the company's domicile country.[47] The expected market return is calculated by Bloomberg as an implied return using forecasted growth rates, earnings, dividends, payout ratio, and current values. First, an internal rate of return for all members of the country's major index is calculated. Then, a capital weighted average of these values is formed, which is then taken as the expected market return. Subtracting the risk-free rate from the expected market return yields the so-called country premium. Multiplying the latter with the company's β, which is calculated by Bloomberg, produces the equity risk premium. Finally, the cost of equity is revealed by adding the risk-free rate. The calculation of the coefficient β deserves a closer look, as it is the only input factor of the cost of equity that differs across companies within one country.

Bloomberg's β is determined through a regression analysis between returns of an equity and returns of the major index of the country of domicile of the equity in question. Table A.1 in the appendix provides a list of the indeces used in the countries analyzed in this thesis. The standard Bloomberg β that is used in the WACC calculation is based on weekly values over a period of two years. The regression based

[46] Out of originally 37,794 companies in the OECD countries analyzed in this thesis, only 1,728 have a "complete" record for the period 2000–2017. For a more detailed description, see section 3.2.

[47] In cases where such a security is not available, a long term swap-rate is used instead. If this is also not available, the US government bond yield is used as a proxy.

on these values yields a so-called *Raw* β, which is then adjusted based on Blume (1971) and Blume (1975), who argues that beta moves towards the market mean of 1. Hence, the adjusted β is calculated as follows:

$$\beta^{Adj} = \frac{2}{3} * \beta^{Raw} + \frac{1}{3} * 1. \tag{2.5}$$

For securities that are not actively traded during the relevant time frame and for which there are therefore no return data to perform the calculation, β is assumed to be 1 for the purpose of WACC calculation. In cases where there are data, but there are missing data points, adjustments are made to compensate for the lower number of observations. However, for extremely low numbers of observations, the calculation produces unreliable estimates for β, leading to unreasonable cost of equity values. According to Bloomberg, this problem arises exclusively for highly illiquid securities. Section 3.3 addresses how these problematic values are dealt with for the purpose of this analysis.

Turning to the cost of debt, Bloomberg relies on estimations of short-term and long-term debt costs derived from fair market reference curves. Fair market curves are bond yield curves created by Bloomberg using various pricing data for different industry sectors and ratings, with the aim of making structurally different bonds comparable. These curves are constructed on a daily basis. Using fair market curves, objective bond prices can be derived even if a certain bond is not actually traded, based on bond prices within the same industry with comparable maturity and rating properties. Thus, whenever such a fair market curve is available for a firm, the cost for short-term and long-term debt are based on these curves, with a maturity of 1 year and 10 years as a reference point, respectively, weighted by their relative contribution to total debt.

However, fair market curves are not available for all firms. In such cases, Bloomberg turns to 10–year government bond rates and 1–year note rates for the long-term and short-term cost of debt. These are again weighted according to their proportion to total debt. Additionally, the resulting cost is multiplied by a so-called *Adjustment Factor*, which is dependent on the credit rating[48] of the firm. The lower the rating, the higher the adjustment factor. For companies where a rating is not provided, the adjustment factor is set to 1.38, which is the equivalent of a BBB+ S&P rating.

Bloomberg's WACC calculation, which is in accordance with the textbook consensus on WACC calculation, steps down the cost of debt for the corporate tax factor. To determine the corporate tax factor, Bloomberg relies on the effective tax rate, which it calculates as income tax expenses divided by pretax income. If one of those values is negative, an effective tax rate is not computed. Bloomberg gives preference to using a 12–months trailing tax rate, covering the whole year prior to the relevant date. Should the data not be available for the whole year, the effective tax rate for the requested quarter or half year, depending on whether quarterly or semiannual values are examined, is used instead. If such data are also

[48] Bloomberg refers to the Standard & Poor's rating for this.

not available, the tax rate is assumed to be zero. If, on the other hand, values are available and exceed 60%, they are capped at this threshold, so that the corporate tax factor $(1-\tau)$ can never fall below 0.4.[49]

Lastly, the cost of preferred equity is determined by dividing the amount paid in preferred dividends by the amount of preferred equity. This calculation is only undertaken when preferred dividends are available and positive for a trailing 12–months time frame. Whenever that is not the case, the cost of preferred equity is not calculated.

[49] Capping the tax rate in this way is necessary as sometimes for periods following large losses the tax rate can be inflated and therefore of limited usefulness. For example, Bloomberg's calculation of the trailing 12 months effective tax rate for a large German firm in the third quarter of 2002 yields a value of over 5,000% following a large loss in the fourth quarter of 2001, lowering the pretax income drastically. In order to prevent these adverse effects of using actual cash flows in the calculation of effective tax rates from influencing the WACC and rendering them completely meaningless, the 60% limit for tax rates was incorporated.

3 Bloomberg's WACC Data

The basis for the following analysis is a data set originally consisting of 37,794 securities from OECD countries listed in Bloomberg's database. For each of these securities, seven data fields were extracted from the database: WACC, weight of equity, weight of debt, cost of equity, cost of debt, 12–months trailing effective tax rate, and effective tax rate. These data were collected on a quarterly and a semi-annual basis for the years 2000–2017. Due to download limitations, data for 2017 could only be downloaded for a selected number of countries. In order to focus on the most relevant economies, this prolonged timeline only covers countries that are also in the G20[50]: Australia, Canada, France, Germany, Italy, Japan, Mexico, South Korea, Turkey, the United Kingdom (UK), and the US. For the other countries, the time frame under consideration is 2000–2016. For some companies, data are only available on a semiannual basis. Each country's quarterly and semiannual data sets were then merged, giving a prior to the quarterly values when both a quarterly and a semiannual value are available.

In total, 970,164 data points for the WACC (and its respective components) were available at the time of data collection. However, not all of these values can be used. Prior to conducting the analysis of the WACC evolution from 2000–2017, certain modifications to the Bloomberg data set needed to be undertaken in order to deal with inaccuracies in the original data set. The present chapter describes these adjustments and justifies why they were necessary. This will be done in the order that the modifications were made. The data set underwent five adjustment processes:

1. Elimination of multiple entries
2. Elimination of firms with insufficient number of data
3. Elimination of outliers
4. Adjustment for preferred equity
5. Adjustment for taxes

After the elimination and adjustment processes, the resulting new WACC values were derived. They constitute the basis for the subsequent analysis in Chapter 4. The following sections will describe the five steps in more detail.

[50] The G20 was founded with the intention of bringing together countries that are systemically relevant to the global economy. They represent over 85% of worldwide Gross Domestic Product (GDP) and two thirds of the world's population.

3.1 Elimination of Multiple Entries

When composing the original data set, a list of equity instruments was downloaded for all companies with an OECD country as their country of residence. Some companies in the data set have multiple securities, which can be due to several reasons. Some firms have American Depository Receipts (ADR) that are listed in the US market or similar instruments for other countries in addition to their common stock.[51] Others have common stock and preferred stock that are listed separately.[52] In all cases, the data for the WACC calculation refer to the company as a whole. For the purpose of this analysis, each firm is only considered once. Multiple entries are eliminated from the data set, reducing the number of equities by 718.

3.2 Elimination of Firms with Insufficient Number of Data

The frequency and availability of WACC data differ significantly across firms. While Bloomberg's data on the WACC are available in 71 quarters for over 1,700 firms, over 9,600 firms have no such data entries at all. These firms without any data are eliminated first. For some of the remaining 27,220 firms only semiannual data are available, while for others quarterly data are only available for part of the time frame. On average, firms report WACC values for 34.9 quarters, the median firm reports 31 quarters.[53] 808 firms only report a single value, over 80% of which are for the fourth quarter of 2016. This is an artifact of the download method and affects the data that were downloaded in the beginning of 2017. In addition to extracting the historic data from the database, the Microsoft Excel plug-in employed calculates current WACC values. This estimate is only produced for the most recent quarter using real-time data. It is also calculated for securities for which historic data are usually not available. This means that if had the formula been applied on another date, the values would likely differ. Therefore, these estimates are highly unreliable and should be eliminated from the data set. In addition, only firms that have reported data for at least 5 quarters and have thus been in the sample for more than a year are considered in the analysis. This qualification eliminates 1,872 firms from the data set.[54]

[51] One example of this is Banco Santander in Spain. In addition to the "SAN SM Equity" security, there is the "SAN US Equity" (ADR for the US market) and the "BSAN33 BZ Equity" (BDR for the Brazilian market).

[52] Ottakringer Getränke AG in Austria is an example of this case, with their common stock "OTS AV Equity" and their preferred stock "OTV AV Equity".

[53] See the appendix for a histogram of the occurrence of reported data, Figure A.2.

[54] This mainly affects the last two years under consideration. For a robustness check, the limitation was dropped. This did not change the overall results notably. For most of the time frame, the average difference per half year amounted to less than a base point. For the WACC and cost of equity values in 2016/2017, including all firms lowers the average of these cost components by 2–10 base points.

3.3 Elimination of Outliers

After these first two steps, the data set still contains outliers. This becomes evident when examining average values of the WACC over the whole time period considered as well as over the quarters individually. The average value for the WACC not only shows high fluctuations, but also negative values, as can be seen in table 3.1.[55] By contrast, the median remains relatively stable. The average over all values at this point is –39%, while the median is just below 7.2%. Negative cost of capital values—especially to the extent seen in the last 6 quarters—are not in line with either theory or practice, suggesting that there are errors in the data calculation. At the same time, a value of over 27% for the third quarter of 2008 seems equally unlikely to be accurate. A closer look at the data set reveals the drivers behind these discrepancies. The highest value for the WACC is found in the third quarter of 2008 and exceeds 370,000%, while the lowest value is at less than –35,000,000% in the third quarter of 2016. The source of this clearly faulty data lies in the cost of equity, more specifically the coefficient β. As mentioned above, the calculation of Bloomberg's β can be problematic in cases of highly illiquid securities. In these instances, faulty β values translate into cost of equity levels that are disconnected from any form of reasonable estimate of the true cost. These data should not remain in the data set going forward. For the purpose of outlier elimination, the focus will be on the cost of equity, since this is where the problem originates. First, an assessment of the scope and distribution of values outside reasonable parameters is necessary. Based on the findings, an appropriate method to detect and eliminate outliers is then chosen.

Quarter	Average	Median	# Firms	Quarter	Average	Median	# Firms
2004Q1	–23.7	6.3	5,539	2012Q3	14.1	7.6	14,743
2004Q2	–8.3	6.2	9,773	2012Q4	11.7	7.3	19,555
2004Q3	–37.0	6.6	5,665	2016Q1	10.1	7.0	17,742
2004Q4	6.6	6.3	10,509	2016Q2	8.3	6.2	22,117
2008Q1	2.1	7.2	11,931	2016Q3	–1,938.5	6.6	18,255
2008Q2	7.1	7.5	15,287	2016Q4	–42.1	6.6	22,887
2008Q3	27.3	7.8	12,276	2017Q1	–134.3	7.2	14,789
2008Q4	12.3	7.7	15,294	2017Q2	–115.7	7.0	16,971
2012Q1	7.9	7.7	14,772	2017Q3	–131.9	7.3	14,676
2012Q2	7.8	7.8	18,359	2017Q4	–48.7	7.2	15,074

Table 3.1: Selected WACC Averages Over All Firms Before Outlier Elimination. Source: Own calculation based on Bloomberg's data.

[55] Table A.2 in the appendix provides the numbers for all quarters.

To assess the extent of the problem, each country is first analyzed with respect to the mean and median cost of equity, the lowest and highest number, as well as the number of negative, moderately high (25–50%) and distinctly high (above 50%) values. An overview of the results is presented in table 3.2. It shows that the problem manifests itself unsystematically across the data set: While the distributional properties seem to not be affected for some countries, for others they are clearly driven by outliers. A good example for the former case is Austria with exclusively positive values for the cost of equity and only a few moderately inflated values. Another interesting example is Czech Republic with just two highly inflated values that drive up the average value significantly, while the rest of the data set is within the range one would expect from the cost of equity. A prime example for the opposite case is the US data set. The highest and lowest values over all countries stem from the US data set, as well as the largest absolute number of negative values and distinctly high values. In relative terms, only the Canada data set includes a larger amount of negative and high values.

In addition to being unevenly distributed across countries, the outliers are also not necessarily restricted to single firms. A firm can have just one odd value out of 50 perfectly reasonable values. For other firms, the cost of equity can be within reasonable limits half the time, with the outliers being distinctly high values in some quarters and negative values amounting to several 100% in others. The culprit is Bloomberg's β, which in these cases is calculated using insufficient data in the affected quarters. This is specific to each quarter, as illustrated by firms with only a few values that are out of order. As it would seem unnecessarily strict to eliminate an entire firm in such cases, only the specific outliers are dropped from the sample.

The process of identifying and eliminating outliers can take many forms and depends on the underlying context and structure of the data as well as the nature of the outliers. In this case, the outliers stem from errors in the computation and should be eliminated. Given a specific range of values that the cost of equity can take would make identifying outliers an uncomplicated process. However, while one could argue that the cost of equity should not be negative and therefore 0 could be a lower bound, the upper bound is a much harder question. Certainly, a cost of equity exceeding 100% seems unreasonable. 50% also seems to still be too high, but values around 25% don't seem so far fetched anymore, especially considering high-risk profiles.

Country	Average	Median	Min	Max	# neg	# > 25	# > 50	# Values
Australia	9.2	8.8	–1,527	521	1,162	257	49	38,142
Austria	9.8	8.9	2	41	0	13	0	3,035
Belgium	8.2	8.0	–16	24	22	0	0	3,014
Canada	10.7	10.2	–13,907	20,052	6,769	3,811	887	102,088
Chile	7.7	6.7	–439	2,111	45	2	8	9,236
Czech Republic	14.6	7.8	1	2,099	0	0	2	447
Denmark	8.6	8.1	–34	33	17	6	0	5,732
Estonia	11.9	9.7	3	35	0	33	0	610
Finland	8.5	8.1	–105	39	15	4	0	6,633
France	8.5	8.2	–85	446	93	7	6	14,490
Germany	9.0	8.6	–26	32	53	14	0	18,350
Greece	8.7	8.4	–20	64	110	12	1	11,846
Hungary	11.2	9.0	–190	1,681	27	13	3	1,305
Iceland	6.2	5.8	–4	22	2	0	0	474
Ireland	10.0	9.5	–10	36	20	12	0	2,260
Israel	9.4	9.2	–1,249	6,725	294	73	39	22,256
Italy	10.0	9.6	–539	203	9	9	2	12,167
Japan	9.3	8.5	–4,132	624	473	644	62	231,812
Latvia	11.0	6.9	–193	2,934	74	30	14	1,319
Luxembourg	9.1	8.6	–8	33	9	2	0	1,021
Mexico	9.5	9.3	–386	35	34	8	0	6,958
Netherlands	9.4	9.2	–175	45	34	7	0	4,561
New Zealand	9.8	8.5	–798	3,217	55	22	13	2,576
Norway	9.1	8.5	–158	58	35	66	4	8,283
Poland	9.2	9.0	–38	56	50	19	3	16,510
Portugal	9.8	9.1	–4	34	5	6	0	2,443
Slovakia	6.1	5.6	–35	26	7	2	0	478
Slovenia	10.0	7.2	–2	448	10	2	7	838
South Korea	11.1	10.8	–5,492	4,793	330	195	32	55,457
Spain	10.4	10.3	–179	74	17	13	2	5,623
Sweden	7.8	8.0	–1,249	185	401	20	10	19,446
Switzerland	8.3	7.8	–41	517	74	6	9	7,350
Turkey	10.7	10.4	–56	305	44	6	3	19,107
United Kingdom	8.5	7.9	–426	8,683	339	105	7	32,669
United States	–307.4	9.5	–70,121,576	408,838	6,927	1,804	1,312	276,577
All Countries	–83.2	9.1	–70,121,576	408,838	17,556	7,223	2,475	945,113

Table 3.2: Cost of Equity After Step 1 and 2. Source: Own calculation based on Bloomberg's data.

An easy and often-employed method to eliminate outliers is to simply cut the top and bottom 0.5 or 1% of the data set. For the top and bottom percent, this eliminates all values below –4.65% and all values above 25.2%. When eliminating the top and bottom 0.5%, the remaining values are between –13.73% and 33.47%. This percentage threshold method might be considered "quick and dirty", but it is easily comprehensible, eliminates the most problematic outliers and is not dependent on any other assumptions regarding the underlying distribution of the data. Other methods that are widely used[56] are the following:

Z-Score method[57]

Defines an outlier as any value that is more than three standard deviations from the mean.[58]

MAD method[59]

Defines an outlier as any value that is more than three scaled median absolute deviations (MAD) from the median.[60]

IQR method[61]

Defines an outlier as elements more than 1.5 interquartiles ranges (IQR) above the third quartile or below the first quartile.

Grubbs test[62]

Using hypothesis testing, this method removes outliers one by one until the test no longer detects any outliers. It is also known as the Extreme Studentized Deviate test.

Generalized Extreme Studentized Deviate (GESD) test[63]

Similar to the Grubbs test, but better suited if the number of outliers is unknown and outliers are suspected to mask each other.

The Z-Score method is highly susceptible to large outliers and thus not a robust statistic for the data set in this analysis. Additionally, it assumes a normal distribution of the underlying data, otherwise the mean and standard deviation are biased. Running an Anderson-Darling test for normal distribution[64] rejects the null hypothesis that the data follow a normal distribution at the 5% level. Therefore, the Z-Score method would not yield appropriate results. This can easily be seen when attempting to utilize it: With the mean of the overall data set being –83.22% at this point and the standard deviation being 72,610.59%, this technique would leave a significant number of outliers unaffected. The MAD

[56] See Iglewicz and Hoaglin (1993) for an overview.
[57] See Aggarwal (2017, pp. 6–7) and Shiffler (1988).
[58] Three is the number most commonly used for this approach, though other multipliers can be used as well.
[59] See Huber (1981).
[60] The scaling factor is assumed to be 1.4826 in accordance with the standard practice.
[61] See Tukey (1977) and Aggarwal (2017, pp. 45–46).
[62] See Grubbs (1969).
[63] See Rosner (1983).
[64] According to Anderson and Darling (1952). See also Stephens (1974) for further specifications.

method seems to yield more reasonable results: The median of the data set is 9.07%, the scaled MAD is 3.48%. Therefore, all data points outside the range –1.37% to 19.51% would be eliminated. Assuming that 20% is still a reasonable value for the cost of equity, this method would eliminate possible false positives, i.e. data that are not actually erroneous. Furthermore, the MAD method also assumes a normal distribution of the underlying data, meaning that the results are again biased. In fact, all methods mentioned above except for the IQR method make this assumption. Therefore, none of the methods except for the IQR method are fit to accurately detect outliers in the data set. However, the IQR method is problematic as well as it would employ an even stricter range than the MAD method, eliminating all values below –0.32% or above 18.92%. This would reduce the data set by almost 2% on the lower and almost 4% on the upper end. Employing the simple percentage threshold thus seems like the best option out of the commonly used outlier detection practices.

There are other methods that are more elaborate and could yield more accurate assessments of the cut-off points for outliers even for non-normal distributions. However, the exact cut-off point might not be critical in the ongoing analysis if the data distortions stem mostly from extreme outliers. Hence, simply cutting of the top and bottom 1% values seems sufficient for this analysis. In order to test the sensitivity of the data to the exact cut-off point, the top and bottom percentile as well as the top and bottom 0.5% of the complete data set are eliminated. As mentioned above, for the top and bottom percent all values below –4.65% and all values above 25.2% are eliminated. This range is slighty wider when eliminating the top and bottom 0.5%, between –13.73% and 33.47%. Comparing the average values of the cost of equity after the elimination by quarter, the differences are negligible.[65] With this in mind, it is unlikely that a more elaborate method to eliminate the outliers will affect the results of the analysis. Therefore, the simple cut-off method using 1% will be used in this case, as it eliminates more of the negative data while setting an upper bound that seems sensible.

Another decision that needs to be made with respect to the elimination of outliers is whether to eliminate outliers from the data set of all countries combined versus eliminating outliers for each country separately applying the same elimination process. The lower and upper bound when applied to the whole data set have already been mentioned. Due to the fact that the outliers are not distributed evenly across countries, this elimination method leads to some countries being cut more than others: Canada (8.45%) or Latvia (6.6%) are for example affected more than Germany (0.15%) or Iceland (0%). With this method, six countries lose more than 2% of their data items, while the remaining 29 lose less than 2%. Another option would be to cut 2% of the data for each country separately. The difference in the average value over all quarters and all countries compared to the other method is negligible. However, at the country level, this second approach leads to highly diverging lower and upper bounds. For some countries, e.g. Czech Republic (3.04%–20.3%) or Italy (5.03%–19.11%), this will eliminate values

[65] The difference between the mean values by quarter ranges from –0.06 to 0.19 percentage points. On average, the difference is 0.

that should not be considered outliers, while it does not exclude questionable values in other countries such as Canada (–27.02%–46.58%) that have a disproportionately higher share of unreasonable values.[66] Over all countries and all quarters, these different cut-off values do not play a big role. Later on in the analysis at a national quarterly level, however, this method could have a significant effect on the outcome. While in general it might be desirable to treat all countries equally for cross-country analyses, due to the unsystematic distribution of the outliers across countries this would have adverse effects going forward. Therefore, the top and bottom percentile of the data set containing all countries are removed to eliminate outliers instead of removing them for each country separately.

3.4 Adjustment for Preferred Equity

As mentioned above, Bloomberg includes *Preferred Equity* as a third source of financing when calculating the WACC. This section will describe the adjustments made to Bloomberg's data with respect to preferred equity. First, it is important to point out the reasons that necessitate corrections to Bloomberg's calculations. Second, the nature of the adjustments will be discussed. To illustrate the shortcomings within the data set, examples of firms will be provided. The data on preferred equity were not downloaded and are thus not part of the original data set.[67] However, it can be inferred from the values that were downloaded: w^E, w^D, and w^{PE} have to add up to 100, and with all other values in formula (2.4) known, calculating the cost of preferred equity used by Bloomberg is straightforward.

When calculating the necessary data, Bloomberg takes the amount of preferred equity from the financial statement of the firm. In cases where firms do not specifically provide information on sources of financing other than common stock or debt, Bloomberg will set the weight of preferred equity to 0. For the cost component, dividends paid out to holders of preferred equity are divided by the amount of preferred equity. This value is only computed if preferred dividend data for the previous 12 months are available, otherwise it is set to 0. This convention is one source of inaccuracy within the preferred equity data employed by Bloomberg, another stems from the availability of detailed information on preferred equity instruments provided by the firms. Preferred equity is a general term and describes a class of instruments that are senior to common stock and subordinate to debt instruments. They can exhibit properties of both debt and equity instruments. The classification of such instruments as either equity or debt is highly complex and has received widespread attention in the accounting literature. Accounting standards such as the IAS 39 and IAS 32 have taken on this topic, a major contribution has also been the new IFRS 9.[68] While the rules set by these standards offer a framework for the clas-

[66] For a complete list for all countries, see table A.3 in the appendix.

[67] Due to limited funds as well as download restrictions, downloading these data for all firms would have meant that the number of firms that could be downloaded would have had to be diminished significantly.

[68] The IFRS 9 standard became binding for firms in 2018 and therefore after the time frame covered in this analysis. However, firms could choose to follow it as early as 2015.

sification, they still leave room for discretionary decisions in certain cases. As the information used by Bloomberg is taken from the financial statement, the resulting data depend entirely on the firm's accounting practice in such cases. The following examples illustrate the consequences of this:

BMW and Procter&Gamble report the use of preferred stock in their annual reports. Nonetheless, the treatment of this preferred stock in the balance sheet differs. BMW offers the consolidated amount of "subscribed capital", consisting of common stock and preferred stock, and gives more detailed information on the respective number of shares in the report itself.[69] Procter&Gamble on the other hand reports preferred and common stock in separate entries under "Shareholders' Equity" in the balance sheet itself. For Bloomberg's data, this has the effect that for Procter&Gamble, the weight of preferred equity is positive, while for BMW preferred equity is not considered separately. In the case of Procter&Gamble, the amount of preferred equity amounts to less than 2% in every quarter, but for other firms this amount can be much higher, more than 50% in some cases. The preferred dividends that Procter&Gamble pays out to its shareholders in absolute terms are the same as the dividends paid out to common shareholders.[70] Calculating the cost of preferred equity used by Bloomberg reveals that it is well above 20%, which is more than three, in some quarters even four times the cost of equity. In the BMW case, due to the preferred shares being included in the equity portion of the WACC calculation, the cost that is applied to the cost of equity is also applied to the preferred shares. Here, this actually leads to a slight underestimation of the cost of preferred equity, as the dividend on preferred shares is 0.02€ above the dividend on common shares.[71]

Another company with preferred equity as a component of its WACC calculation for all quarters after 2014Q1 is Deutsche Bank. Like Procter&Gamble, the weight of preferred equity is below 2%. Deutsche Bank's preferred equity does not come in the form of preferred shares like in the other examples, but instead the balance sheet reports "Additional Equity Components". These so-called "AT1–Notes" qualify as additional Tier–1 capital under the Basel III framework. In the case of Deutsche Bank, the cost of preferred equity that is used by Bloomberg is 0%. The coupon for these instruments given out by Deutsche Bank is in fact at least 6% and therefore much higher than the cost used by Bloomberg.[72] Using these examples, it is clear that using Bloomberg's classification as well as calculated cost of preferred equity is problematic. In addition to the examples mentioned above, other errors in the data cannot be ruled out. Even after the elimination of outliers in step 3, WACC values far outside the reasonable range remain: the lowest WACC value is at almost –50%, the highest exceeds 900%. This time, this is due to the preferred equity part of the calculation. In the former case, the

[69] The aforementioned Ottakringer Getränke AG is another example of this. Even though they specifically have separate preferred stock, the underlying data for both the common stock and the preferred stock are taken from the balance sheet which does not explicitly differentiate the two.
[70] See Procter & Gamble (2008).
[71] As stated in §24 of the Articles of Incorporation of BMW AG.
[72] See Deutsche Bank AG (2014) for information on the issuance of these capital instruments.

weight of preferred equity is above 90% at an estimated cost of below –50%. In the latter case, 0.02% of preferred equity at a cost of over 4,000,000% drive the WACC into inflated territory. Hence, the preferred equity portion of Bloomberg's calculation is highly susceptible to errors and inconsistencies that have to be addressed.

In the data set, approximately 3,600 firms report some sort of preferred equity at least once. While no firms are affected for some countries (Estonia, Iceland), the share of firms with preferred equity can exceed 10% in others (e.g. Netherlands, South Korea), for the US it is as high as 36.4%. The average weight of preferred equity differs drastically, from 0% (Luxembourg) to 25.4% (New Zealand). Examining the average cost of preferred equity employed by Bloomberg, it again becomes clear that the cost estimate used by Bloomberg is flawed. For Austria, where 4 out of 72 firms report preferred equity for a total of 64 entries with an average weight of close to 10%, the cost of equity across all those incidents is 0%. At the other extreme, the US firms—while exhibiting a similar average weight of preferred equity—have an average cost of close to 6,000%, an amount just as unreasonable as 0%.

The examples presented above illustrate the nature of the problem, the scope of it was also shown to be notable.[73] In order to mitigate the effect of these flaws in the data set, the weight of preferred equity is added to the weight of equity in each case, and therefore assigned the same cost as the cost of equity. This approach also has its drawbacks in potentially oversimplifying the cost structure. As was mentioned, the classification of hybrid financial instruments that exhibit both elements of debt and equity is not clear-cut. In addition, Bloomberg is not transparent which instruments actually qualify as "Preferred Equity". However, when surveying a sample of the data and analyzing the annual reports, each case of explicitly stated preferred equity exhibited properties of equity rather than debt and was classified as being a part of equity. Due to the significant flaws in the cost of preferred equity used by Bloomberg, approximating the cost of preferred equity by using the cost of regular equity is assumed to yield a more realistic estimate of the actual cost.

3.5 Adjustment for Taxes

As was already described in section 2.2, the analysis in this thesis should be based on a before-tax basis. Bloomberg's WACC are calculated in accordance with the textbook definition as an after-tax rate with respect to corporate taxes. A reformulation of the WACC with stepped-up cost of equity in line with formula (2.2) becomes necessary. Data on the 12–month trailing effective tax rate as well as the effective tax rate were collected along with the rest of the WACC data. Thus, Bloomberg's corporate tax factor is known and the before-tax cost of debt can be calculated. However, this same corporate tax factor should not be used to step up the cost of equity. Section 2.3 outlined the Bloomberg convention of

[73] For an overview for all countries, see table A.4 in the appendix.

calculating the tax rate. After accounting for steps 1–4 of the adjustments, only a little over half of the data items have a 12–months trailing effective tax rate value. About 25% of the others at least have an effective tax rate, meaning that in 33% of the sample Bloomberg uses a corporate tax rate of 0% in the given quarter. It is highly unlikely that this accurately reflects the tax burden borne by the companies in these cases. At the other extreme, as described in section 2.3, Bloomberg's method of effective tax rate calculation can also lead to values of several hundred or even several thousand percent, see footnote (49). As a consequence, Bloomberg caps effective tax rate at 60% for the WACC calculation. Thus, Bloomberg's tax rate is very volatile and does not reflect the typical tax burden a company would use in their financial budgeting frameworks. When using the WACC as a benchmark for investment decisions, it would be more sensible to use a tax rate that reflects the average tax rate expected by the firm. Bloomberg's effective tax rate is not a reliable estimate in this regard.

As no data on this for each firm in the data set are available, nationwide tax rates are used. The OECD database provides data on statutory tax rates for all countries in the data set. A better suited tax rate would be an estimation of an effective tax rate, which is typically below the statutory rate. There are several ways to calculate effective tax rates. Spengel et al. (2019) provide an overview of different tax rates in their project report for the European Commission Taxation and Customs Union DG. In addition to an overview of statutory tax rates, they calculate effective marginal and effective average tax rates for the EU countries and selected non-EU countries based on the Devereux/Griffith[74] methodology. While this approach might be a better suited proxy for the actual tax burden borne by firms, the method relies heavily on assumptions regarding the specific investment undertaken. A more severe caveat of the effective tax rate data set is that it does not cover all OECD countries. This would result in seven countries having to be completely eliminated from the analysis due to missing data on effective tax rates. These countries are Australia, Chile, Iceland, Israel, Mexico, New Zealand, and South Korea. In addition, Canada, Japan, Norway, Switzerland, Turkey and the US would have to be taken from the data set prior to 2005. Using statutory tax rate data, no such curtailment of the data set is necessary. For the purpose of this analysis, this benefit outweighs the possible advantages of effective tax rates over statutory tax rates in portraying the tax burden of firms within a specific country. Additionally, the statutory tax rate of a company's country of domicile is less volatile than the individual firm's effective tax rate by quarter and therefore a more stable and more appropriate tax rate for investment decisions.

3.6 Final Data Calculation

After the completion of the 5 adjustment steps described in this chapter, a total of 25,348 firms and a total of 926,209 observations per component remain. For each firm, a quarterly WACC value was calculated using the cost and weight values of debt and equity if available. These values were then converted to semiannual values by averaging the first two and the last two quarters of each year. This was

[74] See Devereux and Griffith (1999) and Devereux and Griffith (2003).

deemed necessary in order to smooth the data. For certain countries, data were available on a semiannual basis for almost all firms, leaving every other quarter with either none, or just a handful of firms, to determine that quarter's average. For example, in Australia, more than 1,000 data points per quarter are available for every even quarter after 2006, while the number of data points in the odd quarters doesn't even exceed 22 until 2016. Up to 2005, no data at all are provided for the odd quarters. This artifact leads to strong fluctuations in the data. To address this issue, semiannual values for each firm are used instead. This reduces the number of values per component to 543,777. Following this step, average values of WACC, cost of debt and equity as well as the weights of debt and equity data over all firms within one country (see section 4.1) or industry (see section 4.2) are calculated.[75] Trend lines based on a simple linear regression are added to the data on the cost of capital components.

[75] For a robustness check, median values for the cost components were also derived. Using the median tends to lower the estimates slightly, though not in all cases. Nonetheless, all qualitative results presented in Chapter 4 also hold when using the median instead of the mean.

4 Results

This chapter presents the evolution of the WACC and its components between 2000 and 2017. While all firms in the data set are listed on a stock exchange and can be classified as capital-market oriented, this is where the similarities end. The data set covers all types of firms from local companies with a handful of employees, to global players with hundreds of thousands of employees. For the average values, all companies entered the calculation with the same weight. The aim of this analysis is to explore the average cost of capital irrespective of specific company characteristics such as turnover or market capitalization. Weighting the data with such a metric—assuming that a sensible metric can be identified—would bias the estimate in an indeterminate way and thus obscure the results. While it may be interesting to explore whether or not capital costs differ depending on, for example, the size of a company, the required data to do so covering the entirety of the data set could not be obtained at this point.

The results of the present analysis contribute to the literature as a basis for further research, which could then cover such questions. To date, no other work has taken a detailed look at the development of the WACC and its components for such an extensive data set, particularly in connection to the current low interest rate environment. Examining the capital costs of various firms from different industries, for a wide range of countries, can lead to valuable insights on how the low interest environment has affected firms. A downward trend in the cost of capital, similar to the decline in e.g. government bond yields, could suggest that productivity is indeed low, lending support for the secular stagnation narrative advanced by Summers[76] and others.

Several components of the WACC are dependent on market prices that can react in a volatile fashion in response to economic shocks. This is especially true for the equity part of the WACC, where share prices influence both the weight and cost of equity directly. Therefore, when examining the WACC, certain fluctuations in the markets may also be visible in the WACC evolution. While many factors influence the markets, making them too complex to ever be fully understood, certain effects of major shocks seem likely: a recession will presumably lead to a majority of stock prices falling, diminishing the weight of equity; the increased perceived risk during and following a recession typically leads investors to demand a higher risk premium. As a consequence, the global assessment of the WACC should be

[76] See Summers (2014) and Summers (2015).

conducted given the backdrop of what generally moved the markets in the time period under consideration. Figure 4.1 provides an overview of major global events that influenced market movements in major economies.[77]

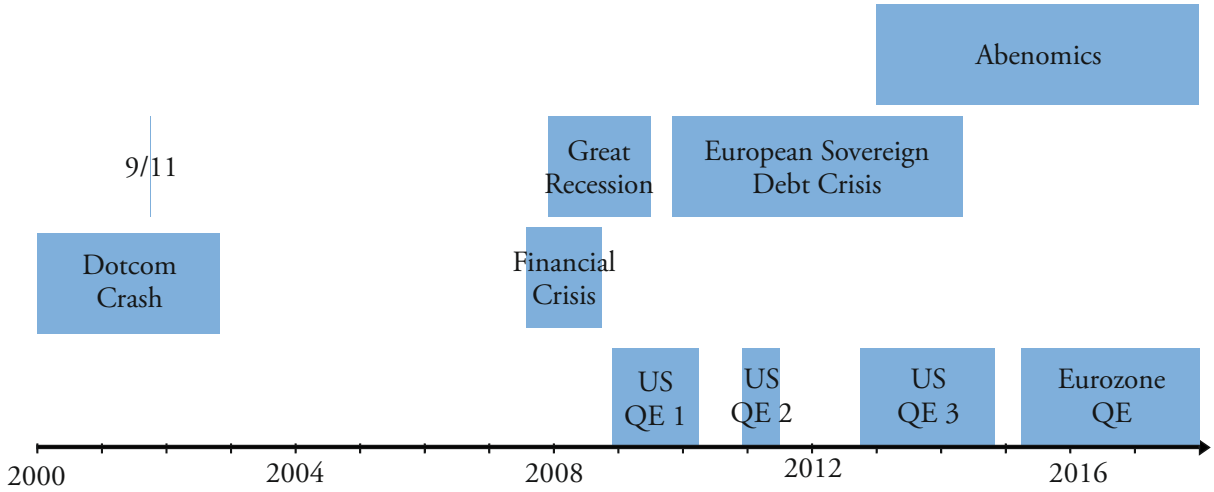

Figure 4.1: Important Events in Major Economies.

In order to provide a comprehensive but at the same time non-repetitive look at the results, only a selection of countries is presented in more detail to familiarize the reader with the key takeaways. The main result taken from all firms in the data set is then presented, before turning to the evolution within specific industrial sectors. Selected graphs and data are included in each subsection of section 4.1 and section 4.2.

4.1 Evolution of WACC Data by Country

This section presents the results on a country basis. First, selected major economies such as the US, Japan, and Germany will be analyzed. Afterwards, the main result will be presented: the evolution of the WACC components over all 25,348 firms in the sample, covering all OECD countries. Finally, a few special cases are presented. The graphs and underlying data for all OECD countries, including the ones not specifically mentioned in the text, can be found in the appendix.

4.1.1 Selected Countries

United States At the outset, the US as the largest economy by GDP and biggest contributor to the sample will be observed. The number of firms per half year varies between 2,653 (2000I) and 6,060 (2016II). On average, 3,934 firms from all sectors across the economy contribute to the finalized graph-

[77] QE denotes the different Quantitative Easing programmes.

ics. Figure 4.2 shows the evolution of the WACC cost components on the top and the corresponding weights for debt and equity on the bottom.

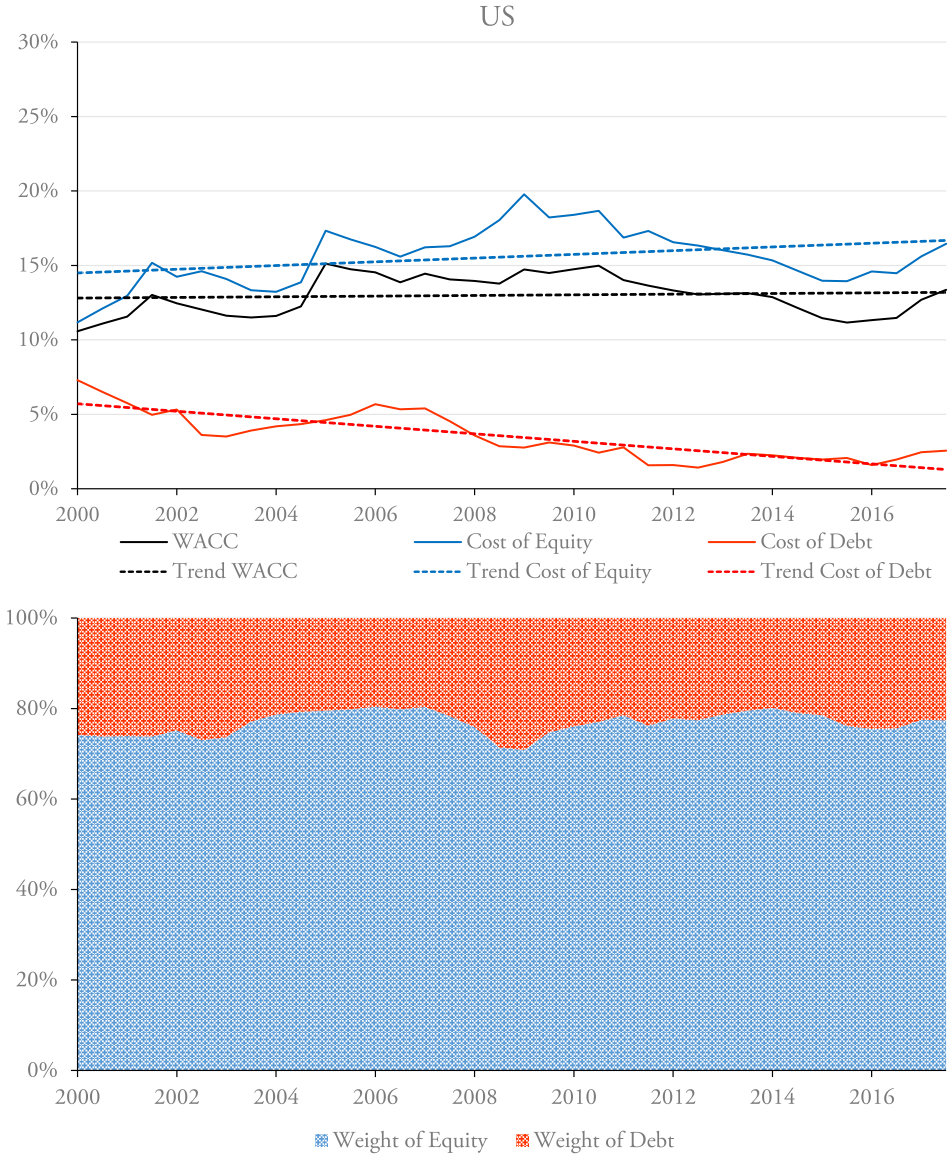

Figure 4.2: WACC and Components United States 2000–2017. Source: Own calculations based on Bloomberg's data.

A first glance at the graph already uncovers an interesting feature: The WACC is relatively stable over the time period covered. Although there are minor fluctuations and the WACC is slightly higher towards the end of the time frame with 13.4% in 2017II vs. 10.6% in 2000I, the trend line suggests an increase of just 1 base point per year, indicating no significant upward or downward movement in the cost of capital. The same cannot be said for the cost of equity and the cost of debt. While the cost of debt exhibits a pronounced downward trend between 2000 and 2017, the cost of equity increases from around 11.2% in 2000I to 16.5% in 2017II. The latter reaches its peak in 2009I at 19.8% following a steady upward climb that gained momentum in the beginning of 2008. This is consistent

with the timing of the Great Recession, which, according to the National Bureau of Economic Research (NBER), lasted from December 2007 until June 2009.[78] The rise in the cost of equity could thus—among other factors—be attributed to a higher perceived risk due to the economic downturn, leading shareholders to demand a higher premium in exchange for providing capital. The cost of equity declines rather slowly afterwards and only falls below 15% towards the end of 2014. This points to a persistently high risk assessment of shareholders through the economic recovery process. The cost of debt closely corresponds to the evolution of the long-term yield on US government bonds. This is not surprising, considering the relationship between such government bonds and other long-term interest rates. Long-term government bonds, home loans, and corporate bonds all attract the same type of investor, namely one that is looking for steady returns from fixed-income assets. Therefore, there is a close interrelation between these rates.[79] The gap between the cost of equity and the cost of debt widens during the Great Recession, reaching its maximum in 2009I. It is 1.5 times as large following the Great Recession as it was prior to it.

Another feature of the graphic that deserves closer attention is that the WACC curve is closer to the cost of equity curve than to the cost of debt curve. The reason can be seen in the bottom graph of Figure 4.2, which identifies equity as the major source of financing according to market values. The ratio between the two is more or less constant over the time period covered at about 3:1, though there is a pronounced dip in the weight of equity. It starts to decline in 2007II and reaches its minimum in 2009I, again corresponding to the timing of the Great Recession. During the economic crisis, the stock markets experienced a steep downturn, which is reflected in the results shown as the weight of equity corresponds to the market capitalization of the firms. Responding to the crisis, firms had to lower their debt levels in order to regain their shareholders' trust. Looking at the non-financial corporate sector for the US, the total debt level declined between 2008 and 2010, see Figure 4.3. Paired with the recovery of the stock market, this led to an upward trend in the weight of equity following the Great Recession. Even though the rise in the stock market has continued without a major crash for the remainder of the time frame, this has not lead to a further rise in the weight of equity in Figure 4.2. Figure 4.3 shows the drastic rise in the level of debt for the non-financial corporate sector that started in 2011, paralleling the rise in the stock market and keeping the ratio between equity and debt fairly constant.

[78] See National Bureau of Economic Research (2019).

[79] See M. T. Allen et al. (1999) for an examination of the relationship between mortgage rates and risky as well as riskless capital-market rates.

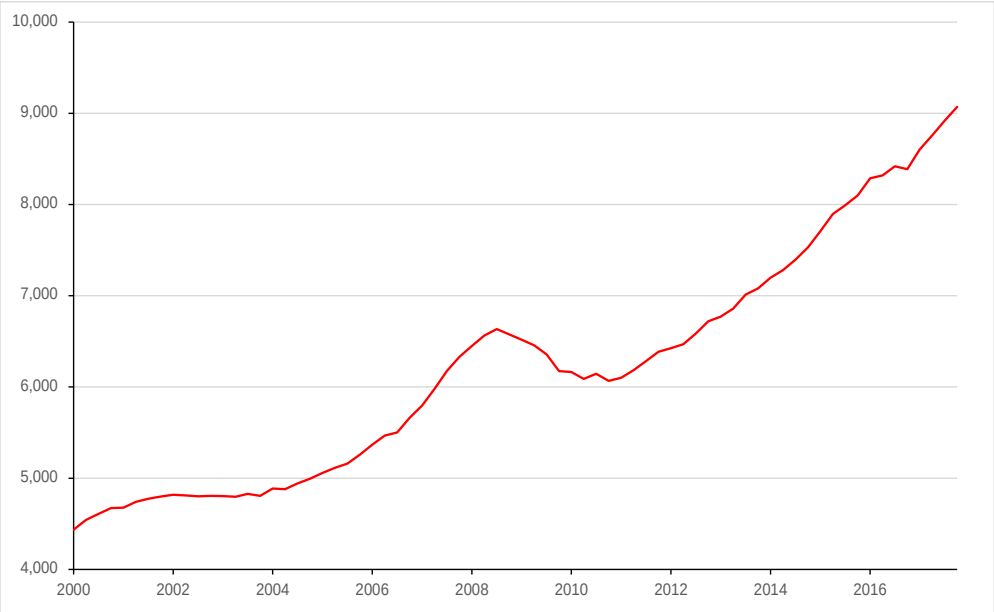

Figure 4.3: US Nonfinancial Corporate Business Debt 2000–2017. Billions of Dollars, seasonally adjusted. Source: FRED <https://fred.stlouisfed.org>, series BCNSDODNS, quarterly data, retrieved November 2019.

Germany Figure 4.4 presents the results for Germany, where data are available starting in 2000II. All three cost components exhibit a uniform downward trend. Similar to the US case, the cost of debt follows the cost of long-term government bonds. Toward the end of the observed period, this cost declines farther and falls below 1% in 2014II. In contrast to the US data, the German cost of equity follows a downward trend, prompting the WACC to decline overall as well. Even though both the WACC and cost of equity start out a few percentage points above the US level, towards the end of the timeline they fall below 10%. The preceding rise in cost of equity to just under 20% in 2010II and accompanying increase in WACC manifests itself after the Great Recession rather than paralleling it. Instead, it occurs during the time of the European sovereign debt crisis, which started in 2010 and added a high degree of uncertainty about the immediate future concerning economic recovery. During this time and lasting until 2012, the gap between the cost of equity and cost of debt widens. Excluding this episode, the difference between the two costs is fairly constant, averaging at 9.9%. Thus, the risk premium after the Great Recession does not seem to fundamentally differ compared to the risk premium prior to the crisis.

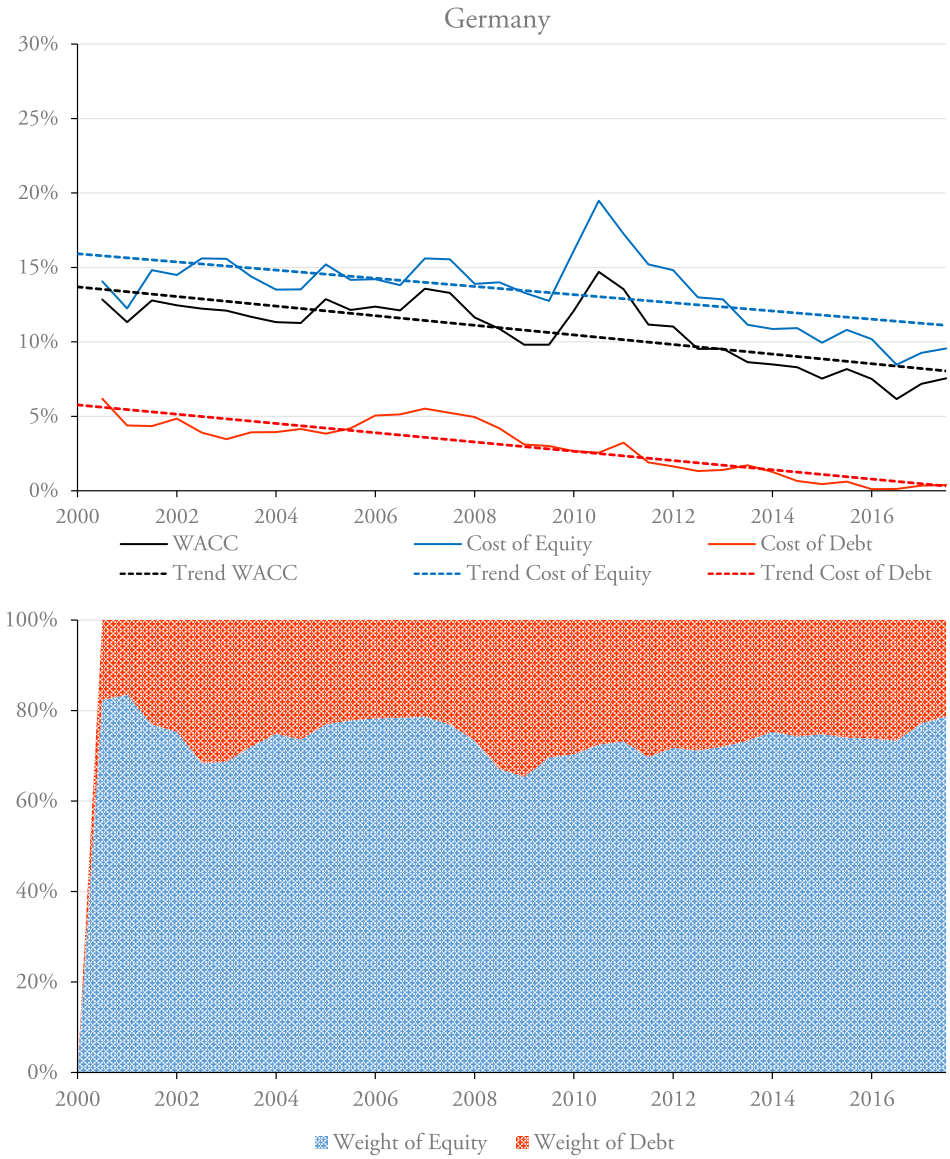

Figure 4.4: WACC and Components Germany 2000–2017. Source: Own calculations based on Bloomberg's data. The artifact that the weights of debt and equity start out at the abscissa is due to a missing value for 2000I.

Looking at the weight of debt and equity, the level of equity financing is lower than in the US. This is consistent with several studies that have shown German companies to prefer bank financing while US firms rely more heavily on market financing. The difference between such bank-centric vs. market-centric economies can also be seen in other countries.[80] Two episodes of a rapidly falling share of equity

[80] A comparison between Germany (bank-based) and the UK (market-based) was made early on, among others by Goldsmith (1969). Japan, France (bank-based) and the US (market-based) were also examined by different authors, e.g. in F. Allen and Gale (2000) or Vitols (2001). Demirgüç-Kunt and Levine (1999) classify a wider range of countries based on a conglomerate index. A majority of the countries in this analysis is included in their classification. For most countries in this analysis that are classified as bank-based by Demirgüç-Kunt and Levine (1999), the weight of debt is on average higher than in countries classified as market-based.

can be identified. The first one starts right at the beginning of the observed period and reaches its low point by the end of 2002. During this time, the DAX lost over 60% between the first quarter of 2000 and 2003 following the burst of the dotcom bubble, almost twice as much as the S&P 500 during the same time period. In 2002/2003, a recession marked the low point of this development. After a short recovery, that is also mirrored in Figure 4.4 by a rising equity share, the Great Recession led equity levels to drop once more to a new low of 65% in 2009I. Pre-crisis equity shares were only reached in 2017.

United Kingdom The graphs for the UK in Figure 4.5 are similar to the US graphs in several aspects. First, the three cost components start closer together and then drift apart. Second, the level of the weight of equity is high, even exceeding the US share. Third, the gap between the cost of equity and the cost of debt is on average larger after the Great Recession than prior to it. However, a downward trend in the WACC and the cost of equity can be identified, though only on a small scale. By the end of the time frame, the WACC and cost of equity reach levels comparable to the beginning of the millennium. The most striking difference to the US graph is the timing of the pronounced and sudden rise in the cost of equity and WACC in 2010, after the Great Recession. The economic outlook at this point was rather dire, as the UK was the last of the G7 countries to exit the Great Recession at the end of 2009.[81] Again, uncertainties about the economic recovery could be among the drivers behind the increased risk premium on equity. The start of the European sovereign debt crisis may also have had a spillover effect. The cost of equity returns to lower levels relatively quickly, reaching its minimum in 2016I before another sharp increase. The cost of debt drops from more than 6% to below 1%. Concerning the weight of debt and equity, the bottom graph also features the now familiar drop in equity levels, although in this case the minimum of 75.6% is reached in 2008II. With an average of 82.9%, the UK equity share is among the highest in the sample.

[81] See G. Allen (2010, pp. 28–29).

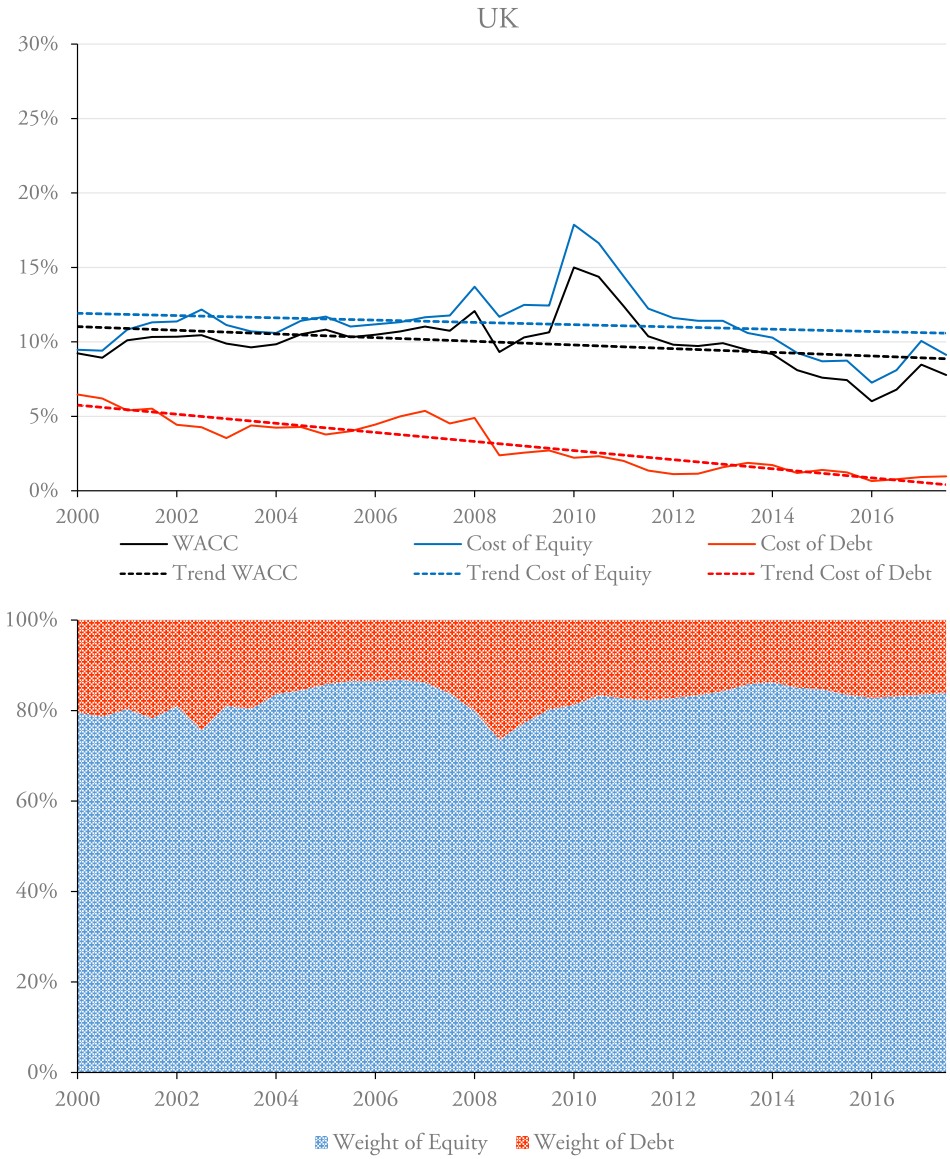

Figure 4.5: WACC and Components United Kingdom 2000–2017. Source: Own calculations based on Bloomberg's data.

France Whereas the UK graph shares certain characteristics with the US graph, France shows more similarities with Germany. The level of the cost of equity and WACC is relatively high, the former reaching 13% on average. The weight of equity is quite low, even lower than in the German case, averaging 68.5%. Its minimum is reached in 2008II at just below 60%. Here, the difference between France and UK is clearly visible: France's maximum value of 75.7% in 2007I barely exceeds the UK's lowest value. What sets France apart from Germany is the absence of a negative trend in the cost of equity as well as broader fluctuations thereof in the first half of the timeline. It peaks in 2010I at 17.6% and recovers rather erratically, reaching its minimum in 2016II at 8.7% followed by another sharp increase in 2017. Unlike the other countries presented so far, the decline in the cost of equity does not follow a steady downward path. Indeed, the cost of equity rises sharply in 2013. During the last quarter of 2012 and the first quarter of 2013 the French economy shrank by 0.2%, this contraction representing

another recession.[82] However, by the second quarter of 2013, the French economy rebounded, easing tensions throughout the eurozone. This is once more consistent with the assumption that movement of the cost of equity is driven by risk perceptions, which are likely to increase during economic distress. The evolution of the cost of debt mirrors the development observed in the other countries and follows a downward trend, approaching values close to zero during the last years observed. The gap between the cost of equity and cost of debt is just over 2% at the beginning, but increases quickly and stays constant at around 7–8% until 2007. Beginning in 2008, the difference grows larger to about 10–12% for the majority of the remaining time period.

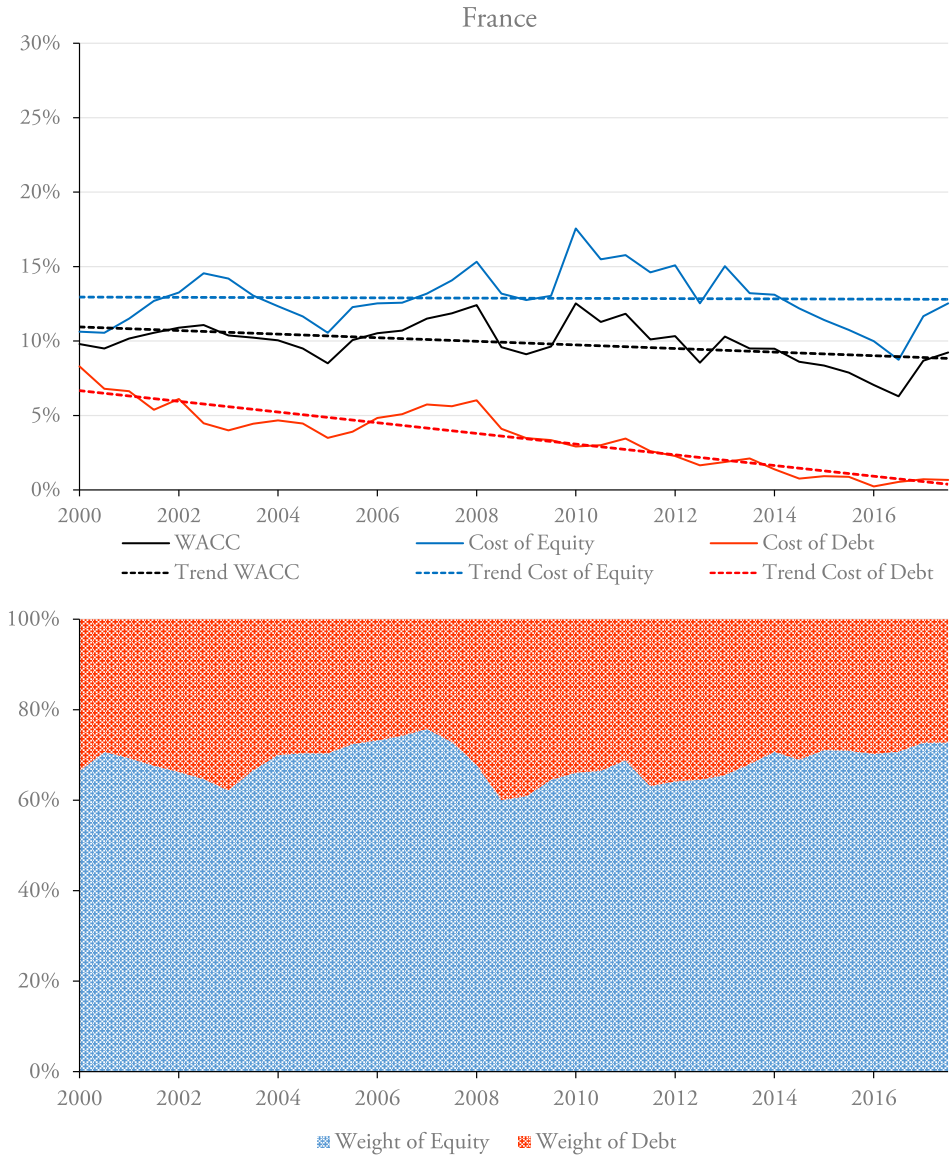

Figure 4.6: WACC and Components France 2000–2017. Source: Own calculations based on Bloomberg's data.

[82] See Insee (2013).

Japan Ranging from 2,141 to 4,585 firms per half year, the Japanese data set provides a well-grounded overview of the evolution of the Japanese cost of capital. Figure 4.7 presents the results graphically. One feature that sets Japan apart from the countries presented so far is that the cost of debt reaches low levels very early on. It falls below 1% in 2005, even reaches –0.03% in 2016I. Of all the countries investigated, Japan exhibits the lowest average cost of debt at just 1.3%.[83] Its cost of equity on the other hand is among the highest with an average of 14.5%. This is mainly due to the extreme rise commencing in 2008 and reaching a peak in 2010 at over 23%. Prior to this development and towards the end of the timeline, the cost of equity is at moderate levels between the US and the German cost of equity. The return to lower values of the cost of equity stagnates in 2012 before gaining momentum again in 2013, coinciding with the beginning of Abenomics, a bundle of policies aimed at stimulating the economy.[84] With the fairly quick drop in the cost of debt in 2004, the gap between the cost of equity and debt rises. At its maximum, it is above 20% from 2009II–2010II. Towards the end of the timeline, it still exceeds 10%, nearly doubling the average gap observed prior to 2005. With the cost of equity at the same level as at the beginning of the timeline, this increase is driven solely by the lowered cost of debt, while the short-term increase is mainly driven by the cost of equity. For Japanese firms, the use of equity gains ground as a source of financing. At the beginning of the millennium, equity levels are low at around 59% but quickly increase from 2003 on. In 2006, the weight of equity rises to almost 75%. Just like the other countries, Japanese equity levels then start dropping, back to just 62% in 2009I. After a slow and steady recovery, levels of around 75% are reached again in 2017.

[83] On average, the cost of debt over all values for South Korea is lower than Japan's at 1.2%. However, this is an artifact of the comparatively low number of firms during the first half years when the cost of debt was still high. When averaging the cost of debt per half year, Japan exhibits by far the lowest value.

[84] See Hausman and Wieland (2014) for a preliminary and Lechevalier and Monfort (2018) for a more recent assessment of Abenomics.

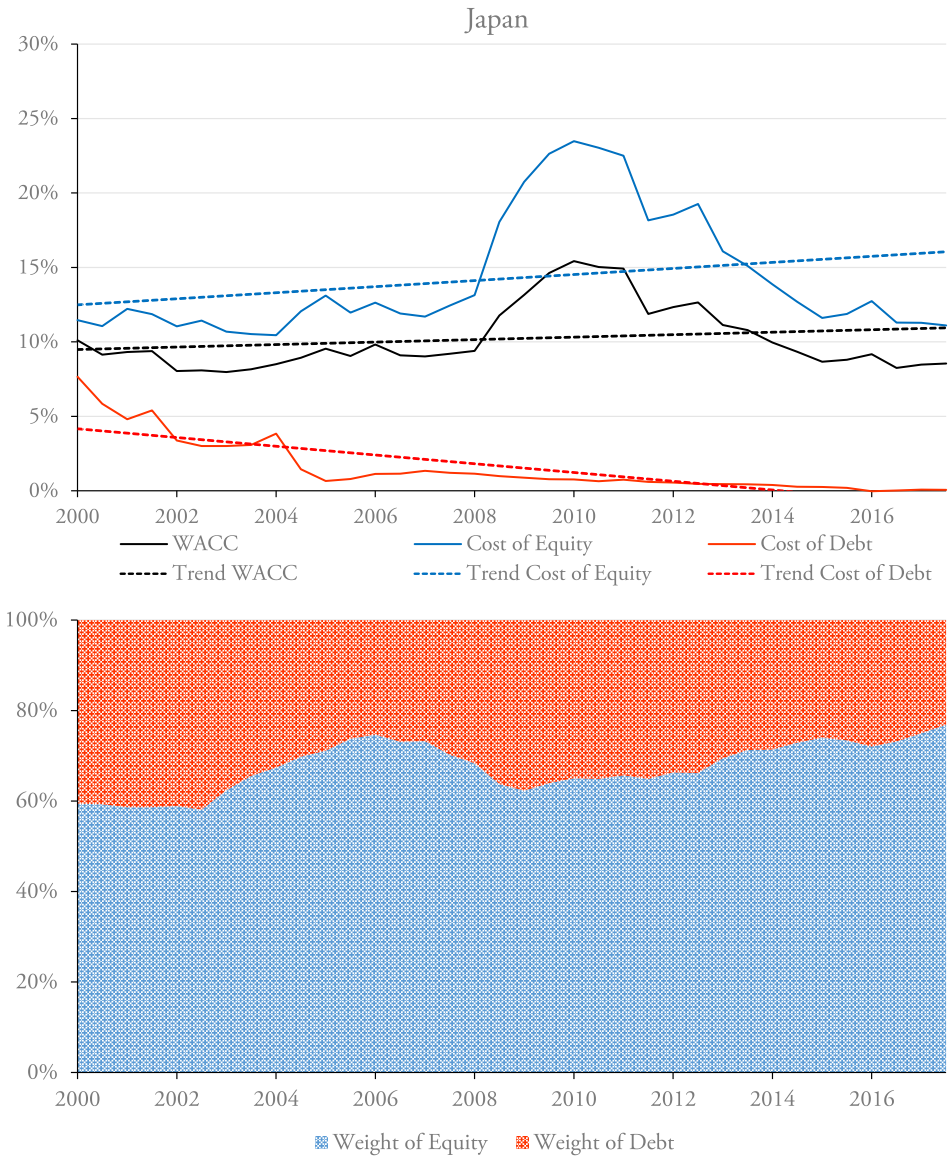

Figure 4.7: WACC and Components Japan 2000–2017. Source: Own calculations based on Bloomberg's data.

4.1.2 All OECD Countries

The preceding section presented the evolution of the cost of capital components for selected advanced economies individually. It showed that while there are differences, a few general characteristics are shared by all countries, such as a decreasing cost of debt and a significant increase in the cost of equity during or after the Great Recession. Only in Germany do the WACC exhibit a pronounced overall downward trend, and even in this case the WACC is still far from zero at the end of the observed time period.

This section presents the findings for the complete data set, representing 25,348 firms from 35 countries. In total, 543,777 observations per component form the basis for this graph, with the number of data items ranging from 6,798 in 2000I to 23,188 in 2016II. Figure 4.8 shows the results, table B.1 in the appendix provides the underlying data in more detail. This figure corroborates the main findings of the figures in the preceding section: the cost of capital has not decreased between 2000 and 2017. The WACC takes on values between 9.4% (2015II) and 14.3% (2010I), averaging at 11.1% from 2000–2017. Driven by an increase in the cost of equity, the WACC also starts rising significantly in 2008. This is in sharp contrast to the development of interbank interest rates and many rates on long-term government bonds across the major economies[85] in this period. During the second half of the observed time period, these rates reached unprecedented lows, ringing in the low interest period that has now lasted for over a decade. For the data observed here, only the cost of debt seems to follow this trend. Given that the cost of debt in Bloomberg's data set is partly calculated using data on government bonds[86], this outcome is not that surprising. It is also in line with the widely accepted relationship between interest rates for loans or mortgages and the yield on government bonds. However, for a firm's overall cost of capital, the downward trend in the cost of debt portion of capital is offset by the increase in the cost of equity. As has been shown before, the movement of the WACC follows the cost of equity rather closely. This is owed to the weight of equity exceeding the weight of debt by a factor of more than 2:1 over the entire time frame.

[85] Mainly the US, Japan, Germany, UK, France.
[86] See section 2.3.

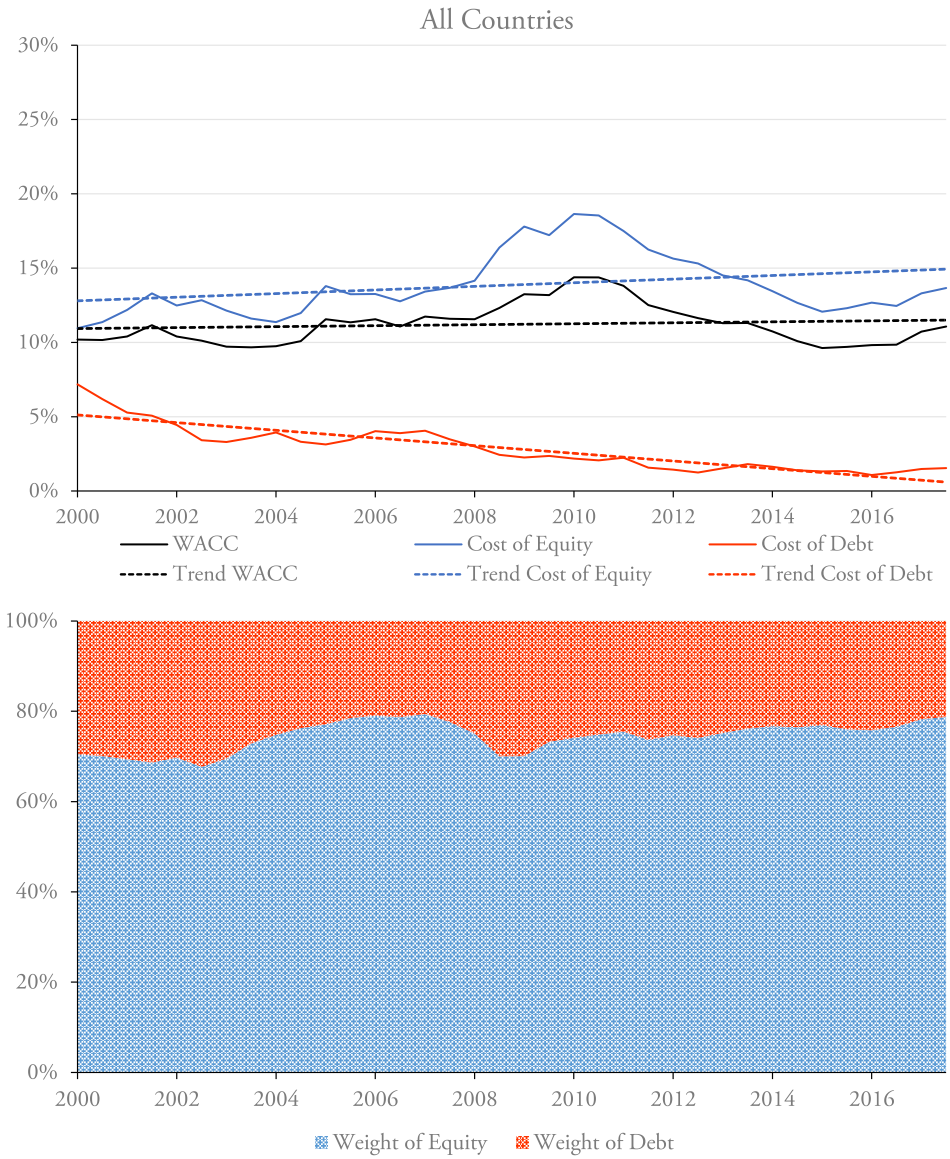

Figure 4.8: WACC and Components All OECD Countries 2000–2017. Source: Own calculations based on Bloomberg's data.

The main takeaway from this graph is striking. In spite of a distinct reduction across several interest rates that are under scrutiny from economists, the overall cost of capital for firms remains at a high level of around 10%. Firms base their investment decisions on this measure rather than on interbank rates or government bonds that they don't have access to and that neglect the equity part of financing completely. Economic reasoning implies that low interest rates should lead to higher investment levels as financing becomes cheaper and more projects become profitable. Such a widespread increase in investment has not been observed in the major economies across the world despite the downward trend in readily observable rates. Figure 4.8 provides an explanation for this discrepancy. Firms' cost of capital simply have not moved in tandem with other prominent interest rates. Persistently high cost of

equity values prevent this from happening. In addition, a more subtle effect is uncovered by the results: the difference between the cost of equity and the cost of debt has increased.

The extent of the difference between the return on risky market instruments and safe interest rates has occupied economic research for a long time. First introduced by Mehra and Prescott (1985), the so-called *Equity Premium Puzzle* states that risk aversion alone cannot account for the gap between risky and safe rates, other factors must be at play. Figure 4.8 now suggests that the equity premium puzzle has played an even bigger role in recent years. As has been pointed out before, the rise in the cost of equity after 2008 could be an indicator of increased risk perception by shareholders. Short-term fluctuations that are in line with the timing of economic distress, as has been seen in section 4.1.1, support this hypothesis. However, other factors that have yet to be identified may also have played a role in pushing up equity premiums.

The narrative of a possible secular stagnation to explain the low interest environment revolves around the economic concept of the marginal productivity of capital and asserts that this unobservable rate has declined, possibly into negative territory. This was already addressed in Chapter 1. So far, no support could be found for this claim on the basis of company cost of capital. However, the graphs presented up to this point all show nominal rates. A true approximation of the marginal productivity of capital has to be a real value and must account for inflation expectations. Unfortunately, comparable data on long-term inflation expectations for all countries under investigation are not available. While the number of inflation-indexed government bonds from which such expectations can be inferred have become more common in recent years, the data are not sufficient to cover the entire sample.[87] Qualitative surveys on inflation expectations are available, but they only cover short-term expectations and are not fitting for this analysis as market-based values would be better suited.[88] In order to still be able to at least give an approximation of the real cost of capital evolution and see if the results would change significantly, ex-post inflation is used to convert Figure 4.8. While this approach is not optimal, it is the preferred option with the available data. Quarterly data on inflation for all countries were taken from the OECD database[89] and used to convert the quarterly values for cost of equity, cost of debt and

[87] Out of the 35 countries under investigation, only 19 issue inflation-linked bonds. Out of these, just 8 started issuing such bonds prior to 2000. The countries issuing inflation-indexed bonds are the following (year of first issue in current form in parentheses): UK (1981), Australia (1985), Canada (1991), Sweden (1994), New Zealand (1995), Mexico (1996), US (1997), France (1998), Chile (2002), Greece (2003), Poland (2003), Italy (2003), Japan (2004), Germany (2006), Israel (2006), South Korea (2007), Turkey (2007), Denmark (2012), and Spain (2014).

[88] The World Economic Survey published by the ifo Institute covers inflation expectations. Starting in 2014, the survey also included a question on inflation expectations in 5 years. Until this point, only questions on the short term (6 months – 1 year) were part of the questionnaire.

[89] Subject: CPI:01–12 All items; Percentage change on the same period of the previous year. Retrieved 16. November 2019.

WACC for each firm with its respective domicile's inflation. Afterwards, the quarterly data were again converted to semiannual data as described above.

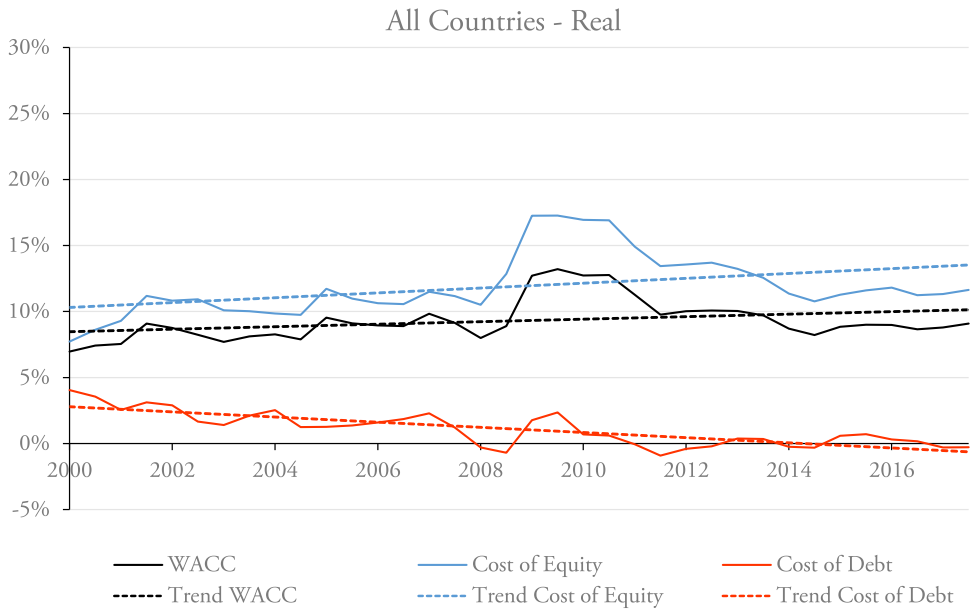

Figure 4.9: Real WACC and Components All OECD Countries 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

At an individual country level, the weakness of this approach is apparent in countries with extremely high and volatile inflation. Using ex-post inflation in these cases causes distortions in the results as the level and movement in the real values is mainly driven by fluctuations in the inflation rate. Long-term inflation expectations can be expected to be lower and more stable. Another assumption made here is that in stable advanced economies, inflation expectations and ex-post inflation differ only slightly over long-term horizons.[90] If this were not the case, it would mean that market participants continuously misjudge inflation. While this may be true in the short term, such a view is harder to justify in the long run. The firms in the sample from countries with highly volatile inflation rates only make up a small portion of the sample. In fact, about one half of the sample is made up of US and Japanese firms. In these countries, inflation over the observed time period was fairly stable. They are thus an acceptable alternative to inflation expectations in this case. Figure 4.9 shows the results. The main findings from the nominal graph remain largely the same. While the cost of debt declines, the overall WACC remains relatively stable. In fact, due to exceptionally low inflation rates in recent years, the WACC trend line indicates a slight increase of 3 base points per year, compared to 0 base points for the nominal graph. The rise in the cost of equity and in the WACC following the Great Recession is more distinct, while the cost of debt turn negative in 2008. They recover to around 2% in 2009, only to fall again and stay

[90] Church (2019) shows that this is largely true for US inflation expectations derived from treasury inflation-protected securities before, during, and after the Great Recession.

close to zero until the end of the observed period. Overall, the real WACC ranges from 7.0% (2000I) to 13.2% (2009II). On average, firms face real capital costs of 9.2%. Thus, correcting for inflation lowers the level of the cost of capital and changes the timing of its minimum and maximum slightly, but the overall picture remains the same. The same can be confirmed for all countries presented in section 4.1.1. The corresponding graphs can be found in the appendix.

4.1.3 Special Cases

At this point, the results for some of the world's major economies as well as the overall data set have been presented. The graphs for the remaining countries can be found in the appendix. For a majority of these countries, the general trends already identified apply. At this point, a detailed analysis of all countries seems unnecessary, as few new insights are expected to be gained from this. Moreover, the aim of this study is not to provide a detailed analysis for each country individually, but rather an assessment whether or not evidence can be found to support the secular stagnation hypothesis in general. The results presented so far suffice for this purpose. However, a few of the remaining countries did stand out in that they exhibited trends deviating from the rest with respect to the the debt-equity-ratio or the cost of debt. As these results are rather interesting, a short overview shall be given here.

Deteriorating Weight of Equity

The first development concerns the weight of equity. Most countries presented so far exhibit fluctuations between 2000 and 2017—most notably the common decrease in 2008/2009—but overall equity levels return to a pre-crisis level. In some cases like Japan even a slight upward trend towards the end can be identified. The average weight of equity exceeds 65% for 26 of the 35 countries. Figure 4.10 shows two countries that exhibit drastically different features: Greece and Portugal. Portugal's average weight of equity is the lowest in the entire sample at just 49.3%. Greece's average lies at 56.4%. Greek equity levels start out significantly higher, driving up the average value. During the last years under observation, the equity levels of both countries are almost identical.

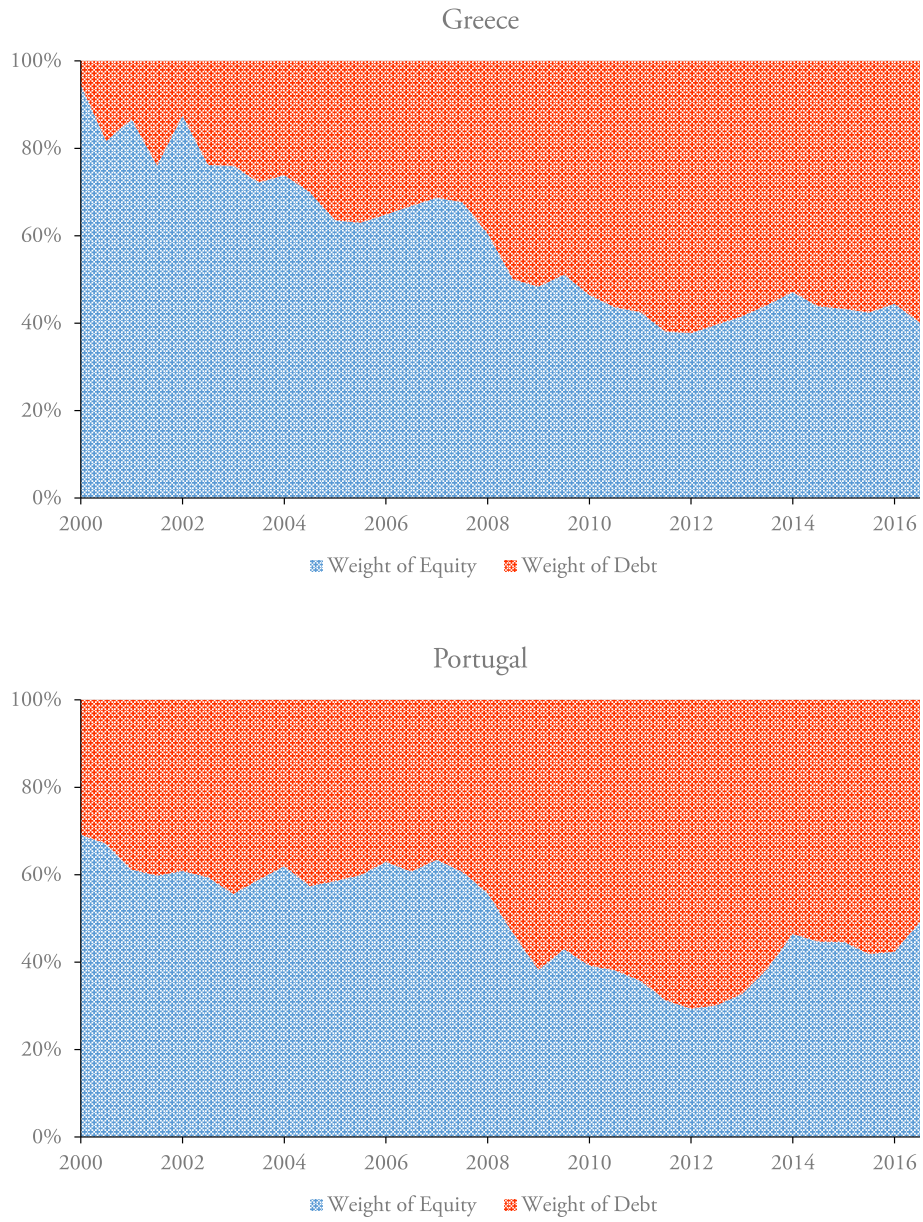

Figure 4.10: Weights of Equity and Debt for Greece and Portugal 2000–2016. Source: Own calculations based on Bloomberg's data.

Greek equity levels start dropping right from the start, but for both countries the year 2008 marks a steep increase in the weight of debt. With the exception of Greece during 2009II, the weight of debt exceeds 50% following the Great Recession for each half year in both countries. The weight of equity reaches its minimum in 2012I at 29.3% in Portugal and 37.7% in Greece. Greece and Portugal belong to the group of countries hit especially hard during the European sovereign debt crisis.[91] While for most of the other countries under investigation equity levels recovered after the Great Recession, in

[91] With Spain (62.5%) and Italy (60.8%), two more of the GIIPS countries (Greece, Italy, Ireland, Portugal, Spain) exhibit comparatively low average levels of equity and a slow recovery after the decrease in 2008. Out of the GIIPS crisis countries, only Ireland shows high levels of equity.

these two cases the drop in 2008 was only the beginning. Yannis Stournaras, Governor of the Bank of Greece, points out the persistent collapse of market-based financing for Greek firms and the challenges resulting from this.[92] While Greek equity levels have been stagnant since 2012, Portugese businesses seem to have managed a turnaround. Here, after 2012 equity levels rise significantly until 2014, after which they remain stable. The timing of this is consistent with the deleveraging trend post–2012 identified by the OECD.[93] The graphs indicate a strong dependence on debt instruments and a lack of market confidence. In Portugal, this is also mirrored in the steadily rising cost of equity between 2009–2012. Only after the start of the deleveraging efforts does the cost of equity go down. However, both countries still have a long way to go to return to adequate equity levels as compared to the other OECD countries. Reports of recovery for Greece and Portugal should therefore be interpreted cautiously in light of this background.

Rising Cost of Debt

The evolution and trend of the cost of equity differ across the countries in the sample, with 24 of the 35 countries exhibiting an upward trend overall. By contrast, the development of the cost of debt is more uniform. A steady downward trend consistent with the observation of low interest rates in many of the developed countries can be observed throughout the data set. All countries end up at cost of debt levels below 2.5%. There are only two cases that do not fulfill either: Mexico and Turkey.[94] This upward trend is visible even when one accounts for inflation. Paralleling the analysis of the other countries in section 4.1, the nominal values are shown in Figure 4.11.

[92] Stournaras (2018).

[93] OECD (2019).

[94] Portugal also exhibits an upward trend and cost of debt slightly above 2.5%, but in this case the former is driven by a sharp increase in the cost of debt around 2011/2012. The cost of debt curve for the Portuguese data set has a much closer relationship with the government bond yield, suggesting that Bloomberg's calculation relies almost exclusively on the approximation via bond rates rather than the fair market curves as described in section 2.3. Disregarding the spike in the cost of debt, the upward trend vanishes. Furthermore, the ECB provides data on the cost of borrowing for non-financial corporations starting in 2003 under the series title MIR.M.PT.B.A2I.AM.R.A.2240.EUR.N. While an increase in interest prior to 2009 as well as prior to 2012 can be identified, the overall trend is negative and thus more in line with the other countries in the sample. Therefore, the upward trend seems to be purely an artifact of Bloomberg's approximation which in this instance does not properly reflect borrowing costs, and Portugal will be disregarded in the following.

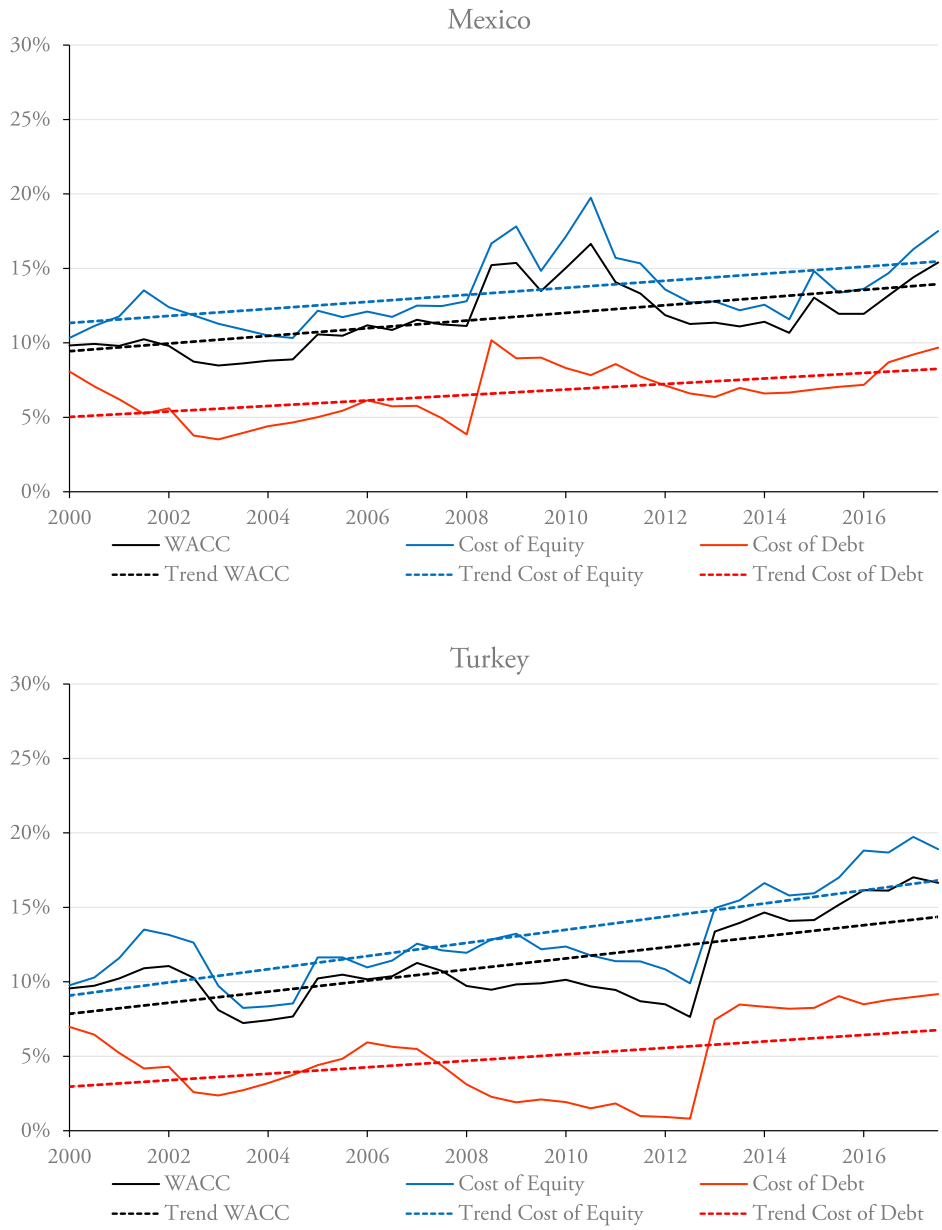

Figure 4.11: Cost of Capital for Mexico and Turkey 2000–2016. Source: Own calculations based on Bloomberg's data.

In both cases, there is a sharp increase in the cost of debt at one point. Mexico's cost of debt jumps from 3.9% in 2008I to 10.2% in 2008II. In Turkey, the cost of debt is at 0.8% in 2012II and increases to 7.4% by 2013I. Prior to this, the cost of debt in each case follows the evolution of the US cost of debt almost perfectly. This suggests that Bloomberg may be using US government bond yields as an approximation for the cost of debt whenever long-term bond yields for the domicile country are not available. Referring to the US data is already employed in such a way for the risk-less rate, see footnote (47). Both of these countries are classified as emerging market economies. Other (former) emerging

economies[95] in the sample exhibit similar behavior. For most cases this lasts much longer, thus attesting the US downward trend in the cost of debt for these countries as well. The sudden increase in the cost of debt for Mexico and Turkey, which is most likely due to the switch to domestic values, causes the upward trend for the overall data. Post-increase the cost of debt stays relatively stable at a high level compared to the other countries in the sample. It is just below 10% by the end of 2017, far exceeding all other interest rates in the sample at this point. Among the emerging economies, Turkey and Mexico have the highest average inflation rate of 16.5% and 4.6%, respectively. In both countries, inflation was exceptionally high at the beginning of the century and has decreased during the first couple of years. Both long-term and short-term interest rates have also decreased as a result. However, the persistent decline following the Great Recession to levels near zero in most advanced economies is not observed in Mexico or Turkey. In fact, interest rates have stayed rather constant at comparatively high levels. This is reflected in the cost of debt post–2008 and post–2012 for Mexico and Turkey, respectively.

This artifact resulting from approximations made by Bloomberg undermines the issue with interpreting individual country data too literally, especially for emerging countries. Again, this does not invalidate the data set as a whole. As has been shown in section 4.1.1, for advanced economies with more reliable and available data, country specific developments were reflected in the data. For the aggregate data set, the number of firms from emerging countries whose data may be biased is small compared to the overall sample. However, at a country level, caution is advised when it comes to interpreting emerging country data specifically.

4.2 Evolution of WACC Data by Industry

Another way to look at the change in WACC and its components over time is to look at different industries. Industries differ with respect to their typical debt-to-equity ratios and their resilience during economic shocks. The Global Industry Classification Standard (GICS) is used to sort the firms in the data set into one of the 11 categories: consumer discretionary, consumer staples, energy, financials, health care, industrials, information technology (IT), materials, real estate, telecommunication services, and utilities. Out of the 25,348 companies in the original sample, 20,444 are assigned to one of the groups. Table 4.1 gives an overview of the distribution across industrial sectors. Graphs on the cost and weight components of the WACC for all sectors can be found in the appendix.

[95] Classification according to the IMF. Other emerging market economies among the countries relevant to this analysis are Poland, Hungary, Chile, Latvia (until 2013), Estonia (until 2010), Czech Republic (until 2008), Slovakia (until 2008), and Slovenia (until 2006).

Sector	# Firms
Consumer Discretionary	2,969
Consumer Staples	1,092
Energy	1,352
Financials	2,220
Health Care	2,021
Industrials	3,326
Information Technology	2,926
Materials	2,911
Real Estate	1,062
Telecommunication Services	202
Utilities	363

Table 4.1: Distribution Across Industrial Sectors. Source: Own calculation based on Bloomberg's data in accordance with the GICS.

Overall, a downward trend in the cost of debt and an upward trend in the cost of equity can be observed across all industries, though the magnitude may vary.[96] This also applies to the peak of the WACC and cost of equity during the Great Recession. The range of the cost of equity is narrower for firms in consumer staples, telecommunication services, health care, and utilities as compared to the other industries. Incidentally, these sectors are generally associated with being non-cyclical and less prone to react during general economic downturns. Cyclical sectors such as materials, real-estate, and consumer discretionary exhibit more volatile behavior. Figure 4.12 shows the evolution of the WACC cost components for three sectors: consumer discretionary, health care, and materials. The difference between the sectors with respect to the range of cost of equity values is clearly visible. Firms in the energy sector are subject to the highest cost of equity, reaching its maximum at 20.0% in 2010I. Here, the gap between the cost of equity and the cost of debt by the end is also among the highest across industries. Other industries with a particularly large difference are the IT and the materials sector. Whether the overall WACC exhibits an increasing, decreasing, or stable trend is closely linked to the ratio between the weight of equity and the weight of debt. Comparing industries according to this metric, considerable variations can be observed.

[96] The only exception is the IT sector, which exhibits a minor downward trend in the cost of equity.

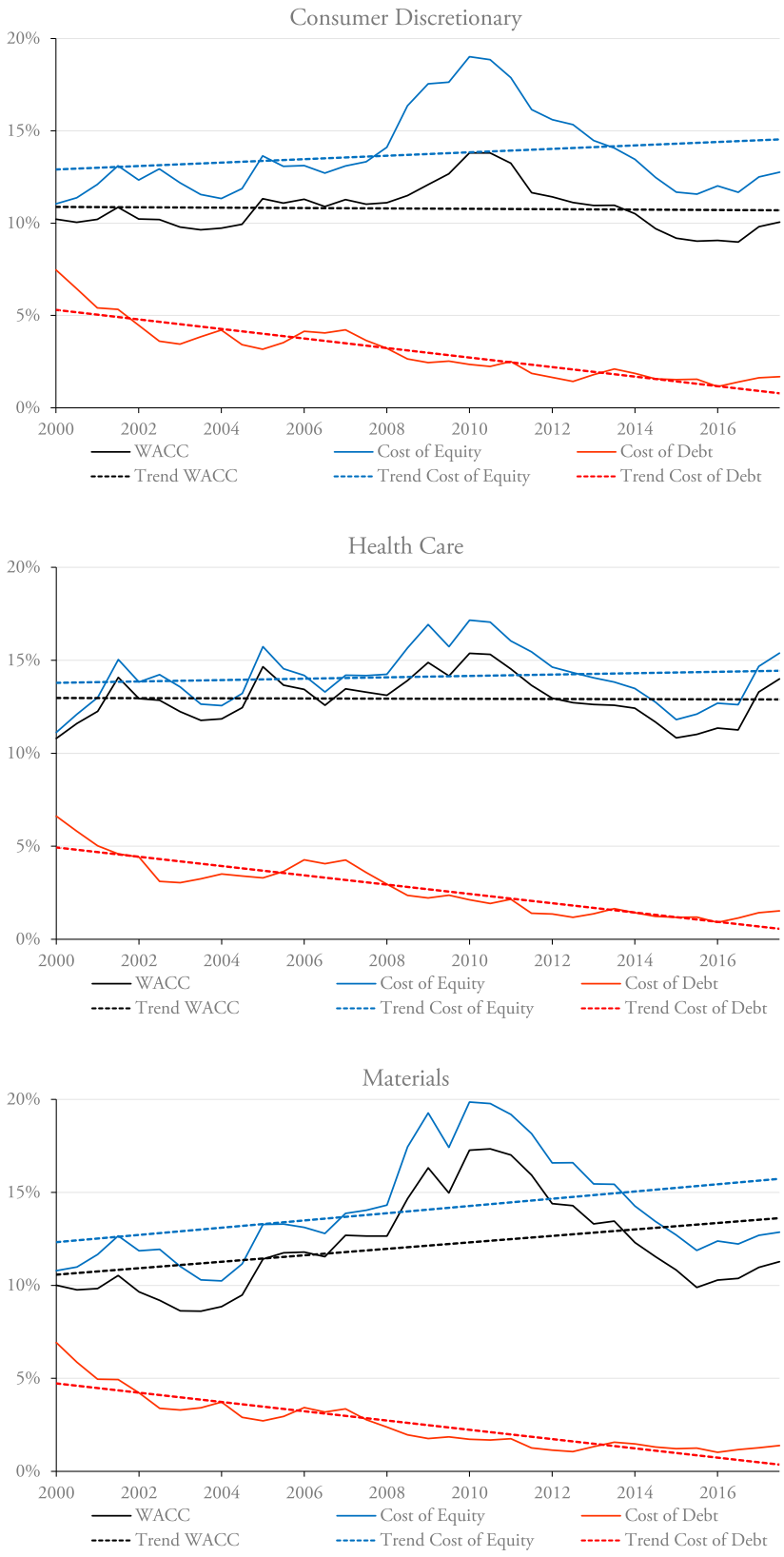

Figure 4.12: Costs of Equity and Debt for Selected Sectors 2000–2017. Source: Own calculations based on Bloomberg's data.

The three industries with the lowest weight of equity are the real-estate sector (57.8%), utilities (61.8%), and financials (63.4%). These sectors are known for their comparatively high debt-to-equity ratios. At the other extreme, the IT and health care sector depend heavily on equity financing due to the inherently higher risk attached to the labor-intensive nature of these sectors. This is also reflected in Bloomberg's data. For firms in the health care sector the weight of equity is on average 88.4%, in the IT sector it is at 85.5%. The fact that the results are in accordance with known properties of the different sectors adds validity to Bloomberg's data set when a high number of firms are used, minimizing potential bias. Two more examples shall illustrate this further.

Figure 4.13 shows the weight of equity and debt for the health care, telecommunication services, and real estate sector. The aforementioned difference in the debt-to-equity ratios is clearly visible, as is the relatively stable level in the health care sector suggesting a higher resilience during shocks. The real estate sector on the other hand shows a drastic decrease in equity levels starting in 2007. The financial crisis that led to the Great Recession was triggered—among other factors—by the burst of a housing bubble in the United States. Paired with the fact that the real-estate sector belongs to the cyclical industries, one would expect to see this sector to be significantly affected. No other sector among the ones analyzed here reveals a steeper drop in equity levels, which fell from 65.2% in 2007I to 45.3% in 2009I. Only one other decrease in equity levels is comparable: the reduction in the telecommunication services sector from 77% at the beginning of the millennium to 61.9% in 2002II. This can also be traced back to a specific incident. Following the dotcom bubble at the turn of the century, a sector-specific crisis hit the telecommunication services sector. This 'telecoms crash' turned out to exceed the dimension of the aftermath of the dotcom bubble and damaged the industry for several years.[97] The drop in equity levels during this episode is absent in the other sectors in Bloomberg's data, as would be expected. This is additional proof that the data presented here are well suited for a general assessment of the development of cost of capital components for individual sectors.

[97] The dotcom crash also affected the IT sector and led to a decrease in equity levels, though the effect was more subdued than that of the telecoms crisis. For a more thourough background and analysis of the telecoms crisis, see Economist (2002) and Kam (2006).

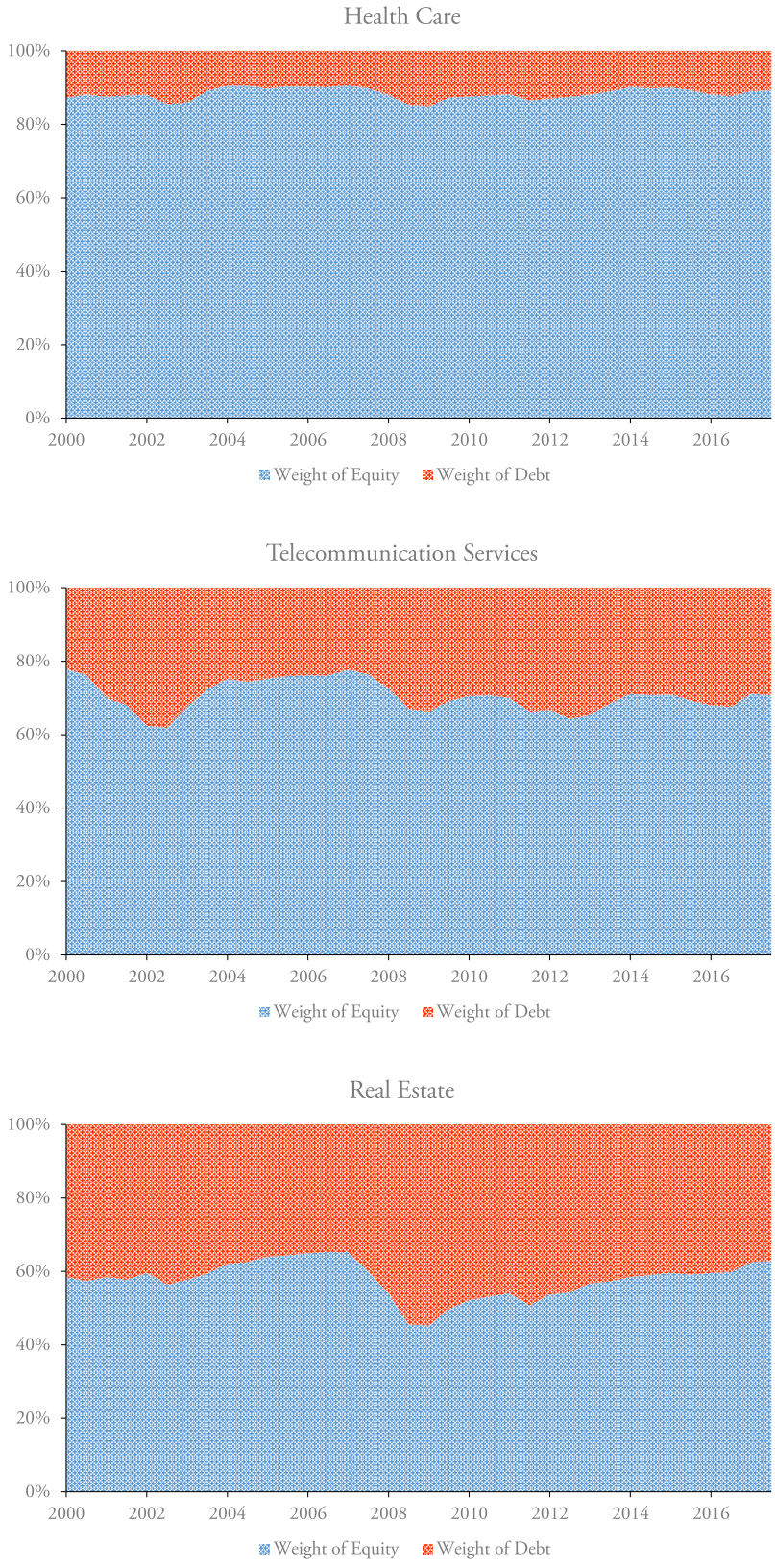

Figure 4.13: Weights of Equity and Debt for Selected Sectors 2000–2017. Source: Own calculations based on Bloomberg's data.

5 Conclusion

The decline in real interest rates over the past decades has received widespread attention in the economic literature. Oftentimes, this decline is viewed as a threat to prosperity, one that can only be countered by increasing public debt levels.[98] At the core of this argument lies the assumption that saving and investment are the driving forces determining the marginal productivity of capital and that this marginal productivity has declined substantially. This narrative, which is widely popularized by Summers, is mainly based on two observations: (i) the evolution of real safe interest rates, commonly approximated by government bonds, and (ii) shifts in trends that shape saving and investment, such as demographic and technological changes, which supposedly led to higher saving and lower investment. Challenging this interpretation, other authors such as Borio et al. (2019) and Jordà, Knoll, et al. (2019) have argued that low or even negative real interest rates on government bonds are not unusual. Borio et al. (2019) show that traditional saving-investment determinants fail to explain the evolution of real interest rates altogether, while Mayer and Schnabl (2019) find no evidence for a link between demographic changes and household saving rates. This begs the question if the current low interest environment does in fact suggest that the marginal productivity of capital has declined.

This thesis adds to the ongoing debate surrounding this topic by offering an alternative approach to evaluating the marginal productivity of capital using actual financial data from firms. The underlying premise is that interest rates are indeed determined by market forces and that financial factors play a substantial role rather than factors influencing saving and investment. When evaluating the marginal productivity of capital, it makes sense to take a closer look at what drives firms' investment decisions instead of referring to government bond rates. For that purpose, this thesis introduced a new instrument based on the Weighted Average Cost of Capital, or WACC, allowing for a detailed investigation of the evolution of firms' financing costs.

The main finding based on this concept is that the global marginal productivity of capital, approximated by WACC data from all OECD countries, has not declined since the turn of the millennium. Instead, the WACC from 2017 is almost identical to the WACC from 2000. An increase can be observed following the Great Recession, but overall the WACC appears to be relatively stable. This strongly contradicts the notion of a possible secular stagnation or declining productivity of capital. These results

[98] See Summers (2015) and Weizsäcker (2014).

can be confirmed on the country-level for a majority of the sample as well as across different industry sectors. Even in the few cases where a downward trend in the WACC can be seen, such as in Germany, it is rather weak and the cost of capital remain well above zero and, more importantly, well above the growth rate. Apart from the absence of a clear trend of the global marginal productivity inferred from WACC data, another interesting result is uncovered by the data. This finding pertains to the importance of distinguishing between the different sources of financing, debt and equity. It cannot be denied that certain interest rates have taken on exceptionally low values for an extended period of time, such as selected government bond rates and interbank rates. This is also reflected in the cost of debt part of the WACC calculation. However, the decline in the cost of debt has not led to a similar decline in the cost of equity. It has been shown that for the WACC, the latter's role in financing outweighs the debt's role by a factor of over 2:1 on average. Therefore, focusing on the cost of debt alone leaves out an important part of the story. Abandoning this narrow view can shed new light on different aspects of the current low interest environment.

First, neglecting the cost of equity and focusing on the cost of debt leads to a drastic underestimation of the marginal productivity of capital. As mentioned before, the benchmark that led to the discussion on low interest rates are government bonds. For certain economies, such as Japan and Germany, these have taken on negative values in recent years, making the call for higher government debt sound rather innocent. At first glance, it seems that governments can even make money by emitting bonds with a negative interest. Indeed, authors such as Weizsäcker (2014) argue that the government has the responsibility to increase its debt. According to them, the economy is on a dynamically inefficient growth path due to having accumulated too much capital.[99] When evaluating whether or not an economy is dynamically efficient, the relationship between its growth rate and the marginal productivity of capital is crucial. As long as the growth rate falls short of the marginal productivity of capital in the limit, dynamic efficiency is ensured.[100] In such a state, Ponzi schemes are not feasible and increasing government debt is not a "free lunch".[101] Assuming that the relationship between the two rates follows an ergodic process—and thus that observed averages must converge to overall averages—permits empirical testing.

However, the relevant rate in this case is not the "safe" rate on government bonds. It has been proven that in a stochastic model with a safe and a risky interest rate, the risky rate is the relevant one for the assessment of dynamic efficiency.[102] Even a (negative) rate on government bonds that falls short of the growth rate does not change the outcome: as long as the risky rate exceeds the growth rate, rolling over

[99] For seminal contributions on the matter, see Malinvaud (1953), Samuelson (1958), and Diamond (1965).
[100] See Homburg (2014, pp. 413–414). This criterion originally goes back to Cass (1972) for an economy under certainty. Its essence was confirmed for stochastic models by Zilcha (1990) and Zilcha (1991), and for exchange economies by Balasko and Shell (1980).
[101] See O'Connell and Zeldes (1988).
[102] See Bohn (1995) and Barbie et al. (2001).

a deficit will eventually lead debt levels to explode.[103] With the WACC constituting a more suitable approximation of the marginal productivity of capital than government bonds, this thesis finds no support for the economies under investigation to be dynamically inefficient. Increasing government debt will always come at a cost.

Second, the results of this analysis point to an increasing gap between equity and debt financing. The equity premium puzzle has already received considerable attention in the financial literature over the past decades. Including insights from these discussions in macroeconomic analyses of the low interest environment may help to understand its effects. While a constant overall cost of capital, or put differently an unchanged rate of return, implies no significant change overall, distributional effects can still be substantial. Holders of debt instruments have seen their returns diminished over the past years. This can have drastic consequences for institutions that are required to hold "safe" debt instruments due to regulations, such as pension funds or insurance companies that have to adhere to Solvency II. Banks face similar rules under the Basel III framework. These institutions have been vocal about the threat that prolonged low interest rates pose to their ability to cover their costs.[104] Meanwhile, stock markets around the world have seen steady increases over the past years. For holders of debt and equity instruments, lower returns on debt instruments were compensated by increased dividends or stock price gains. The equity premium puzzle has not yet been solved, and hence the magnitude of the difference between "safe" and "risky" returns cannot be fully explained.

One possible explanation that future research could investigate further based on the findings in this thesis is the role of risk perception. For example, Baker et al. (2015) devise an Economic Policy Uncertainty Index for a number of economies.[105] Their global aggregate suggests a higher average risk perception following the Great Recession that is in line with the results based on the WACC cost components. This could have led to an increase in the demand for "safe" capital investments, pushing down rates on government bonds. The aforementioned regulations along with extensive quantitative easing programs largely targeting government bonds by the major central banks may also have played a role in keeping these interest rates low.[106] Investigating such links and their consequences further would complement the findings in this thesis.

Third, a constant marginal productivity of capital is more compatible with evidence derived from national account data than a declining marginal productivity of capital. Mayer and Schnabl (2019) define the marginal productivity of capital as the absolute change of real output divided by real investment. They find that the marginal productivity has been about 10% over the past 30 years, excluding the

[103] See Homburg (2014, pp. 424–425).
[104] See Deutsche Bundesbank (2017) and European Central Bank (2015, pp. 65–68, 134–146).
[105] Accessible under https://www.policyuncertainty.com/.
[106] See Krishnamurthy and Vissing-Jorgensen (2011) for and analysis of QE1 and QE2 by the Fed and Eser et al. (2019) for an analysis of the Asset Purchase Programme by the ECB.

Great Recession, and thus close to the results presented here. This approach may be biased due to its omission of changes in labor. Assuming the work force does not undergo drastic changes, this method produces a rough yet valid estimate. A closer look at other macroeconomic variables from national account data seems worthwhile. Apart from demographic change, technological advances are also frequently named among the reasons for a declining capital demand. Summers explicitly points to Apple and Google, deriving a general lack of investment opportunities from the fact that these companies seem to hoard "excess cash".[107] A surge in share buybacks by US companies in recent years, with a record high of over $800 billion in 2018, has also fueled concerns that firms are out of other profitable investment opportunities.[108] These arguments suffer from two problems. First, as shown in a report by Goldman Sachs, there is no empirical evidence supporting the notion that share buybacks come at the expense of investment.[109] In fact, growth investment has increased overall. In an interview included in the report, Damodaran argues that while some companies might invest less due to share buybacks, the freed money is typically reinvested in other companies, which in turn increase their investment.[110] This is linked to the second flaw: looking at individual firms might make for a compelling argument, especially if these firms are in the public eye. However, for an assessment of the economy as a whole, this view is not sufficient. For a more comprehensive picture, national account data should be consulted.

The capital-output ratio has historically been more or less constant.[111] This trend has not been broken in recent years.[112] Homburg and Knolle (2017) propose to derive an estimate of the marginal productivity of capital from national account data following Euler's Theorem according to which the production factors are reimbursed at the level of their marginal product under perfect competition. Therefore, the wage share[113] and the profit share[114] have to add up to 1. With the wage share and the capital-output ratio known from national account data, an estimate for the marginal productivity of capital can be easily calculated. Figure A.3 in the appendix illustrates the results of this calculation for the US and Germany. Again, there is no sign of a downward trend, thus corroborating the findings in this thesis and further calling into question the relevance of the secular stagnation hypothesis. This result also makes sense intuitively, if one considers that the reciprocal of the capital-output ratio is the average capital productivity. With this in mind, a constant average capital productivity is difficult to reconcile with a consistently declining marginal productivity of capital.

[107] See Summers (2015, p. 62).
[108] See Rooney (2019) and Almeida et al. (2016).
[109] See Nathan and Groman (2019).
[110] See Nathan and Groman (2019, p. 6).
[111] This was famously pointed out by Kaldor (1957, p. 592).
[112] See Figure A.3 in the appendix for graphs portraying the capital-output ratio and other indicators from national accounts for the US and Germany.
[113] Defined as the marginal productivity of labor multiplied by the work force divided by total output.
[114] Defined as the marginal productivity of capital multiplied by the capital-output ratio.

This thesis set out to introduce a novel approach to tackling the question of how the widely observed low interest environment fits with a persistently solid economic development, defying the bad omens articulated by proponents of the secular stagnation hypothesis. To do so, the standard assumption that the marginal productivity of capital can be inferred from the real interest rate on government bonds has been abandoned, following Homburg (2017, p. 90). Instead, a finance-based understanding of interest is employed. Standard macro models use only one interest rate, some add a second, risky, rate. The real world, by contrast, is full of different interest rates and, more importantly, different sources of capital. The WACC approach introduced here allows a differentiation between debt and equity forms of financing. Analyzing these has led to some valuable insights: while the cost of capital on debt instruments has declined, the cost of equity has not followed this trend. Overall, the cost of capital has been more or less constant since the turn of the millennium, while the gap between the cost of debt and equity has increased. This is in line with other empirical findings on the matter, e.g. by Caballero et al. (2017) and other authors mentioned. It might also explain why large scale interventions by central banks to push down interest rates and boost investment have not reached their objective. As long as the average hurdle rates for investment decisions remain roughly the same, overall investment will not be affected.

According to the findings in this thesis, the current low interest environment is a phenomenon that seems to only pertain to selected government bond rates and interbank rates. While this can negatively influence certain market participants that are required to hold debt instruments, it is not per se troubling for the economic performance overall. The bull markets and record lows in unemployment over the past years in precisely the same countries that exhibit low interest rates can attest to that. The real danger lies in mistaking low interest rates on government bonds for a sign that deficits are not only favorable, but even necessary. Eventually, such a policy would undermine the sustainability of government debt levels. As long as this is kept in mind, prosperity and low interest rates are by no means mutually exclusive.

Appendix

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A General Graphs and Tables

A.1 Graphs

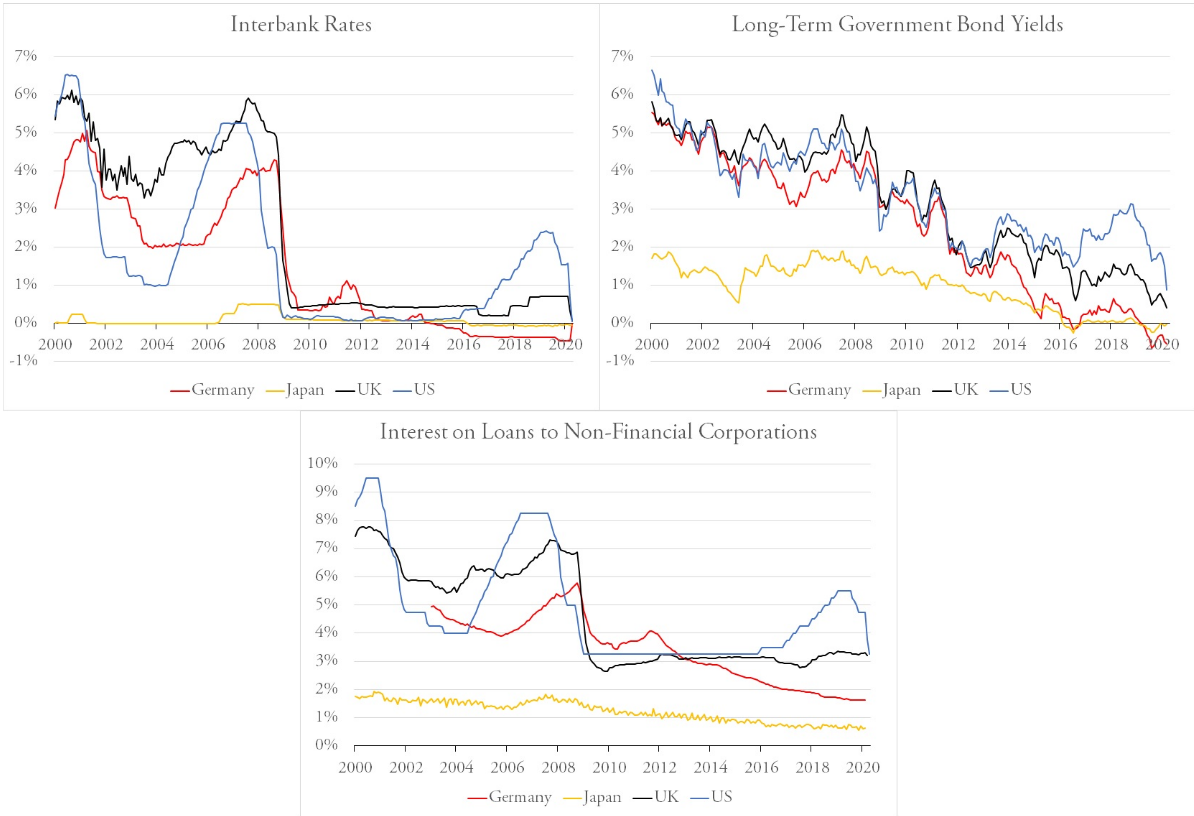

Figure A.1: Interest Rates Across Major Economies 2000–2020. Sources: *Interbank Rates:* Eurostat <https://ec.europa.eu/eurostat/de/data/database> (Series irt_st_m), Bank of Japan <https://www.stat-search.boj.or.jp/index_en.html> (Series FM01'STRDCLUCON), Bank of England <https://www.bankofengland.co.uk/boeapps/database/> (Series IUMASOIA), FRED <https://fred.stlouisfed.org> (Series FEDFUNDS). *Government Bond Yields:* Eurostat <https://ec.europa.eu/eurostat/de/data/database> (Series irt_lt_mcby_m and irt_lt_gby10_m). *Interest Rates for Corporations:* ECB Statistical Data Warehouse <https://sdw.ecb.europa.eu> (Series MIR.M.DE.B.A20.I.R.A.2240.EUR.O), Bank of Japan <https://www.stat-search.boj.or.jp/index_en.html> (Series IR04'DLLR2CIDBNL1), Bank of England <https://www.bankofengland.co.uk/boeapps/database/> (Series CFMHSDC), FRED <https://fred.stlouisfed.org> (Series MPRIME). Retrieved 04. May 2020.

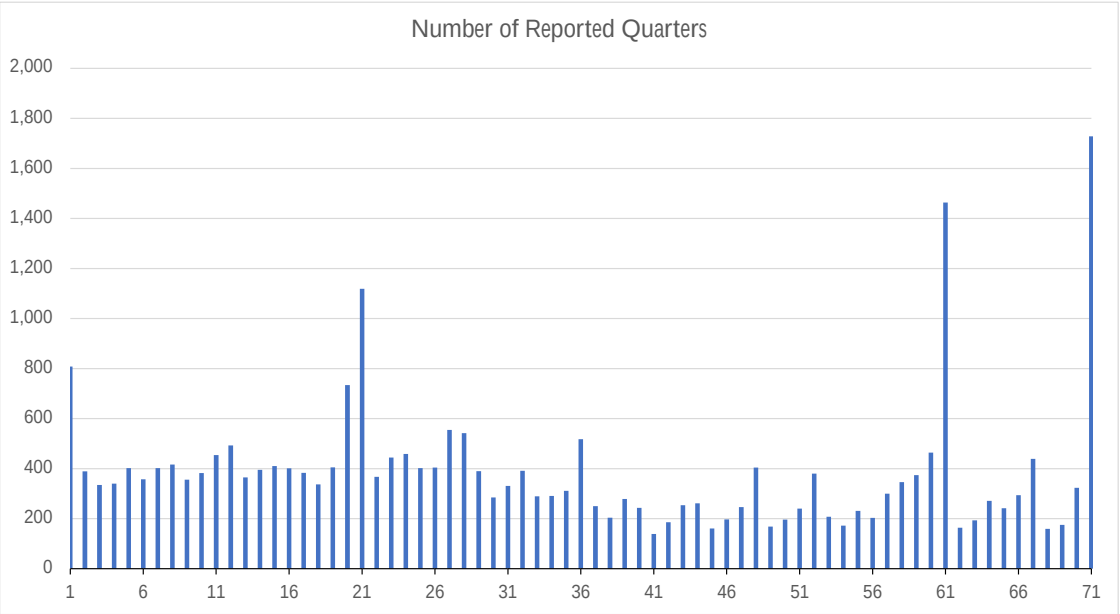

Figure A.2: Histogram of Reported Quarters Across All Firms. Source: Own calculation based on Bloomberg's data.

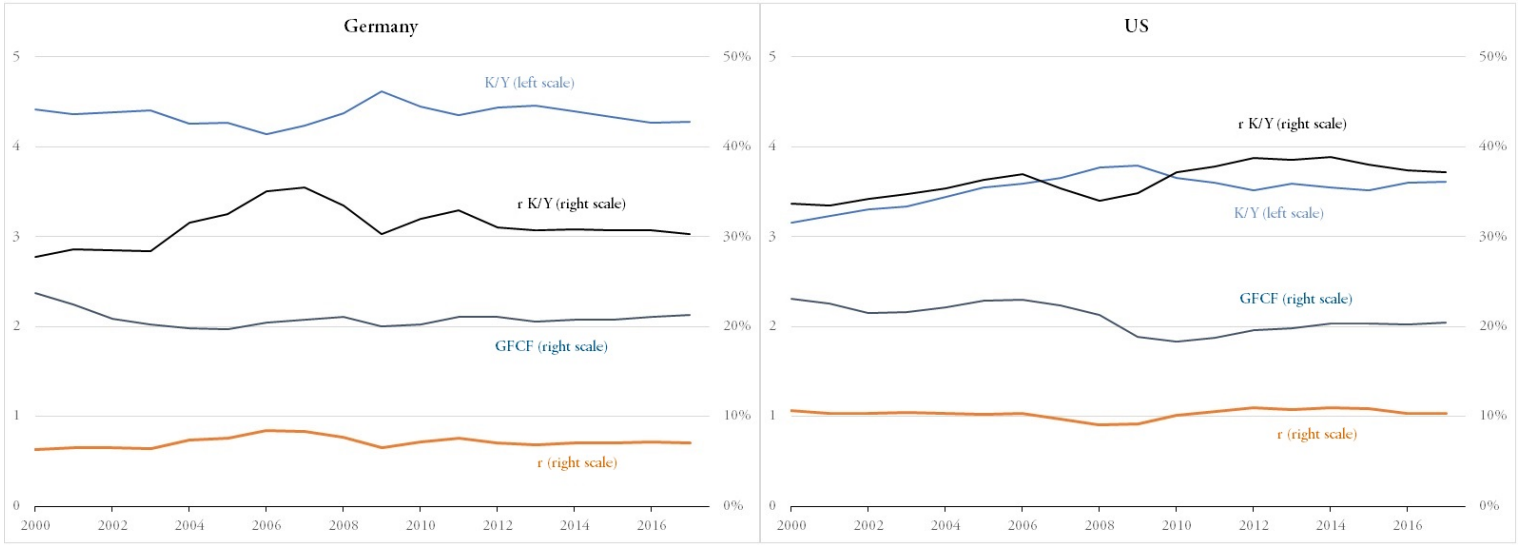

Figure A.3: National Account Data Germany and the United States 2000–2017. GFCF is Gross Fixed Capital Formation as a percentage of GDP. Y is Disposable Income ("Volkseinkommen" for Germany), K is Net Fixed Assets, and rK/Y is computed as "1– Compensation of Employees/Disposable Income". Sources: Destatis <https://www-genesis.destatis.de> (Series 81000–0001, 81000–0003, 81000–0115, 81000–0117), OECD (Series B6NS1, B1_GE, P51, N11NA), FRED <https://fred.stlouisfed.org> (Series A033RC1A027NBEA). Retrieved 04. May 2020.

A.2 Tables

Country	Index Used
Australia	S&P/ASX 200
Austria	ATX
Belgium	BEL 20
Canada	S&P/TSX
Chile	S&P CLX IPSA
Czech Republic	CTX
Denmark	OMX Copenhagen 20
Estonia	OMX Tallinn
Finland	OMX Helsinki 25
France	CAC 40
Germany	DAX
Greece	-
Hungary	BUX
Iceland	-
Ireland	ISEQ
Israel	TA–25 / TA–35
Italy	FTSE MIB
Japan	TPX

Country	Index Used
Latvia	-
Luxembourg	-
Mexico	MEXBOL
Netherlands	AEX
New Zealand	NZX 50
Norway	OSEBX
Poland	WIG 20
Portugal	PSI 20
Slovakia	-
Slovenia	SBITOP
South Korea	KOSPI
Spain	IBEX 35
Sweden	OMX Stockholm 30
Switzerland	SMI
Turkey	XU100
United Kingdom	FTSE 100
United States	S&P 500

Table A.1: Stock Indices Used for β Calculation by Bloomberg. For countries where no index is provided, the market return is calculated using all firms with their place of domicile in the respective country.

Quarter	Average	Median	# Firms	Quarter	Average	Median	# Firms	Quarter	Average	Median	# Firms	Quarter	Average	Median	# Firms
2000Q1			0	2005Q1	4.90	7.57	7,093	2010Q1	9.14	8.61	13,409	2015Q1	7.45	6.25	17,771
2000Q2	6.51	6.55	6,810	2005Q2	–3.92	7.17	12,134	2010Q2	10.46	9.45	16,796	2015Q2	12.62	6.36	21,984
2000Q3	7.20	6.90	3,875	2005Q3	5.23	7.34	9,277	2010Q3	6.13	8.94	13,642	2015Q3	12.55	6.51	17,880
2000Q4	6.56	6.29	7,390	2005Q4	2.43	7.02	12,445	2010Q4	7.07	9.17	17,041	2015Q4	9.31	6.33	21,752
2001Q1	6.70	6.55	4,365	2006Q1	0.60	7.52	10,370	2011Q1	9.80	9.02	14,262	2016Q1	10.14	6.96	17,742
2001Q2	6.82	6.66	7,976	2006Q2	3.91	7.35	13,274	2011Q2	8.49	8.53	17,772	2016Q2	8.34	6.26	22,117
2001Q3	8.22	7.43	4,404	2006Q3	3.52	7.09	10,648	2011Q3	8.76	7.96	14,393	2016Q3	–1,938.49	6.55	18,255
2001Q4	7.13	6.69	8,168	2006Q4	4.22	7.12	13,475	2011Q4	7.39	7.85	17,773	2016Q4	–42.14	6.57	22,887
2002Q1	7.67	7.25	4,785	2007Q1	10.21	7.47	11,222	2012Q1	7.92	7.74	14,772	2017Q1	–134.30	7.24	14,789
2002Q2	5.19	6.50	8,426	2007Q2	8.65	7.62	14,312	2012Q2	7.81	7.77	18,359	2017Q2	–115.68	7.02	16,971
2002Q3	3.98	6.45	4,752	2007Q3	9.11	7.55	11,490	2012Q3	14.08	7.55	14,743	2017Q3	–131.86	7.34	14,676
2002Q4	–5.20	6.24	8,647	2007Q4	7.87	7.38	14,485	2012Q4	11.70	7.32	19,555	2017Q4	–48.65	7.18	15,074
2003Q1	7.19	6.68	4,861	2008Q1	2.06	7.24	11,931	2013Q1	9.47	7.23	16,319				
2003Q2	–7.28	5.78	8,618	2008Q2	7.09	7.53	15,287	2013Q2	7.93	7.59	20,020				
2003Q3	–23.97	6.38	4,997	2008Q3	27.28	7.84	12,276	2013Q3	7.96	7.34	16,470				
2003Q4	–10.70	6.02	9,154	2008Q4	12.31	7.72	15,294	2013Q4	17.04	7.37	20,274				
2004Q1	–23.69	6.34	5,539	2009Q1	9.73	8.02	12,714	2014Q1	10.49	7.36	17,010				
2004Q2	–8.32	6.20	9,773	2009Q2	9.26	8.41	15,944	2014Q2	8.43	6.76	20,984				
2004Q3	–37.02	6.56	5,665	2009Q3	9.38	8.59	12,909	2014Q3	8.78	6.76	17,134				
2004Q4	6.64	6.26	10,509	2009Q4	8.85	8.42	16,122	2014Q4	7.15	6.32	21,071				

Table A.2: Average WACC Over All Firms Before Outlier Elimination. Source: Own calculation based on Bloomberg's data.

Country	Lower Bound	Upper Bound
Australia	–5.77	24.03
Austria	4.53	22.08
Belgium	1.74	17.89
Canada	–27.02	46.58
Chile	2.01	13.57
Czech Republic	3.04	20.3
Denmark	3.06	18.03
Estonia	4.06	30.04
Finland	3.33	16.86
France	1.42	17.04
Germany	2.8	18.42
Greece	0.20	18.23
Hungary	–7.26	29.09
Iceland	2.41	11.89
Ireland	0.76	21.79
Israel	–1.58	20.27
Italy	5.03	19.11
Japan	3.32	21.56

Country	Lower Bound	Upper Bound
Latvia	–16.67	56.49
Luxembourg	0.22	19.3
Mexico	2.59	17.34
Netherlands	1.58	19.26
New Zealand	–9.59	27.46
Norway	2.49	23.48
Poland	3.13	16.49
Portugal	3.95	20.42
Slovakia	–2.25	21.08
Slovenia	–0.32	31.95
South Korea	1.82	22.07
Spain	3.12	18.93
Sweden	–3.46	16.32
Switzerland	–0.06	16.91
Turkey	4.12	17.72
United Kingdom	–0.12	20.07
United States	–8.95	26.77

Table A.3: Alternative Cut Off Points for Cost of Equity. Shows resulting upper and lower bounds when the top and bottom 1% is eliminated on a country basis instead of for the data set as a whole. Source: Own calculations based on Bloomberg's data.

Country	# Firms	# Firms with PE	Affected Firms per Country in %	# Entries with PE	Average Weight of PE	Average Cost of PE
Australia	1,763	68	3.7	496	8.4	46.2
Austria	72	4	5.5	64	9.2	0.0
Belgium	115	3	2.3	35	5.5	0.3
Canada	2,854	223	8.0	3,961	8.2	233.0
Chile	199	1	1.0	5	0.1	5.8
Czech Republic	16	1	5.6	9	18.7	0.0
Denmark	148	6	3.8	23	5.0	0.4
Estonia	16	0	0.0	0	0.0	0.0
Finland	128	3	2.1	17	5.7	3.8
France	607	18	2.9	173	5.1	0.8
Germany	426	15	2.5	153	5.6	0.3
Greece	232	25	10.6	173	6.9	736.0
Hungary	41	6	15.9	25	7.8	0.3
Iceland	18	0	0.0	0	0.0	0.0
Ireland	82	12	13.8	134	3.3	470.0
Israel	515	39	7.6	113	11.7	1.2
Italy	301	3	0.9	7	2.3	0.0
Japan	4,592	192	4.2	3,947	17.2	1.5
Latvia	32	1	2.8	1	14.3	0.0
Luxembourg	38	1	2.1	12	0.0	1.3
Mexico	142	2	1.4	2	10.5	–0.1
Netherlands	132	24	17.0	235	5.7	19.4
New Zealand	132	8	5.3	22	25.4	1.1
Norway	204	4	1.7	22	4.6	0.0
Poland	465	5	0.7	9	11.1	0.0

Portugal	50	2	3.8	74	1.4	2.0
Slovakia	39	1	1.9	13	0.3	10.4
Slovenia	31	2	5.7	3	6.0	0.0
South Korea	2,540	261	11.9	4,041	1.1	0.6
Spain	162	6	3.0	37	3.0	0.0
Sweden	574	25	4.1	226	4.2	73.5
Switzerland	256	12	4.1	143	5.7	49.0
Turkey	410	27	6.8	56	2.2	0.0
UK	1,306	124	9.1	757	5.2	13.9
US	6,710	2,487	36.4	38,549	9.9	5,963.2
Overall	25,348	3,611	14.0	53,537	9.5	4,302.3

Table A.4: Cases of Preferred Equity by Country. Source: Own calculations based on Bloomberg's data.

	Consumer Discretionary	Consumer Staples	Energy	Financials	Health Care	Industrials	Information Technology	Materials	Real Estate	Telecom-munication Services	Utilities
Australia	145	49	198	109	134	149	163	634	79	16	20
Austria	9	5	3	13	2	16	6	7	7	1	3
Belgium	8	11	3	11	14	12	13	12	26	2	1
Canada	121	58	351	111	123	146	172	1,041	79	8	34
Chile	18	33	3	30	4	30	1	23	9	4	21
Czech Republic	3	2	0	2	0	2	0	2	0	1	3
Denmark	19	7	1	30	20	33	15	7	10	1	2
Estonia	5	2	0	1	0	4	0	0	3	0	1
Finland	18	7	1	11	6	41	25	11	5	2	1
France	115	35	11	48	72	106	112	32	55	6	11
Greece	40	26	9	12	7	60	20	24	9	3	5
Germany	80	10	3	41	40	88	97	22	26	7	9
Hungary	1	1	2	7	3	7	5	1	4	3	4
Iceland	0	3	0	3	1	4	1	0	3	2	0
Ireland	6	8	8	5	17	11	4	14	3	2	1
Israel	40	25	26	55	74	71	90	22	76	9	6
Italy	73	14	7	49	12	60	28	10	12	7	21
Japan	861	285	30	192	173	982	679	310	142	13	26
Latvia	4	4	2	0	3	9	1	1	1	0	1

Luxembourg	5	3	2	6	1	4	5	5	3	2	2
Mexico	30	21	1	23	2	21	0	18	14	2	1
Netherlands	17	9	7	14	7	25	24	9	10	2	1
New Zealand	19	20	3	9	10	22	17	10	11	3	7
Norway	9	8	53	36	12	34	16	9	9	3	5
Poland	69	31	7	53	18	111	58	48	24	8	15
Portugal	13	4	1	5	1	10	4	7	0	2	2
Slovakia	2	0	1	5	1	2	1	2	0	0	0
Slovenia	7	3	0	5	2	4	1	2	0	1	0
South Korea	64	20	1	8	48	49	142	48	6	0	3
Spain	21	7	3	16	15	31	7	12	18	6	9
Sweden	71	21	14	38	108	122	97	28	36	9	4
Switzerland	28	15	4	51	24	56	23	20	17	2	8
Turkey	86	40	5	68	6	67	14	67	31	2	7
United Kingdom	216	54	113	142	99	217	164	127	78	13	16
United States	746	251	479	1,011	962	720	921	326	256	60	113
Overall	2,969	1,092	1,352	2,220	2,021	3,326	2,926	2,911	1,062	202	363

Table A.5: Distribution Across Countries and Industries. Source: Own calculation based on Bloomberg's data.

B WACC Graphs and Data for Each Country and Industry

B.1 Graphs

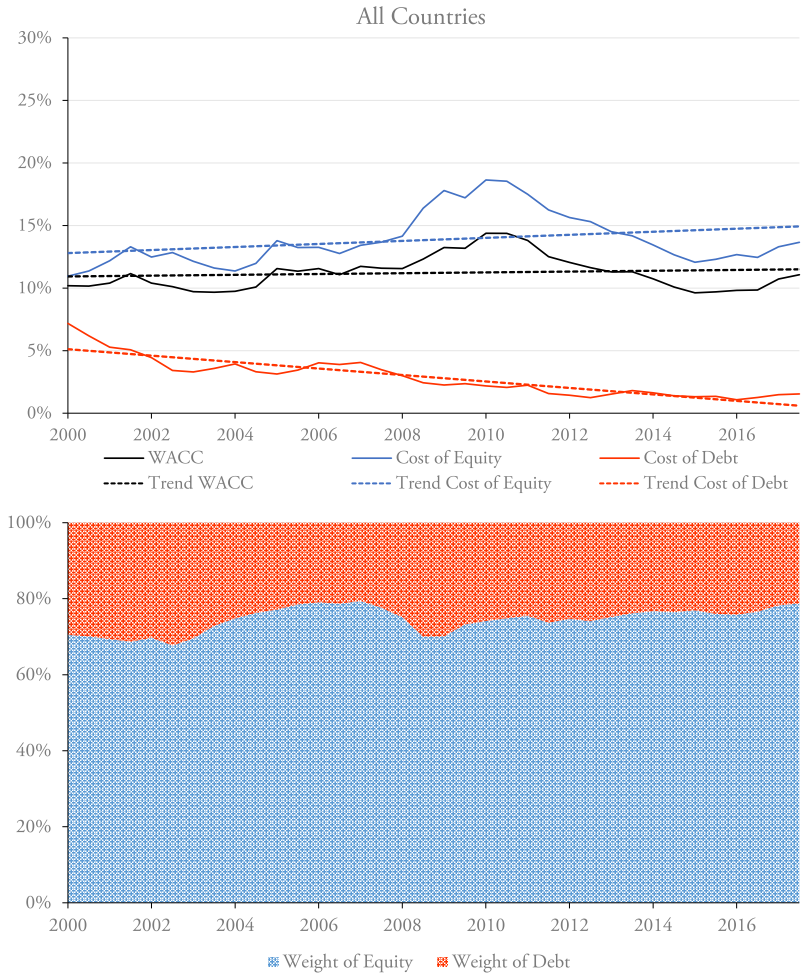

Figure B.1: All Countries 2000–2017. Source: Own calculations based on Bloomberg's data.

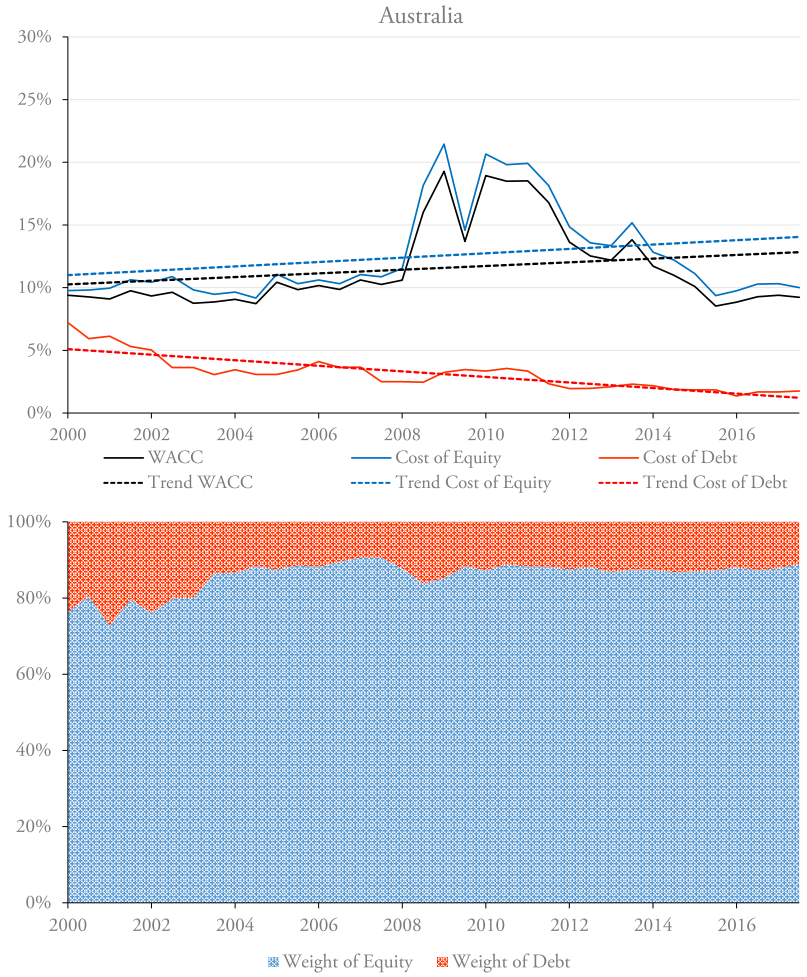

Figure B.2: Australia 2000–2017. Source: Own calculations based on Bloomberg's data.

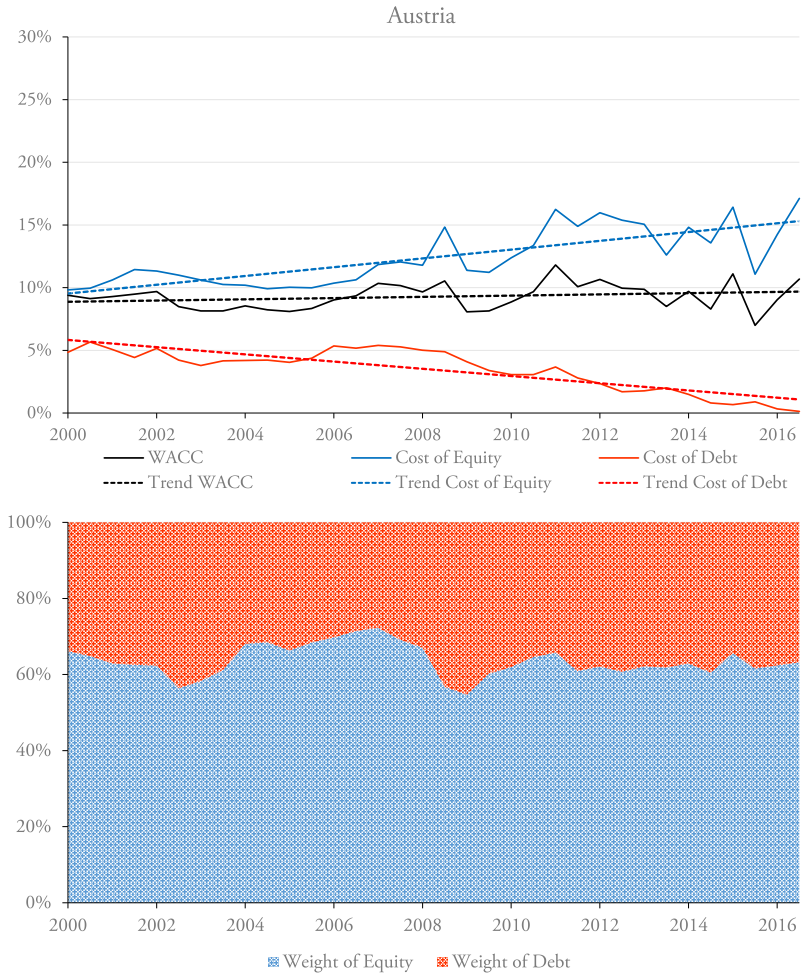

Figure B.3: Austria 2000–2016. Source: Own calculations based on Bloomberg's data.

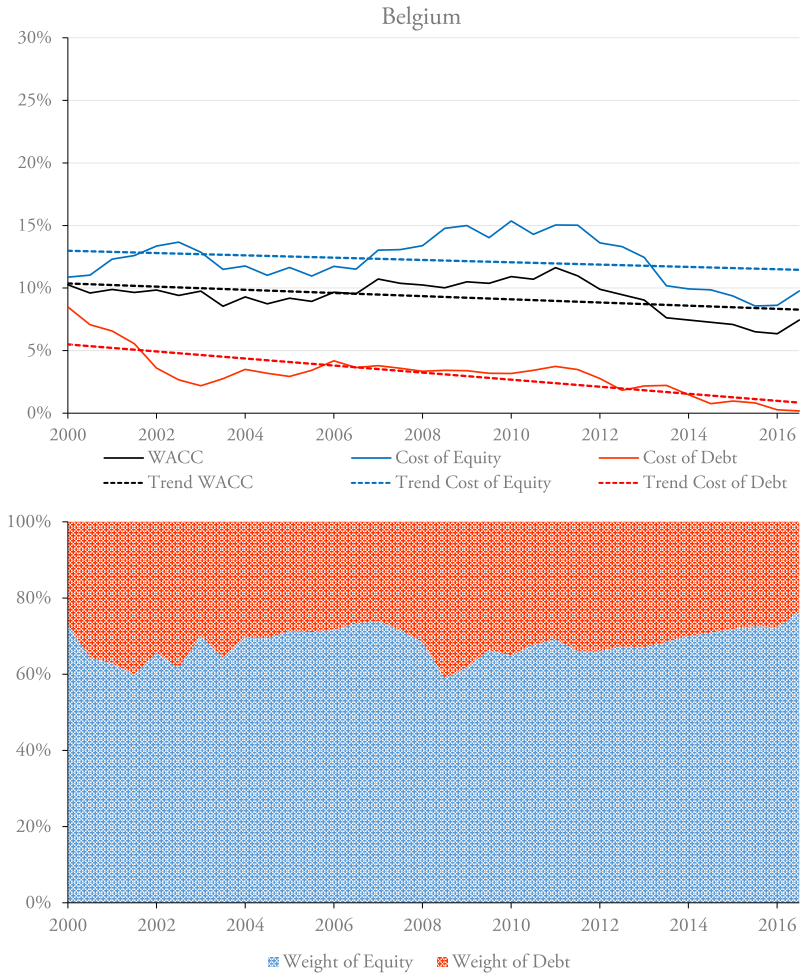

Figure B.4: Belgium 2000–2016. Source: Own calculations based on Bloomberg's data.

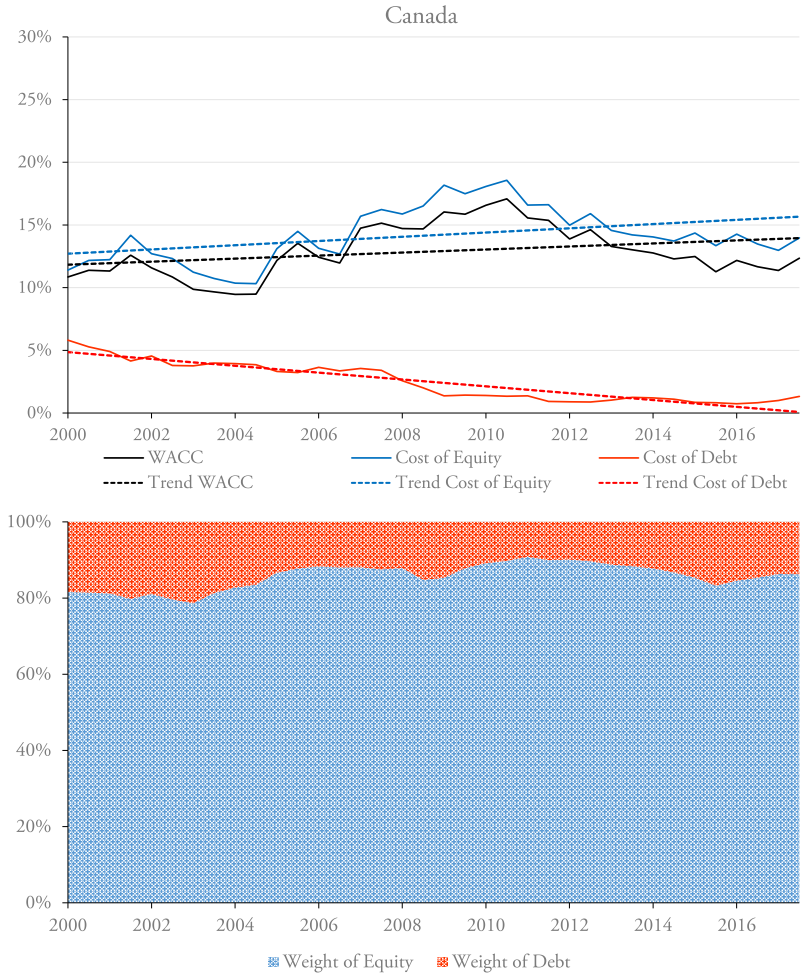

Figure B.5: Canada 2000–2017. Source: Own calculations based on Bloomberg's data.

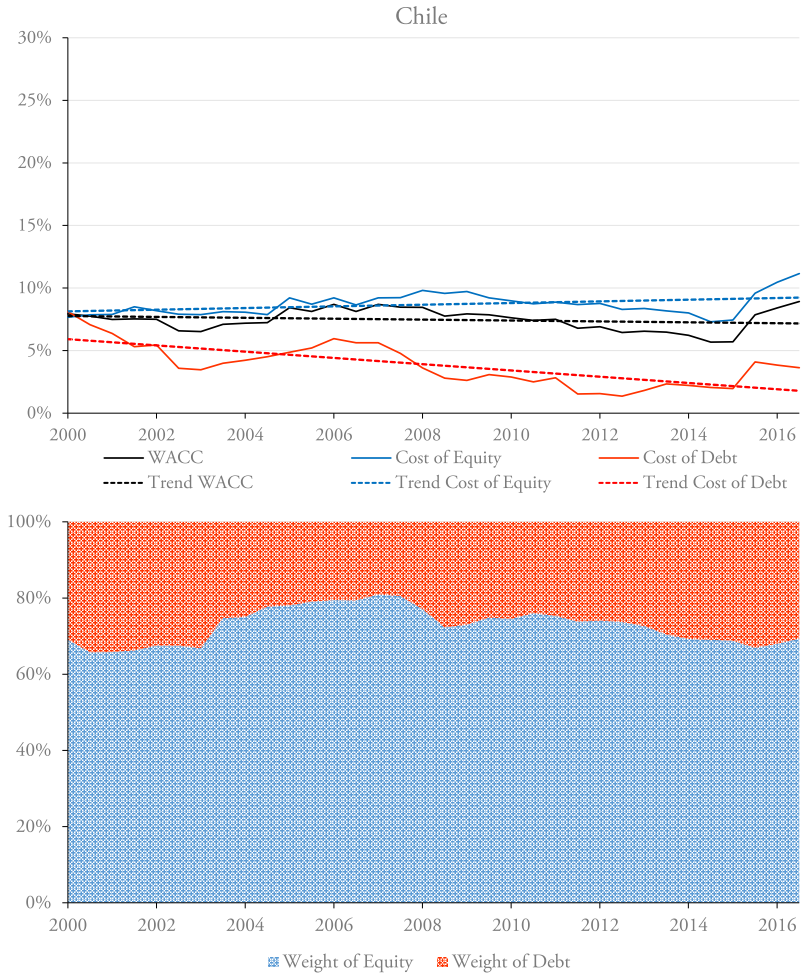

Figure B.6: Chile 2000–2016. Source: Own calculations based on Bloomberg's data.

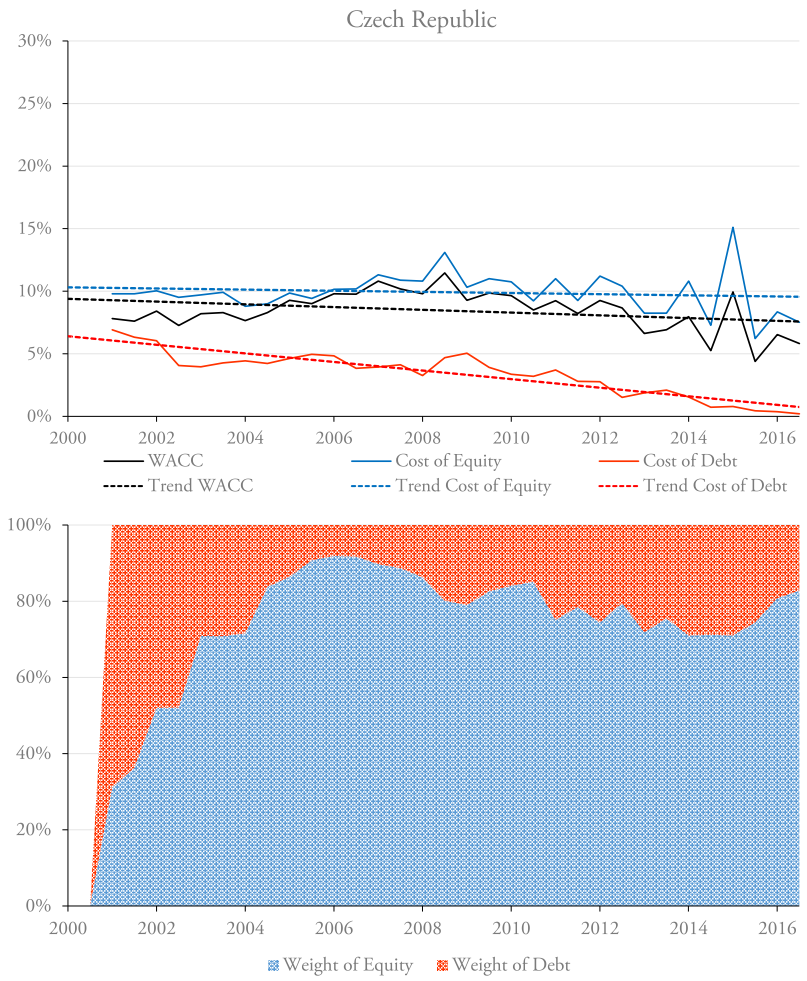

Figure B.7: Czech Republic 2000–2016. Source: Own calculations based on Bloomberg's data. The artifact that the weights of debt and equity touch the abscissa is due to missing values for the affected half year.

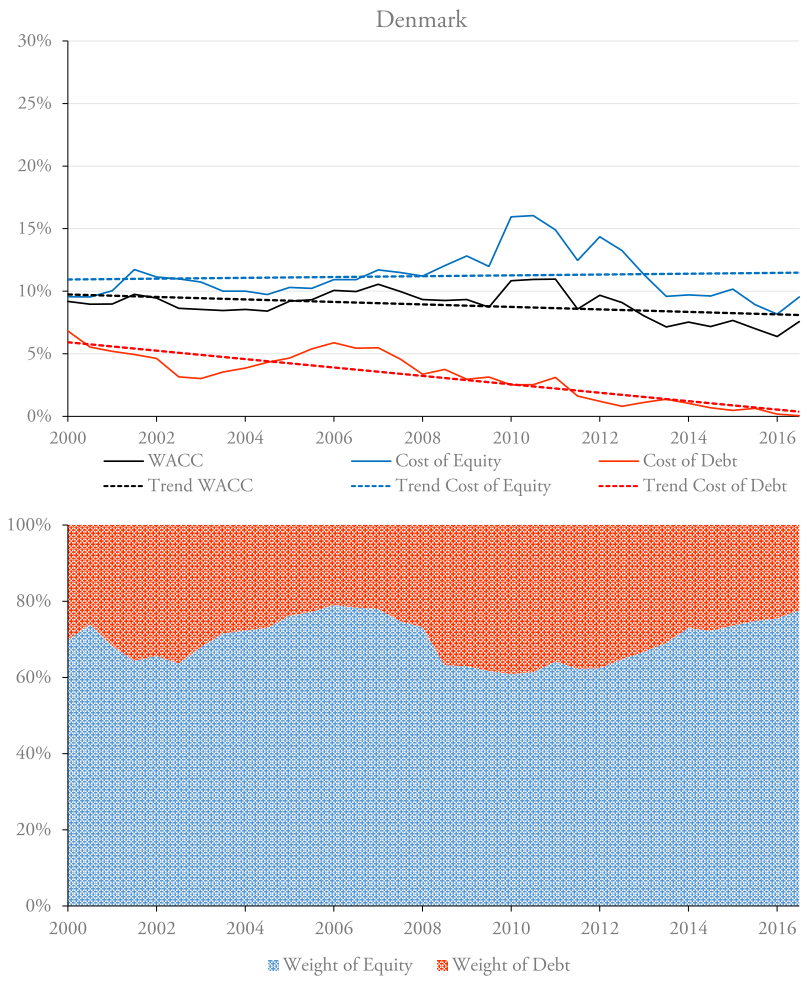

Figure B.8: Denmark 2000–2016. Source: Own calculations based on Bloomberg's data.

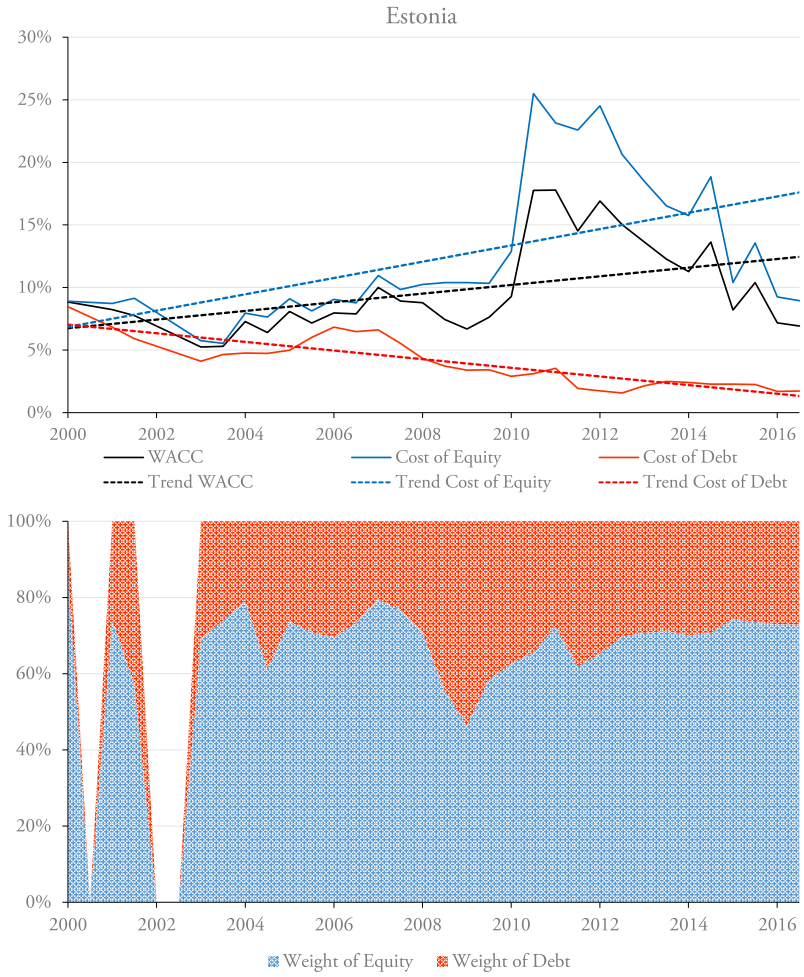

Figure B.9: Estonia 2000–2016. Source: Own calculations based on Bloomberg's data. The artifact that the weights of debt and equity touch the abscissa is due to missing values for the affected half year.

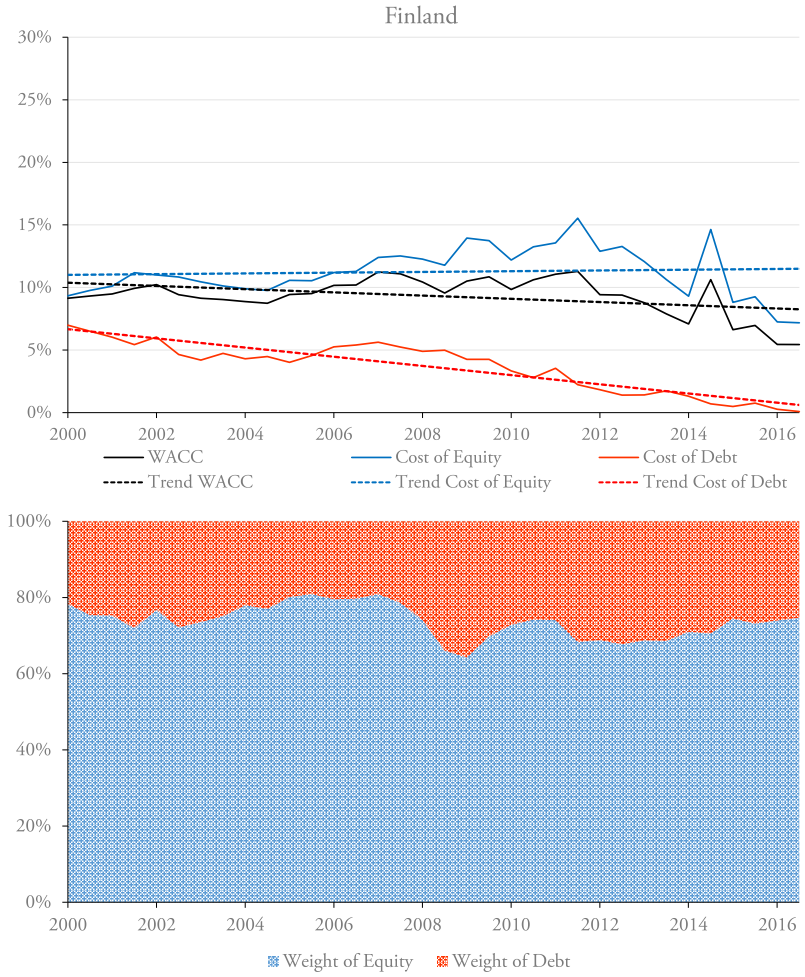

Figure B.10: Finland 2000–2016. Source: Own calculations based on Bloomberg's data.

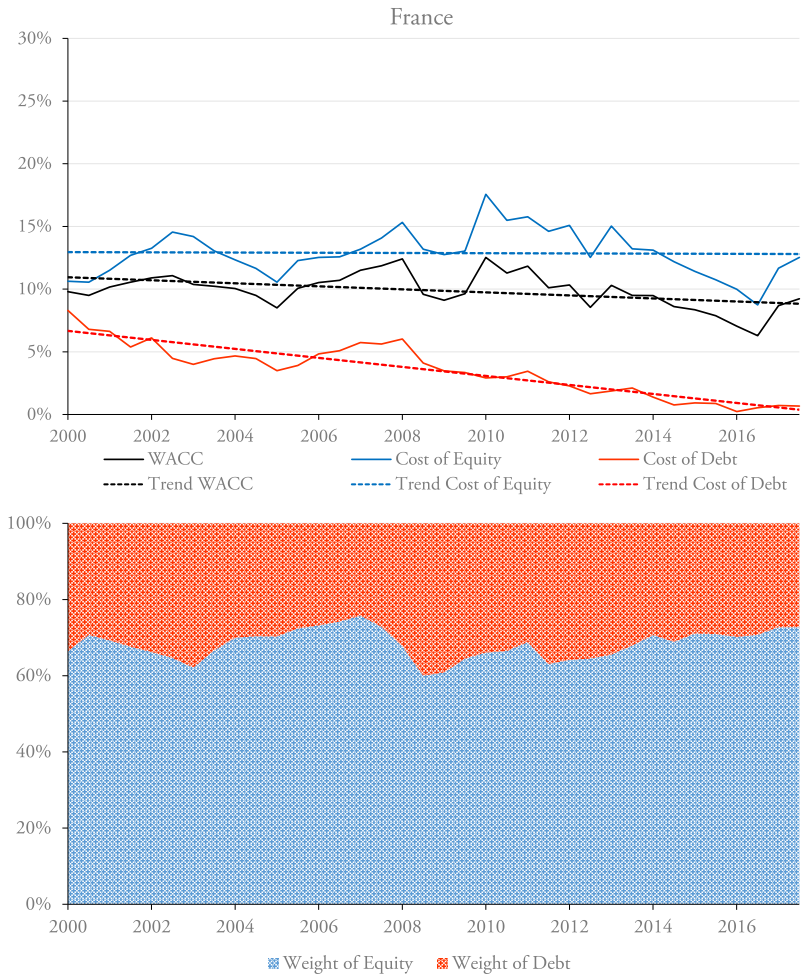

Figure B.11: France 2000–2017. Source: Own calculations based on Bloomberg's data.

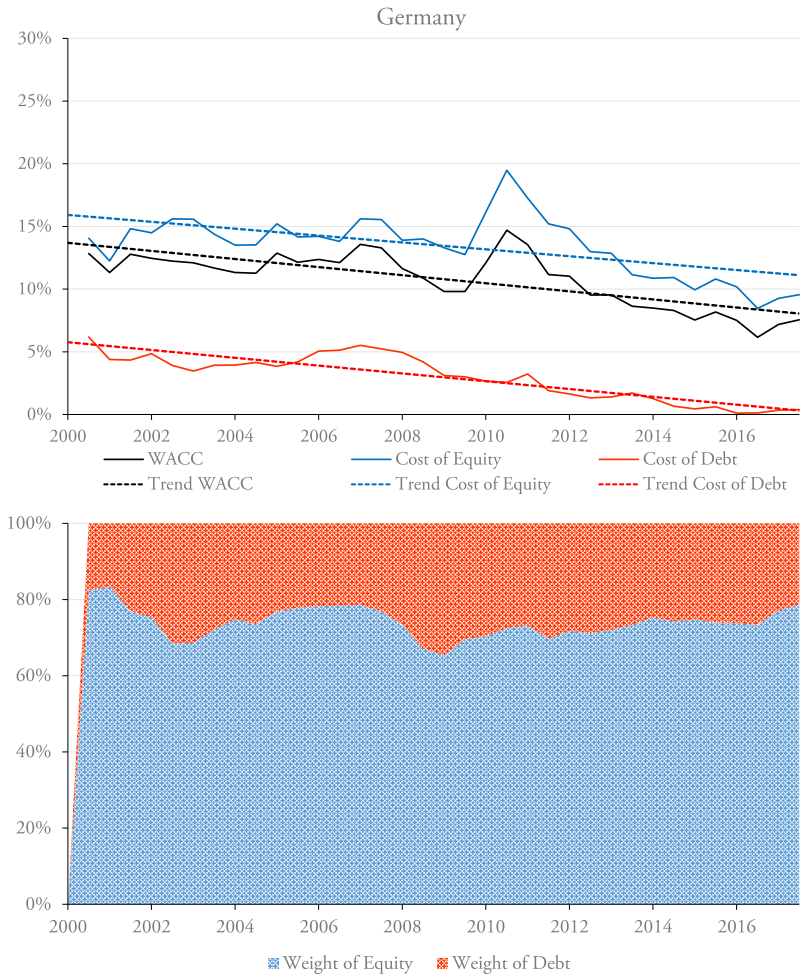

Figure B.12: Germany 2000–2017. Source: Own calculations based on Bloomberg's data. The artifact that the weights of debt and equity touch the abscissa is due to missing values for the affected half year.

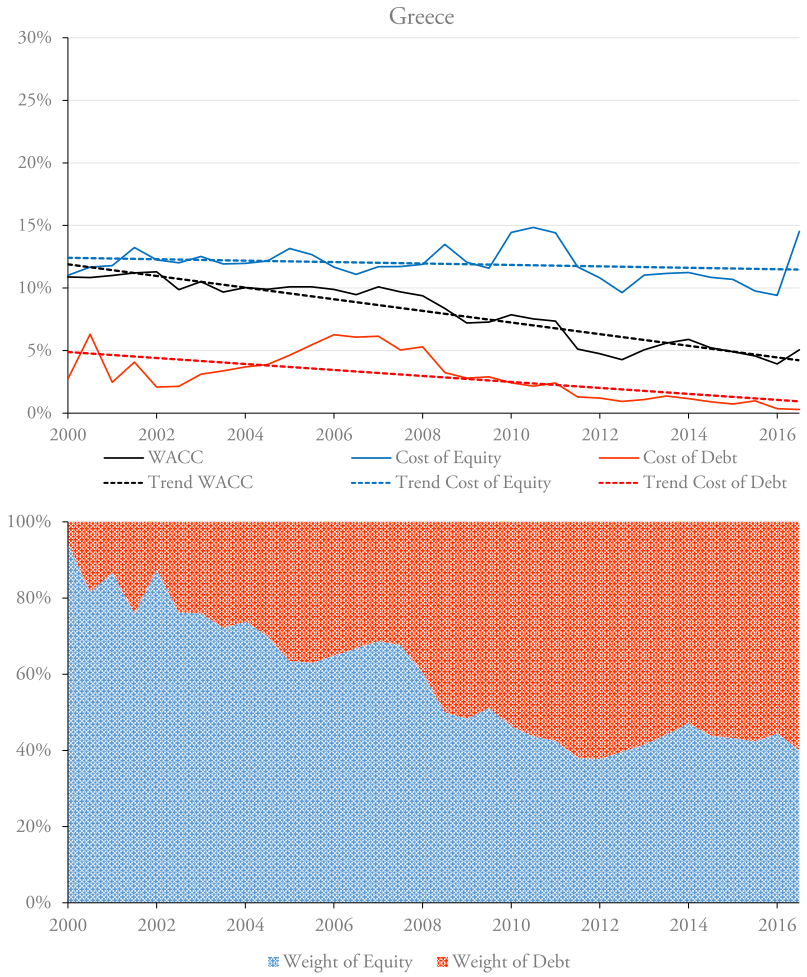

Figure B.13: Greece 2000–2016. Source: Own calculations based on Bloomberg's data.

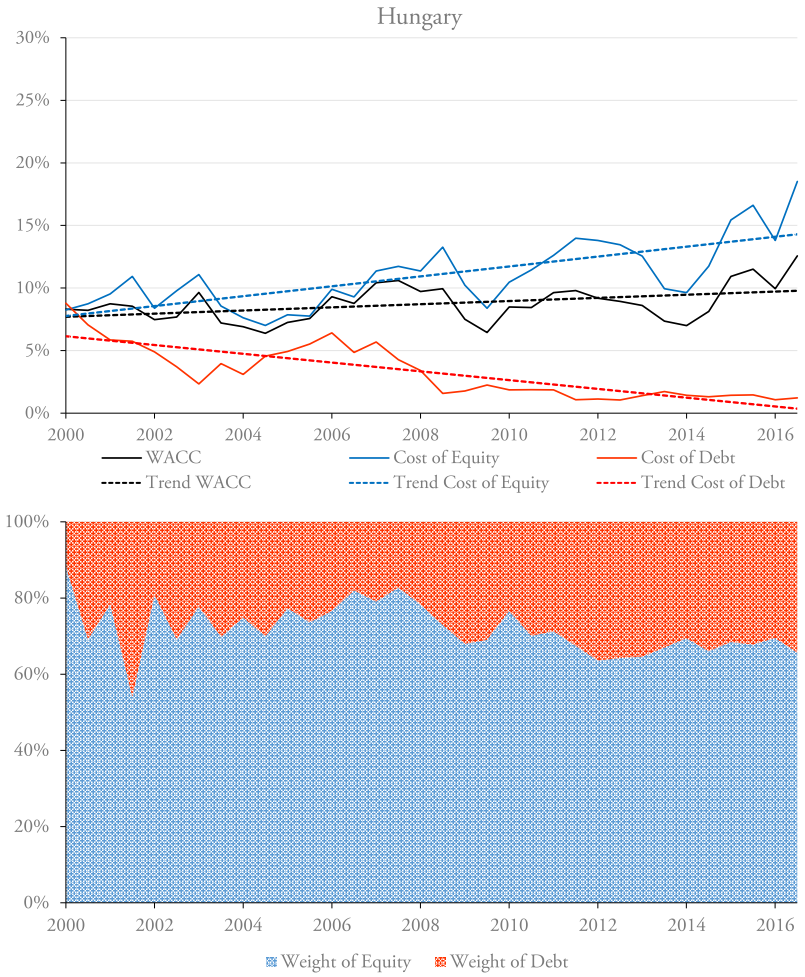

Figure B.14: Hungary 2000–2016. Source: Own calculations based on Bloomberg's data.

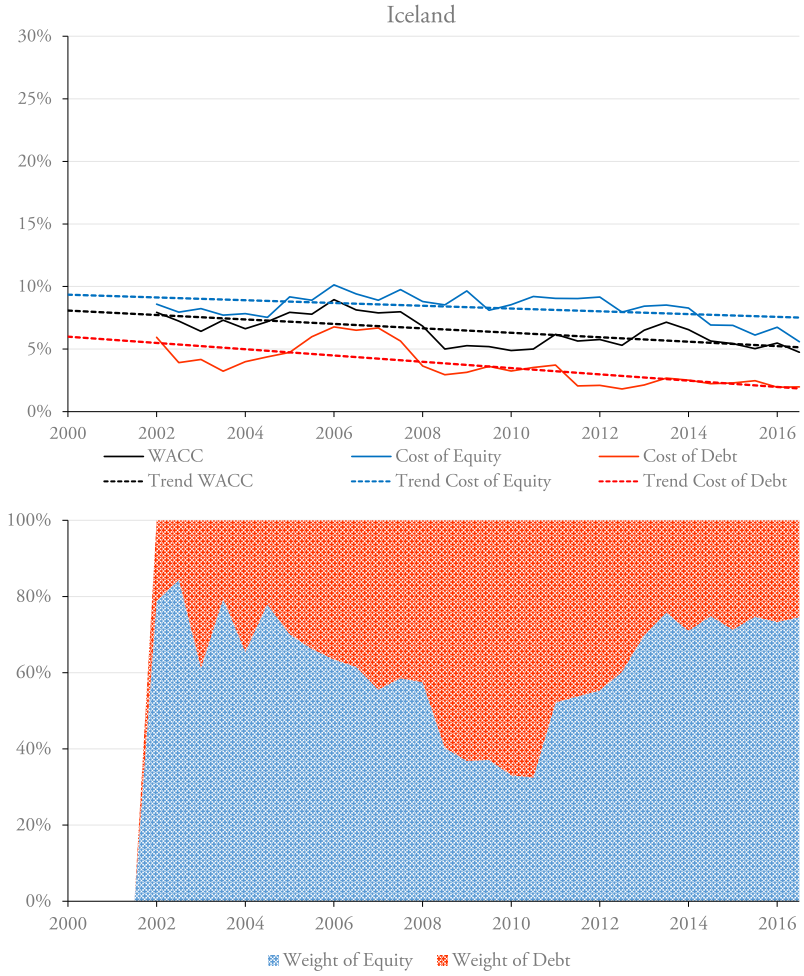

Figure B.15: Iceland 2000–2016. Source: Own calculations based on Bloomberg's data. The artifact that the weights of debt and equity touch the abscissa is due to missing values for the affected half year.

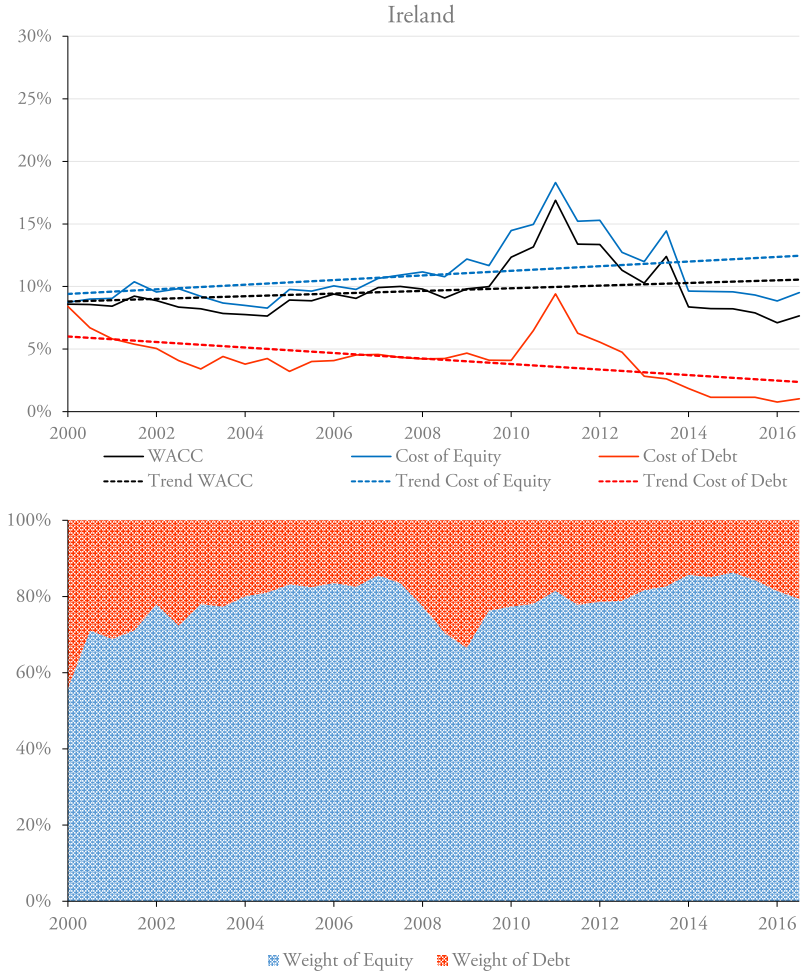

Figure B.16: Ireland 2000–2016. Source: Own calculations based on Bloomberg's data.

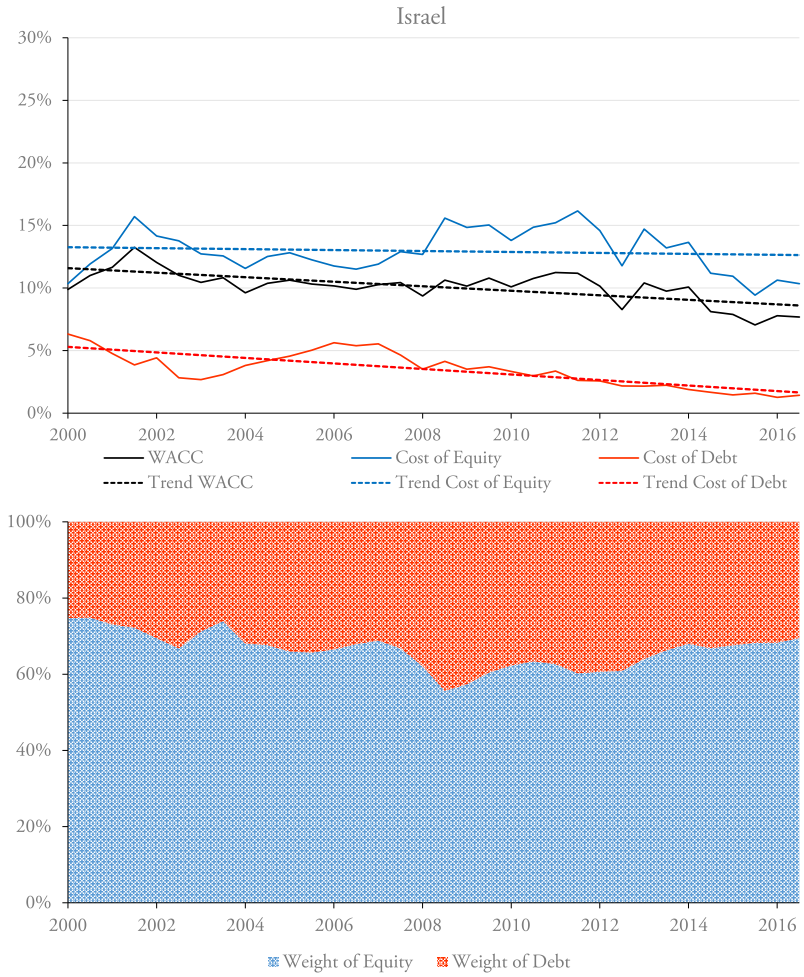

Figure B.17: Israel 2000–2016. Source: Own calculations based on Bloomberg's data.

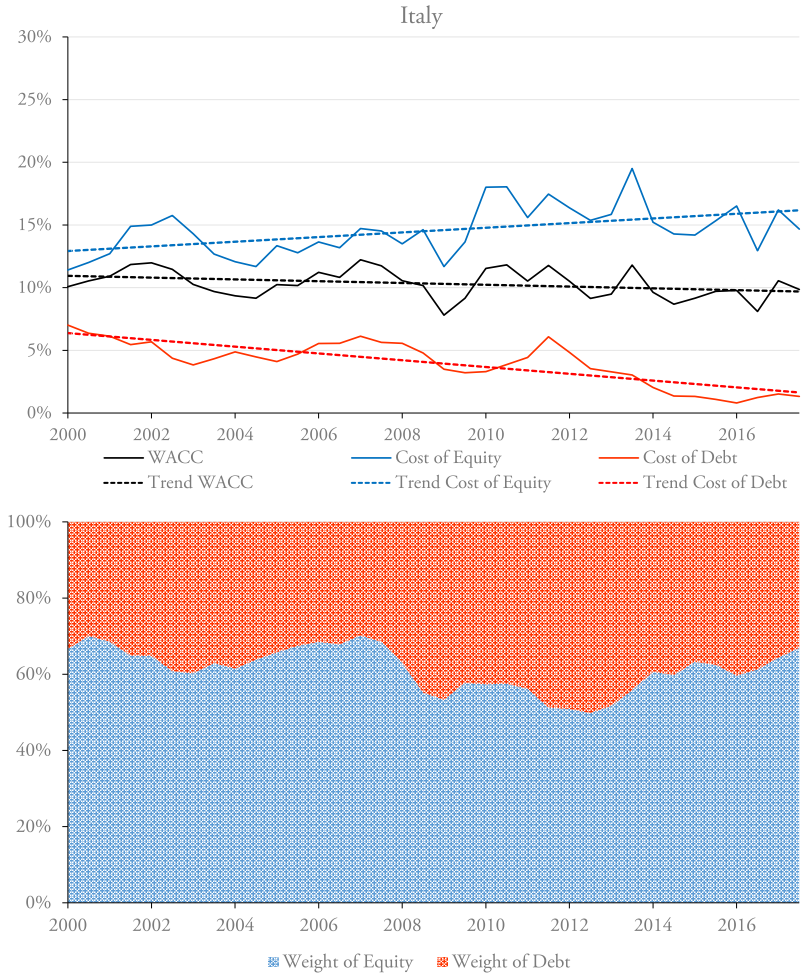

Figure B.18: Italy 2000–2017. Source: Own calculations based on Bloomberg's data.

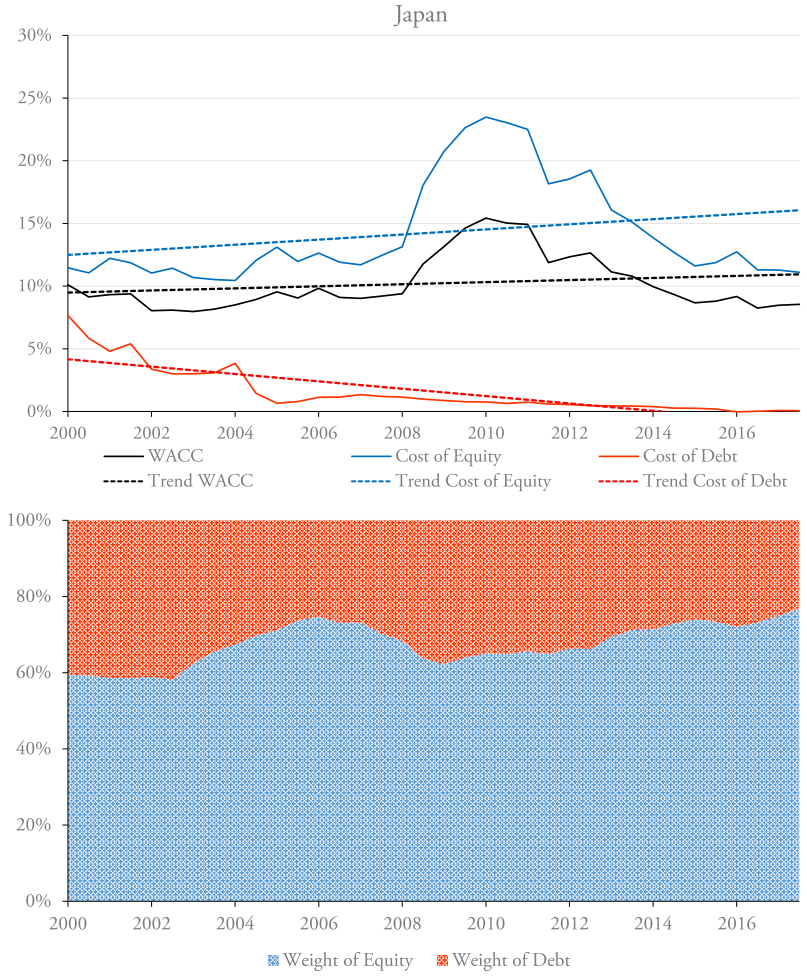

Figure B.19: Japan 2000–2017. Source: Own calculations based on Bloomberg's data.

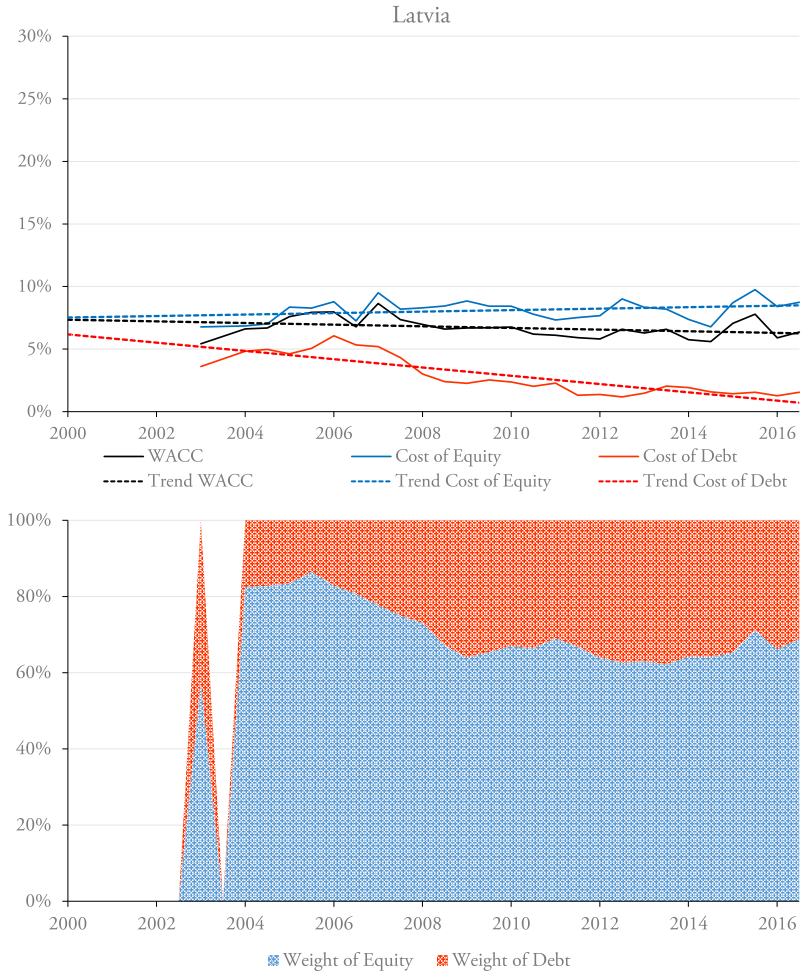

Figure B.20: Latvia 2000–2016. Source: Own calculations based on Bloomberg's data. The artifact that the weights of debt and equity touch the abscissa is due to missing values for the affected half year.

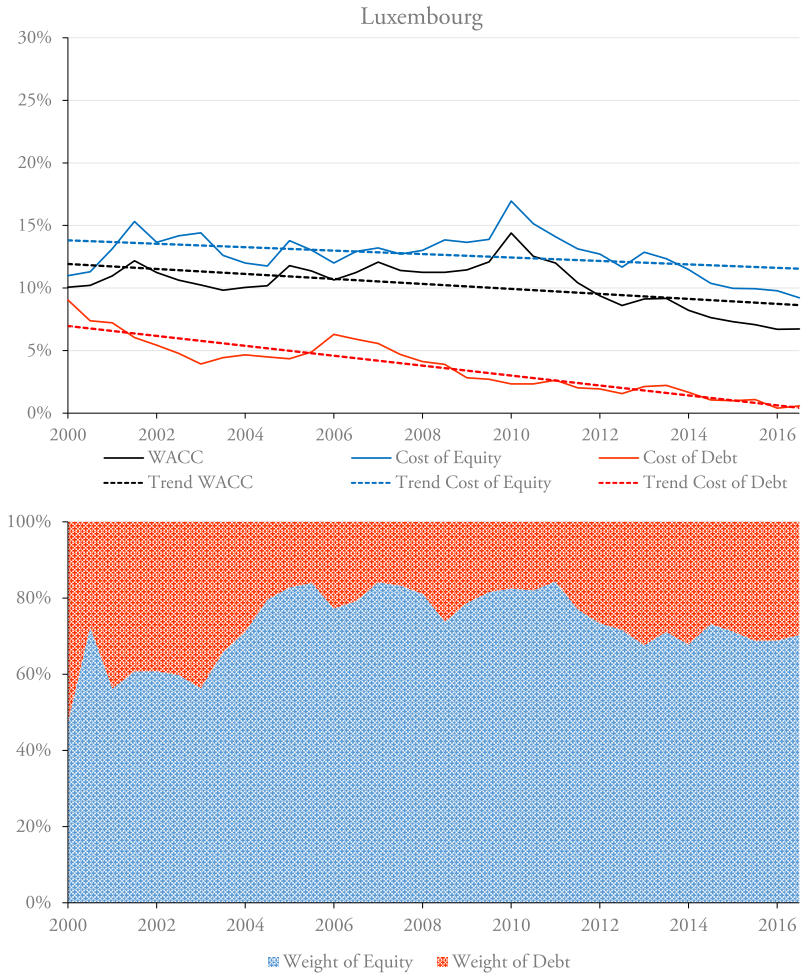

Figure B.21: Luxembourg 2000–2016. Source: Own calculations based on Bloomberg's data.

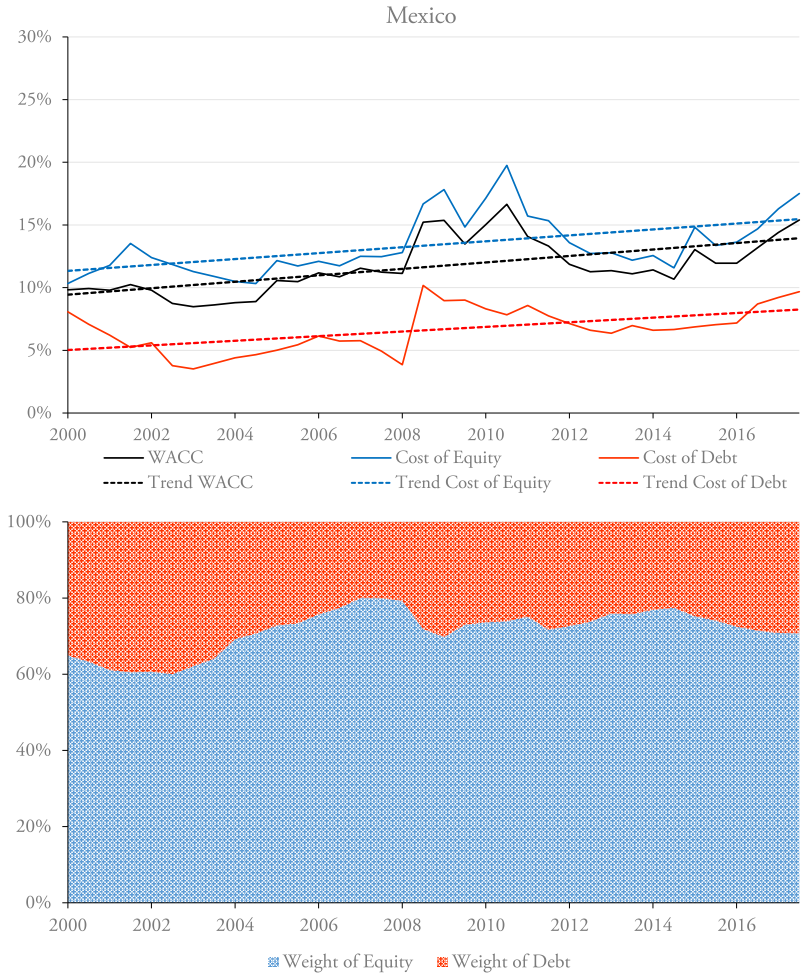

Figure B.22: Mexico 2000–2017. Source: Own calculations based on Bloomberg's data.

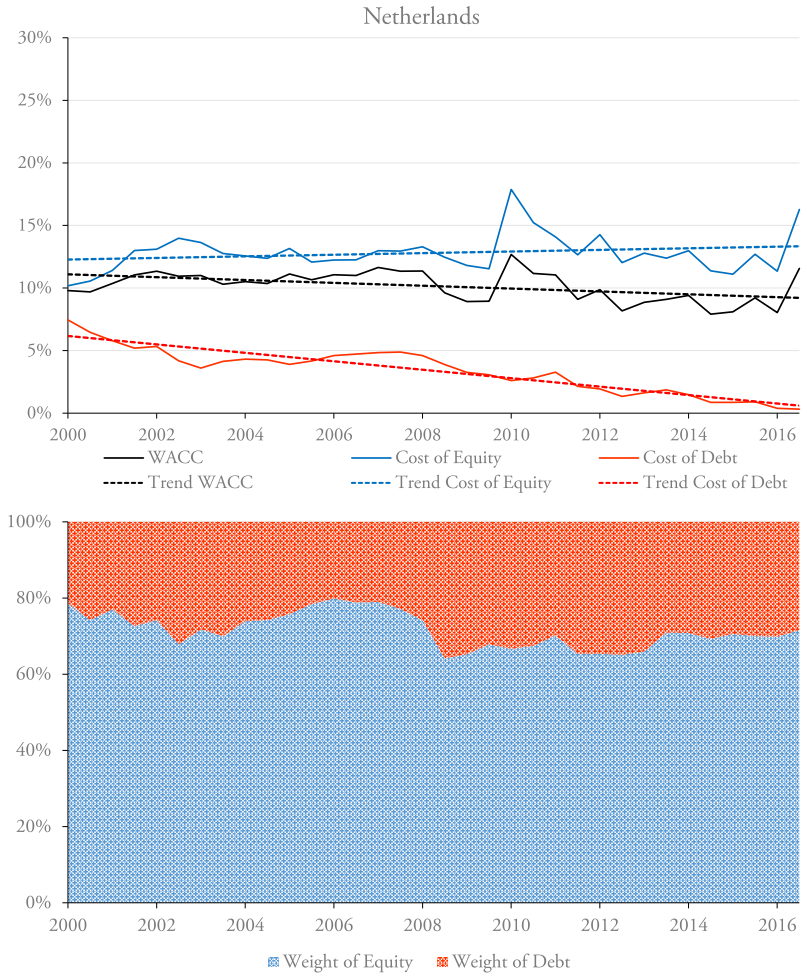

Figure B.23: Netherlands 2000–2016. Source: Own calculations based on Bloomberg's data.

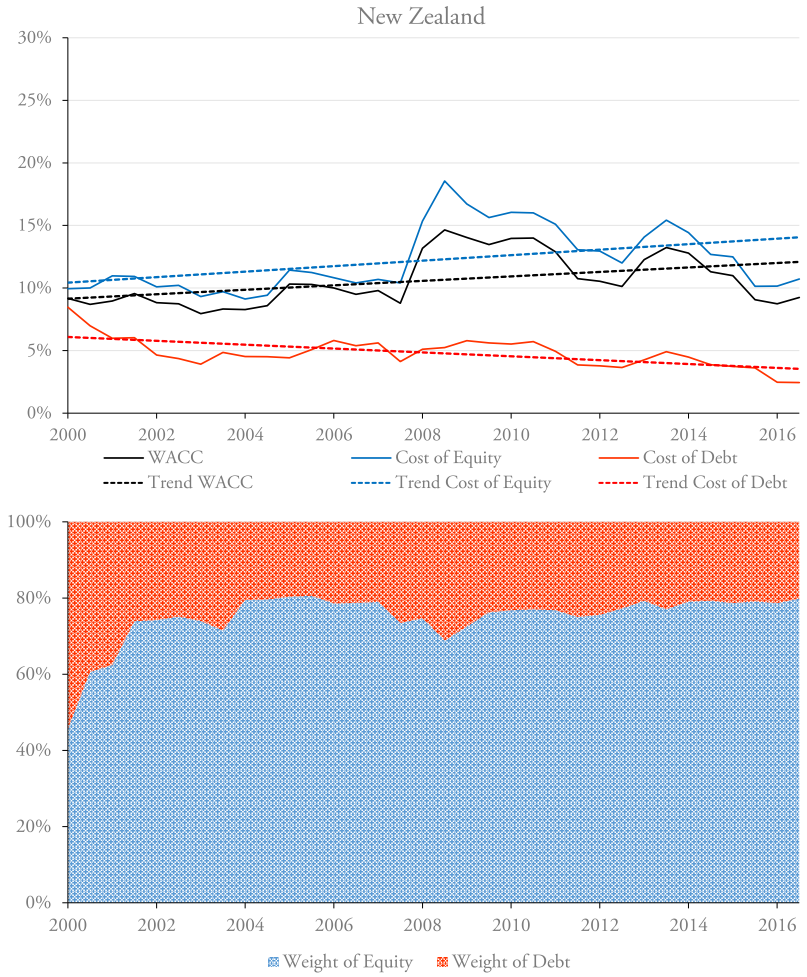

Figure B.24: New Zealand 2000–2016. Source: Own calculations based on Bloomberg's data.

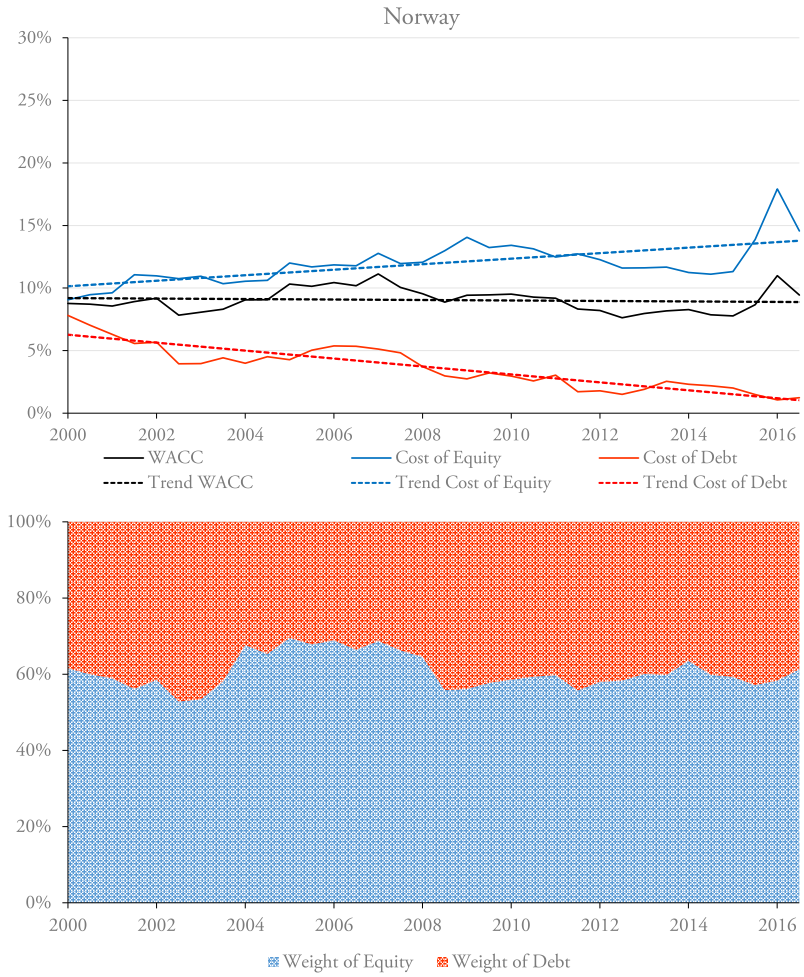

Figure B.25: Norway 2000–2016. Source: Own calculations based on Bloomberg's data.

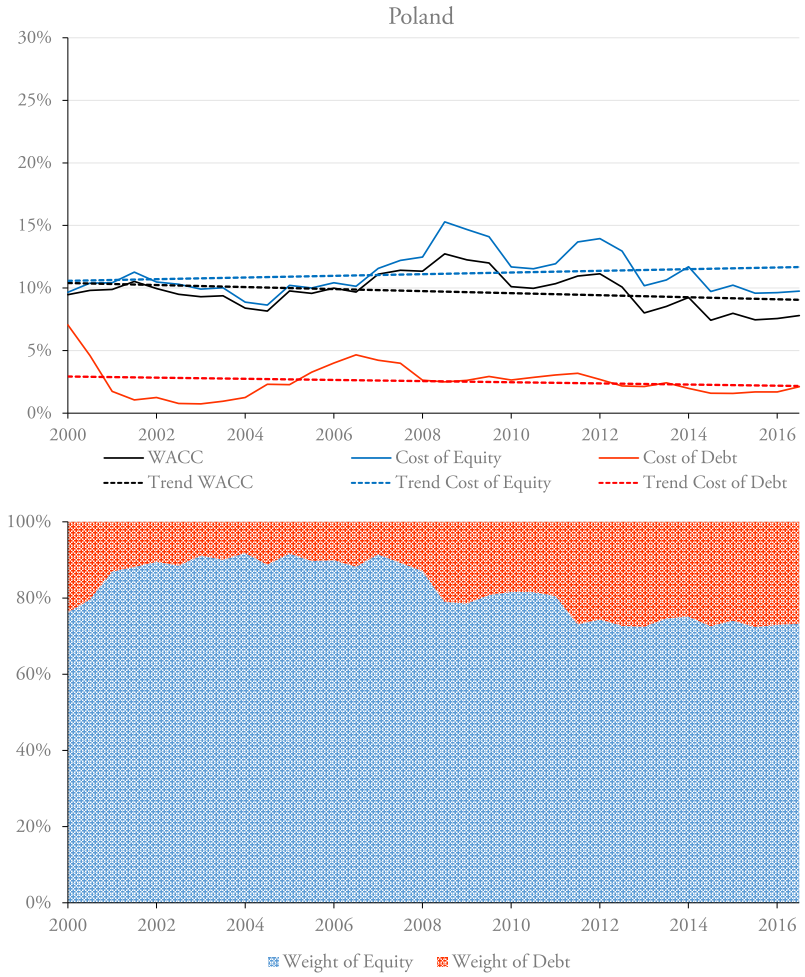

Figure B.26: Poland 2000–2016. Source: Own calculations based on Bloomberg's data.

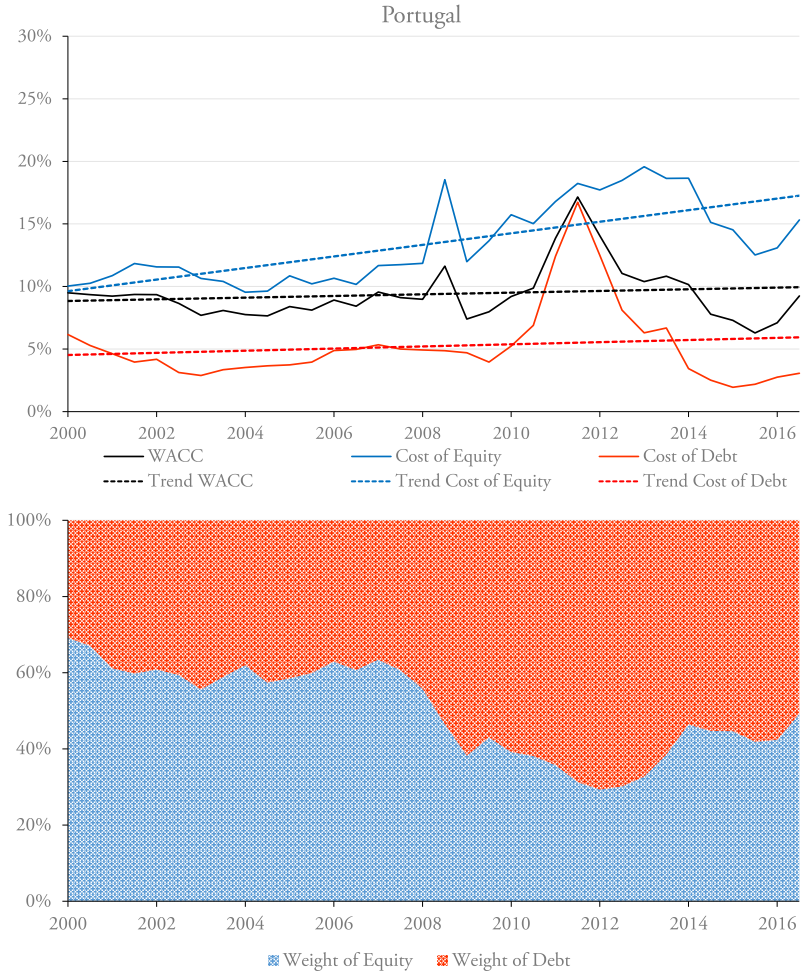

Figure B.27: Portugal 2000–2016. Source: Own calculations based on Bloomberg's data.

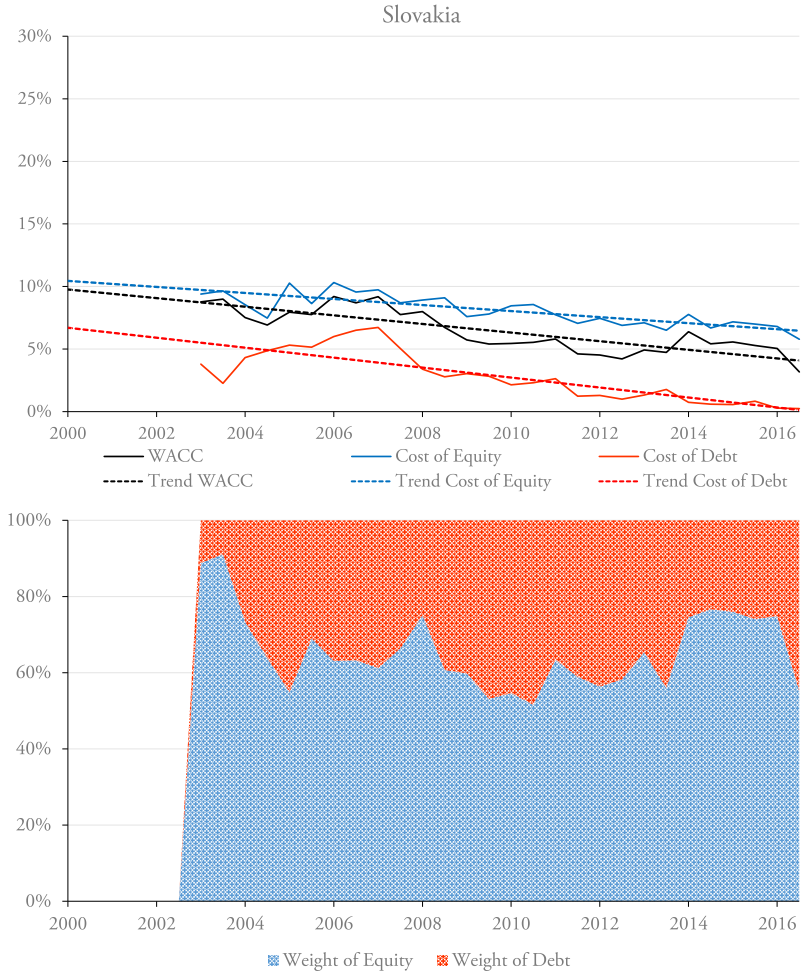

Figure B.28: Slovakia 2000–2016. Source: Own calculations based on Bloomberg's data. The artifact that the weights of debt and equity touch the abscissa is due to missing values for the affected half year.

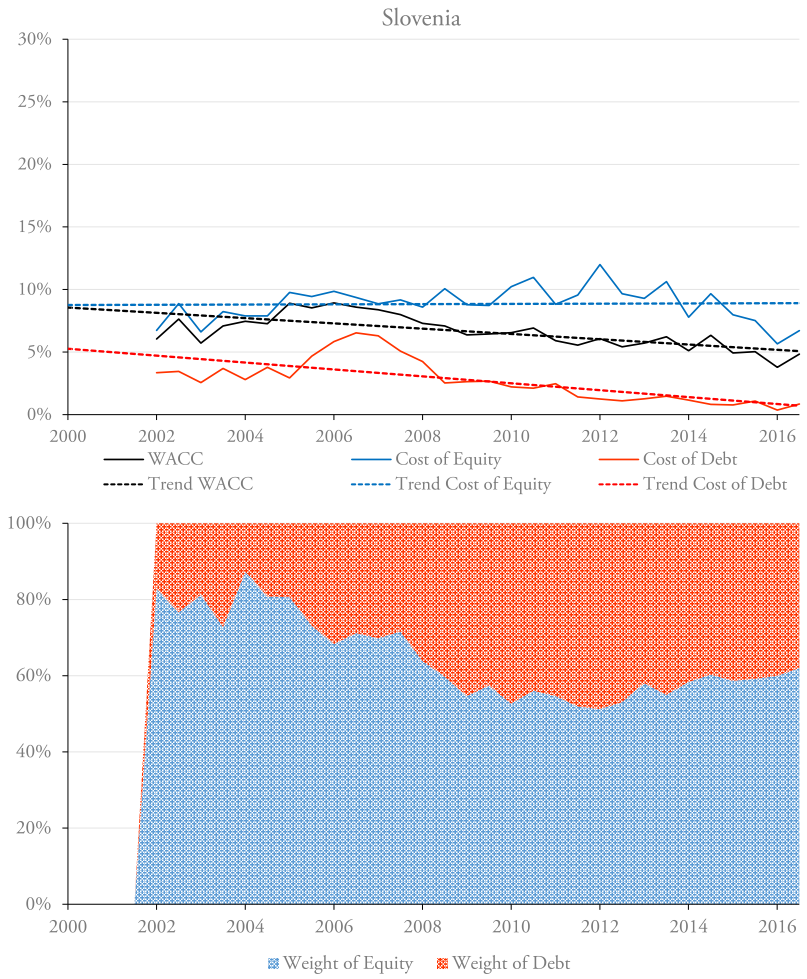

Figure B.29: Slovenia 2000–2016. Source: Own calculations based on Bloomberg's data. The artifact that the weights of debt and equity touch the abscissa is due to missing values for the affected half year.

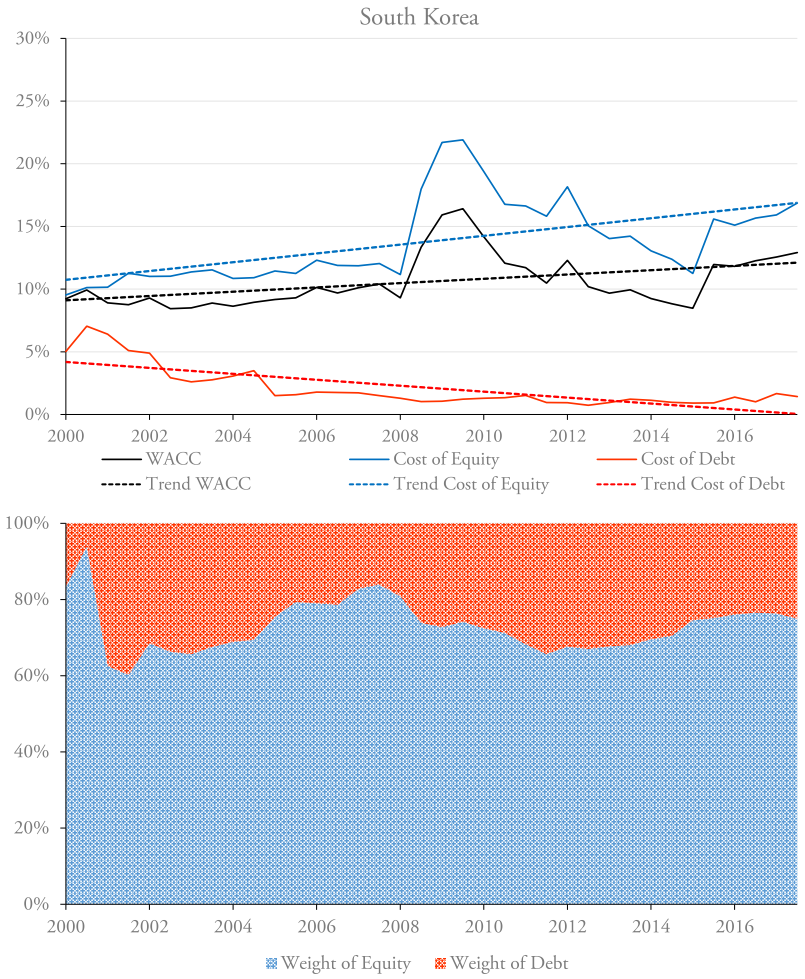

Figure B.30: South Korea 2000–2017. Source: Own calculations based on Bloomberg's data.

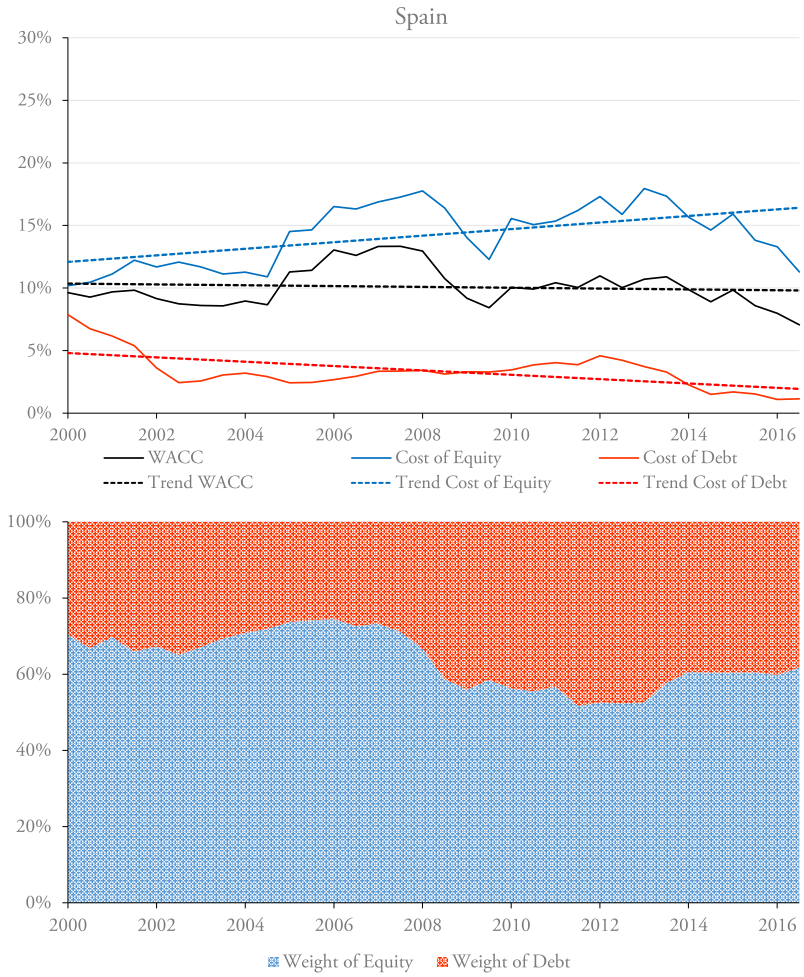

Figure B.31: Spain 2000–2016. Source: Own calculations based on Bloomberg's data.

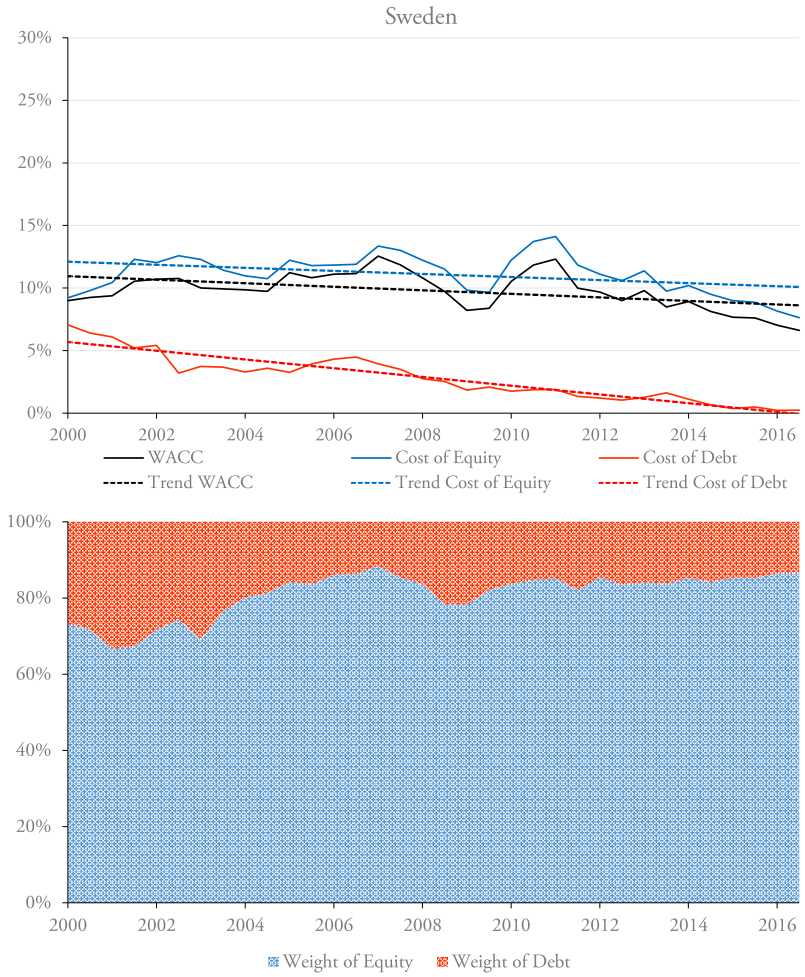

Figure B.32: Sweden 2000–2016. Source: Own calculations based on Bloomberg's data.

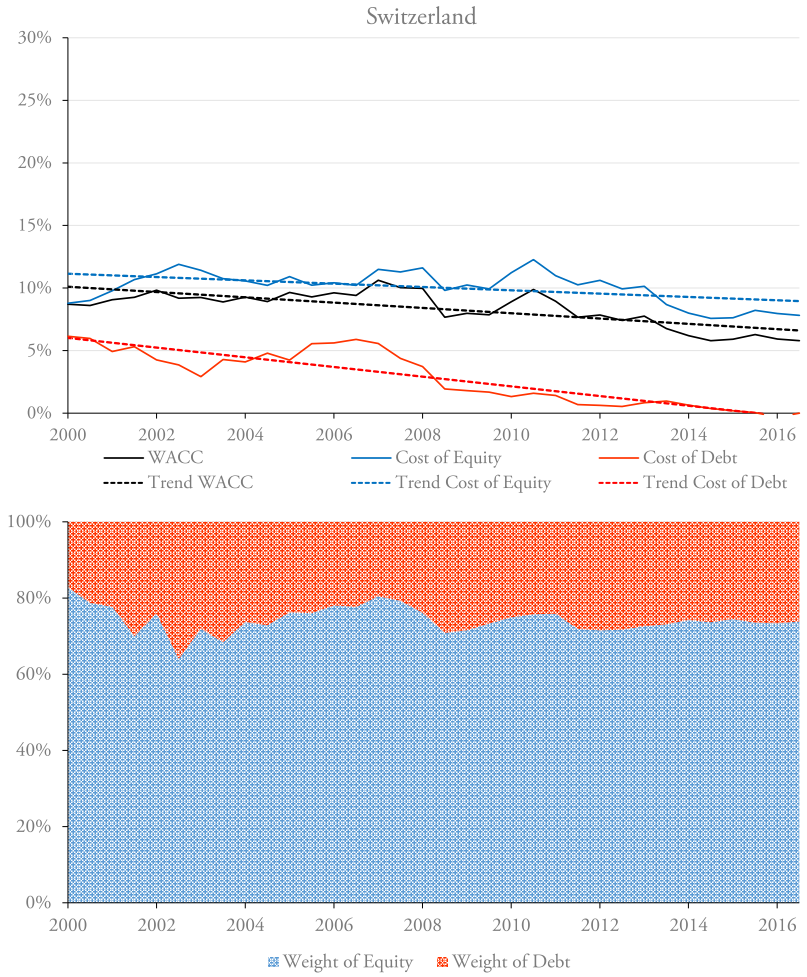

Figure B.33: Switzerland 2000–2016. Source: Own calculations based on Bloomberg's data.

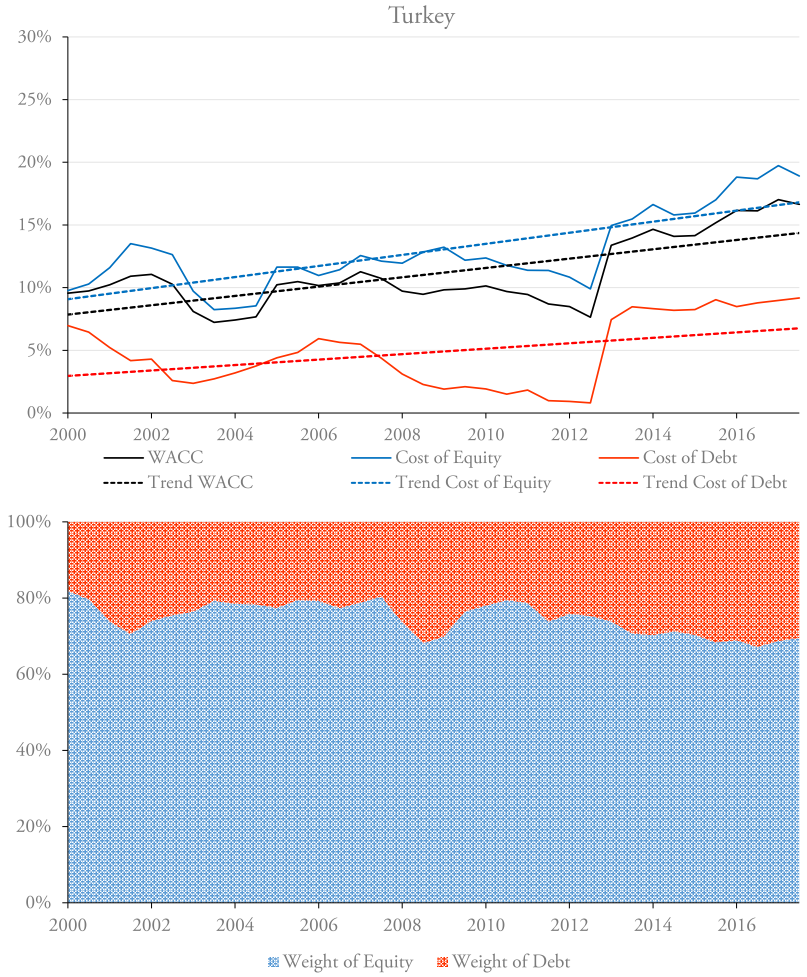

Figure B.34: Turkey 2000–2017. Source: Own calculations based on Bloomberg's data.

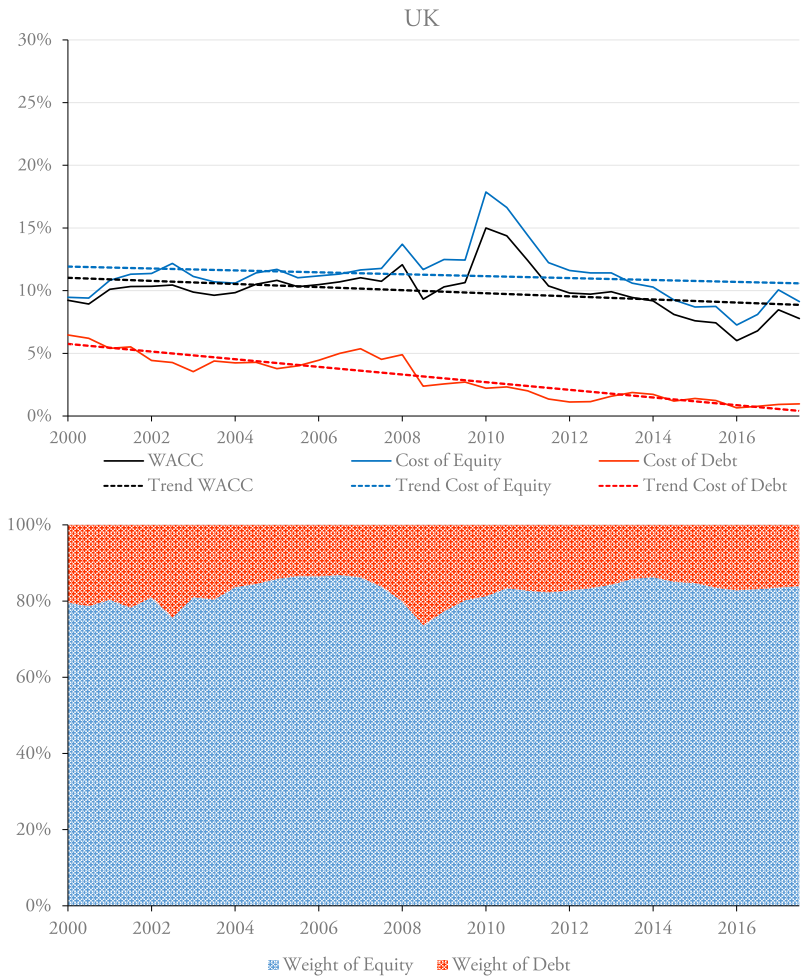

Figure B.35: United Kingdom 2000–2017. Source: Own calculations based on Bloomberg's data.

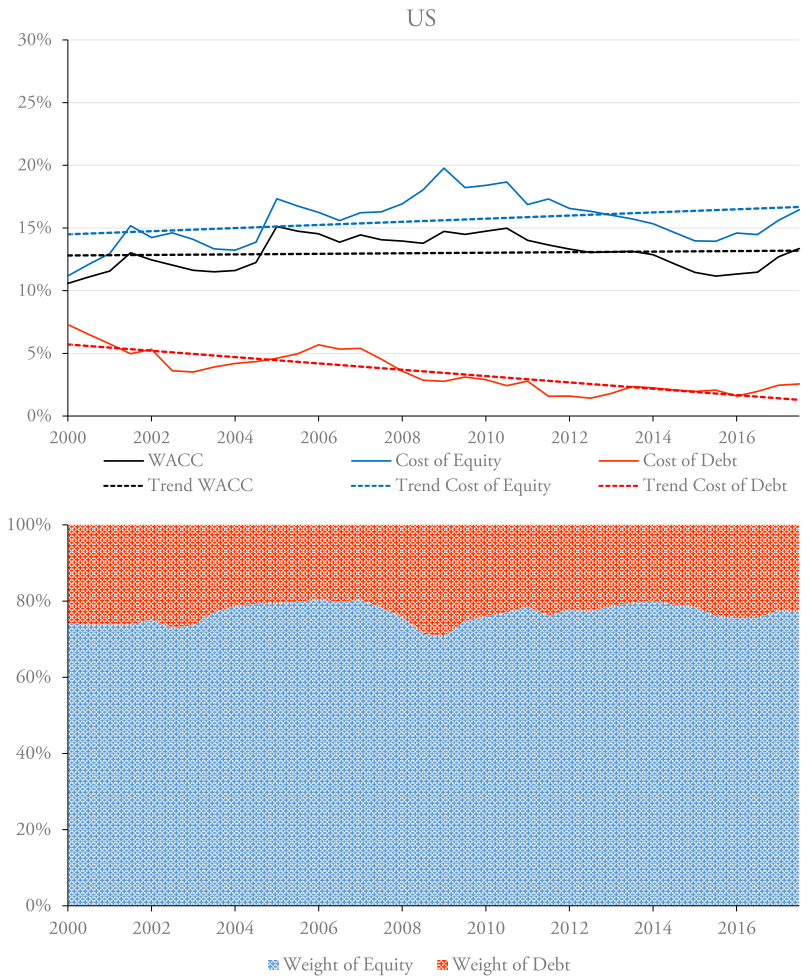

Figure B.36: United States 2000–2017. Source: Own calculations based on Bloomberg's data.

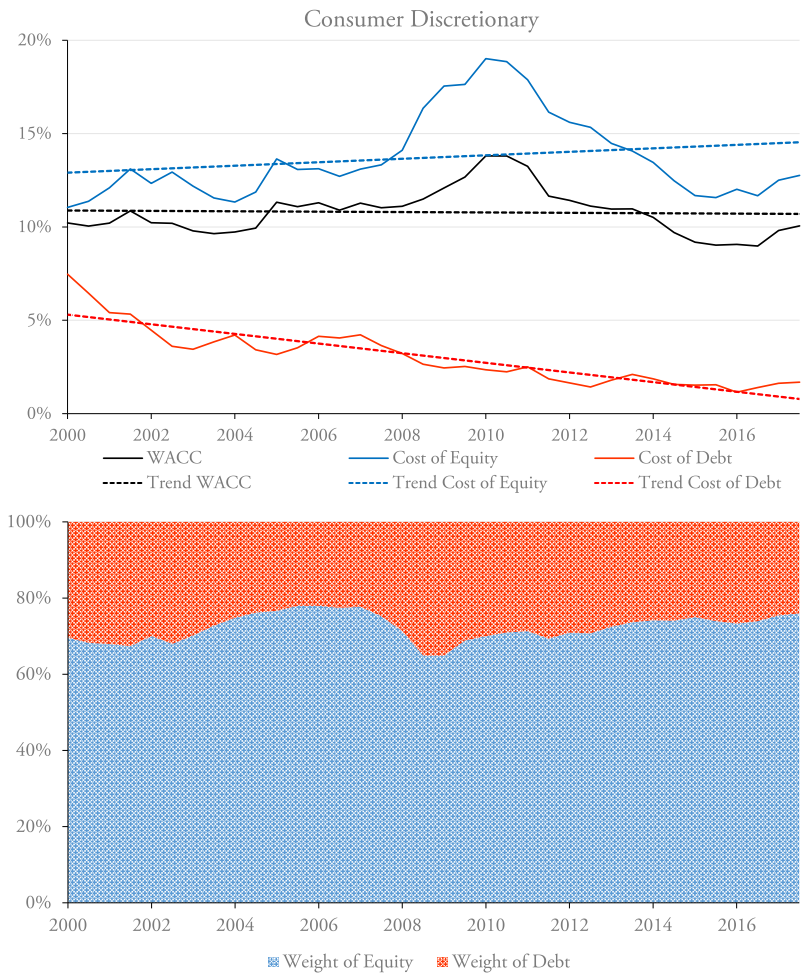

Figure B.37: Consumer Discretionary 2000–2017. Source: Own calculations based on Bloomberg's data.

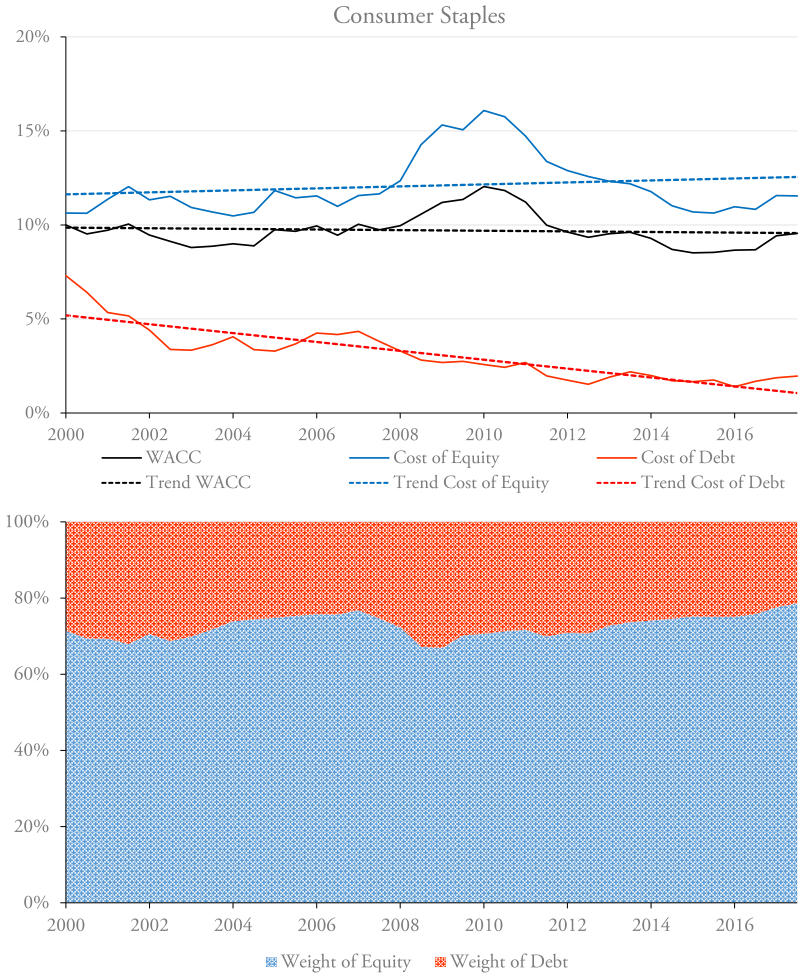

Figure B.38: Consumer Staples 2000–2017. Source: Own calculations based on Bloomberg's data.

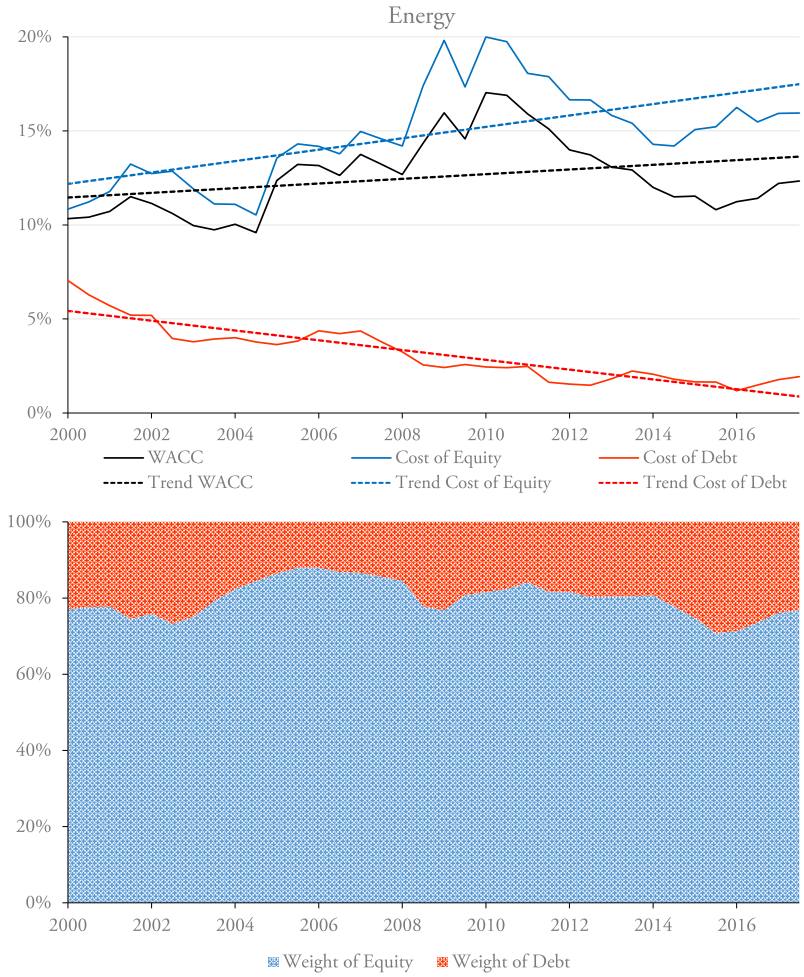

Figure B.39: Energy 2000–2017. Source: Own calculations based on Bloomberg's data.

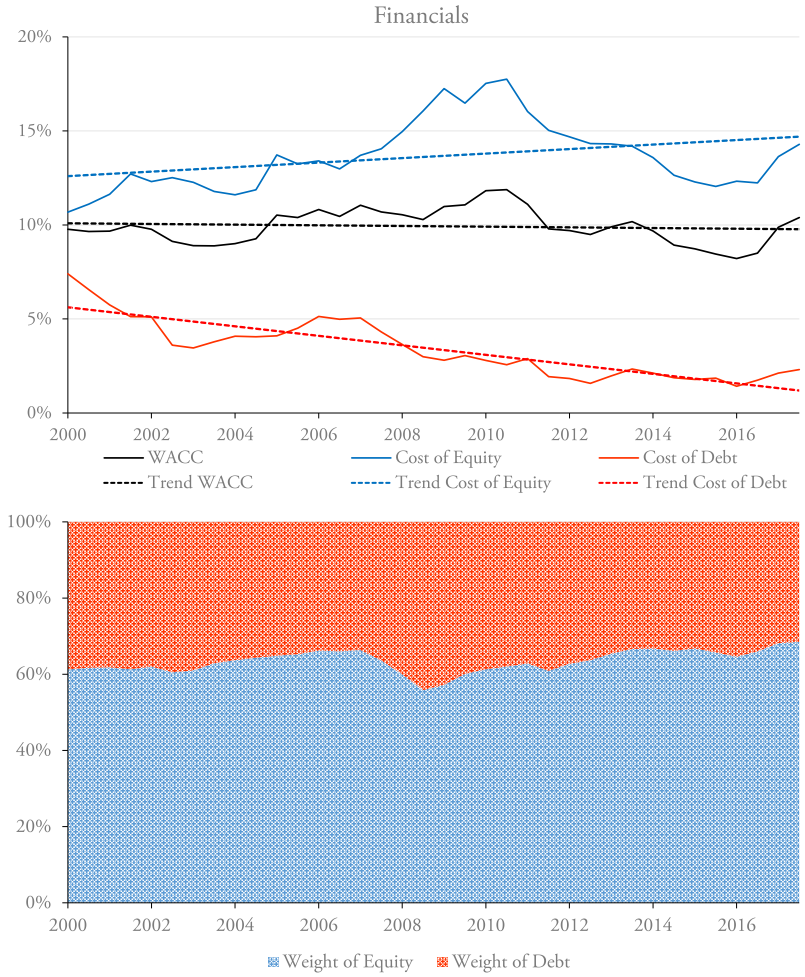

Figure B.40: Financials 2000–2017. Source: Own calculations based on Bloomberg's data.

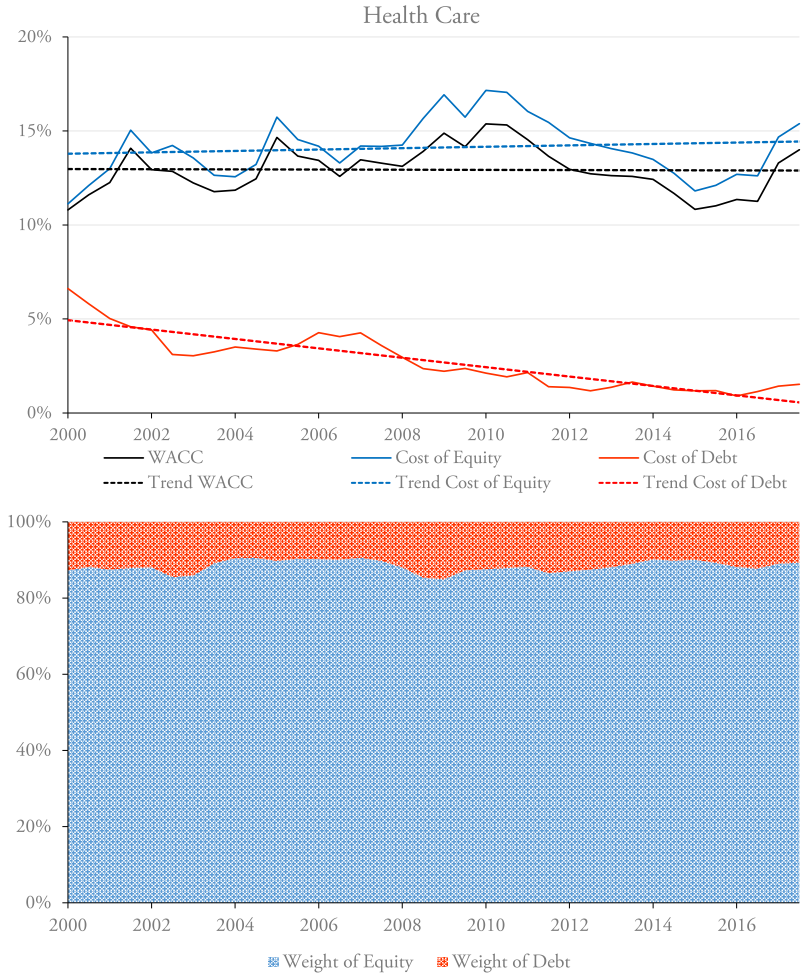

Figure B.41: Health Care 2000–2017. Source: Own calculations based on Bloomberg's data.

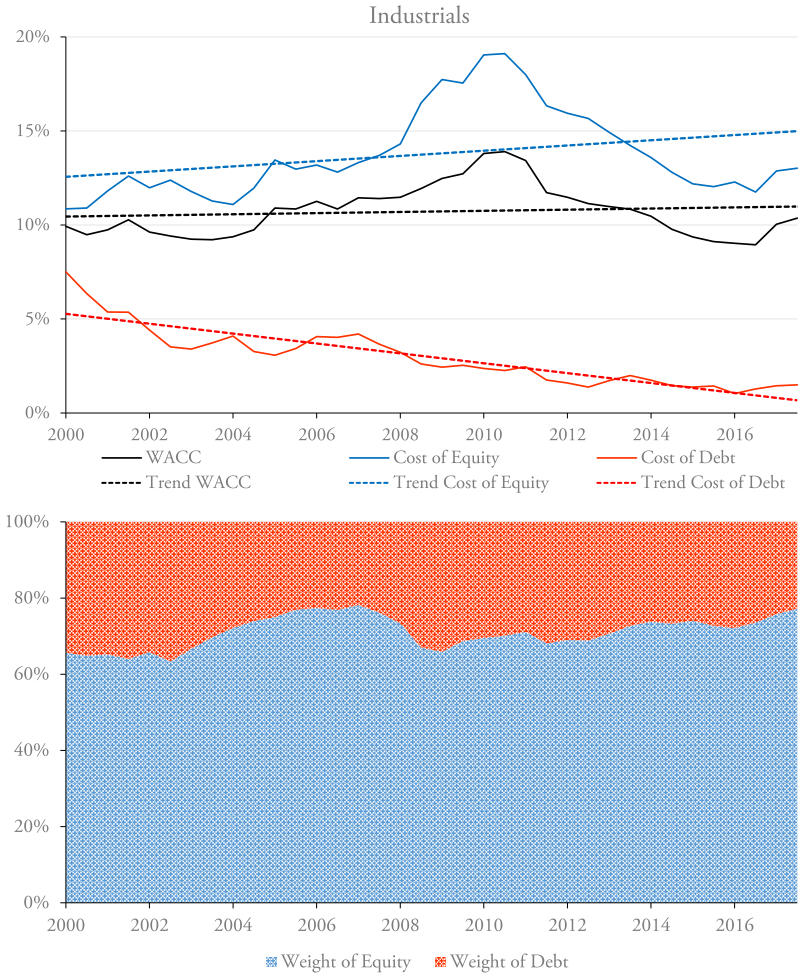

Figure B.42: Industrials 2000–2017. Source: Own calculations based on Bloomberg's data.

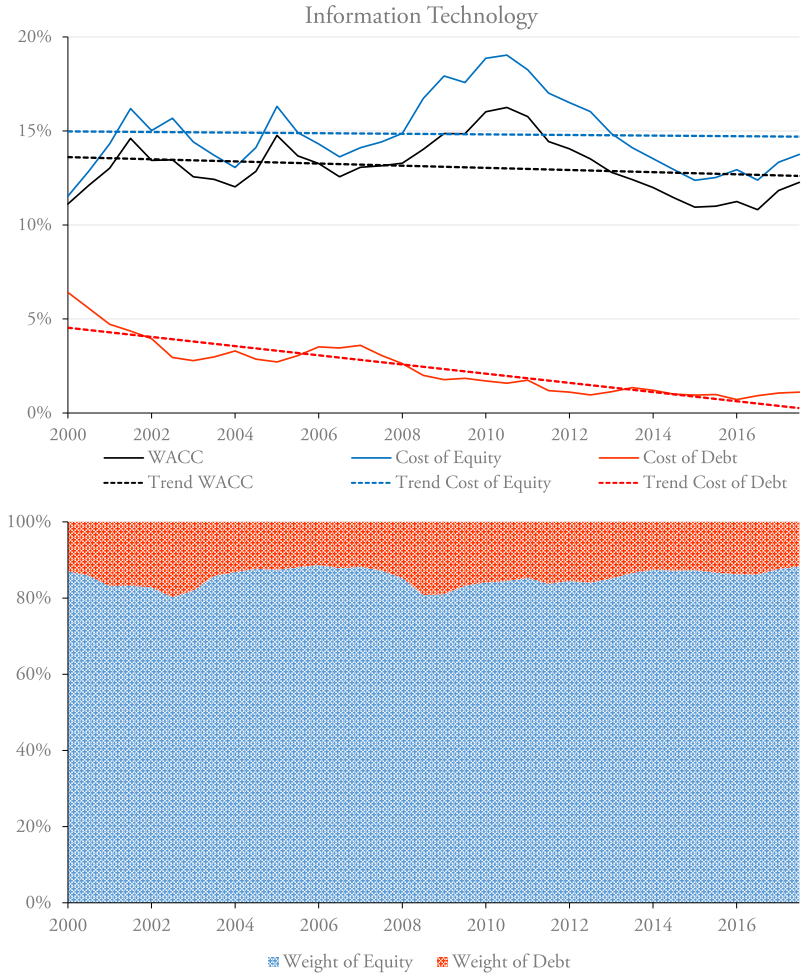

Figure B.43: Information Technology 2000–2017. Source: Own calculations based on Bloomberg's data.

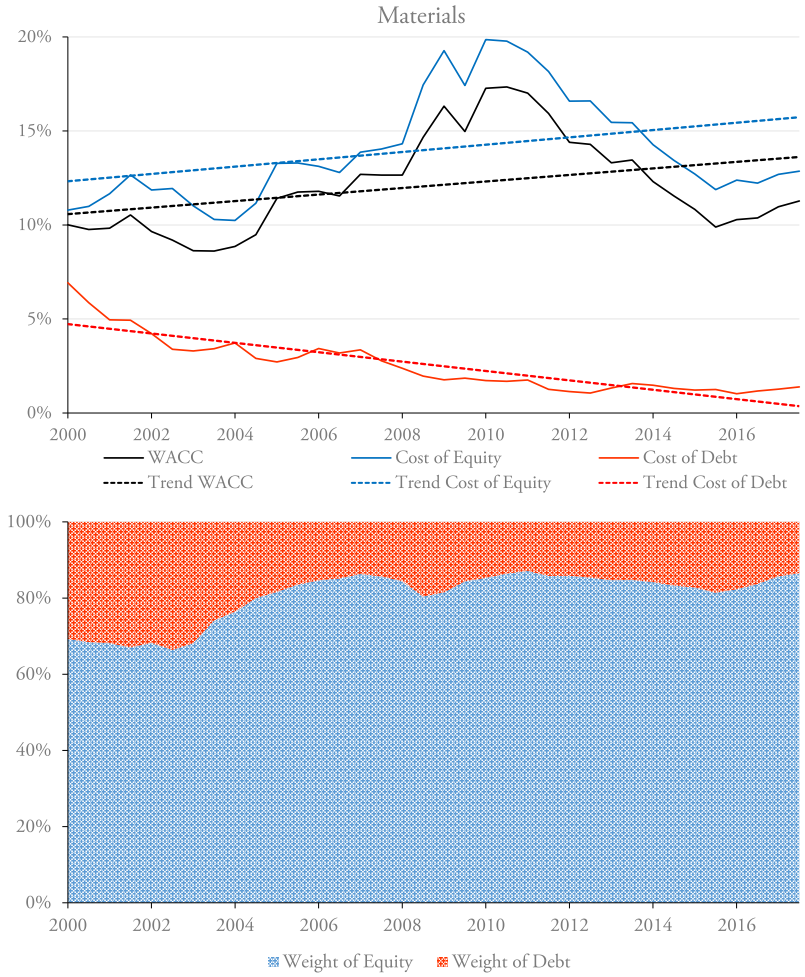

Figure B.44: Materials 2000–2017. Source: Own calculations based on Bloomberg's data.

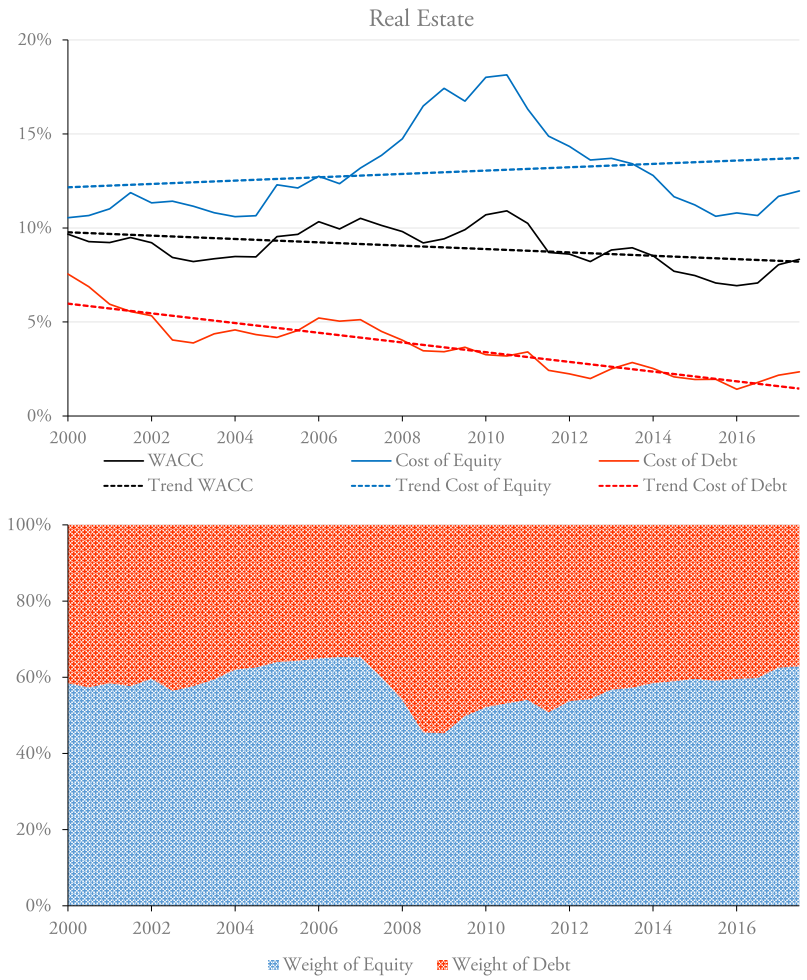

Figure B.45: Real Estate 2000–2017. Source: Own calculations based on Bloomberg's data.

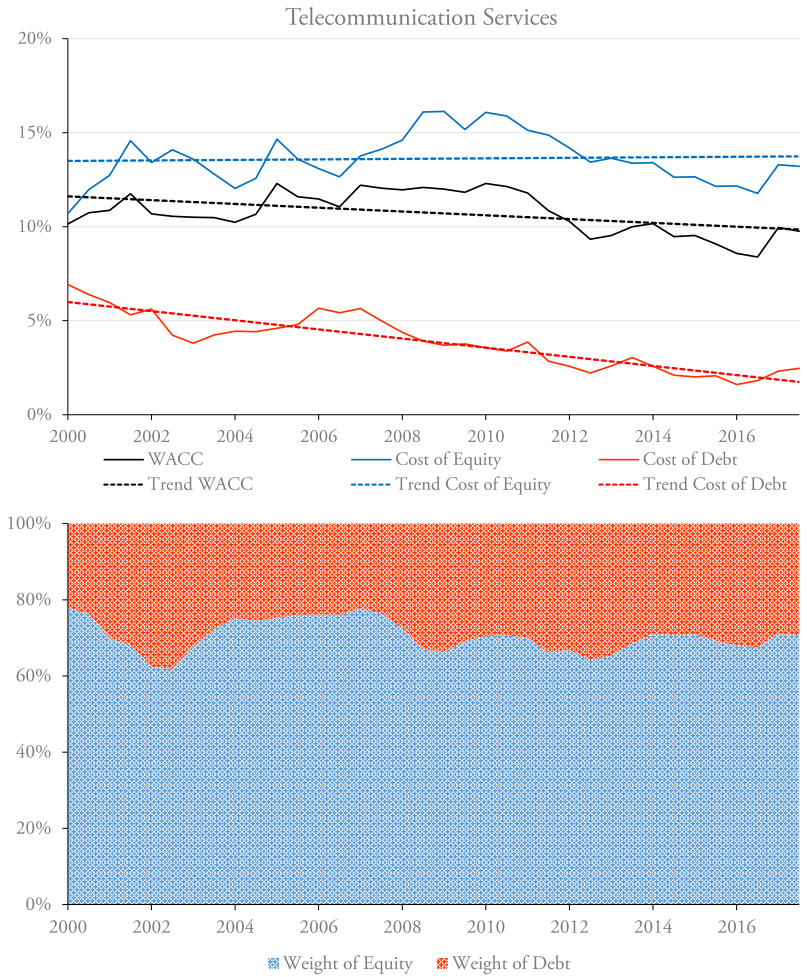

Figure B.46: Telecommunication Services 2000–2017. Source: Own calculations based on Bloomberg's data.

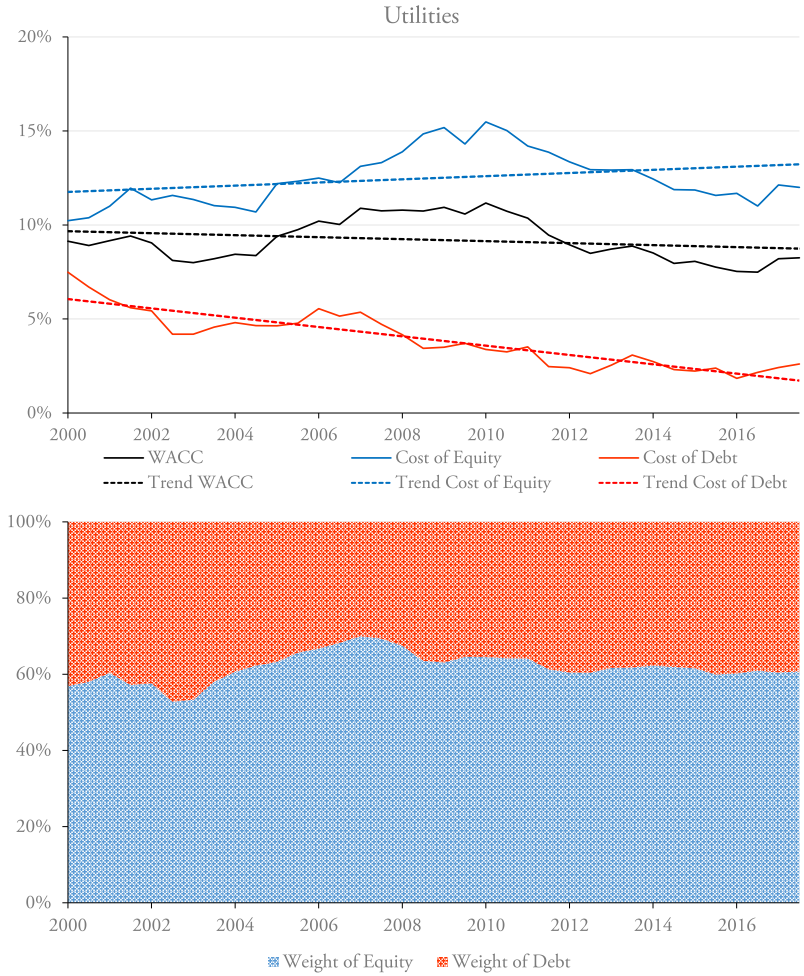

Figure B.47: Utilities 2000–2017. Source: Own calculations based on Bloomberg's data.

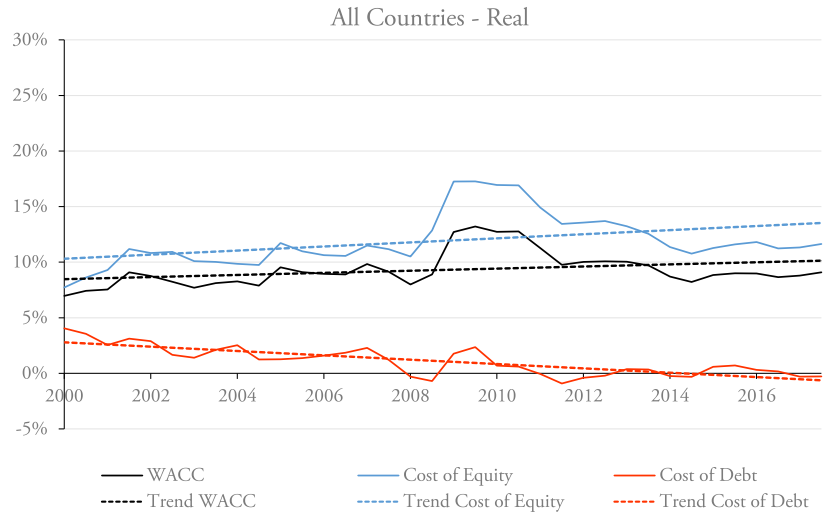

Figure B.48: Real Cost All Countries 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

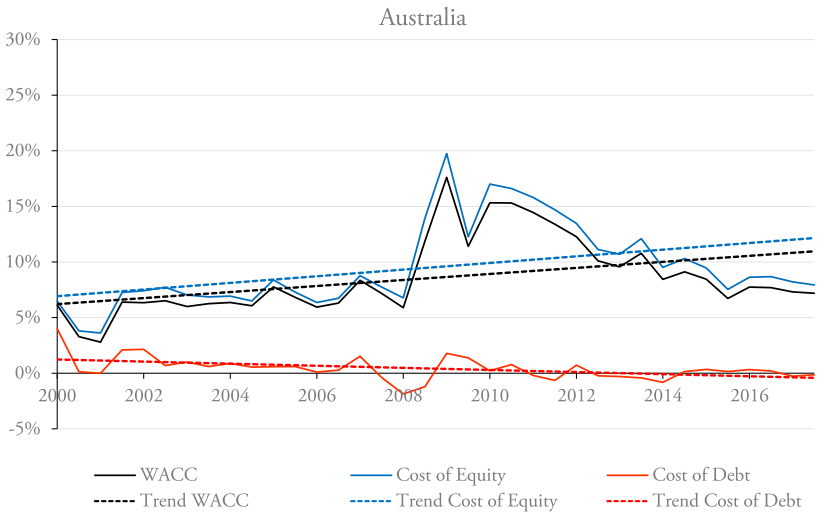

Figure B.49: Real Cost Australia 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

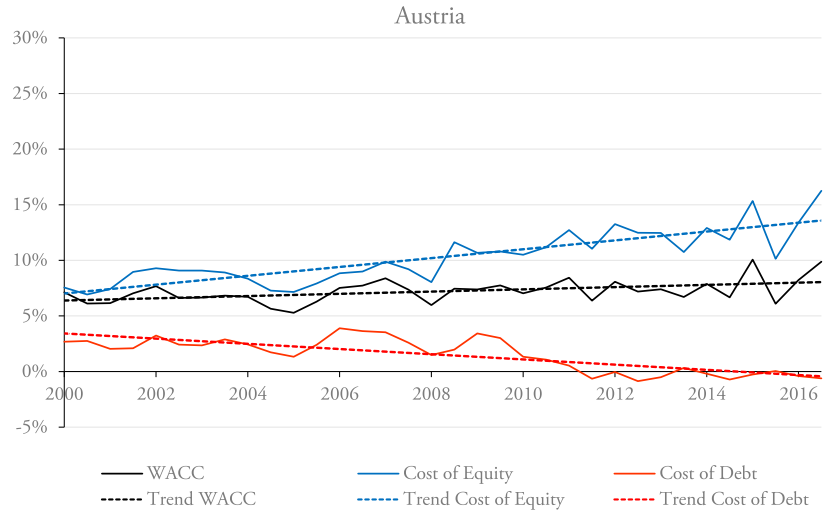

Figure B.50: Real Cost Austria 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

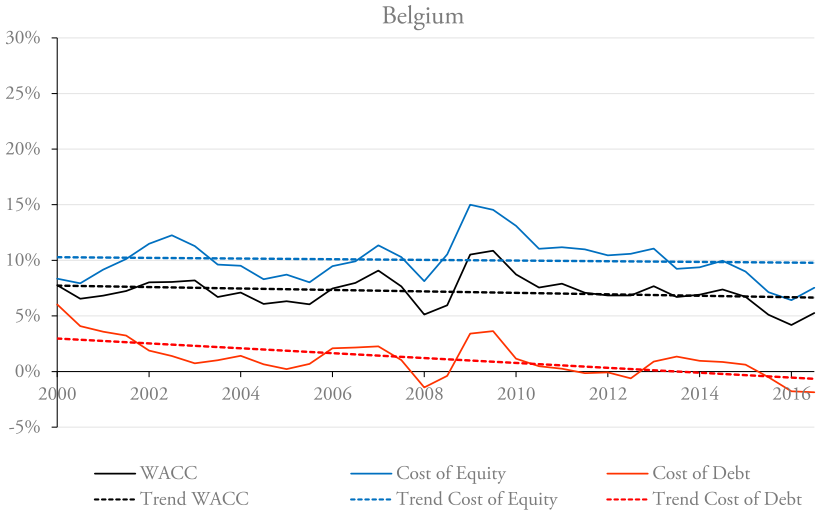

Figure B.51: Real Cost Belgium 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

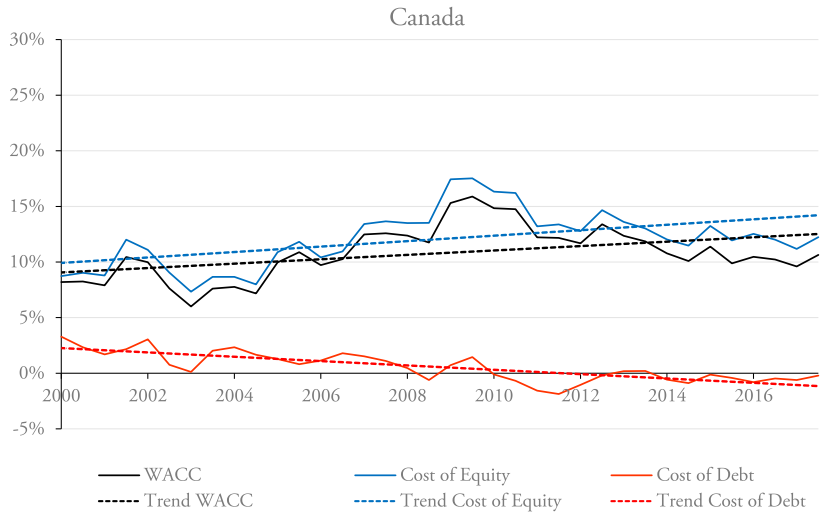

Figure B.52: Real Cost Canada 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

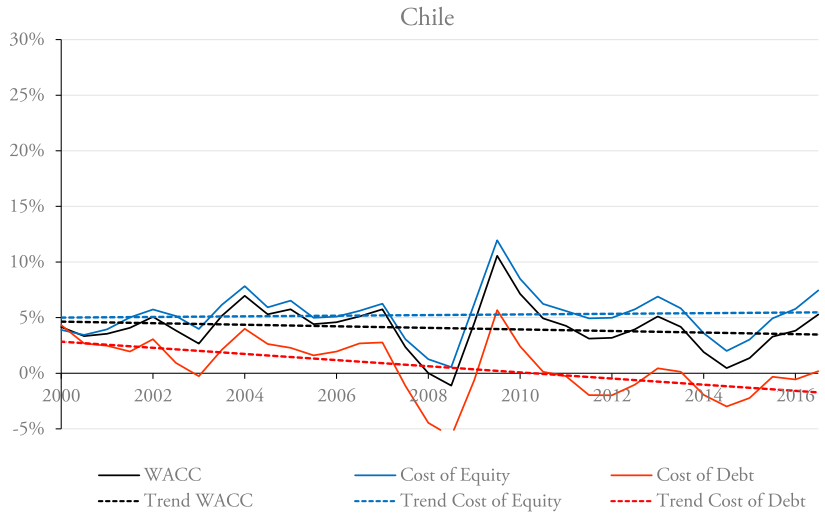

Figure B.53: Real Cost Chile 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

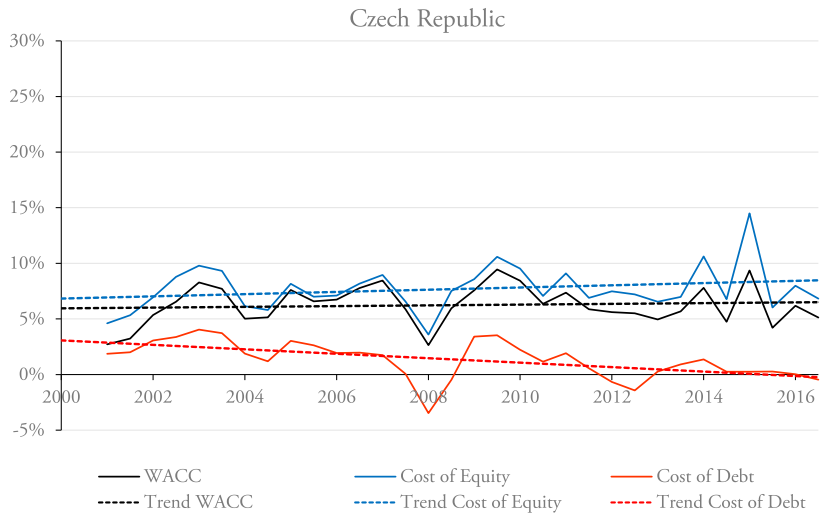

Figure B.54: Real Cost Czech Republic 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

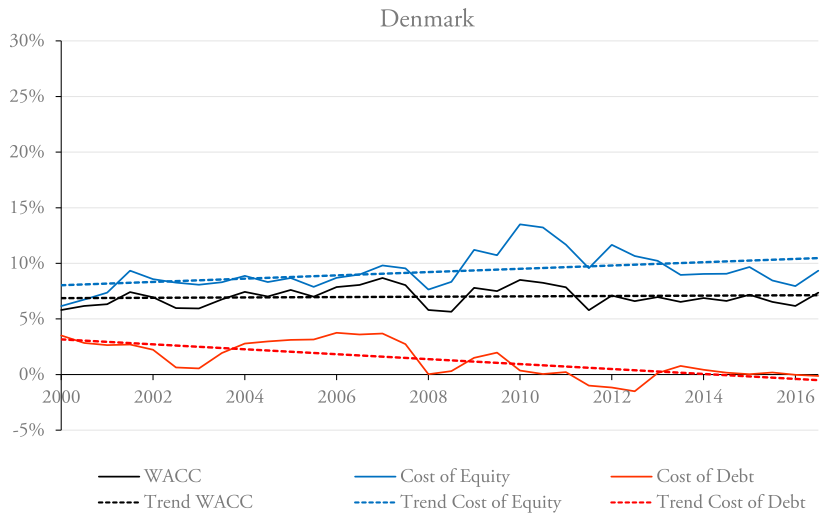

Figure B.55: Real Cost Denmark 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

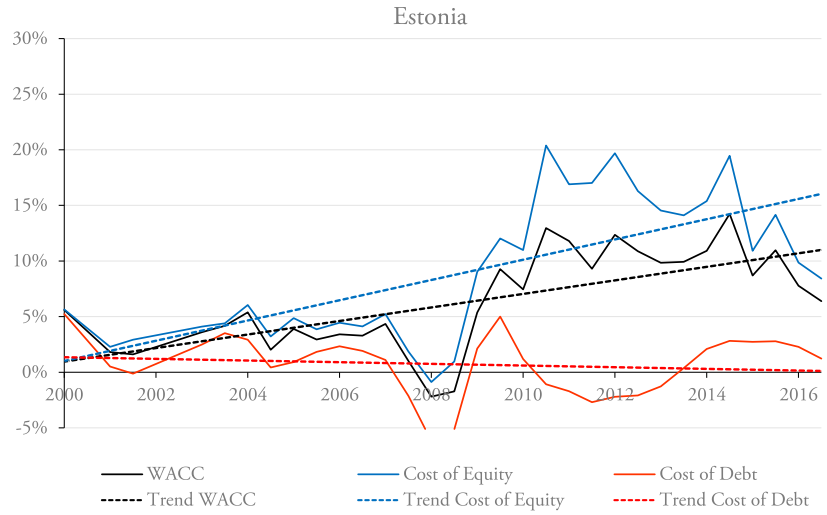

Figure B.56: Real Cost Estonia 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

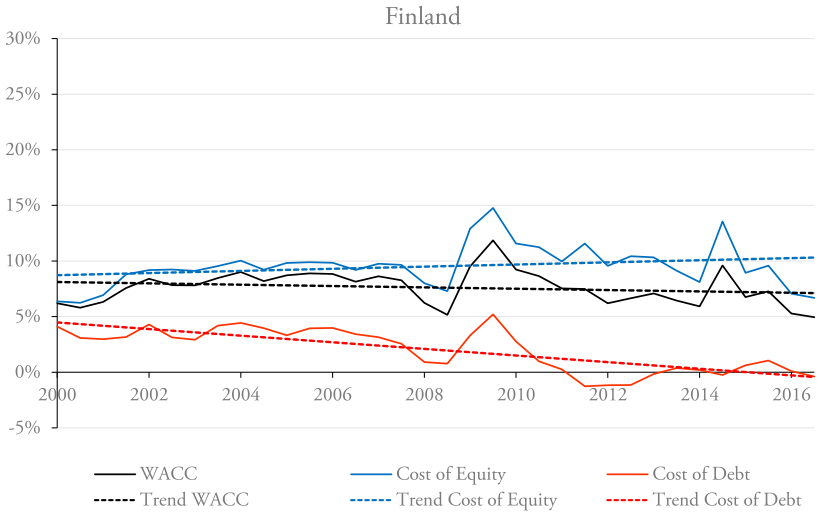

Figure B.57: Real Cost Finland 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

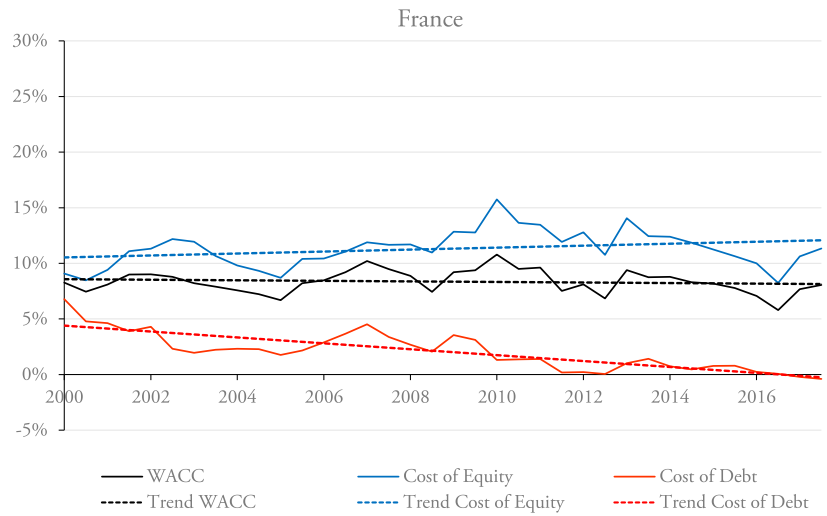

Figure B.58: Real Cost France 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

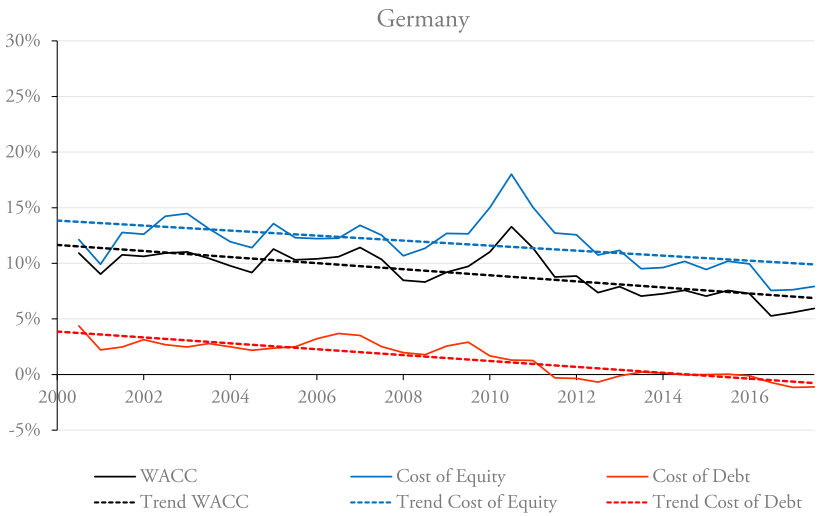

Figure B.59: Real Cost Germany 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

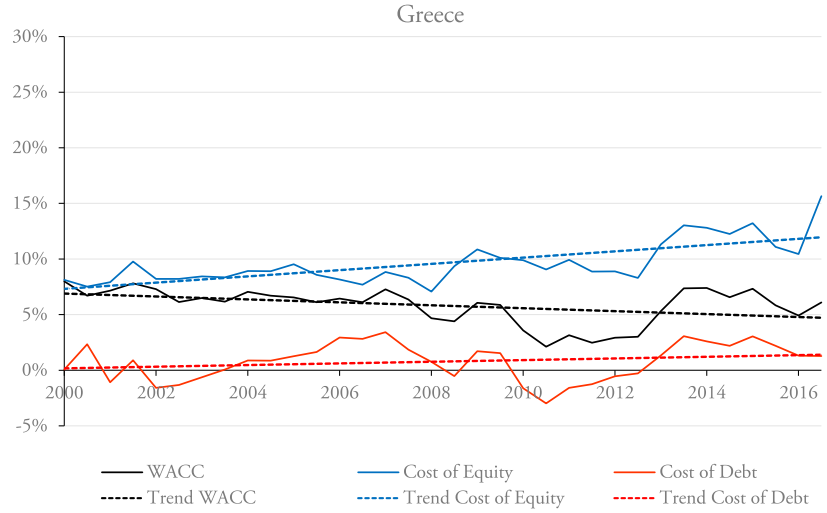

Figure B.60: Real Cost Greece 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

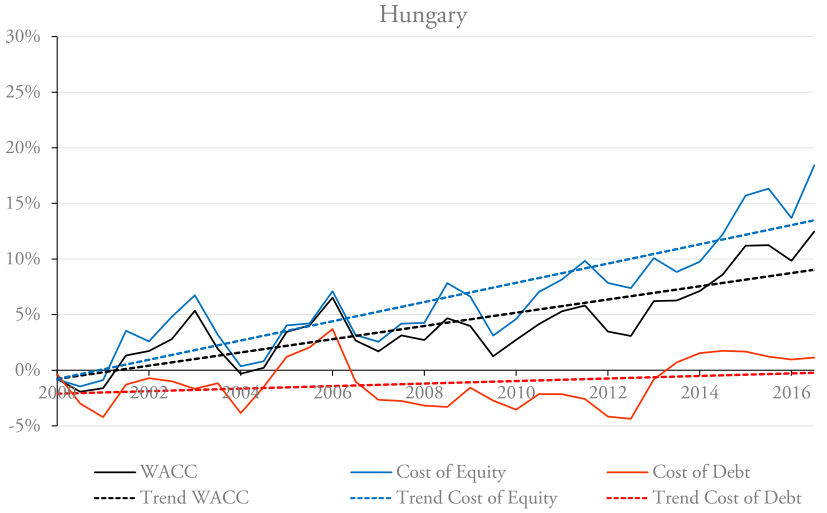

Figure B.61: Real Cost Hungary 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

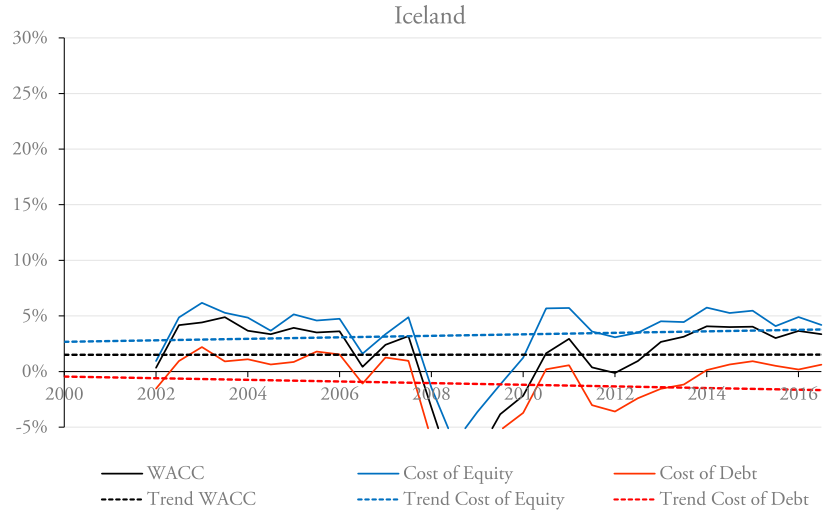

Figure B.62: Real Cost Iceland 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

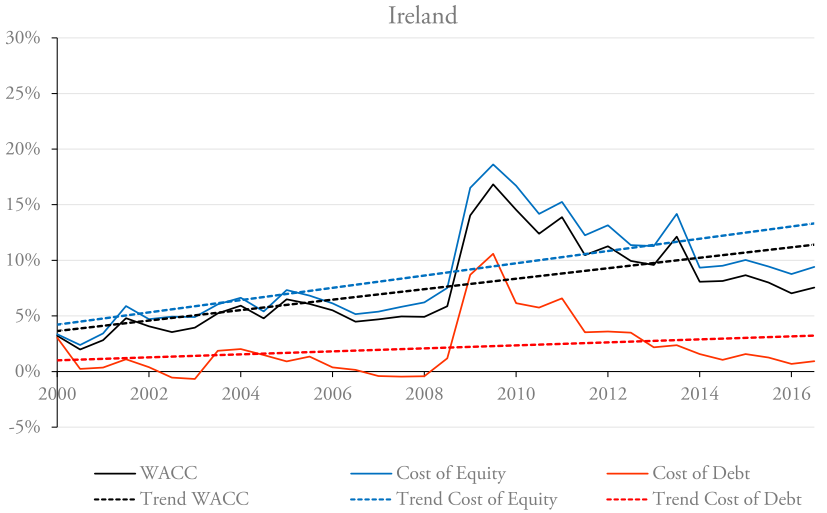

Figure B.63: Real Cost Ireland 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

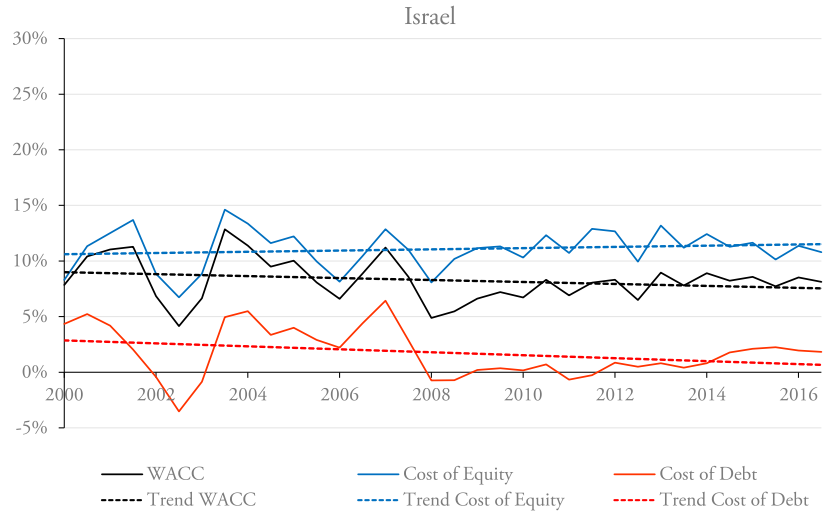

Figure B.64: Real Cost Israel 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

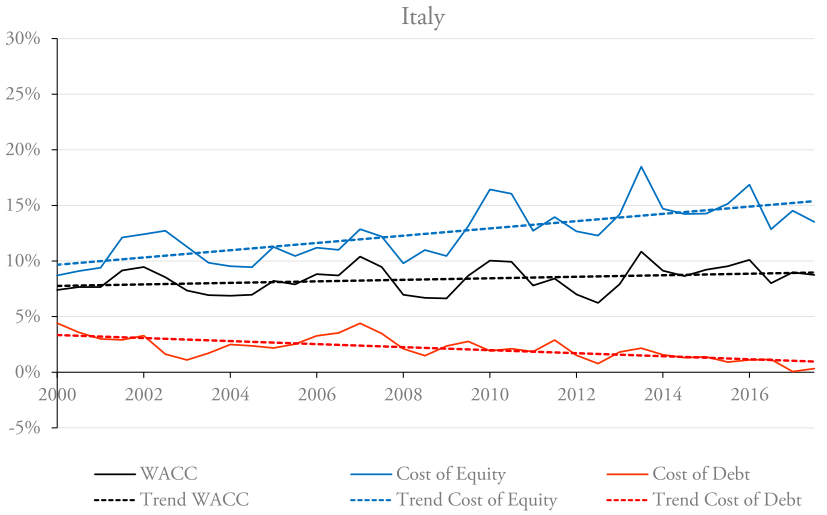

Figure B.65: Real Cost Italy 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

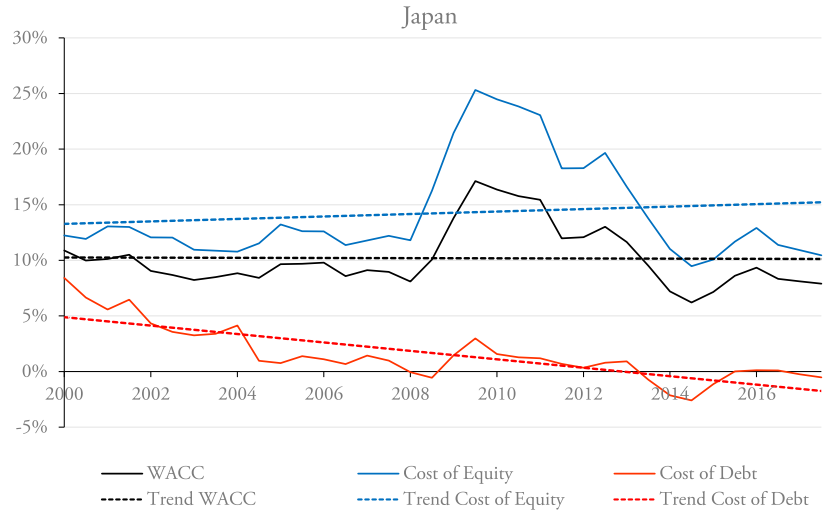

Figure B.66: Real Cost Japan 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

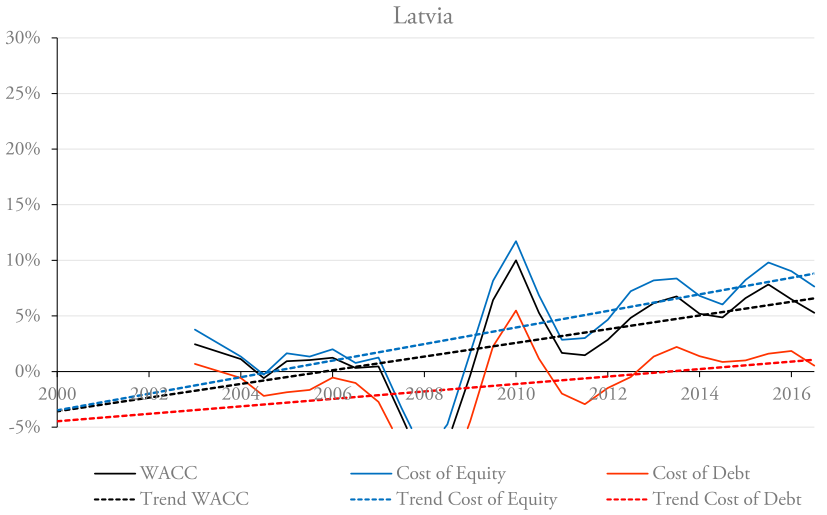

Figure B.67: Real Cost Latvia 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

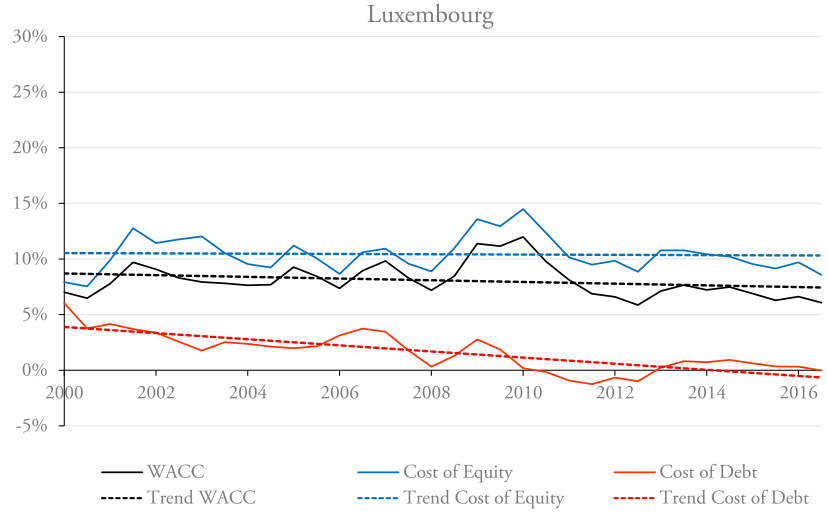

Figure B.68: Real Cost Luxembourg 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

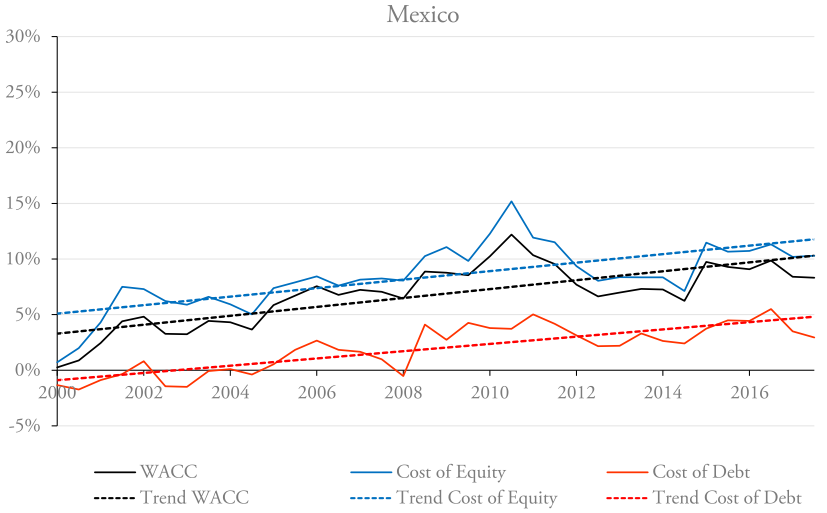

Figure B.69: Real Cost Mexico 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

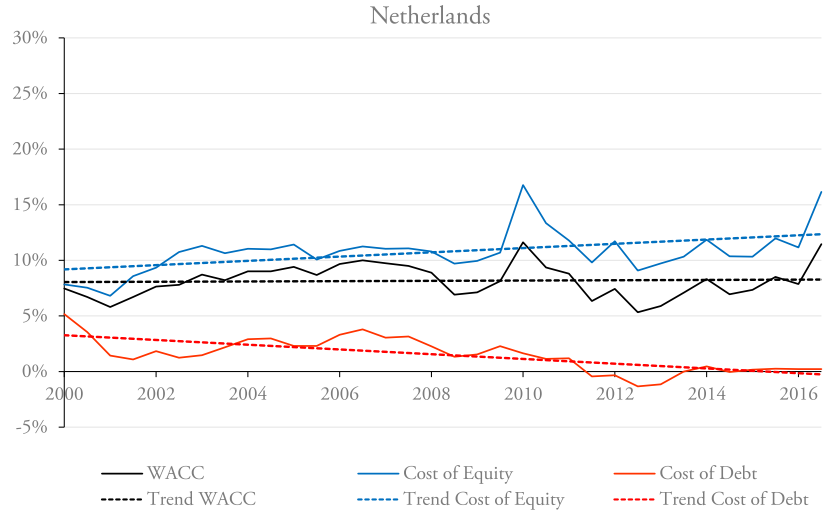

Figure B.70: Real Cost Netherlands 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

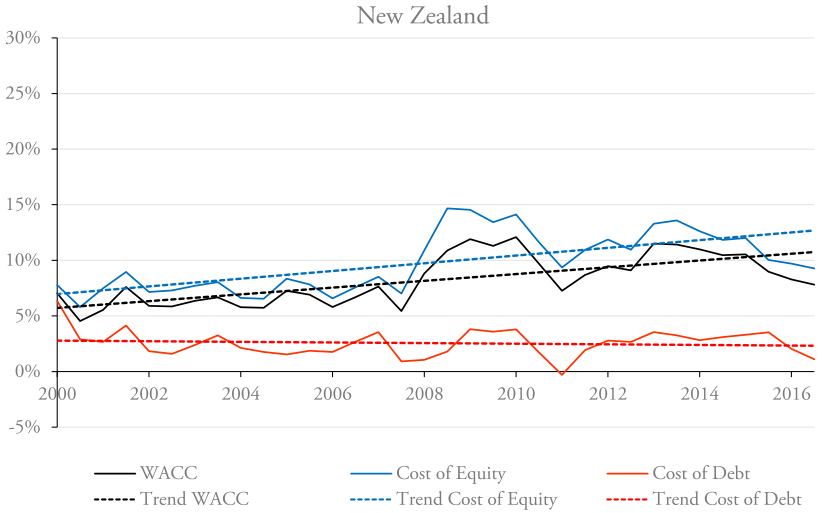

Figure B.71: Real Cost New Zealand 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

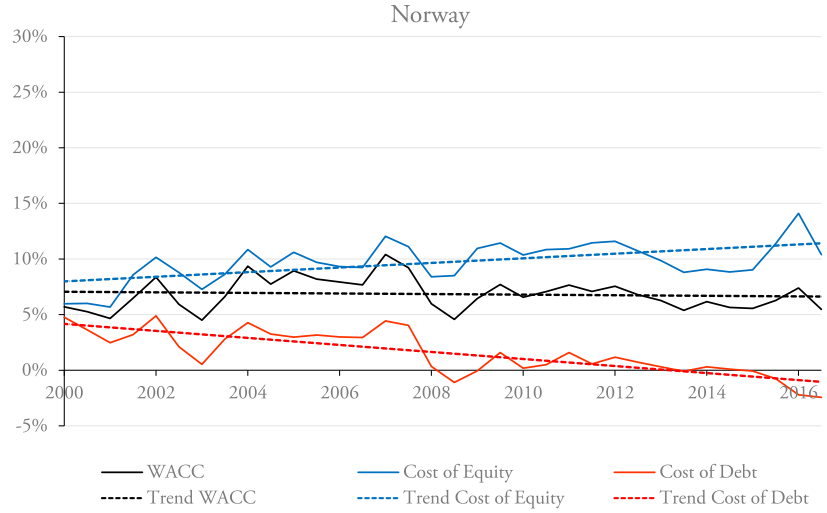

Figure B.72: Real Cost Norway 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

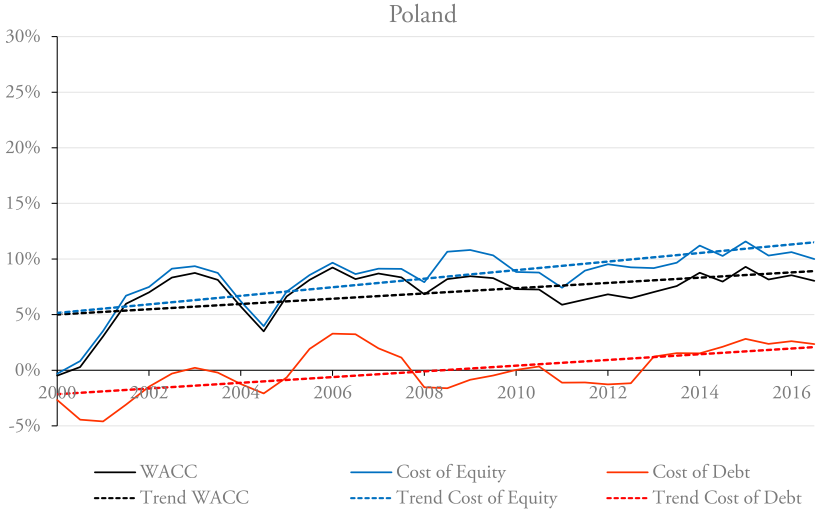

Figure B.73: Real Cost Poland 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

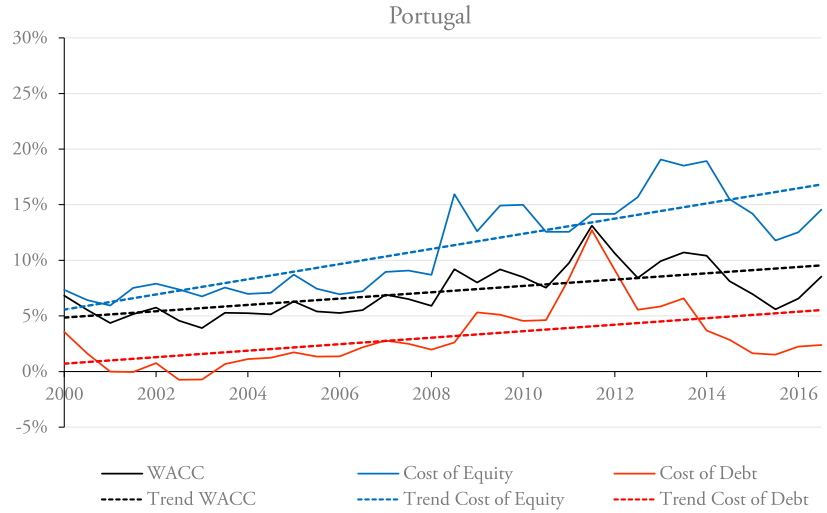

Figure B.74: Real Cost Portugal 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

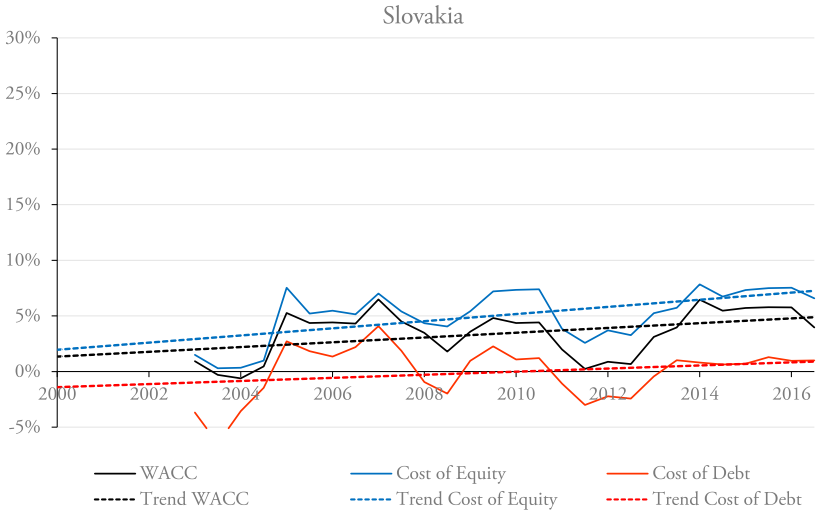

Figure B.75: Real Cost Slovakia 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

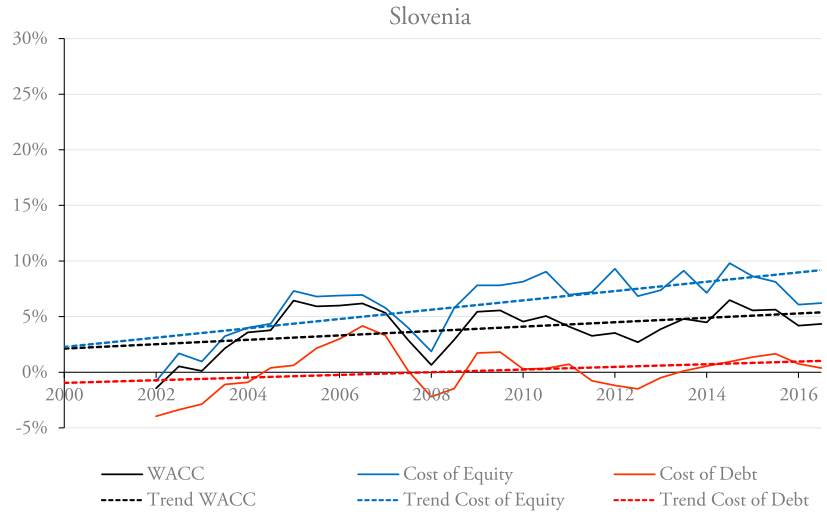

Figure B.76: Real Cost Slovenia 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

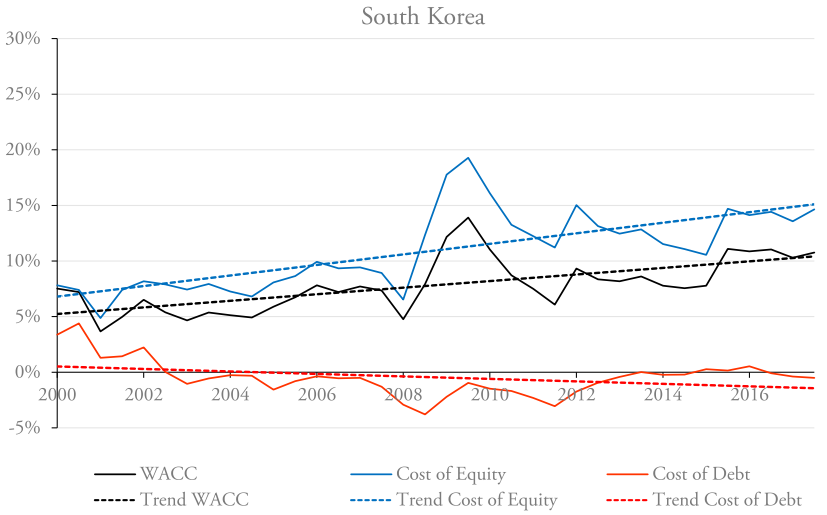

Figure B.77: Real Cost South Korea 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

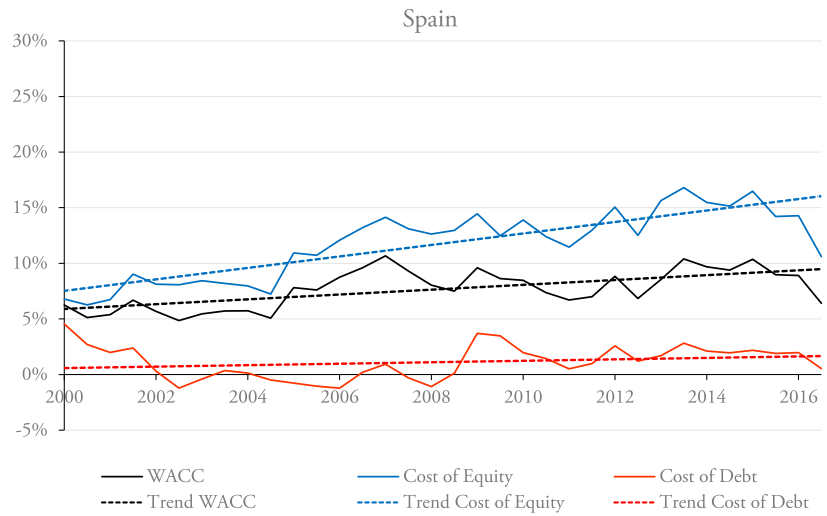

Figure B.78: Real Cost Spain 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

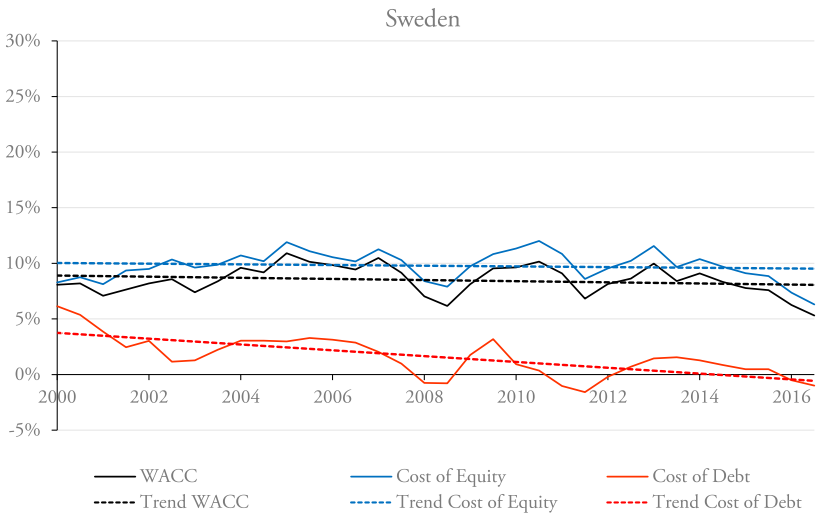

Figure B.79: Real Cost Sweden 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

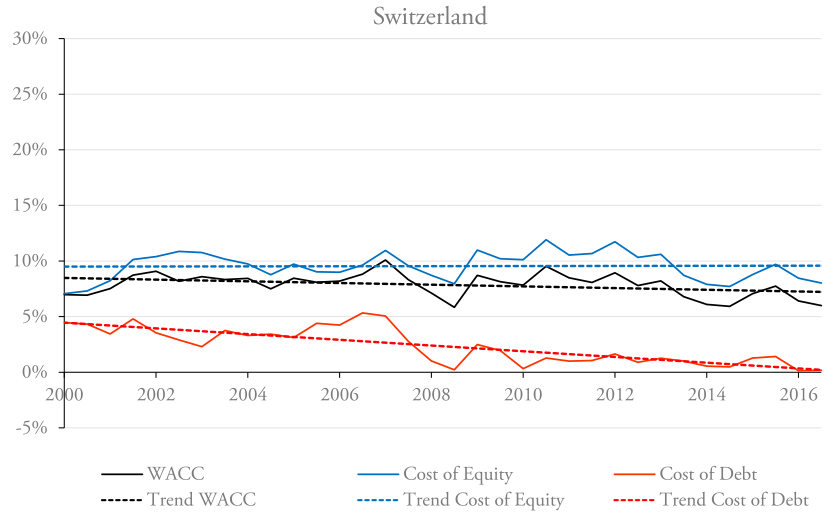

Figure B.80: Real Cost Switzerland 2000–2016. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

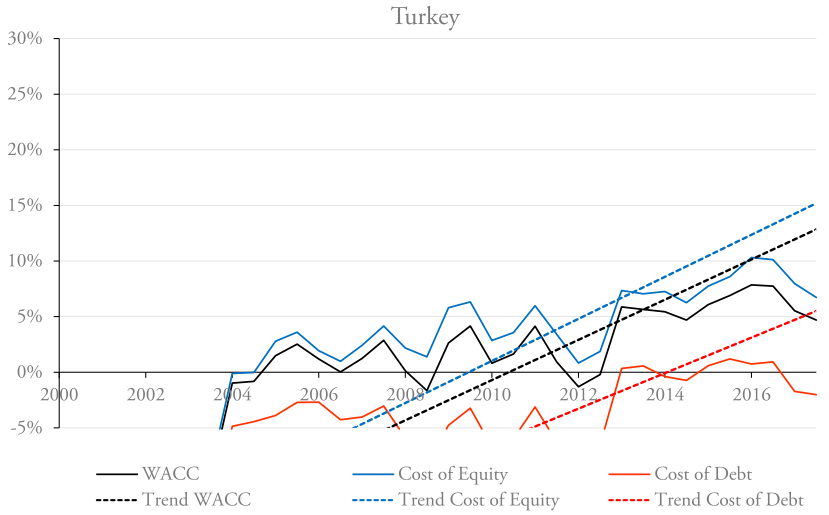

Figure B.81: Real Cost Turkey 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

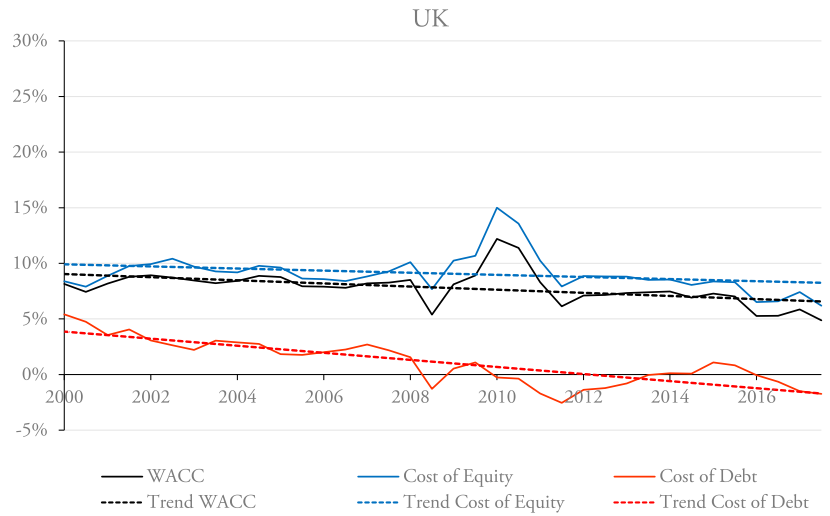

Figure B.82: Real Cost United Kingdom 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

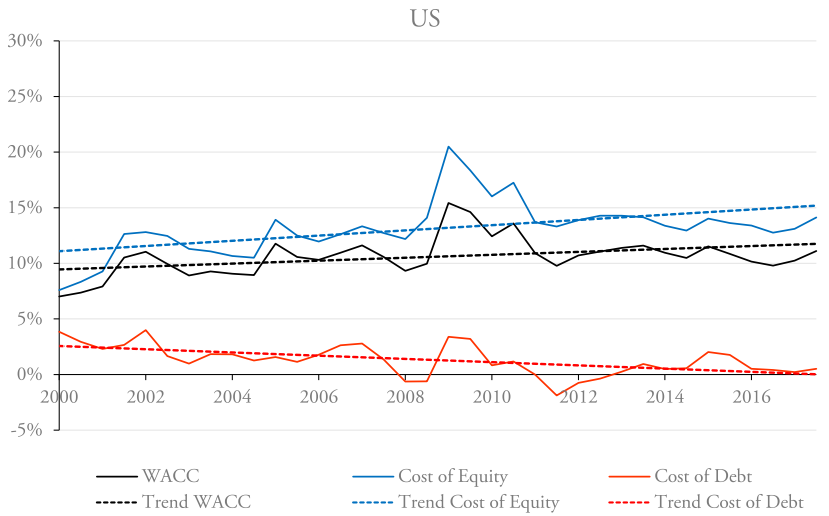

Figure B.83: Real Cost United States 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

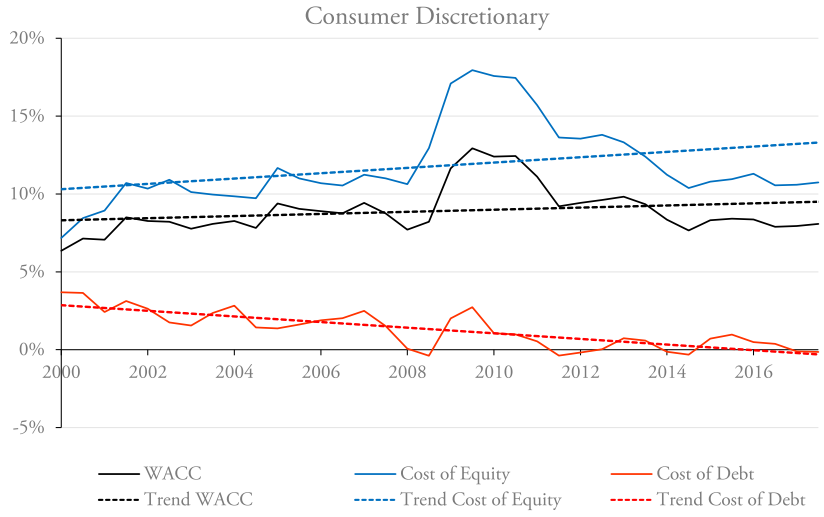

Figure B.84: Real Cost Consumer Discretionary 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

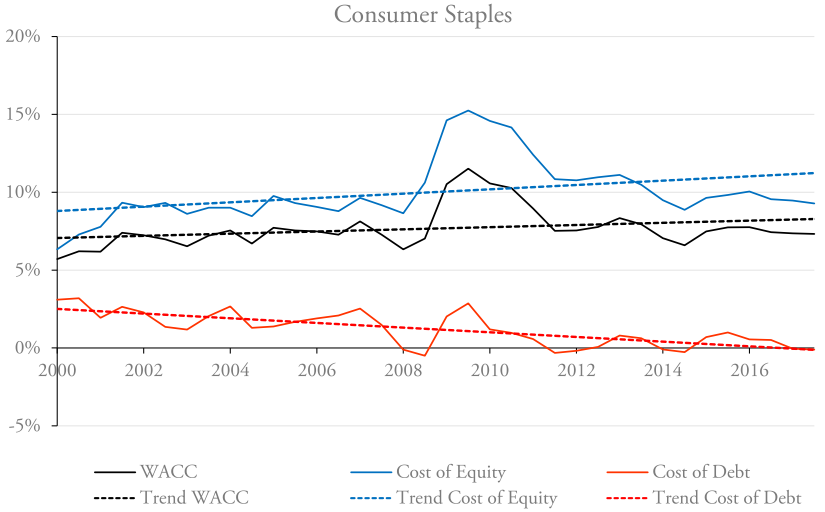

Figure B.85: Real Cost Consumer Staples 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

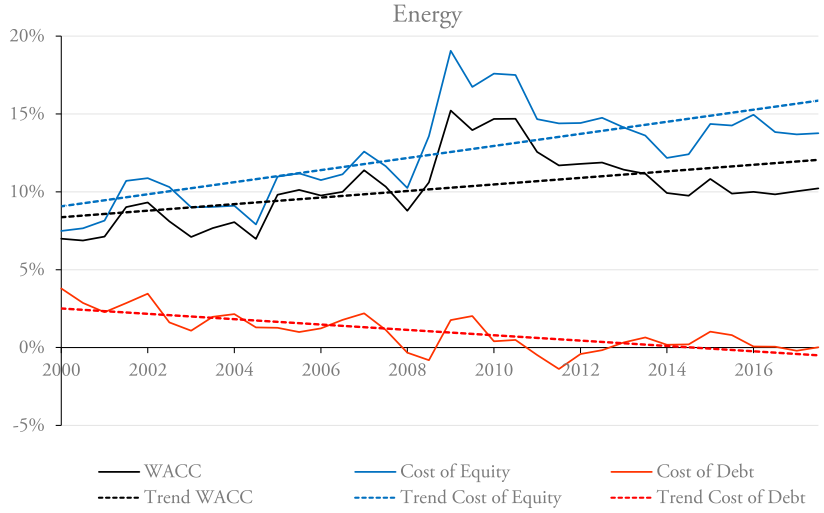

Figure B.86: Real Cost Energy 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

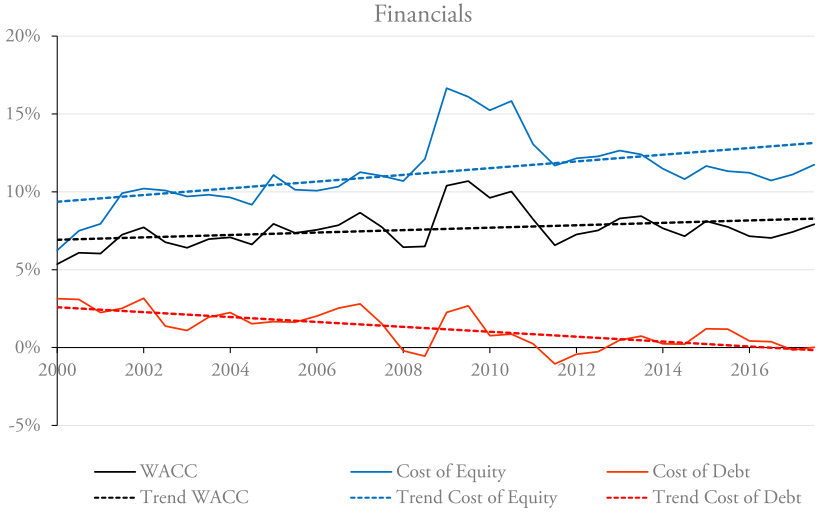

Figure B.87: Real Cost Financials 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

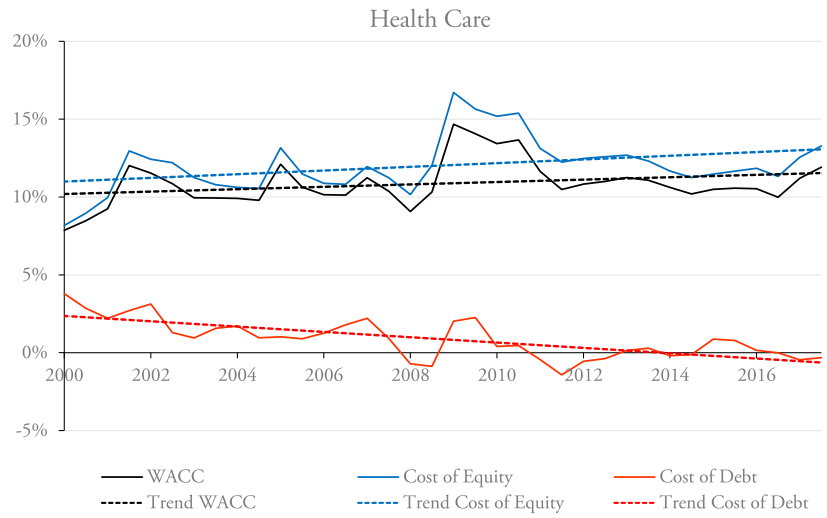

Figure B.88: Real Cost Health Care 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

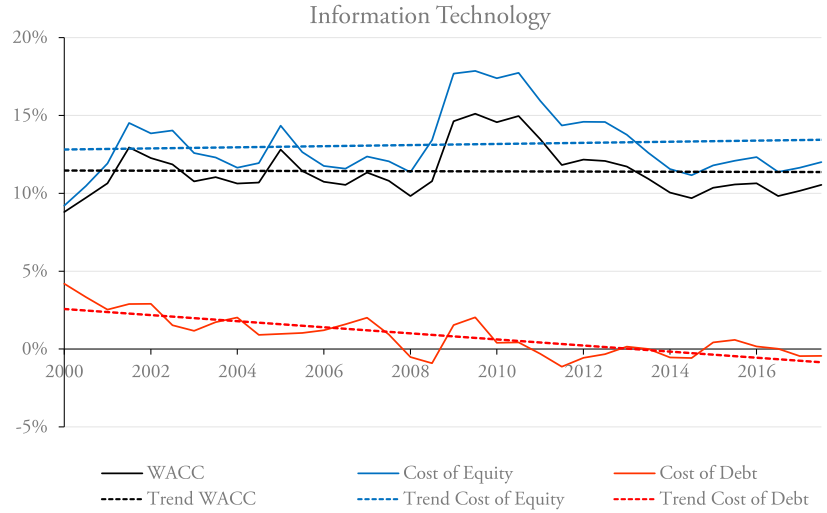

Figure B.90: Real Cost Information Technology 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

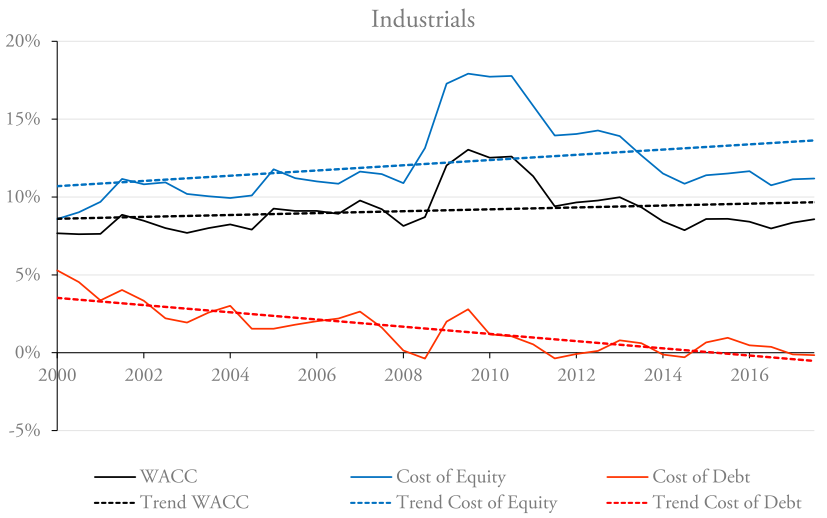

Figure B.89: Real Cost Industrials 2000–2017. Source: Own calculations based on Bloomberg's data.

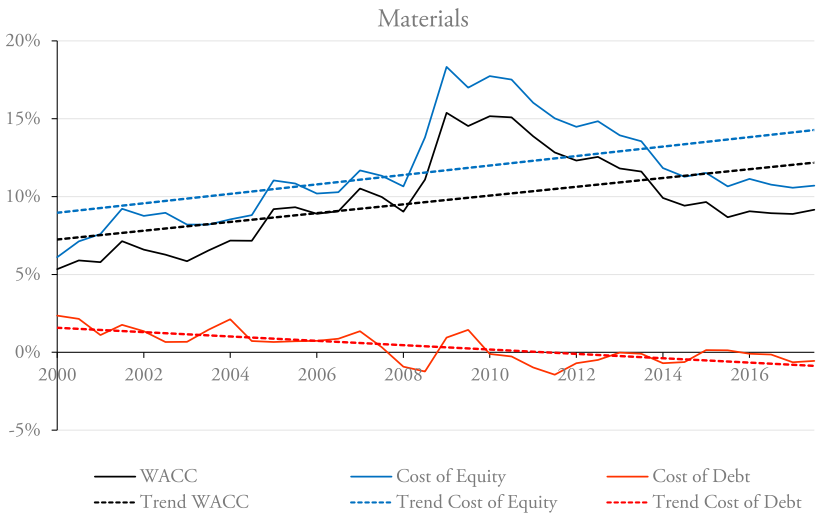

Figure B.91: Real Cost Materials 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

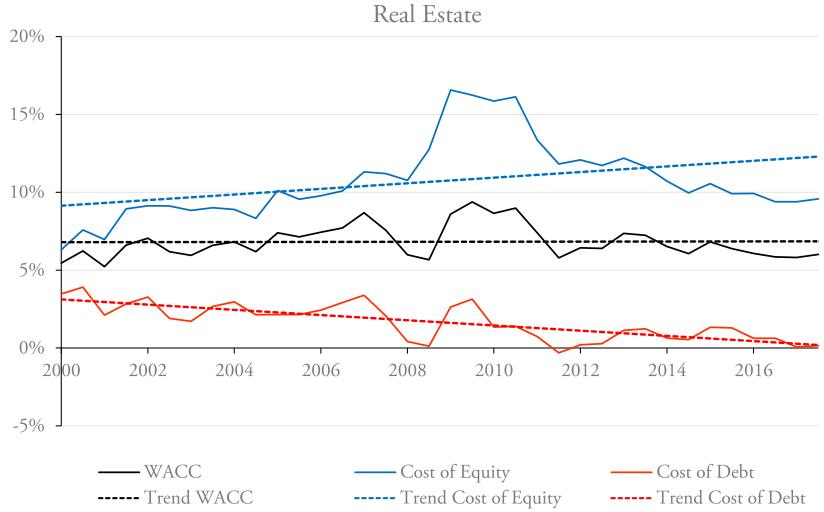

Figure B.92: Real Cost Real Estate 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

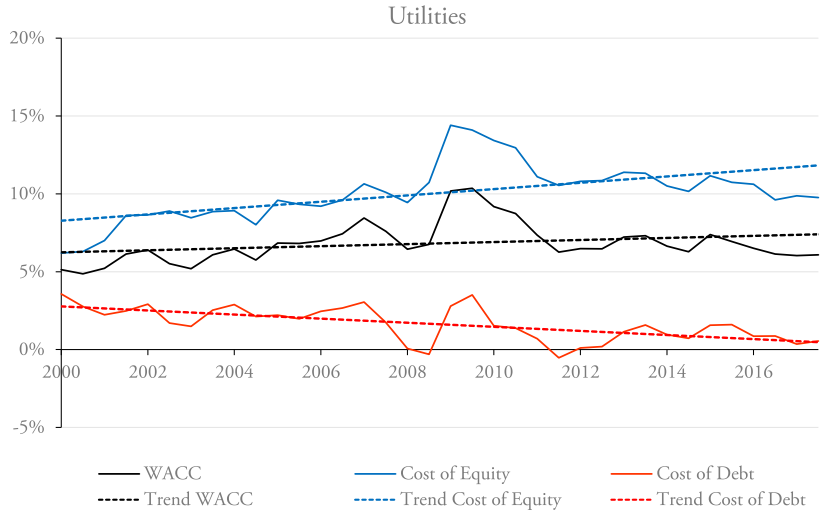

Figure B.94: Real Cost Utilities 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

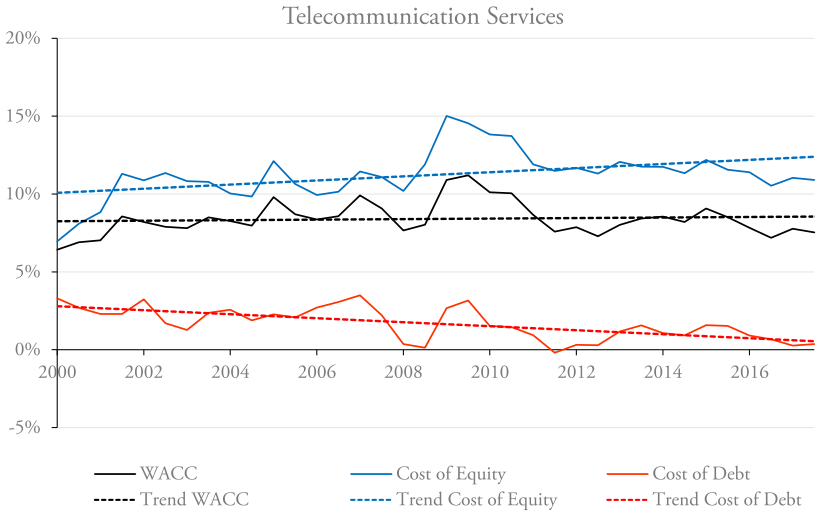

Figure B.93: Real Cost Telecommunication Services 2000–2017. Source: Own calculations based on Bloomberg's data and OECD inflation rates.

B.2 Tables

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	6,798	10.2	11.0	70.5	7.2	29.5	7.0	7.7	4.0
2000II	7,493	10.2	11.4	70.1	6.2	29.9	7.4	8.6	3.5
2001	8,089	10.4	12.2	69.3	5.3	30.7	7.5	9.3	2.6
2001II	8,338	11.2	13.3	68.6	5.1	31.4	9.1	11.2	3.1
2002	8,555	10.4	12.5	69.7	4.4	30.3	8.7	10.8	2.9
2002II	8,851	10.1	12.8	67.7	3.4	32.3	8.2	10.9	1.7
2003	8,758	9.7	12.1	69.5	3.3	30.5	7.7	10.1	1.4
2003II	9,333	9.7	11.6	72.9	3.6	27.1	8.1	10.0	2.1
2004	9,896	9.8	11.4	74.8	3.9	25.2	8.3	9.9	2.5
2004II	10,663	10.1	12.0	76.3	3.3	23.7	7.9	9.8	1.2
2005	12,140	11.6	13.8	77.2	3.1	22.8	9.5	11.7	1.3
2005II	12,552	11.4	13.2	78.5	3.4	21.5	9.1	11.0	1.4
2006	13,351	11.6	13.3	79.1	4.0	20.9	8.9	10.6	1.6
2006II	13,668	11.1	12.8	78.7	3.9	21.3	8.9	10.6	1.8
2007	14,402	11.7	13.4	79.4	4.1	20.6	9.8	11.5	2.3
2007II	14,759	11.6	13.7	77.6	3.5	22.4	9.1	11.2	1.2
2008	15,395	11.6	14.2	75.1	3.0	24.9	8.0	10.5	–0.3

2008II	15,630	12.3	16.4	70.0	2.4	30.0	8.9	12.9	–0.7
2009	16,028	13.2	17.8	70.1	2.3	29.9	12.7	17.3	1.8
2009II	16,310	13.2	17.2	73.2	2.4	26.8	13.2	17.3	2.4
2010	16,780	14.4	18.6	74.1	2.2	25.9	12.7	16.9	0.7
2010II	17,029	14.4	18.5	74.9	2.1	25.1	12.8	16.9	0.6
2011	17,717	13.8	17.5	75.5	2.2	24.5	11.3	14.9	0.0
2011II	18,017	12.5	16.3	73.7	1.6	26.3	9.8	13.4	–0.9
2012	18,461	12.0	15.6	74.7	1.4	25.3	10.0	13.6	–0.4
2012II	19,748	11.6	15.3	74.1	1.2	25.9	10.1	13.7	–0.2
2013	20,153	11.3	14.5	75.2	1.5	24.8	10.0	13.2	0.4
2013II	20,393	11.3	14.2	76.2	1.8	23.8	9.7	12.6	0.3
2014	20,763	10.7	13.4	76.7	1.6	23.3	8.7	11.4	–0.3
2014II	21,125	10.1	12.7	76.5	1.4	23.5	8.2	10.8	–0.3
2015	21,695	9.6	12.1	76.9	1.3	23.1	8.8	11.3	0.6
2015II	21,904	9.7	12.3	76.0	1.3	24.0	9.0	11.6	0.7
2016	21,912	9.8	12.7	75.8	1.1	24.2	9.0	11.8	0.3
2016II	23,188	9.8	12.5	76.6	1.3	23.4	8.6	11.2	0.2
2017	17,218	10.7	13.3	78.3	1.5	21.7	8.8	11.3	–0.3
2017II	16,665	11.1	13.7	78.8	1.5	21.2	9.1	11.6	–0.3

Table B.1: Data for All Countries. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	106	9.4	9.8	76.4	7.2	23.6	6.1	6.5	4.0
2000II	171	9.3	9.8	80.4	5.9	19.6	3.3	3.8	0.1
2001	123	9.1	10.0	72.8	6.1	27.2	2.8	3.6	0.0
2001II	191	9.7	10.6	79.6	5.3	20.4	6.4	7.3	2.1
2002	142	9.3	10.4	76.0	5.0	24.0	6.3	7.4	2.1
2002II	201	9.6	10.9	79.9	3.6	20.1	6.5	7.7	0.7
2003	176	8.8	9.8	80.1	3.6	19.9	6.0	7.0	1.0
2003II	473	8.9	9.5	86.5	3.1	13.5	6.3	6.9	0.6
2004	459	9.1	9.7	86.7	3.4	13.3	6.4	6.9	0.9
2004II	753	8.7	9.2	88.3	3.1	11.7	6.1	6.5	0.5
2005	751	10.4	11.1	87.5	3.1	12.5	7.8	8.4	0.6
2005II	861	9.8	10.3	88.6	3.4	11.4	6.8	7.3	0.6
2006	884	10.2	10.6	88.1	4.1	11.9	5.9	6.4	0.1
2006II	1,003	9.9	10.3	89.6	3.6	10.4	6.3	6.7	0.3
2007	1,031	10.6	11.1	90.6	3.7	9.4	8.3	8.8	1.5
2007II	1,194	10.3	10.9	90.7	2.5	9.3	7.2	7.8	–0.4
2008	1,216	10.6	11.5	87.7	2.5	12.3	5.9	6.8	–1.9

2008II	1,257	16.0	18.1	83.8	2.4	16.2	11.9	13.9	–1.2
2009	1,237	19.3	21.5	85.2	3.2	14.8	17.6	19.7	1.8
2009II	1,292	13.7	14.6	88.3	3.5	11.7	11.4	12.3	1.4
2010	1,263	18.9	20.7	87.3	3.3	12.7	15.3	17.0	0.2
2010II	1,348	18.5	19.8	88.8	3.6	11.2	15.3	16.6	0.8
2011	1,368	18.5	19.9	88.3	3.3	11.7	14.5	15.8	–0.2
2011II	1,450	16.8	18.1	88.2	2.3	11.8	13.4	14.7	–0.6
2012	1,463	13.6	14.8	87.5	1.9	12.5	12.3	13.5	0.7
2012II	1,485	12.5	13.6	88.1	2.0	11.9	10.1	11.1	–0.2
2013	1,487	12.2	13.3	86.8	2.1	13.2	9.6	10.7	–0.3
2013II	1,502	13.8	15.2	87.6	2.3	12.4	10.8	12.1	–0.4
2014	1,507	11.7	12.8	87.5	2.2	12.5	8.4	9.5	–0.8
2014II	1,543	11.0	12.2	86.8	1.9	13.2	9.1	10.3	0.1
2015	1,536	10.1	11.1	87.1	1.8	12.9	8.5	9.5	0.3
2015II	1,601	8.5	9.4	87.3	1.8	12.7	6.7	7.5	0.2
2016	1,565	8.9	9.8	88.0	1.4	12.0	7.7	8.6	0.3
2016II	1,691	9.3	10.3	87.4	1.7	12.6	7.7	8.7	0.2
2017	1,384	9.4	10.3	87.8	1.7	12.2	7.3	8.2	–0.3
2017II	1,302	9.2	10.0	89.0	1.8	11.0	7.2	7.9	–0.1

Table B.2: Data for Australia. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	12	9.4	9.8	66.2	4.8	33.8	7.1	7.5	2.7
2000II	15	9.1	10.0	64.8	5.7	35.2	6.1	6.9	2.7
2001	18	9.3	10.6	62.9	5.1	37.1	6.1	7.4	2.0
2001II	20	9.5	11.4	62.5	4.4	37.5	7.0	9.0	2.1
2002	20	9.7	11.3	62.3	5.2	37.7	7.7	9.3	3.2
2002II	24	8.5	11.0	56.4	4.2	43.6	6.6	9.1	2.4
2003	30	8.1	10.6	58.3	3.8	41.7	6.6	9.1	2.3
2003II	30	8.2	10.2	61.2	4.2	38.8	6.8	8.9	2.9
2004	31	8.5	10.2	68.1	4.2	31.9	6.7	8.3	2.4
2004II	33	8.2	9.9	68.5	4.2	31.5	5.6	7.3	1.7
2005	40	8.1	10.0	66.3	4.0	33.7	5.3	7.2	1.3
2005II	40	8.3	10.0	68.4	4.4	31.6	6.3	7.9	2.4
2006	46	9.0	10.4	69.7	5.3	30.3	7.5	8.8	3.9
2006II	49	9.3	10.6	71.4	5.2	28.6	7.7	9.0	3.6
2007	60	10.3	11.9	72.3	5.4	27.7	8.4	9.9	3.5
2007II	61	10.2	12.0	69.1	5.3	30.9	7.4	9.2	2.6
2008	62	9.7	11.8	67.0	5.0	33.0	6.0	8.0	1.5

2008II	61	10.5	14.8	56.8	4.9	43.2	7.5	11.6	2.0
2009	62	8.1	11.4	54.7	4.1	45.3	7.4	10.7	3.4
2009II	62	8.1	11.2	60.2	3.4	39.8	7.7	10.8	3.0
2010	65	8.9	12.4	61.9	3.1	38.1	7.0	10.5	1.3
2010II	65	9.7	13.4	64.6	3.1	35.4	7.6	11.2	1.1
2011	65	11.8	16.2	65.7	3.7	34.3	8.4	12.7	0.5
2011II	66	10.1	14.9	61.0	2.8	39.0	6.4	11.0	-0.7
2012	67	10.7	16.0	62.1	2.4	37.9	8.1	13.3	0.0
2012II	67	10.0	15.4	60.7	1.7	39.3	7.2	12.5	-0.9
2013	67	9.9	15.0	62.2	1.8	37.8	7.4	12.5	-0.5
2013II	68	8.5	12.6	61.9	2.0	38.1	6.7	10.7	0.3
2014	68	9.7	14.8	62.9	1.5	37.1	7.9	12.9	-0.2
2014II	69	8.3	13.6	60.5	0.8	39.5	6.7	11.9	-0.7
2015	67	11.1	16.4	65.6	0.7	34.4	10.1	15.3	-0.3
2015II	69	7.0	11.1	61.6	0.9	38.4	6.1	10.1	0.0
2016	68	9.0	14.2	62.4	0.3	37.6	8.2	13.4	-0.4
2016II	52	10.7	17.1	63.2	0.1	36.8	9.9	16.3	-0.6

Table B.3: Data for Austria. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	3	10.3	10.9	73.0	8.5	27.0	7.8	8.4	6.0
2000II	29	9.6	11.0	64.3	7.1	35.7	6.5	7.9	4.1
2001	11	9.9	12.3	62.8	6.6	37.2	6.8	9.2	3.6
2001II	36	9.6	12.6	59.9	5.6	40.1	7.2	10.1	3.2
2002	22	9.8	13.4	65.7	3.6	34.3	8.0	11.5	1.9
2002II	39	9.4	13.7	61.6	2.7	38.4	8.1	12.3	1.4
2003	29	9.7	12.9	70.0	2.2	30.0	8.2	11.3	0.7
2003II	45	8.5	11.5	64.3	2.7	35.7	6.7	9.6	1.0
2004	40	9.3	11.8	69.6	3.5	30.4	7.1	9.5	1.4
2004II	52	8.7	11.0	69.4	3.2	30.6	6.1	8.3	0.7
2005	54	9.2	11.6	71.3	2.9	28.7	6.3	8.7	0.2
2005II	62	8.9	11.0	71.1	3.4	28.9	6.0	8.0	0.7
2006	67	9.7	11.7	71.7	4.2	28.3	7.5	9.5	2.1
2006II	77	9.5	11.5	73.3	3.7	26.7	8.0	9.9	2.2
2007	81	10.7	13.0	74.0	3.8	26.0	9.1	11.4	2.3
2007II	87	10.4	13.1	71.6	3.6	28.4	7.7	10.3	1.0
2008	95	10.2	13.4	68.4	3.4	31.6	5.1	8.1	-1.4

2008II	91	10.0	14.8	58.9	3.4	41.1	6.0	10.5	-0.4
2009	103	10.5	15.0	61.8	3.4	38.2	10.5	15.0	3.4
2009II	98	10.4	14.0	66.4	3.2	33.6	10.9	14.5	3.6
2010	105	10.9	15.4	64.9	3.2	35.1	8.7	13.1	1.2
2010II	102	10.7	14.3	67.8	3.4	32.2	7.6	11.0	0.5
2011	102	11.6	15.0	69.1	3.7	30.9	7.9	11.2	0.3
2011II	100	11.0	15.0	66.1	3.5	33.9	7.1	11.0	-0.1
2012	106	9.9	13.6	66.2	2.8	33.8	6.8	10.4	-0.1
2012II	102	9.5	13.3	67.2	1.8	32.8	6.8	10.6	-0.6
2013	108	9.0	12.4	67.1	2.2	32.9	7.7	11.0	0.9
2013II	106	7.6	10.2	68.5	2.2	31.5	6.7	9.2	1.3
2014	110	7.4	9.9	70.0	1.5	30.0	6.9	9.4	1.0
2014II	108	7.3	9.9	70.9	0.8	29.1	7.4	10.0	0.9
2015	112	7.1	9.4	71.9	1.0	28.1	6.7	9.0	0.6
2015II	110	6.5	8.6	72.6	0.8	27.4	5.1	7.1	-0.5
2016	107	6.3	8.6	72.3	0.3	27.7	4.2	6.4	-1.8
2016II	30	7.5	9.8	76.3	0.2	23.7	5.3	7.5	-1.9

Table B.4: Data for Belgium. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	386	10.9	11.4	81.6	5.8	18.4	8.2	8.7	3.3
2000II	468	11.4	12.2	81.5	5.3	18.5	8.3	9.0	2.3
2001	489	11.3	12.2	81.2	4.9	18.8	7.9	8.8	1.7
2001II	478	12.6	14.2	79.8	4.1	20.2	10.5	12.0	2.2
2002	451	11.6	12.7	81.0	4.5	19.0	10.0	11.1	3.0
2002II	429	10.9	12.3	79.6	3.8	20.4	7.6	9.0	0.8
2003	397	9.9	11.2	78.6	3.8	21.4	6.0	7.3	0.1
2003II	394	9.7	10.7	81.3	4.0	18.7	7.6	8.7	2.0
2004	448	9.5	10.4	82.8	3.9	17.2	7.8	8.7	2.3
2004II	467	9.5	10.3	83.5	3.8	16.5	7.2	8.0	1.7
2005	687	12.2	13.1	86.6	3.3	13.4	10.0	10.9	1.3
2005II	812	13.5	14.5	87.8	3.2	12.2	10.9	11.8	0.8
2006	921	12.4	13.1	88.3	3.6	11.7	9.7	10.4	1.1
2006II	947	12.0	12.7	88.0	3.4	12.0	10.3	11.0	1.8
2007	1,014	14.7	15.7	88.1	3.6	11.9	12.5	13.4	1.5
2007II	1,044	15.1	16.2	87.5	3.4	12.5	12.6	13.6	1.1
2008	1,196	14.7	15.9	87.9	2.6	12.1	12.4	13.5	0.5

2008II	1,355	14.7	16.5	84.8	2.0	15.2	11.7	13.5	-0.6
2009	1,667	16.0	18.2	85.3	1.4	14.7	15.3	17.4	0.7
2009II	1,799	15.9	17.5	87.8	1.4	12.2	15.9	17.5	1.5
2010	1,980	16.6	18.1	89.1	1.4	10.9	14.8	16.3	-0.1
2010II	1,979	17.1	18.6	89.7	1.3	10.3	14.7	16.2	-0.7
2011	2,110	15.6	16.6	90.8	1.4	9.2	12.2	13.2	-1.6
2011II	2,195	15.4	16.6	90.0	0.9	10.0	12.2	13.4	-1.9
2012	2,274	13.9	15.0	90.1	0.9	9.9	11.7	12.8	-1.0
2012II	2,244	14.6	15.9	89.7	0.9	10.3	13.4	14.7	-0.2
2013	2,298	13.3	14.6	88.8	1.0	11.2	12.4	13.6	0.2
2013II	2,264	13.0	14.2	88.3	1.2	11.7	11.9	13.0	0.2
2014	2,198	12.8	14.0	87.8	1.2	12.2	10.8	12.0	-0.6
2014II	2,274	12.3	13.7	86.7	1.1	13.3	10.1	11.5	-0.9
2015	2,141	12.5	14.4	85.3	0.9	14.7	11.4	13.2	-0.1
2015II	2,183	11.3	13.3	83.2	0.8	16.8	9.9	11.9	-0.4
2016	2,126	12.2	14.3	84.5	0.7	15.5	10.5	12.5	-0.8
2016II	2,204	11.7	13.5	85.4	0.8	14.6	10.2	12.0	-0.5
2017	1,854	11.4	13.0	86.3	1.0	13.7	9.6	11.2	-0.6
2017II	1,835	12.4	14.0	86.3	1.3	13.7	10.6	12.2	-0.2

Table B.5: Data for Canada. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	77	7.9	7.7	69.0	8.1	31.0	4.2	3.9	4.3
2000II	77	7.8	7.9	65.7	7.1	34.3	3.3	3.4	2.7
2001	76	7.5	7.9	65.8	6.4	34.2	3.6	3.9	2.5
2001II	84	7.5	8.5	66.2	5.3	33.8	4.1	5.0	1.9
2002	81	7.5	8.2	67.5	5.5	32.5	5.1	5.7	3.1
2002II	80	6.6	7.9	67.5	3.6	32.5	3.9	5.1	0.9
2003	82	6.5	7.9	66.8	3.5	33.2	2.7	4.0	-0.3
2003II	83	7.1	8.1	74.7	4.0	25.3	5.2	6.1	2.1
2004	93	7.2	8.1	75.0	4.2	25.0	7.0	7.8	4.0
2004II	88	7.2	7.9	77.7	4.5	22.3	5.3	5.9	2.6
2005	124	8.4	9.2	78.1	4.9	21.9	5.7	6.5	2.3
2005II	128	8.1	8.7	79.1	5.2	20.9	4.4	5.0	1.6
2006	126	8.7	9.2	79.5	6.0	20.5	4.6	5.1	1.9
2006II	124	8.1	8.6	79.4	5.6	20.6	5.1	5.6	2.7
2007	143	8.7	9.2	80.9	5.6	19.1	5.8	6.3	2.8
2007II	146	8.5	9.2	80.5	4.8	19.5	2.3	3.1	-1.1
2008	155	8.5	9.8	77.1	3.6	22.9	0.0	1.3	-4.5

2008II	154	7.8	9.6	72.3	2.8	27.7	-1.1	0.6	-5.7
2009	158	7.9	9.7	73.0	2.6	27.0	4.5	6.2	-0.6
2009II	159	7.9	9.2	74.9	3.1	25.1	10.6	12.0	5.7
2010	164	7.6	9.0	74.5	2.9	25.5	7.1	8.5	2.4
2010II	167	7.4	8.7	76.0	2.5	24.0	4.9	6.2	0.1
2011	176	7.5	8.9	75.3	2.8	24.7	4.3	5.6	-0.3
2011II	174	6.8	8.7	73.8	1.5	26.2	3.1	4.9	-2.0
2012	182	6.9	8.8	74.0	1.6	26.0	3.2	5.0	-2.0
2012II	183	6.5	8.3	73.7	1.4	26.3	4.0	5.7	-1.0
2013	188	6.5	8.4	72.7	1.8	27.3	5.1	6.9	0.4
2013II	190	6.5	8.2	70.4	2.3	29.6	4.2	5.8	0.1
2014	194	6.2	8.0	69.3	2.2	30.7	1.9	3.6	-1.9
2014II	194	5.7	7.3	69.0	2.0	31.0	0.5	2.0	-3.0
2015	194	5.7	7.4	68.8	2.0	31.2	1.4	3.0	-2.2
2015II	193	7.9	9.6	66.9	4.1	33.1	3.3	4.9	-0.3
2016	194	8.4	10.5	68.0	3.8	32.0	3.8	5.8	-0.6
2016II	193	8.9	11.2	69.3	3.6	30.7	5.3	7.4	0.2

Table B.6: Data for Chile. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	0								
2000II	0								
2001	1	7.8	9.8	31.2	6.9	68.8	2.7	4.6	1.9
2001II	2	7.6	9.8	36.3	6.3	63.7	3.2	5.3	2.0
2002	3	8.4	10.0	52.0	6.0	48.0	5.4	6.9	3.1
2002II	3	7.3	9.5	52.1	4.1	47.9	6.6	8.8	3.4
2003	3	8.2	9.7	70.9	4.0	29.1	8.3	9.8	4.0
2003II	3	8.3	9.9	70.8	4.3	29.2	7.7	9.3	3.7
2004	5	7.6	8.8	71.6	4.4	28.4	5.0	6.1	1.9
2004II	7	8.3	9.0	83.8	4.2	16.2	5.1	5.8	1.2
2005	8	9.3	9.9	86.4	4.6	13.6	7.6	8.2	3.0
2005II	9	9.0	9.4	90.7	5.0	9.3	6.6	7.0	2.6
2006	10	9.8	10.2	91.9	4.8	8.1	6.7	7.1	1.9
2006II	10	9.8	10.2	91.7	3.8	8.3	7.8	8.2	2.0
2007	10	10.8	11.3	89.8	3.9	10.2	8.5	9.0	1.7
2007II	10	10.2	10.9	88.7	4.1	11.3	5.9	6.6	0.1
2008	9	9.8	10.8	86.3	3.3	13.7	2.6	3.6	-3.5

2008II	9	11.5	13.1	80.1	4.7	19.9	6.0	7.5	-0.5
2009	9	9.3	10.3	79.0	5.1	21.0	7.6	8.6	3.4
2009II	9	9.9	11.0	82.5	3.9	17.5	9.5	10.6	3.5
2010	10	9.6	10.7	84.1	3.4	15.9	8.4	9.5	2.2
2010II	10	8.5	9.2	85.1	3.2	14.9	6.4	7.1	1.2
2011	13	9.3	11.0	75.1	3.7	24.9	7.4	9.1	1.9
2011II	12	8.2	9.3	78.5	2.8	21.5	5.9	6.9	0.6
2012	13	9.3	11.2	74.4	2.8	25.6	5.6	7.5	-0.7
2012II	12	8.7	10.4	79.5	1.5	20.5	5.5	7.2	-1.4
2013	13	6.6	8.2	71.9	1.9	28.1	4.9	6.5	0.3
2013II	13	6.9	8.2	75.5	2.1	24.5	5.7	7.0	0.9
2014	15	8.0	10.8	71.0	1.5	29.0	7.8	10.6	1.4
2014II	15	5.3	7.3	71.2	0.7	28.8	4.8	6.8	0.3
2015	15	9.9	15.1	71.0	0.8	29.0	9.4	14.5	0.3
2015II	14	4.4	6.2	74.4	0.5	25.6	4.2	6.0	0.3
2016	15	6.5	8.3	80.8	0.4	19.2	6.2	8.0	0.0
2016II	7	5.8	7.5	82.8	0.2	17.2	5.1	6.8	-0.5

Table B.7: Data for Czech Republic. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	11	9.2	9.6	69.9	6.8	30.1	5.8	6.2	3.5
2000II	16	9.0	9.6	74.0	5.5	26.0	6.2	6.7	2.8
2001	26	9.0	10.0	68.3	5.2	31.7	6.3	7.4	2.6
2001II	25	9.8	11.7	64.3	4.9	35.7	7.4	9.3	2.7
2002	45	9.5	11.1	65.6	4.6	34.4	6.9	8.6	2.2
2002II	48	8.6	11.0	63.7	3.2	36.3	6.0	8.3	0.6
2003	51	8.6	10.7	68.1	3.0	31.9	5.9	8.1	0.5
2003II	55	8.5	10.0	71.6	3.5	28.4	6.8	8.3	1.9
2004	63	8.6	10.0	72.3	3.9	27.7	7.4	8.9	2.8
2004II	72	8.4	9.7	73.0	4.3	27.0	7.0	8.3	3.0
2005	90	9.2	10.3	76.2	4.7	23.8	7.6	8.7	3.1
2005II	88	9.3	10.2	77.2	5.4	22.8	7.0	7.9	3.2
2006	94	10.1	10.9	79.0	5.9	21.0	7.9	8.7	3.8
2006II	101	10.0	10.9	78.3	5.4	21.7	8.1	9.0	3.6
2007	102	10.6	11.7	78.0	5.5	22.0	8.7	9.8	3.7
2007II	114	10.0	11.5	74.8	4.6	25.2	8.0	9.5	2.7
2008	121	9.3	11.2	73.1	3.4	26.9	5.8	7.6	0.0

2008II	122	9.3	12.0	63.2	3.8	36.8	5.6	8.3	0.3
2009	122	9.3	12.8	62.9	3.0	37.1	7.8	11.2	1.5
2009II	120	8.7	12.0	61.6	3.1	38.4	7.5	10.7	2.0
2010	125	10.8	15.9	60.9	2.5	39.1	8.5	13.5	0.4
2010II	126	10.9	16.0	61.4	2.5	38.6	8.2	13.2	0.0
2011	125	11.0	14.9	64.2	3.1	35.8	7.9	11.7	0.2
2011II	121	8.6	12.5	62.3	1.6	37.7	5.8	9.6	-1.0
2012	129	9.7	14.4	62.4	1.2	37.6	7.1	11.7	-1.2
2012II	124	9.1	13.3	64.8	0.8	35.2	6.6	10.7	-1.5
2013	128	8.0	11.3	66.7	1.1	33.3	7.0	10.2	0.1
2013II	128	7.1	9.6	69.1	1.4	30.9	6.5	9.0	0.8
2014	136	7.5	9.7	73.0	1.0	27.0	6.9	9.0	0.4
2014II	136	7.2	9.6	72.2	0.7	27.8	6.6	9.1	0.2
2015	141	7.7	10.2	73.6	0.5	26.4	7.2	9.7	0.0
2015II	146	7.0	8.9	74.8	0.6	25.2	6.5	8.5	0.2
2016	146	6.4	8.2	75.5	0.2	24.5	6.2	8.0	0.0
2016II	108	7.6	9.5	77.6	0.1	22.4	7.4	9.3	-0.1

Table B.8: Data for Denmark. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	1	8.8	8.9	86.2	8.5	13.8	5.6	5.7	5.2
2000II	0								
2001	2	8.2	8.7	74.0	6.8	26.0	1.8	2.3	0.5
2001II	1	7.8	9.1	57.0	5.9	43.0	1.6	2.9	-0.1
2002	0								
2002II	0								
2003	1	5.2	5.8	69.1	4.1	30.9	3.6	4.1	2.5
2003II	1	5.3	5.5	74.0	4.6	26.0	4.2	4.4	3.5
2004	1	7.3	7.9	78.9	4.8	21.1	5.4	6.0	2.9
2004II	2	6.4	7.6	61.2	4.7	38.8	2.0	3.2	0.4
2005	6	8.1	9.1	73.7	5.0	26.3	3.9	4.9	0.9
2005II	7	7.2	8.1	70.8	6.0	29.2	2.9	3.9	1.8
2006	8	8.0	9.1	69.5	6.8	30.5	3.4	4.4	2.3
2006II	10	7.9	8.8	73.3	6.5	26.7	3.3	4.1	1.9
2007	11	10.0	11.0	79.5	6.6	20.5	4.3	5.2	1.1
2007II	12	8.9	9.8	76.7	5.5	23.3	1.0	1.9	-2.1
2008	13	8.8	10.2	70.8	4.3	29.2	-2.2	-0.9	-6.2

2008II	13	7.4	10.4	55.6	3.7	44.4	-1.7	1.0	-5.1
2009	13	6.7	10.4	46.3	3.4	53.7	5.4	9.0	2.1
2009II	13	7.6	10.3	58.5	3.4	41.5	9.3	12.0	5.0
2010	14	9.3	12.9	62.6	2.9	37.4	7.5	11.0	1.2
2010II	9	17.8	25.5	65.5	3.1	34.5	13.0	20.4	-1.1
2011	14	17.8	23.2	72.3	3.5	27.7	11.8	16.9	-1.7
2011II	13	14.5	22.6	61.9	1.9	38.1	9.3	17.0	-2.7
2012	14	16.9	24.5	65.2	1.7	34.8	12.4	19.7	-2.2
2012II	13	15.0	20.6	69.7	1.6	30.3	10.9	16.3	-2.1
2013	15	13.6	18.5	70.7	2.1	29.3	9.8	14.5	-1.3
2013II	15	12.3	16.5	71.2	2.5	28.8	9.9	14.1	0.4
2014	15	11.3	15.8	70.1	2.4	29.9	10.9	15.4	2.1
2014II	15	13.6	18.8	70.7	2.3	29.3	14.2	19.5	2.8
2015	16	8.2	10.4	74.2	2.3	25.8	8.7	10.9	2.7
2015II	16	10.4	13.6	73.6	2.3	26.4	11.0	14.2	2.8
2016	16	7.2	9.2	73.0	1.7	27.0	7.8	9.9	2.3
2016II	16	6.9	9.0	72.9	1.7	27.1	6.4	8.4	1.2

Table B.9: Data for Estonia. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	73	9.1	9.3	78.3	7.0	21.7	6.2	6.4	4.1
2000II	75	9.3	9.8	75.4	6.5	24.6	5.8	6.2	3.1
2001	79	9.5	10.1	75.3	6.0	24.7	6.3	6.9	3.0
2001II	78	9.9	11.2	71.9	5.4	28.1	7.6	8.8	3.2
2002	92	10.2	11.0	76.7	6.0	23.3	8.4	9.2	4.3
2002II	91	9.4	10.8	72.2	4.6	27.8	7.8	9.2	3.1
2003	92	9.1	10.5	73.5	4.2	26.5	7.8	9.1	2.9
2003II	89	9.0	10.1	75.1	4.7	24.9	8.5	9.6	4.2
2004	95	8.9	9.9	77.9	4.3	22.1	9.0	10.0	4.4
2004II	96	8.7	9.8	77.0	4.5	23.0	8.2	9.2	4.0
2005	99	9.4	10.6	80.1	4.0	19.9	8.7	9.8	3.3
2005II	101	9.5	10.5	80.9	4.6	19.1	8.9	9.9	3.9
2006	102	10.2	11.2	79.5	5.3	20.5	8.8	9.8	4.0
2006II	101	10.2	11.3	79.8	5.4	20.2	8.1	9.2	3.4
2007	104	11.2	12.4	80.8	5.6	19.2	8.6	9.8	3.1
2007II	105	11.1	12.5	78.6	5.2	21.4	8.3	9.7	2.6
2008	105	10.4	12.3	74.1	4.9	25.9	6.2	8.0	0.9

2008II	105	9.6	11.8	66.1	5.0	33.9	5.2	7.3	0.8
2009	106	10.5	13.9	64.2	4.3	35.8	9.5	12.9	3.3
2009II	103	10.8	13.7	69.7	4.3	30.3	11.9	14.8	5.2
2010	108	9.8	12.2	72.8	3.3	27.2	9.2	11.6	2.8
2010II	107	10.6	13.3	74.2	2.8	25.8	8.6	11.2	1.0
2011	108	11.1	13.6	74.1	3.5	25.9	7.5	10.0	0.2
2011II	106	11.3	15.5	68.3	2.2	31.7	7.5	11.6	-1.3
2012	110	9.4	12.9	68.8	1.8	31.2	6.2	9.6	-1.2
2012II	109	9.4	13.3	67.7	1.4	32.3	6.6	10.4	-1.1
2013	116	8.8	12.1	68.8	1.4	31.2	7.1	10.3	-0.2
2013II	116	7.9	10.6	68.6	1.7	31.4	6.4	9.1	0.4
2014	122	7.1	9.3	71.0	1.3	29.0	5.9	8.1	0.2
2014II	121	10.6	14.6	70.6	0.7	29.4	9.6	13.6	-0.2
2015	125	6.6	8.8	74.5	0.5	25.5	6.8	8.9	0.6
2015II	127	7.0	9.3	73.1	0.8	26.9	7.3	9.6	1.1
2016	127	5.5	7.3	73.9	0.3	26.1	5.3	7.1	0.1
2016II	105	5.4	7.2	74.6	0.1	25.4	4.9	6.7	-0.4

Table B.10: Data for Finland. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	18	9.8	10.6	66.4	8.3	33.6	8.3	9.1	6.8
2000II	92	9.5	10.6	70.7	6.8	29.3	7.5	8.5	4.8
2001	51	10.2	11.5	69.3	6.6	30.7	8.1	9.4	4.6
2001II	121	10.6	12.7	67.6	5.4	32.4	9.0	11.1	3.9
2002	89	10.9	13.3	66.2	6.1	33.8	9.0	11.3	4.3
2002II	156	11.1	14.5	64.7	4.5	35.3	8.8	12.2	2.3
2003	124	10.4	14.2	62.1	4.0	37.9	8.2	11.9	2.0
2003II	170	10.2	13.0	66.6	4.4	33.4	7.9	10.7	2.2
2004	218	10.0	12.3	70.0	4.7	30.0	7.6	9.8	2.3
2004II	256	9.5	11.7	70.3	4.5	29.7	7.2	9.3	2.3
2005	373	8.5	10.5	70.3	3.5	29.7	6.7	8.7	1.8
2005II	377	10.1	12.3	72.4	3.9	27.6	8.2	10.4	2.2
2006	423	10.5	12.5	73.2	4.8	26.8	8.5	10.4	2.9
2006II	413	10.7	12.6	74.2	5.1	25.8	9.2	11.1	3.7
2007	464	11.5	13.2	75.7	5.7	24.3	10.2	11.9	4.5
2007II	472	11.9	14.1	72.9	5.6	27.1	9.5	11.7	3.4
2008	475	12.4	15.3	67.7	6.0	32.3	8.9	11.7	2.7

2008II	474	9.6	13.2	60.0	4.1	40.0	7.4	11.0	2.1
2009	478	9.1	12.7	60.9	3.5	39.1	9.2	12.8	3.6
2009II	464	9.6	13.0	64.5	3.4	35.5	9.4	12.8	3.1
2010	484	12.5	17.6	66.1	2.9	33.9	10.8	15.7	1.3
2010II	476	11.3	15.5	66.5	3.0	33.5	9.5	13.6	1.4
2011	497	11.8	15.8	68.8	3.4	31.2	9.6	13.5	1.4
2011II	484	10.1	14.6	63.1	2.6	36.9	7.5	11.9	0.2
2012	504	10.3	15.1	64.1	2.3	35.9	8.1	12.8	0.2
2012II	490	8.5	12.5	64.5	1.7	35.5	6.8	10.8	0.1
2013	508	10.3	15.0	65.5	1.9	34.5	9.4	14.1	1.0
2013II	498	9.5	13.2	67.9	2.1	32.1	8.7	12.4	1.4
2014	535	9.5	13.1	70.7	1.4	29.3	8.8	12.4	0.7
2014II	517	8.6	12.2	68.9	0.8	31.1	8.3	11.9	0.5
2015	561	8.3	11.4	71.1	0.9	28.9	8.2	11.2	0.8
2015II	555	7.9	10.7	70.9	0.9	29.1	7.8	10.6	0.8
2016	559	7.1	10.0	70.2	0.2	29.8	7.1	10.0	0.2
2016II	520	6.3	8.7	70.7	0.5	29.3	5.8	8.2	0.1
2017	496	8.7	11.7	72.7	0.7	27.3	7.7	10.6	-0.2
2017II	284	9.2	12.5	72.7	0.7	27.3	8.1	11.3	-0.4

Table B.11: Data for France. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	0								
2000II	102	12.8	14.1	82.3	6.2	17.7	10.9	12.1	4.4
2001	138	11.3	12.2	83.5	4.4	16.5	9.0	9.9	2.2
2001II	156	12.8	14.8	76.9	4.3	23.1	10.8	12.8	2.5
2002	180	12.5	14.5	75.3	4.8	24.7	10.6	12.6	3.1
2002II	194	12.2	15.6	68.4	3.9	31.6	10.9	14.2	2.7
2003	205	12.1	15.6	68.6	3.5	31.4	11.0	14.5	2.5
2003II	211	11.7	14.4	72.0	3.9	28.0	10.5	13.1	2.8
2004	220	11.3	13.5	74.9	3.9	25.1	9.8	11.9	2.5
2004II	224	11.3	13.5	73.6	4.1	26.4	9.2	11.4	2.2
2005	245	12.9	15.2	76.9	3.8	23.1	11.3	13.6	2.4
2005II	249	12.1	14.2	77.8	4.2	22.2	10.3	12.3	2.5
2006	265	12.4	14.2	78.2	5.0	21.8	10.4	12.2	3.2
2006II	264	12.1	13.8	78.4	5.1	21.6	10.6	12.3	3.7
2007	298	13.6	15.6	78.6	5.5	21.4	11.4	13.4	3.5
2007II	311	13.3	15.5	76.9	5.2	23.1	10.4	12.5	2.5
2008	314	11.6	13.9	73.4	5.0	26.6	8.5	10.7	2.0

2008II	316	10.9	14.0	67.1	4.2	32.9	8.3	11.4	1.8
2009	302	9.8	13.3	65.4	3.1	34.6	9.2	12.7	2.6
2009II	306	9.8	12.8	69.6	3.0	30.4	9.7	12.7	2.9
2010	302	12.1	16.1	70.4	2.7	29.6	11.0	15.0	1.7
2010II	304	14.7	19.5	72.4	2.6	27.6	13.3	18.0	1.3
2011	312	13.5	17.3	73.2	3.2	26.8	11.4	15.0	1.3
2011II	308	11.2	15.2	69.7	1.9	30.3	8.8	12.7	-0.3
2012	307	11.0	14.8	71.7	1.6	28.3	8.9	12.6	-0.4
2012II	306	9.5	13.0	71.2	1.3	28.8	7.4	10.8	-0.7
2013	310	9.5	12.9	72.0	1.4	28.0	7.9	11.2	-0.1
2013II	308	8.6	11.1	73.4	1.7	26.6	7.1	9.5	0.2
2014	309	8.5	10.9	75.3	1.3	24.7	7.3	9.6	0.1
2014II	303	8.3	10.9	74.3	0.7	25.7	7.6	10.2	0.0
2015	319	7.5	9.9	74.8	0.4	25.2	7.1	9.4	0.0
2015II	317	8.2	10.8	74.0	0.6	26.0	7.6	10.2	0.0
2016	295	7.5	10.2	73.8	0.1	26.2	7.3	9.9	-0.1
2016II	418	6.2	8.5	73.4	0.1	26.6	5.3	7.6	-0.7
2017	351	7.2	9.3	77.1	0.3	22.9	5.6	7.6	-1.2
2017II	294	7.5	9.6	78.7	0.4	21.3	5.9	7.9	-1.1

Table B.12: Data for Germany. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	131	10.9	11.0	94.4	2.7	5.6	8.0	8.1	0.1
2000II	95	10.8	11.7	81.6	6.3	18.4	6.7	7.5	2.3
2001	148	11.0	11.8	86.6	2.5	13.4	7.2	7.9	-1.1
2001II	112	11.2	13.2	76.1	4.1	24.0	7.8	9.8	0.9
2002	164	11.3	12.2	87.5	2.1	12.5	7.3	8.2	-1.6
2002II	159	9.9	12.0	76.2	2.1	23.8	6.1	8.2	-1.3
2003	156	10.5	12.5	76.0	3.1	24.0	6.5	8.4	-0.6
2003II	139	9.7	11.9	72.2	3.4	27.8	6.2	8.3	0.1
2004	136	10.0	12.0	73.8	3.7	26.2	7.0	8.9	0.9
2004II	139	9.9	12.2	70.0	3.9	30.0	6.7	8.9	0.9
2005	189	10.1	13.2	63.5	4.6	36.5	6.6	9.5	1.3
2005II	190	10.1	12.7	63.0	5.5	37.1	6.1	8.6	1.6
2006	199	9.9	11.7	64.9	6.3	35.1	6.4	8.2	2.9
2006II	199	9.5	11.1	66.8	6.1	33.2	6.1	7.7	2.8
2007	208	10.1	11.7	68.7	6.1	31.3	7.3	8.8	3.4
2007II	208	9.7	11.7	67.7	5.0	32.3	6.4	8.3	1.9
2008	216	9.4	11.9	60.5	5.3	39.5	4.7	7.1	0.8

2008II	217	8.4	13.5	50.0	3.2	50.0	4.4	9.3	-0.5
2009	222	7.2	12.1	48.3	2.8	51.7	6.1	10.9	1.7
2009II	222	7.3	11.6	51.1	2.9	48.9	5.9	10.1	1.5
2010	222	7.9	14.4	46.4	2.4	53.6	3.6	9.9	-1.6
2010II	224	7.5	14.8	43.6	2.2	56.4	2.1	9.1	-3.0
2011	225	7.4	14.4	42.5	2.4	57.5	3.2	9.9	-1.6
2011II	223	5.1	11.7	38.1	1.3	61.9	2.5	8.9	-1.3
2012	222	4.7	10.8	37.7	1.2	62.3	2.9	8.9	-0.5
2012II	222	4.3	9.6	39.6	0.9	60.4	3.0	8.3	-0.3
2013	223	5.1	11.0	41.6	1.1	58.4	5.3	11.3	1.3
2013II	217	5.6	11.2	44.1	1.4	55.9	7.4	13.0	3.1
2014	219	5.9	11.2	47.1	1.2	52.9	7.4	12.8	2.6
2014II	217	5.2	10.8	43.8	0.9	56.2	6.6	12.3	2.2
2015	213	4.9	10.7	43.3	0.7	56.7	7.3	13.2	3.0
2015II	209	4.6	9.8	42.4	1.0	57.6	5.8	11.1	2.2
2016	191	3.9	9.4	44.5	0.4	55.5	4.9	10.5	1.3
2016II	38	5.1	14.5	40.0	0.3	60.0	6.1	15.7	1.3

Table B.13: Data for Greece. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	1	8.3	8.3	88.3	8.8	11.7	-0.8	-0.8	-0.3
2000II	1	8.2	8.7	69.1	7.1	30.9	-1.9	-1.5	-3.0
2001	1	8.7	9.5	78.3	5.9	21.7	-1.6	-0.9	-4.2
2001II	1	8.5	10.9	54.0	5.7	46.0	1.3	3.5	-1.3
2002	8	7.5	8.4	80.8	4.9	19.2	1.7	2.6	-0.7
2002II	5	7.7	9.8	69.1	3.7	30.9	2.8	4.8	-1.0
2003	9	9.6	11.1	77.8	2.3	22.2	5.4	6.7	-1.7
2003II	6	7.2	8.6	69.8	4.0	30.2	1.9	3.2	-1.2
2004	19	6.9	7.6	74.9	3.1	25.1	-0.3	0.4	-3.9
2004II	18	6.4	7.0	70.0	4.6	30.0	0.2	0.8	-1.5
2005	23	7.2	7.9	77.3	4.9	22.7	3.4	4.0	1.2
2005II	19	7.6	7.8	73.7	5.5	26.3	4.0	4.2	2.1
2006	23	9.3	9.9	76.6	6.4	23.4	6.5	7.1	3.7
2006II	25	8.8	9.3	82.0	4.9	18.0	2.7	3.2	-1.0
2007	26	10.4	11.4	79.1	5.7	20.9	1.7	2.6	-2.7
2007II	26	10.6	11.7	82.8	4.3	17.2	3.1	4.2	-2.8
2008	29	9.7	11.4	78.3	3.4	21.7	2.7	4.3	-3.2

2008II	28	9.9	13.3	72.9	1.6	27.1	4.7	7.8	-3.3
2009	30	7.5	10.2	68.0	1.8	32.0	4.0	6.6	-1.6
2009II	27	6.4	8.4	69.0	2.2	31.0	1.3	3.1	-2.7
2010	36	8.5	10.5	76.6	1.9	23.4	2.7	4.6	-3.5
2010II	30	8.4	11.4	70.1	1.9	29.9	4.2	7.0	-2.1
2011	32	9.6	12.6	71.3	1.9	28.7	5.3	8.2	-2.2
2011II	26	9.8	14.0	67.5	1.1	32.5	5.8	9.8	-2.6
2012	35	9.2	13.8	63.6	1.1	36.4	3.5	7.8	-4.2
2012II	31	8.9	13.5	64.2	1.1	35.8	3.1	7.4	-4.4
2013	37	8.6	12.6	64.6	1.4	35.4	6.2	10.1	-0.8
2013II	37	7.4	9.9	67.0	1.7	33.0	6.3	8.8	0.7
2014	40	7.0	9.6	69.4	1.4	30.6	7.1	9.7	1.5
2014II	38	8.1	11.7	66.0	1.3	34.0	8.6	12.2	1.7
2015	38	10.9	15.4	68.5	1.4	31.5	11.2	15.7	1.7
2015II	35	11.5	16.6	67.8	1.5	32.2	11.2	16.3	1.2
2016	36	10.0	13.8	69.5	1.1	30.5	9.8	13.7	1.0
2016II	19	12.6	18.5	65.7	1.2	34.3	12.5	18.4	1.1

Table B.14: Data for Hungary. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	0								
2000II	0								
2001	0								
2001II	0								
2002	2	7.9	8.6	78.8	5.9	21.2	0.3	1.0	-1.5
2002II	2	7.2	7.9	84.4	3.9	15.6	4.2	4.9	0.9
2003	5	6.4	8.2	61.2	4.2	38.8	4.4	6.2	2.2
2003II	6	7.3	7.7	79.4	3.2	20.6	4.9	5.3	0.9
2004	5	6.6	7.8	65.4	4.0	34.6	3.7	4.8	1.1
2004II	5	7.2	7.5	77.9	4.4	22.1	3.4	3.7	0.6
2005	7	7.9	9.2	70.1	4.7	29.9	3.9	5.1	0.9
2005II	5	7.8	8.9	66.3	6.0	33.7	3.5	4.6	1.8
2006	8	9.0	10.1	63.4	6.8	36.6	3.6	4.7	1.5
2006II	4	8.1	9.4	61.6	6.5	38.4	0.4	1.6	-1.1
2007	7	7.9	8.9	55.5	6.7	44.5	2.4	3.4	1.3
2007II	8	8.0	9.8	58.5	5.6	41.5	3.2	4.9	1.0
2008	7	6.8	8.8	57.5	3.6	42.5	-3.2	-1.4	-6.1

2008II	7	5.0	8.5	40.3	3.0	59.7	-9.4	-6.4	-11.2
2009	8	5.3	9.6	36.8	3.1	63.2	-7.5	-3.6	-9.4
2009II	6	5.2	8.1	37.1	3.6	62.9	-3.8	-1.2	-5.3
2010	8	4.9	8.6	33.1	3.2	66.9	-2.2	1.2	-3.7
2010II	9	5.0	9.2	32.5	3.5	67.5	1.6	5.7	0.2
2011	9	6.2	9.0	52.1	3.7	47.9	2.9	5.7	0.6
2011II	10	5.6	9.0	53.8	2.1	46.2	0.4	3.6	-3.0
2012	12	5.8	9.2	55.3	2.1	44.7	-0.1	3.1	-3.6
2012II	13	5.3	8.0	60.2	1.8	39.8	1.0	3.5	-2.4
2013	16	6.5	8.4	69.8	2.1	30.2	2.7	4.5	-1.5
2013II	15	7.1	8.5	75.8	2.7	24.2	3.1	4.5	-1.2
2014	17	6.6	8.3	71.0	2.5	29.0	4.1	5.8	0.1
2014II	17	5.6	6.9	74.8	2.2	25.2	4.0	5.3	0.6
2015	18	5.4	6.9	71.3	2.3	28.7	4.0	5.5	0.9
2015II	18	5.0	6.1	74.7	2.5	25.3	3.0	4.1	0.5
2016	18	5.5	6.7	73.3	2.0	26.7	3.7	4.9	0.2
2016II	16	4.7	5.6	74.6	2.0	25.4	3.4	4.2	0.6

Table B.15: Data for Iceland. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	16	8.6	8.7	55.9	8.4	44.1	3.2	3.4	3.0
2000II	24	8.6	9.0	71.1	6.7	28.9	2.0	2.4	0.2
2001	28	8.4	9.0	68.9	5.8	31.1	2.8	3.4	0.4
2001II	27	9.2	10.4	71.1	5.4	28.9	4.8	5.9	1.1
2002	32	8.9	9.6	77.9	5.0	22.1	4.1	4.7	0.4
2002II	30	8.4	9.8	72.4	4.1	27.6	3.5	4.9	-0.5
2003	33	8.2	9.2	78.0	3.4	22.0	4.0	4.9	-0.7
2003II	34	7.8	8.7	77.3	4.4	22.7	5.2	6.0	1.9
2004	35	7.8	8.5	80.0	3.8	20.0	5.9	6.6	2.0
2004II	35	7.6	8.3	81.0	4.2	19.0	4.8	5.4	1.5
2005	43	8.9	9.8	83.2	3.2	16.8	6.5	7.3	0.9
2005II	45	8.9	9.6	82.5	4.0	17.5	6.1	6.8	1.3
2006	49	9.4	10.0	83.5	4.1	16.5	5.5	6.1	0.4
2006II	49	9.1	9.8	82.6	4.5	17.4	4.5	5.2	0.1
2007	56	9.9	10.7	85.6	4.6	14.4	4.7	5.4	-0.4
2007II	58	10.0	10.9	83.5	4.3	16.5	5.0	5.8	-0.5
2008	59	9.8	11.2	77.4	4.2	22.6	4.9	6.2	-0.4

2008II	61	9.1	10.8	70.4	4.2	29.6	5.9	7.5	1.2
2009	58	9.8	12.2	66.5	4.7	33.5	14.0	16.5	8.7
2009II	62	10.0	11.7	76.3	4.1	23.7	16.8	18.6	10.6
2010	61	12.3	14.5	77.3	4.1	22.7	14.5	16.7	6.2
2010II	58	13.2	15.0	78.1	6.5	21.9	12.4	14.2	5.8
2011	60	16.9	18.3	81.5	9.4	18.5	13.9	15.3	6.6
2011II	65	13.4	15.2	77.8	6.3	22.2	10.5	12.2	3.5
2012	64	13.4	15.3	78.6	5.5	21.4	11.3	13.1	3.6
2012II	65	11.3	12.7	78.9	4.8	21.1	10.0	11.4	3.5
2013	69	10.3	12.0	81.6	2.8	18.4	9.6	11.3	2.2
2013II	67	12.4	14.4	82.7	2.6	17.3	12.1	14.2	2.4
2014	76	8.4	9.6	85.7	1.8	14.3	8.1	9.3	1.6
2014II	77	8.2	9.6	85.1	1.1	14.9	8.1	9.5	1.1
2015	78	8.2	9.6	86.3	1.1	13.7	8.7	10.0	1.6
2015II	79	7.9	9.3	84.3	1.1	15.7	8.0	9.4	1.3
2016	75	7.1	8.8	81.5	0.8	18.5	7.0	8.8	0.7
2016II	33	7.7	9.5	79.4	1.0	20.6	7.5	9.4	0.9

Table B.16: Data for Ireland. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	58	9.9	10.3	74.7	6.3	25.3	7.9	8.3	4.3
2000II	64	11.0	11.9	74.9	5.8	25.1	10.4	11.3	5.2
2001	63	11.7	13.2	73.1	4.8	26.9	11.0	12.5	4.2
2001II	71	13.3	15.7	72.2	3.9	27.8	11.3	13.7	2.0
2002	74	12.0	14.2	69.4	4.4	30.6	6.8	8.9	-0.4
2002II	68	11.0	13.8	66.8	2.8	33.2	4.2	6.7	-3.5
2003	75	10.5	12.7	71.2	2.7	28.8	6.7	8.9	-0.9
2003II	68	10.8	12.6	74.0	3.1	26.0	12.9	14.6	5.0
2004	119	9.6	11.6	68.0	3.8	32.0	11.4	13.4	5.5
2004II	120	10.4	12.5	67.6	4.2	32.4	9.5	11.6	3.4
2005	335	10.6	12.8	65.9	4.6	34.1	10.0	12.2	4.0
2005II	333	10.3	12.3	65.7	5.0	34.3	8.1	10.0	2.9
2006	383	10.2	11.8	66.5	5.6	33.5	6.6	8.1	2.2
2006II	389	9.9	11.5	67.9	5.4	32.1	8.9	10.5	4.4
2007	423	10.3	11.9	68.8	5.5	31.2	11.2	12.9	6.4
2007II	429	10.4	12.9	66.8	4.6	33.2	8.6	11.0	2.9
2008	429	9.4	12.7	62.1	3.5	37.9	4.9	8.1	-0.7

2008II	430	10.6	15.6	55.6	4.1	44.4	5.5	10.2	-0.7
2009	438	10.1	14.8	57.3	3.5	42.7	6.6	11.2	0.2
2009II	440	10.8	15.0	60.4	3.7	39.6	7.2	11.3	0.4
2010	445	10.1	13.8	62.2	3.3	37.8	6.7	10.3	0.2
2010II	451	10.8	14.9	63.4	3.0	36.6	8.3	12.3	0.7
2011	459	11.2	15.2	62.6	3.4	37.4	6.9	10.7	-0.7
2011II	457	11.2	16.2	60.2	2.6	39.8	8.1	12.9	-0.3
2012	460	10.2	14.6	60.6	2.6	39.4	8.3	12.7	0.9
2012II	462	8.3	11.8	60.9	2.2	39.1	6.5	10.0	0.5
2013	468	10.4	14.7	64.0	2.2	36.0	9.0	13.2	0.8
2013II	469	9.8	13.2	66.3	2.2	33.7	7.8	11.2	0.4
2014	468	10.1	13.6	68.0	1.9	32.0	8.9	12.4	0.8
2014II	473	8.1	11.2	66.8	1.7	33.2	8.2	11.3	1.8
2015	476	7.9	10.9	67.6	1.5	32.4	8.6	11.6	2.1
2015II	478	7.1	9.4	68.2	1.6	31.8	7.7	10.1	2.2
2016	477	7.8	10.6	68.3	1.3	31.7	8.5	11.4	2.0
2016II	499	7.7	10.3	69.4	1.4	30.6	8.1	10.8	1.8

Table B.17: Data for Israel. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	122	10.1	11.4	66.7	7.0	33.3	7.4	8.7	4.4
2000II	128	10.5	12.0	70.0	6.4	30.0	7.7	9.1	3.6
2001	135	10.9	12.7	68.5	6.1	31.5	7.7	9.4	3.0
2001II	133	11.8	14.9	64.9	5.5	35.1	9.1	12.1	2.9
2002	139	12.0	15.0	64.8	5.7	35.2	9.5	12.4	3.3
2002II	141	11.5	15.8	60.8	4.4	39.2	8.5	12.7	1.6
2003	148	10.3	14.3	60.2	3.8	39.8	7.4	11.3	1.1
2003II	146	9.7	12.7	62.9	4.3	37.1	6.9	9.8	1.7
2004	152	9.4	12.1	61.4	4.9	38.6	6.9	9.5	2.5
2004II	152	9.2	11.7	63.8	4.5	36.2	7.0	9.4	2.4
2005	168	10.2	13.3	65.8	4.1	34.2	8.2	11.3	2.2
2005II	167	10.2	12.8	67.4	4.7	32.6	7.9	10.5	2.5
2006	184	11.2	13.6	68.5	5.5	31.5	8.8	11.2	3.3
2006II	186	10.8	13.2	67.8	5.6	32.2	8.7	11.0	3.5
2007	196	12.2	14.7	70.1	6.1	29.9	10.4	12.9	4.4
2007II	198	11.7	14.5	68.5	5.6	31.5	9.5	12.2	3.5
2008	204	10.6	13.5	63.0	5.6	37.0	7.0	9.8	2.1

2008II	206	10.2	14.6	55.1	4.8	44.9	6.7	11.0	1.5
2009	208	7.8	11.7	53.3	3.5	46.7	6.6	10.5	2.4
2009II	210	9.2	13.6	57.7	3.2	42.3	8.7	13.1	2.8
2010	216	11.5	18.0	57.3	3.3	42.7	10.0	16.4	1.9
2010II	214	11.8	18.0	57.5	3.9	42.5	9.9	16.0	2.1
2011	218	10.5	15.6	56.2	4.4	43.8	7.8	12.7	1.9
2011II	219	11.8	17.5	51.2	6.1	48.8	8.4	13.9	2.9
2012	227	10.5	16.4	50.9	4.8	49.1	7.0	12.7	1.5
2012II	227	9.1	15.4	49.8	3.5	50.2	6.2	12.3	0.8
2013	243	9.5	15.8	51.7	3.3	48.3	7.9	14.2	1.8
2013II	248	11.8	19.5	55.8	3.0	44.2	10.8	18.5	2.2
2014	269	9.6	15.2	60.7	2.0	39.3	9.1	14.7	1.6
2014II	271	8.7	14.3	59.8	1.4	40.2	8.6	14.2	1.3
2015	289	9.2	14.2	63.2	1.3	36.8	9.2	14.3	1.4
2015II	291	9.7	15.3	62.5	1.1	37.5	9.5	15.2	0.9
2016	295	9.8	16.5	59.6	0.8	40.4	10.1	16.9	1.1
2016II	281	8.1	13.0	61.2	1.2	38.8	8.0	12.9	1.2
2017	271	10.6	16.2	64.4	1.5	35.6	9.0	14.5	0.1
2017II	246	9.9	14.7	66.9	1.3	33.1	8.8	13.5	0.3

Table B.18: Data for Italy. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	2,141	10.1	11.5	59.4	7.7	40.6	10.9	12.2	8.4
2000II	2,294	9.1	11.1	59.3	5.8	40.7	10.0	11.9	6.7
2001	2,704	9.3	12.2	58.6	4.8	41.4	10.1	13.0	5.6
2001II	2,719	9.4	11.9	58.6	5.4	41.4	10.5	13.0	6.5
2002	2,815	8.0	11.0	58.9	3.4	41.1	9.1	12.1	4.3
2002II	2,848	8.1	11.4	58.1	3.0	41.9	8.7	12.0	3.6
2003	2,937	8.0	10.7	62.4	3.0	37.6	8.2	11.0	3.3
2003II	2,956	8.2	10.5	65.6	3.1	34.4	8.5	10.9	3.4
2004	3,064	8.5	10.4	67.4	3.8	32.6	8.8	10.8	4.1
2004II	3,087	8.9	12.1	69.8	1.4	30.2	8.4	11.5	1.0
2005	3,234	9.5	13.1	71.1	0.7	28.9	9.6	13.2	0.8
2005II	3,282	9.0	12.0	73.8	0.8	26.2	9.7	12.6	1.4
2006	3,444	9.8	12.6	74.7	1.1	25.3	9.8	12.6	1.1
2006II	3,505	9.1	11.9	73.1	1.1	26.9	8.6	11.4	0.7
2007	3,609	9.0	11.7	73.2	1.3	26.8	9.1	11.8	1.4
2007II	3,621	9.2	12.4	70.2	1.2	29.8	9.0	12.2	1.0
2008	3,831	9.4	13.1	68.3	1.1	31.7	8.1	11.8	-0.1

2008II	3,890	11.8	18.1	63.7	1.0	36.3	10.1	16.3	-0.6
2009	3,936	13.2	20.8	62.3	0.9	37.7	13.8	21.4	1.5
2009II	3,939	14.6	22.6	63.9	0.8	36.1	17.1	25.3	3.0
2010	3,960	15.4	23.5	65.0	0.8	35.0	16.4	24.5	1.6
2010II	3,971	15.0	23.0	64.9	0.6	35.1	15.8	23.8	1.3
2011	4,016	14.9	22.5	65.7	0.7	34.3	15.4	23.0	1.2
2011II	4,045	11.9	18.2	64.9	0.6	35.1	12.0	18.3	0.7
2012	4,089	12.3	18.6	66.3	0.6	33.7	12.1	18.3	0.3
2012II	4,109	12.6	19.3	66.2	0.5	33.8	13.0	19.7	0.8
2013	4,175	11.1	16.1	69.5	0.4	30.5	11.6	16.6	0.9
2013II	4,207	10.8	15.1	71.3	0.4	28.7	9.5	13.8	-0.7
2014	4,275	10.0	13.9	71.4	0.4	28.6	7.2	11.0	-2.1
2014II	4,333	9.3	12.7	72.9	0.3	27.1	6.2	9.5	-2.6
2015	4,450	8.7	11.6	74.0	0.3	26.0	7.2	10.1	-1.1
2015II	4,470	8.8	11.9	73.4	0.2	26.6	8.6	11.7	0.0
2016	4,568	9.2	12.7	72.0	0.0	28.0	9.3	12.9	0.1
2016II	4,585	8.3	11.3	73.1	0.0	26.9	8.3	11.4	0.1
2017	4,526	8.5	11.3	75.0	0.1	25.0	8.1	10.9	-0.3
2017II	4,522	8.6	11.1	76.9	0.1	23.1	7.9	10.4	-0.5

Table B.19: Data for Japan. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	0								
2000II	0								
2001	0								
2001II	0								
2002	0								
2002II	0								
2003	1	5.4	6.8	57.4	3.6	42.6	2.5	3.8	0.7
2003II	0								
2004	4	6.6	6.8	82.5	4.8	17.5	1.1	1.3	-0.6
2004II	4	6.7	7.0	82.8	5.0	17.2	-0.6	-0.3	-2.2
2005	19	7.6	8.4	83.4	4.6	16.6	0.9	1.6	-1.9
2005II	20	7.9	8.3	86.5	5.1	13.5	1.0	1.4	-1.7
2006	25	8.0	8.8	82.8	6.1	17.2	1.2	2.0	-0.5
2006II	25	6.8	7.3	80.8	5.3	19.2	0.3	0.8	-1.0
2007	28	8.6	9.5	77.8	5.2	22.2	0.5	1.3	-2.7
2007II	29	7.4	8.2	75.0	4.3	25.0	-4.0	-3.3	-6.7
2008	29	7.0	8.3	73.1	3.0	26.9	-8.6	-7.5	-12.0

2008II	29	6.6	8.4	67.2	2.4	32.8	-6.4	-4.8	-10.1
2009	29	6.7	8.8	64.0	2.3	36.0	-0.4	1.6	-4.5
2009II	29	6.7	8.4	65.4	2.5	34.6	6.4	8.2	2.3
2010	29	6.8	8.4	67.0	2.4	33.0	10.0	11.7	5.5
2010II	29	6.2	7.8	66.4	2.0	33.6	5.3	6.9	1.2
2011	29	6.1	7.3	69.1	2.3	30.9	1.7	2.9	-2.0
2011II	29	5.9	7.5	66.8	1.3	33.2	1.5	3.0	-2.9
2012	29	5.8	7.7	64.0	1.4	36.0	2.9	4.7	-1.5
2012II	27	6.6	9.0	62.6	1.2	37.4	4.8	7.2	-0.5
2013	28	6.3	8.3	63.0	1.5	37.0	6.1	8.2	1.3
2013II	27	6.6	8.2	62.3	2.0	37.7	6.8	8.4	2.2
2014	24	5.8	7.4	64.2	1.9	35.8	5.2	6.8	1.4
2014II	25	5.6	6.8	64.2	1.6	35.8	4.9	6.0	0.9
2015	23	7.1	8.7	65.2	1.4	34.8	6.6	8.2	1.0
2015II	25	7.8	9.7	71.2	1.6	28.8	7.8	9.8	1.6
2016	23	5.9	8.4	66.2	1.3	33.8	6.5	9.0	1.8
2016II	27	6.4	8.7	68.9	1.6	31.1	5.3	7.6	0.5

Table B.20: Data for Latvia. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	2	10.1	11.0	47.2	9.0	52.8	7.0	7.9	6.0
2000II	5	10.2	11.3	72.4	7.4	27.6	6.5	7.5	3.7
2001	4	11.0	13.1	56.2	7.2	43.8	7.8	9.9	4.1
2001II	5	12.2	15.3	60.7	6.0	39.3	9.7	12.8	3.7
2002	6	11.2	13.7	60.8	5.4	39.2	9.1	11.4	3.4
2002II	7	10.6	14.2	59.8	4.8	40.2	8.3	11.8	2.6
2003	8	10.2	14.4	56.3	3.9	43.7	7.9	12.0	1.8
2003II	9	9.8	12.6	65.8	4.4	34.2	7.8	10.5	2.5
2004	8	10.0	12.0	71.1	4.7	28.9	7.6	9.6	2.4
2004II	9	10.2	11.8	79.6	4.5	20.4	7.7	9.2	2.1
2005	11	11.8	13.8	82.7	4.3	17.3	9.3	11.2	2.0
2005II	11	11.4	13.0	83.9	4.9	16.1	8.5	10.1	2.2
2006	18	10.6	12.0	77.3	6.3	22.7	7.4	8.7	3.1
2006II	18	11.2	12.9	79.2	5.9	20.8	8.9	10.6	3.7
2007	20	12.1	13.2	84.2	5.6	15.8	9.8	10.9	3.5
2007II	19	11.4	12.7	83.2	4.7	16.8	8.3	9.6	1.8
2008	22	11.3	13.0	81.1	4.1	18.9	7.2	8.9	0.3

2008II	21	11.3	13.8	73.8	3.9	26.2	8.5	11.0	1.3
2009	23	11.5	13.7	78.7	2.8	21.3	11.4	13.6	2.8
2009II	24	12.1	13.9	81.5	2.7	18.5	11.2	12.9	1.9
2010	26	14.4	17.0	82.5	2.3	17.5	12.0	14.5	0.2
2010II	27	12.5	15.1	82.0	2.3	18.0	9.8	12.3	-0.2
2011	28	12.0	14.1	84.3	2.6	15.7	8.1	10.1	-0.9
2011II	28	10.4	13.1	77.1	2.0	22.9	6.9	9.5	-1.3
2012	33	9.4	12.7	73.3	1.9	26.7	6.6	9.8	-0.7
2012II	32	8.6	11.7	71.6	1.6	28.4	5.9	8.9	-1.0
2013	32	9.1	12.9	67.6	2.1	32.4	7.1	10.8	0.2
2013II	31	9.2	12.3	71.1	2.2	28.9	7.7	10.8	0.8
2014	36	8.2	11.5	67.8	1.7	32.2	7.2	10.4	0.7
2014II	32	7.6	10.4	73.2	1.1	26.8	7.5	10.2	0.9
2015	36	7.3	10.0	71.2	1.0	28.8	6.9	9.5	0.6
2015II	34	7.1	9.9	68.7	1.1	31.3	6.3	9.1	0.3
2016	34	6.7	9.8	68.8	0.4	31.2	6.6	9.7	0.3
2016II	38	6.7	9.2	70.3	0.6	29.7	6.1	8.6	0.0

Table B.21: Data for Luxembourg. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	71	9.8	10.3	64.9	8.1	35.1	0.3	0.7	-1.3
2000II	70	9.9	11.1	63.3	7.1	36.7	0.9	2.0	-1.7
2001	71	9.8	11.8	61.1	6.2	38.9	2.4	4.3	-0.9
2001II	70	10.2	13.5	60.5	5.2	39.5	4.4	7.5	-0.3
2002	73	9.8	12.4	60.7	5.6	39.3	4.8	7.3	0.8
2002II	73	8.7	11.8	60.0	3.8	40.0	3.3	6.2	-1.4
2003	72	8.5	11.3	62.1	3.5	37.9	3.2	5.9	-1.5
2003II	72	8.6	10.9	64.1	4.0	35.9	4.4	6.6	-0.1
2004	75	8.8	10.5	69.2	4.4	30.8	4.3	5.9	0.1
2004II	76	8.9	10.3	70.7	4.7	29.3	3.7	5.0	-0.4
2005	77	10.6	12.2	72.8	5.0	27.2	5.9	7.4	0.5
2005II	80	10.5	11.7	73.4	5.4	26.6	6.7	7.9	1.8
2006	86	11.2	12.1	75.7	6.1	24.3	7.6	8.4	2.7
2006II	86	10.9	11.7	77.4	5.7	22.6	6.8	7.6	1.8
2007	87	11.6	12.5	80.0	5.8	20.0	7.2	8.1	1.7
2007II	90	11.2	12.5	79.9	4.9	20.1	7.1	8.2	1.0
2008	95	11.1	12.8	79.3	3.9	20.7	6.4	8.1	-0.5

2008II	95	15.2	16.7	71.9	10.2	28.1	8.9	10.3	4.1
2009	97	15.4	17.8	69.8	9.0	30.2	8.8	11.1	2.7
2009II	97	13.5	14.8	73.0	9.0	27.0	8.5	9.8	4.3
2010	100	15.0	17.1	73.6	8.3	26.4	10.2	12.3	3.8
2010II	104	16.6	19.8	73.9	7.8	26.1	12.2	15.2	3.7
2011	109	14.1	15.7	75.1	8.6	24.9	10.3	11.9	5.0
2011II	110	13.3	15.3	71.7	7.8	28.3	9.6	11.5	4.2
2012	112	11.9	13.6	72.7	7.1	27.3	7.7	9.4	3.1
2012II	115	11.3	12.7	73.8	6.6	26.2	6.6	8.0	2.2
2013	120	11.4	12.8	75.9	6.4	24.1	7.0	8.4	2.2
2013II	122	11.1	12.2	75.8	7.0	24.2	7.3	8.4	3.3
2014	122	11.4	12.6	76.9	6.6	23.1	7.3	8.4	2.6
2014II	127	10.7	11.6	77.4	6.7	22.6	6.2	7.1	2.4
2015	130	13.0	14.8	75.2	6.9	24.8	9.7	11.5	3.7
2015II	133	12.0	13.4	74.1	7.0	25.9	9.3	10.7	4.5
2016	136	12.0	13.6	72.5	7.2	27.5	9.1	10.7	4.4
2016II	139	13.2	14.7	71.4	8.7	28.6	9.9	11.3	5.5
2017	135	14.4	16.3	70.8	9.2	29.2	8.4	10.2	3.5
2017II	134	15.4	17.5	70.7	9.7	29.3	8.3	10.3	2.9

Table B.22: Data for Mexico. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	48	9.8	10.2	78.6	7.5	21.4	7.5	7.8	5.2
2000II	64	9.7	10.6	74.2	6.5	25.8	6.7	7.5	3.6
2001	68	10.4	11.4	77.1	5.8	22.9	5.8	6.8	1.4
2001II	73	11.0	13.0	72.7	5.2	27.3	6.7	8.6	1.1
2002	73	11.3	13.1	74.2	5.3	25.8	7.6	9.3	1.8
2002II	79	10.9	14.0	67.9	4.2	32.1	7.8	10.7	1.2
2003	79	11.0	13.6	71.8	3.6	28.2	8.7	11.3	1.5
2003II	85	10.3	12.8	69.9	4.1	30.1	8.2	10.6	2.2
2004	82	10.5	12.6	73.9	4.3	26.1	9.0	11.0	2.9
2004II	85	10.4	12.4	74.2	4.3	25.8	9.0	11.0	3.0
2005	89	11.1	13.2	75.8	3.9	24.2	9.4	11.4	2.3
2005II	92	10.7	12.1	78.4	4.2	21.6	8.7	10.1	2.3
2006	91	11.1	12.2	79.9	4.6	20.1	9.7	10.8	3.3
2006II	91	11.0	12.2	78.8	4.7	21.2	10.0	11.2	3.8
2007	98	11.6	13.0	79.0	4.8	21.0	9.7	11.0	3.0
2007II	96	11.3	13.0	77.1	4.9	22.9	9.5	11.1	3.1
2008	97	11.4	13.3	74.2	4.6	25.8	8.9	10.8	2.3

2008II	96	9.6	12.5	64.1	3.9	35.9	6.9	9.7	1.3
2009	100	8.9	11.8	65.3	3.3	34.7	7.1	9.9	1.5
2009II	99	9.0	11.5	67.9	3.1	32.1	8.1	10.7	2.3
2010	108	12.7	17.9	66.7	2.6	33.3	11.6	16.8	1.6
2010II	104	11.2	15.2	67.4	2.8	32.6	9.4	13.3	1.1
2011	107	11.0	14.1	70.2	3.3	29.8	8.8	11.8	1.2
2011II	109	9.1	12.7	65.4	2.1	34.6	6.3	9.8	-0.4
2012	111	9.9	14.3	65.4	1.9	34.6	7.4	11.7	-0.3
2012II	112	8.2	12.0	65.1	1.3	34.9	5.3	9.1	-1.3
2013	112	8.9	12.8	66.0	1.6	34.0	5.9	9.7	-1.1
2013II	113	9.1	12.4	70.9	1.9	29.1	7.1	10.3	0.0
2014	114	9.4	13.0	70.8	1.5	29.2	8.3	11.8	0.5
2014II	116	7.9	11.4	69.3	0.9	30.7	6.9	10.4	0.0
2015	120	8.1	11.1	70.6	0.9	29.4	7.3	10.3	0.2
2015II	116	9.2	12.7	70.0	0.9	30.0	8.5	12.0	0.3
2016	113	8.0	11.4	69.9	0.4	30.1	7.9	11.2	0.2
2016II	57	11.6	16.3	71.6	0.3	28.4	11.5	16.2	0.2

Table B.23: Data for Netherlands. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	3	9.2	9.9	45.6	8.5	54.4	7.0	7.8	6.3
2000II	6	8.7	10.0	60.6	7.0	39.4	4.5	5.8	2.9
2001	9	9.0	11.0	62.4	6.0	37.6	5.5	7.5	2.7
2001II	14	9.6	10.9	73.9	6.0	26.1	7.6	9.0	4.1
2002	21	8.8	10.1	74.2	4.6	25.8	5.9	7.1	1.8
2002II	17	8.7	10.2	75.1	4.4	24.9	5.9	7.3	1.6
2003	28	8.0	9.3	73.9	3.9	26.1	6.4	7.7	2.4
2003II	26	8.3	9.7	71.5	4.9	28.5	6.7	8.0	3.3
2004	34	8.3	9.1	79.5	4.5	20.5	5.8	6.6	2.1
2004II	51	8.6	9.4	79.6	4.5	20.4	5.7	6.5	1.8
2005	61	10.3	11.4	80.3	4.4	19.7	7.3	8.4	1.5
2005II	65	10.3	11.2	80.6	5.1	19.4	6.9	7.8	1.9
2006	63	10.0	10.8	78.6	5.8	21.4	5.8	6.6	1.8
2006II	66	9.5	10.4	78.7	5.4	21.3	6.7	7.6	2.7
2007	71	9.8	10.7	79.0	5.6	21.0	7.6	8.5	3.5
2007II	69	8.8	10.4	73.4	4.1	26.6	5.4	7.0	0.9
2008	67	13.2	15.4	74.7	5.1	25.3	8.8	10.9	1.1

2008II	76	14.6	18.6	68.8	5.2	31.2	10.9	14.7	1.8
2009	86	14.0	16.7	72.6	5.8	27.4	11.9	14.5	3.8
2009II	91	13.5	15.6	76.2	5.6	23.8	11.3	13.4	3.6
2010	92	14.0	16.0	76.8	5.5	23.2	12.1	14.1	3.8
2010II	93	14.0	16.0	77.0	5.7	23.0	9.7	11.6	1.7
2011	96	12.9	15.1	76.8	4.9	23.2	7.3	9.4	-0.3
2011II	101	10.8	13.1	75.0	3.9	25.0	8.7	10.9	1.9
2012	99	10.5	12.9	75.6	3.8	24.4	9.5	11.9	2.8
2012II	101	10.1	12.0	77.3	3.6	22.7	9.1	11.0	2.7
2013	106	12.3	14.1	79.3	4.3	20.7	11.5	13.3	3.5
2013II	106	13.2	15.4	77.0	4.9	23.0	11.4	13.6	3.2
2014	118	12.8	14.4	79.0	4.5	21.0	11.0	12.6	2.8
2014II	123	11.3	12.7	79.3	3.9	20.7	10.5	11.8	3.1
2015	122	11.0	12.5	78.7	3.7	21.3	10.5	12.0	3.3
2015II	122	9.1	10.1	79.1	3.6	20.9	9.0	10.0	3.5
2016	120	8.7	10.2	78.7	2.5	21.3	8.3	9.7	2.0
2016II	129	9.2	10.7	79.8	2.4	20.2	7.8	9.3	1.1

Table B.24: Data for New Zealand. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	46	8.8	9.1	61.6	7.8	38.4	5.7	6.0	4.8
2000II	46	8.7	9.5	60.0	7.0	40.0	5.3	6.0	3.6
2001	49	8.6	9.6	58.9	6.3	41.1	4.7	5.7	2.5
2001II	49	8.9	11.1	56.1	5.6	43.9	6.5	8.6	3.2
2002	56	9.2	11.0	58.5	5.7	41.5	8.4	10.1	4.9
2002II	56	7.8	10.7	52.8	3.9	47.2	5.9	8.8	2.1
2003	54	8.1	10.9	53.4	4.0	46.6	4.5	7.3	0.5
2003II	56	8.3	10.3	58.1	4.4	41.9	6.6	8.6	2.8
2004	80	9.1	10.5	67.6	4.0	32.4	9.4	10.8	4.3
2004II	83	9.1	10.6	65.3	4.5	34.7	7.7	9.3	3.3
2005	100	10.3	12.0	69.5	4.3	30.5	8.9	10.6	3.0
2005II	101	10.1	11.7	67.9	5.0	32.1	8.2	9.7	3.2
2006	115	10.4	11.9	68.9	5.4	31.1	7.9	9.3	3.0
2006II	117	10.2	11.8	66.4	5.3	33.6	7.7	9.2	2.9
2007	127	11.1	12.8	68.7	5.1	31.3	10.4	12.0	4.4
2007II	129	10.0	11.9	66.2	4.8	33.8	9.2	11.1	4.0
2008	141	9.5	12.1	64.5	3.7	35.5	6.0	8.4	0.3

2008II	137	8.9	13.0	55.9	3.0	44.1	4.6	8.5	-1.1
2009	140	9.4	14.1	56.1	2.7	43.9	6.4	10.9	-0.1
2009II	143	9.5	13.2	57.7	3.2	42.3	7.7	11.4	1.6
2010	152	9.5	13.4	58.6	3.0	41.4	6.6	10.4	0.2
2010II	150	9.3	13.1	59.3	2.6	40.7	7.1	10.8	0.5
2011	160	9.2	12.5	59.8	3.0	40.2	7.7	10.9	1.6
2011II	157	8.3	12.7	55.8	1.7	44.2	7.1	11.4	0.6
2012	161	8.2	12.3	58.0	1.8	42.0	7.6	11.6	1.2
2012II	158	7.6	11.6	58.3	1.5	41.7	6.8	10.7	0.7
2013	170	8.0	11.6	60.1	1.9	39.9	6.3	9.9	0.3
2013II	168	8.2	11.7	59.8	2.5	40.2	5.4	8.8	-0.1
2014	187	8.3	11.2	63.5	2.3	36.5	6.2	9.1	0.3
2014II	185	7.9	11.1	59.9	2.2	40.1	5.7	8.8	0.1
2015	195	7.8	11.3	59.3	2.0	40.7	5.6	9.0	-0.1
2015II	194	8.7	13.9	57.1	1.5	42.9	6.3	11.4	-0.8
2016	195	11.0	17.9	58.3	1.1	41.7	7.4	14.1	-2.2
2016II	202	9.4	14.6	61.3	1.2	38.7	5.5	10.4	-2.4

Table B.25: Data for Norway. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	36	9.5	9.7	76.2	7.1	23.8	-0.5	-0.3	-2.7
2000II	33	9.8	10.4	79.6	4.6	20.4	0.3	0.8	-4.5
2001	46	9.9	10.4	87.0	1.7	13.0	3.0	3.5	-4.6
2001II	48	10.5	11.3	88.1	1.1	11.9	6.0	6.7	-3.1
2002	51	10.0	10.5	89.5	1.3	10.5	7.0	7.5	-1.5
2002II	63	9.5	10.3	88.5	0.8	11.5	8.3	9.1	-0.3
2003	54	9.3	9.9	91.1	0.7	8.9	8.7	9.4	0.2
2003II	57	9.4	10.0	90.1	1.0	9.9	8.1	8.8	-0.2
2004	146	8.4	8.9	91.8	1.2	8.2	5.7	6.2	-1.2
2004II	157	8.2	8.6	88.7	2.3	11.3	3.5	4.0	-2.1
2005	174	9.8	10.2	91.7	2.3	8.3	6.6	7.1	-0.6
2005II	175	9.6	10.0	89.7	3.3	10.3	8.1	8.6	1.9
2006	203	10.0	10.4	89.9	4.0	10.1	9.2	9.7	3.3
2006II	203	9.7	10.1	88.2	4.7	11.8	8.2	8.6	3.2
2007	234	11.1	11.6	91.4	4.2	8.6	8.7	9.1	2.0
2007II	251	11.4	12.2	89.2	4.0	10.8	8.3	9.1	1.1
2008	287	11.3	12.5	87.1	2.6	12.9	6.8	7.9	-1.5

2008II	285	12.7	15.3	79.0	2.5	21.0	8.2	10.7	-1.6
2009	318	12.2	14.7	78.6	2.6	21.4	8.5	10.8	-0.8
2009II	317	12.0	14.1	80.8	2.9	19.2	8.3	10.3	-0.5
2010	329	10.1	11.7	81.6	2.6	18.4	7.3	8.8	0.0
2010II	334	10.0	11.5	81.6	2.9	18.4	7.3	8.8	0.3
2011	357	10.4	11.9	80.6	3.1	19.4	5.9	7.4	-1.1
2011II	365	11.0	13.7	73.1	3.2	26.9	6.3	9.0	-1.1
2012	372	11.1	13.9	74.4	2.7	25.6	6.8	9.5	-1.3
2012II	383	10.1	13.0	72.7	2.2	27.3	6.5	9.3	-1.2
2013	378	8.0	10.2	72.4	2.1	27.6	7.0	9.2	1.2
2013II	379	8.5	10.6	74.7	2.4	25.3	7.6	9.7	1.5
2014	400	9.2	11.7	75.1	2.0	24.9	8.8	11.2	1.5
2014II	403	7.4	9.7	72.6	1.6	27.4	8.0	10.3	2.1
2015	414	8.0	10.2	74.1	1.6	25.9	9.3	11.6	2.8
2015II	427	7.5	9.6	72.4	1.7	27.6	8.2	10.3	2.4
2016	426	7.6	9.6	72.9	1.7	27.1	8.5	10.6	2.6
2016II	460	7.8	9.8	73.2	2.1	26.8	8.0	10.0	2.3

Table B.26: Data for Poland. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	34	9.5	10.0	69.2	6.2	30.8	6.8	7.3	3.6
2000II	36	9.3	10.3	67.1	5.3	32.9	5.5	6.4	1.6
2001	36	9.2	10.9	61.1	4.6	38.9	4.4	5.9	0.0
2001II	36	9.4	11.8	59.8	4.0	40.2	5.2	7.5	0.0
2002	36	9.3	11.6	60.9	4.2	39.1	5.8	7.9	0.8
2002II	36	8.6	11.6	59.4	3.1	40.6	4.6	7.4	-0.7
2003	37	7.7	10.6	55.6	2.9	44.4	3.9	6.8	-0.7
2003II	36	8.1	10.4	58.9	3.3	41.1	5.3	7.5	0.7
2004	37	7.8	9.5	62.0	3.5	38.0	5.2	7.0	1.1
2004II	37	7.7	9.6	57.4	3.7	42.6	5.1	7.1	1.2
2005	36	8.4	10.9	58.5	3.7	41.5	6.3	8.7	1.7
2005II	36	8.1	10.2	59.9	4.0	40.1	5.4	7.5	1.4
2006	38	8.9	10.7	62.9	4.9	37.1	5.3	7.0	1.4
2006II	37	8.4	10.2	60.7	5.0	39.3	5.5	7.2	2.2
2007	40	9.6	11.7	63.4	5.3	36.6	6.9	9.0	2.8
2007II	41	9.1	11.7	60.7	5.0	39.3	6.5	9.1	2.5
2008	41	9.0	11.8	55.8	4.9	44.2	5.9	8.7	2.0

2008II	42	11.6	18.5	46.5	4.9	53.5	9.2	16.0	2.6
2009	42	7.4	12.0	38.2	4.7	61.8	8.0	12.6	5.3
2009II	42	8.0	13.7	43.0	4.0	57.0	9.2	14.9	5.1
2010	43	9.2	15.7	39.2	5.2	60.8	8.5	15.0	4.6
2010II	43	9.9	15.0	38.1	6.9	61.9	7.5	12.6	4.6
2011	43	13.9	16.8	35.7	12.4	64.3	9.8	12.6	8.3
2011II	43	17.2	18.2	31.3	16.7	68.7	13.1	14.2	12.7
2012	43	14.1	17.7	29.3	12.5	70.7	10.6	14.2	9.1
2012II	44	11.0	18.5	30.1	8.1	69.9	8.4	15.7	5.6
2013	44	10.4	19.6	32.7	6.3	67.3	9.9	19.1	5.9
2013II	46	10.8	18.6	38.5	6.7	61.5	10.7	18.5	6.6
2014	46	10.2	18.7	46.4	3.4	53.6	10.4	18.9	3.7
2014II	46	7.8	15.1	44.7	2.5	55.3	8.1	15.5	2.8
2015	45	7.3	14.5	44.6	1.9	55.4	7.0	14.2	1.6
2015II	44	6.3	12.5	41.9	2.2	58.1	5.6	11.8	1.5
2016	45	7.1	13.1	42.4	2.8	57.6	6.6	12.5	2.2
2016II	29	9.2	15.3	49.2	3.1	50.8	8.5	14.6	2.4

Table B.27: Data for Portugal. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	0								
2000II	0								
2001	0								
2001II	0								
2002	0								
2002II	0								
2003	1	8.8	9.4	88.8	3.8	11.2	0.9	1.5	-3.7
2003II	1	9.0	9.7	91.1	2.3	8.9	-0.3	0.3	-6.5
2004	3	7.5	8.5	73.3	4.3	26.7	-0.6	0.3	-3.6
2004II	5	6.9	7.5	63.8	4.9	36.2	0.5	1.0	-1.5
2005	5	7.9	10.3	54.9	5.3	45.1	5.3	7.5	2.7
2005II	7	7.8	8.6	69.0	5.2	31.0	4.4	5.2	1.8
2006	7	9.2	10.3	63.1	6.0	36.9	4.4	5.5	1.3
2006II	6	8.7	9.6	63.2	6.5	36.8	4.3	5.1	2.2
2007	7	9.2	9.7	61.2	6.7	38.8	6.5	7.0	4.1
2007II	6	7.8	8.7	66.4	5.0	33.6	4.5	5.4	1.9
2008	8	8.0	8.9	75.1	3.4	24.9	3.5	4.3	-0.9

2008II	5	6.7	9.1	60.7	2.8	39.3	1.8	4.0	-2.0
2009	7	5.7	7.6	59.8	3.0	40.2	3.6	5.4	1.0
2009II	7	5.4	7.8	53.1	2.8	46.9	4.8	7.2	2.3
2010	11	5.4	8.5	54.6	2.1	45.4	4.4	7.3	1.1
2010II	9	5.5	8.6	51.6	2.3	48.4	4.4	7.4	1.2
2011	16	5.8	7.7	63.4	2.6	36.6	2.0	3.8	-1.1
2011II	12	4.6	7.1	58.9	1.2	41.1	0.2	2.6	-3.0
2012	14	4.5	7.5	56.4	1.3	43.6	0.9	3.7	-2.2
2012II	13	4.2	6.9	58.2	1.0	41.8	0.7	3.3	-2.4
2013	14	4.9	7.1	65.4	1.3	34.6	3.1	5.2	-0.4
2013II	12	4.7	6.5	55.9	1.8	44.1	4.0	5.7	1.0
2014	36	6.4	7.8	74.5	0.7	25.5	6.5	7.8	0.8
2014II	37	5.4	6.7	76.6	0.6	23.4	5.5	6.7	0.6
2015	38	5.6	7.2	76.0	0.6	24.0	5.7	7.3	0.7
2015II	38	5.3	7.0	74.0	0.8	26.0	5.8	7.5	1.3
2016	37	5.0	6.8	74.8	0.3	25.2	5.8	7.5	1.0
2016II	3	3.2	5.8	55.1	0.2	44.9	4.0	6.6	1.0

Table B.28: Data for Slovakia. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	0								
2000II	0								
2001	0								
2001II	0								
2002	3	6.0	6.7	82.8	3.3	17.2	-1.4	-0.8	-4.0
2002II	2	7.6	8.9	76.6	3.5	23.4	0.5	1.7	-3.4
2003	3	5.7	6.6	81.3	2.6	18.7	0.1	1.0	-2.9
2003II	2	7.1	8.2	72.7	3.7	27.3	2.1	3.2	-1.1
2004	9	7.5	7.9	87.3	2.8	12.7	3.6	4.0	-0.9
2004II	8	7.3	7.9	80.8	3.8	19.2	3.8	4.4	0.4
2005	12	8.9	9.8	80.6	2.9	19.4	6.5	7.3	0.6
2005II	11	8.5	9.4	73.1	4.7	26.9	5.9	6.8	2.2
2006	15	8.9	9.9	68.3	5.8	31.7	6.0	6.9	3.0
2006II	15	8.6	9.4	71.2	6.5	28.8	6.2	6.9	4.2
2007	16	8.4	8.9	69.8	6.3	30.2	5.3	5.8	3.3
2007II	15	8.0	9.2	71.6	5.1	28.4	2.9	4.0	0.1
2008	17	7.3	8.6	63.8	4.2	36.2	0.7	1.9	-2.2

2008II	16	7.1	10.1	59.7	2.5	40.3	2.9	5.8	-1.5
2009	26	6.4	8.8	54.7	2.6	45.3	5.4	7.8	1.7
2009II	25	6.5	8.7	57.4	2.7	42.6	5.6	7.8	1.8
2010	29	6.6	10.2	52.6	2.2	47.4	4.5	8.1	0.3
2010II	25	6.9	11.0	56.0	2.1	44.0	5.1	9.0	0.3
2011	28	5.9	8.8	54.7	2.5	45.3	4.1	7.0	0.7
2011II	26	5.5	9.6	51.9	1.4	48.1	3.3	7.2	-0.8
2012	27	6.1	12.0	51.2	1.2	48.8	3.5	9.3	-1.2
2012II	27	5.4	9.7	53.0	1.1	47.0	2.7	6.8	-1.5
2013	29	5.7	9.3	58.0	1.3	42.0	3.9	7.4	-0.5
2013II	25	6.2	10.6	55.0	1.5	45.0	4.8	9.1	0.1
2014	28	5.1	7.8	58.3	1.2	41.7	4.5	7.1	0.6
2014II	28	6.3	9.7	60.3	0.8	39.7	6.5	9.8	0.9
2015	29	4.9	8.0	58.7	0.8	41.3	5.6	8.6	1.4
2015II	28	5.0	7.5	59.2	1.1	40.8	5.6	8.1	1.7
2016	28	3.8	5.7	59.9	0.4	40.1	4.2	6.1	0.8
2016II	29	4.8	6.7	62.0	0.9	38.0	4.3	6.2	0.4

Table B.29: Data for Slovenia. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	10	9.2	9.5	83.4	5.0	16.6	7.5	7.8	3.4
2000II	2	9.9	10.1	93.9	7.0	6.1	7.2	7.4	4.4
2001	16	8.9	10.2	62.5	6.4	37.5	3.7	4.9	1.3
2001II	15	8.8	11.3	60.2	5.1	39.8	5.0	7.4	1.4
2002	118	9.3	11.0	68.5	4.9	31.5	6.5	8.2	2.2
2002II	125	8.4	11.0	66.3	2.9	33.7	5.4	7.9	0.0
2003	128	8.5	11.4	65.7	2.6	34.3	4.7	7.4	-1.0
2003II	132	8.9	11.5	67.5	2.8	32.5	5.4	7.9	-0.6
2004	142	8.6	10.8	68.9	3.1	31.1	5.1	7.3	-0.3
2004II	147	8.9	10.9	69.4	3.5	30.6	4.9	6.8	-0.3
2005	148	9.2	11.4	75.5	1.5	24.5	5.9	8.1	-1.6
2005II	162	9.3	11.3	79.3	1.6	20.7	6.7	8.7	-0.8
2006	161	10.1	12.3	79.0	1.8	21.0	7.8	9.9	-0.4
2006II	168	9.7	11.9	78.6	1.8	21.4	7.2	9.3	-0.5
2007	170	10.1	11.9	82.8	1.7	17.2	7.7	9.4	-0.5
2007II	179	10.4	12.0	83.9	1.5	16.1	7.3	8.9	-1.3
2008	185	9.3	11.2	80.8	1.3	19.2	4.8	6.5	-2.9

2008II	194	13.3	18.0	73.9	1.0	26.1	7.9	12.3	-3.8
2009	220	15.9	21.7	72.8	1.1	27.2	12.2	17.8	-2.2
2009II	232	16.4	21.9	74.2	1.2	25.8	13.9	19.3	-1.0
2010	281	14.2	19.4	72.5	1.3	27.5	11.0	16.1	-1.5
2010II	373	12.1	16.8	71.2	1.3	28.8	8.7	13.3	-1.7
2011	561	11.7	16.6	68.2	1.5	31.8	7.5	12.2	-2.3
2011II	568	10.5	15.8	65.7	1.0	34.3	6.1	11.2	-3.1
2012	646	12.3	18.2	67.6	0.9	32.4	9.3	15.0	-1.7
2012II	1,792	10.2	15.1	67.1	0.7	32.9	8.4	13.1	-0.9
2013	1,896	9.7	14.0	67.7	1.0	32.3	8.2	12.5	-0.4
2013II	1,904	9.9	14.2	68.0	1.2	32.0	8.6	12.8	0.0
2014	1,989	9.2	13.1	69.5	1.1	30.5	7.8	11.5	-0.2
2014II	2,016	8.8	12.4	70.5	1.0	29.5	7.6	11.1	-0.2
2015	2,344	8.5	11.3	74.6	0.9	25.4	7.8	10.6	0.3
2015II	2,366	12.0	15.6	75.1	0.9	24.9	11.1	14.7	0.1
2016	2,460	11.8	15.1	76.0	1.4	24.0	10.9	14.1	0.5
2016II	2,526	12.3	15.7	76.6	1.0	23.4	11.0	14.4	-0.1
2017	2,411	12.6	15.9	76.3	1.7	23.7	10.3	13.6	-0.4
2017II	2,389	12.9	16.9	74.9	1.4	25.1	10.8	14.6	-0.5

Table B.30: Data for South Korea. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	73	9.6	10.2	70.4	7.9	29.6	6.3	6.8	4.5
2000II	63	9.3	10.5	66.9	6.7	33.1	5.1	6.3	2.7
2001	81	9.7	11.1	69.7	6.2	30.3	5.4	6.7	2.0
2001II	61	9.8	12.2	65.9	5.4	34.1	6.7	9.0	2.4
2002	82	9.2	11.7	67.3	3.6	32.7	5.7	8.1	0.3
2002II	78	8.7	12.1	65.1	2.4	34.9	4.9	8.1	-1.2
2003	85	8.6	11.7	67.1	2.6	32.9	5.5	8.4	-0.4
2003II	83	8.6	11.1	69.4	3.1	30.6	5.7	8.2	0.3
2004	94	9.0	11.3	70.9	3.2	29.1	5.7	8.0	0.1
2004II	95	8.7	10.9	71.9	2.9	28.1	5.1	7.2	-0.5
2005	97	11.3	14.5	73.7	2.4	26.3	7.8	10.9	-0.8
2005II	96	11.4	14.7	74.2	2.5	25.8	7.6	10.7	-1.0
2006	103	13.0	16.5	74.5	2.7	25.5	8.7	12.1	-1.2
2006II	105	12.6	16.3	72.6	3.0	27.4	9.6	13.2	0.2
2007	110	13.3	16.9	73.3	3.3	26.7	10.7	14.1	0.9
2007II	109	13.3	17.3	71.2	3.4	28.8	9.3	13.1	-0.3
2008	117	13.0	17.8	66.6	3.4	33.4	8.0	12.6	-1.1

2008II	118	10.8	16.4	58.7	3.1	41.3	7.5	13.0	0.1
2009	118	9.2	14.0	56.0	3.3	44.0	9.6	14.4	3.7
2009II	119	8.4	12.3	58.5	3.3	41.5	8.6	12.5	3.5
2010	123	10.0	15.6	56.2	3.5	43.8	8.5	13.9	2.0
2010II	123	9.9	15.1	55.5	3.9	44.5	7.4	12.4	1.4
2011	129	10.4	15.3	56.7	4.0	43.3	6.7	11.5	0.5
2011II	127	10.1	16.2	51.7	3.9	48.3	7.0	13.0	1.0
2012	138	11.0	17.3	52.6	4.6	47.4	8.8	15.1	2.6
2012II	138	10.0	15.9	52.4	4.2	47.6	6.8	12.5	1.2
2013	135	10.7	18.0	52.6	3.7	47.4	8.5	15.6	1.7
2013II	137	10.9	17.3	57.7	3.3	42.3	10.4	16.8	2.8
2014	145	9.9	15.7	60.6	2.3	39.4	9.7	15.5	2.1
2014II	149	8.9	14.6	60.4	1.5	39.6	9.4	15.1	2.0
2015	159	9.8	15.9	60.5	1.7	39.5	10.4	16.5	2.2
2015II	159	8.6	13.8	60.5	1.5	39.5	9.0	14.2	1.9
2016	157	8.0	13.3	59.8	1.1	40.2	8.9	14.3	2.0
2016II	158	7.1	11.3	61.8	1.1	38.2	6.4	10.6	0.5

Table B.31: Data for Spain. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	72	9.0	9.2	73.3	7.1	26.7	8.1	8.3	6.1
2000II	75	9.2	9.8	71.8	6.4	28.2	8.2	8.7	5.4
2001	93	9.4	10.4	66.7	6.1	33.3	7.1	8.1	3.9
2001II	96	10.5	12.3	67.3	5.2	32.7	7.6	9.4	2.5
2002	109	10.7	12.0	71.7	5.4	28.3	8.2	9.5	3.0
2002II	140	10.8	12.6	74.4	3.2	25.6	8.6	10.4	1.2
2003	122	10.0	12.3	69.2	3.7	30.8	7.4	9.6	1.3
2003II	138	9.9	11.4	76.5	3.7	23.5	8.4	9.9	2.2
2004	172	9.9	11.0	80.1	3.3	19.9	9.6	10.7	3.1
2004II	182	9.7	10.8	81.3	3.6	18.7	9.2	10.2	3.0
2005	209	11.2	12.2	84.2	3.3	15.8	10.9	11.9	3.0
2005II	213	10.8	11.8	83.6	3.9	16.4	10.1	11.1	3.3
2006	235	11.1	11.8	86.2	4.3	13.8	9.8	10.6	3.1
2006II	236	11.2	11.9	86.3	4.5	13.7	9.4	10.2	2.9
2007	279	12.6	13.4	88.4	3.9	11.6	10.5	11.3	2.0
2007II	287	11.8	13.0	85.4	3.5	14.6	9.1	10.3	1.0
2008	313	10.8	12.2	83.7	2.7	16.3	7.0	8.4	-0.7

2008II	313	9.7	11.5	78.4	2.5	21.6	6.2	7.9	-0.8
2009	324	8.2	9.8	78.2	1.8	21.8	8.1	9.7	1.8
2009II	315	8.4	9.7	82.1	2.1	17.9	9.5	10.8	3.2
2010	339	10.5	12.2	83.7	1.8	16.3	9.6	11.3	0.9
2010II	345	11.8	13.7	84.7	1.9	15.3	10.2	12.0	0.4
2011	367	12.3	14.1	85.2	1.9	14.8	9.1	10.9	-1.0
2011II	371	10.0	11.8	82.2	1.3	17.8	6.8	8.6	-1.6
2012	390	9.7	11.1	85.5	1.2	14.5	8.1	9.5	-0.2
2012II	387	9.0	10.6	83.5	1.0	16.5	8.6	10.2	0.7
2013	422	9.8	11.4	84.1	1.3	15.9	10.0	11.6	1.4
2013II	420	8.5	9.8	83.8	1.6	16.2	8.4	9.7	1.6
2014	470	8.9	10.2	85.3	1.1	14.7	9.1	10.4	1.3
2014II	484	8.1	9.5	84.2	0.7	15.8	8.3	9.7	0.9
2015	535	7.7	9.0	85.3	0.4	14.7	7.8	9.1	0.5
2015II	558	7.6	8.9	85.3	0.5	14.7	7.6	8.9	0.5
2016	569	7.0	8.2	86.5	0.2	13.5	6.2	7.4	-0.5
2016II	571	6.6	7.6	86.7	0.2	13.3	5.3	6.3	-1.0

Table B.32: Data for Sweden. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	59	8.7	8.8	82.8	6.1	17.2	7.0	7.1	4.5
2000II	72	8.6	9.0	78.7	6.0	21.3	6.9	7.3	4.3
2001	81	9.1	9.8	77.7	4.9	22.3	7.5	8.2	3.4
2001II	91	9.3	10.7	70.0	5.3	30.0	8.7	10.1	4.8
2002	88	9.8	11.1	75.9	4.3	24.1	9.1	10.4	3.6
2002II	99	9.2	11.9	64.0	3.9	36.0	8.2	10.9	2.9
2003	96	9.2	11.4	71.9	2.9	28.1	8.6	10.8	2.3
2003II	109	8.9	10.7	68.4	4.3	31.6	8.3	10.2	3.8
2004	118	9.3	10.6	73.7	4.1	26.3	8.4	9.7	3.3
2004II	131	8.9	10.2	72.8	4.8	27.2	7.5	8.8	3.4
2005	159	9.6	10.9	76.2	4.2	23.8	8.5	9.7	3.1
2005II	157	9.3	10.2	76.1	5.6	23.9	8.1	9.0	4.4
2006	176	9.6	10.4	78.1	5.6	21.9	8.2	9.0	4.2
2006II	177	9.4	10.2	77.7	5.9	22.3	8.8	9.6	5.3
2007	196	10.6	11.5	80.5	5.6	19.5	10.1	11.0	5.1
2007II	194	10.0	11.3	79.3	4.4	20.7	8.3	9.6	2.8
2008	205	10.0	11.6	76.1	3.7	23.9	7.1	8.7	1.0

2008II	205	7.7	9.8	70.9	1.9	29.1	5.8	7.9	0.2
2009	212	8.0	10.2	71.5	1.8	28.5	8.7	11.0	2.5
2009II	209	7.9	9.9	73.3	1.7	26.7	8.1	10.2	1.9
2010	221	8.9	11.2	74.9	1.3	25.1	7.8	10.1	0.3
2010II	222	9.9	12.3	75.7	1.6	24.3	9.5	11.9	1.3
2011	228	8.9	11.0	75.9	1.4	24.1	8.5	10.5	1.0
2011II	228	7.7	10.3	71.9	0.7	28.1	8.1	10.7	1.1
2012	234	7.8	10.6	71.5	0.6	28.5	8.9	11.7	1.6
2012II	236	7.4	9.9	71.7	0.5	28.3	7.8	10.3	0.9
2013	240	7.8	10.1	72.6	0.8	27.4	8.2	10.6	1.3
2013II	240	6.8	8.7	73.1	1.0	26.9	6.8	8.7	1.0
2014	239	6.2	8.0	74.2	0.6	25.8	6.1	7.9	0.5
2014II	241	5.8	7.6	73.6	0.4	26.4	5.9	7.7	0.5
2015	240	5.9	7.6	74.4	0.2	25.6	7.1	8.8	1.3
2015II	239	6.3	8.2	73.5	0.0	26.5	7.7	9.7	1.4
2016	232	5.9	8.0	73.3	-0.3	26.7	6.4	8.5	0.1
2016II	253	5.8	7.8	73.9	0.0	26.1	6.0	8.0	0.2

Table B.33: Data for Switzerland. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	216	9.6	9.8	81.9	7.0	18.1	-32.2	-32.1	-33.8
2000II	130	9.7	10.3	79.7	6.5	20.3	-25.3	-24.9	-27.5
2001	202	10.2	11.6	73.8	5.2	26.2	-24.2	-23.3	-27.7
2001II	155	10.9	13.5	70.5	4.2	29.5	-32.0	-30.4	-36.1
2002	157	11.1	13.1	73.9	4.3	26.1	-29.6	-28.3	-33.9
2002II	149	10.3	12.6	75.5	2.6	24.5	-18.7	-16.9	-24.4
2003	140	8.1	9.7	76.4	2.4	23.6	-14.3	-13.1	-18.9
2003II	138	7.2	8.2	79.3	2.7	20.7	-9.7	-8.8	-13.4
2004	172	7.4	8.3	78.5	3.2	21.5	-1.0	-0.1	-4.9
2004II	162	7.7	8.5	78.3	3.8	21.7	-0.8	0.0	-4.4
2005	246	10.2	11.6	77.4	4.4	22.6	1.5	2.8	-3.9
2005II	247	10.5	11.6	79.4	4.8	20.6	2.5	3.6	-2.7
2006	255	10.2	11.0	79.2	5.9	20.8	1.2	1.9	-2.7
2006II	259	10.4	11.4	77.4	5.6	22.6	0.0	1.0	-4.3
2007	272	11.3	12.6	78.8	5.5	21.2	1.2	2.4	-4.0
2007II	272	10.7	12.1	80.4	4.4	19.6	2.9	4.2	-3.0
2008	275	9.7	12.0	73.6	3.1	26.4	0.1	2.2	-5.9

2008II	273	9.5	12.8	68.2	2.3	31.8	-1.6	1.4	-8.1
2009	276	9.8	13.2	69.9	1.9	30.1	2.6	5.8	-4.8
2009II	275	9.9	12.2	76.5	2.1	23.5	4.2	6.3	-3.2
2010	290	10.1	12.4	78.0	1.9	22.0	0.8	2.9	-6.7
2010II	299	9.7	11.8	79.4	1.5	20.6	1.6	3.6	-6.0
2011	306	9.5	11.4	78.7	1.8	21.3	4.1	6.0	-3.1
2011II	300	8.7	11.4	73.8	1.0	26.2	0.9	3.4	-6.2
2012	347	8.5	10.8	75.9	0.9	24.1	-1.3	0.8	-8.2
2012II	342	7.6	9.9	75.3	0.8	24.7	-0.2	1.9	-6.5
2013	376	13.4	14.9	73.9	7.4	26.1	5.9	7.3	0.3
2013II	377	14.0	15.5	70.7	8.5	29.3	5.6	7.1	0.6
2014	384	14.6	16.6	70.3	8.3	29.7	5.4	7.3	-0.4
2014II	385	14.1	15.8	71.2	8.2	28.8	4.7	6.3	-0.7
2015	398	14.1	15.9	70.3	8.2	29.7	6.1	7.7	0.6
2015II	392	15.2	17.0	68.4	9.0	31.6	6.9	8.6	1.2
2016	395	16.2	18.8	68.9	8.5	31.1	7.9	10.3	0.7
2016II	407	16.1	18.7	67.2	8.8	32.8	7.8	10.1	0.9
2017	378	17.0	19.7	68.7	9.0	31.3	5.5	8.0	-1.7
2017II	373	16.7	18.9	69.5	9.2	30.5	4.7	6.7	-2.0

Table B.34: Data for Turkey. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	319	9.2	9.5	79.6	6.5	20.4	8.1	8.4	5.4
2000II	329	8.9	9.4	78.7	6.2	21.3	7.4	7.9	4.7
2001	372	10.1	10.8	80.3	5.4	19.7	8.2	8.9	3.5
2001II	358	10.3	11.3	78.3	5.5	21.7	8.8	9.8	4.1
2002	405	10.3	11.4	80.9	4.4	19.1	8.9	9.9	3.1
2002II	372	10.4	12.2	75.7	4.3	24.3	8.7	10.4	2.6
2003	425	9.9	11.1	81.0	3.5	19.0	8.5	9.7	2.2
2003II	410	9.6	10.7	80.4	4.4	19.6	8.2	9.3	3.0
2004	521	9.8	10.6	83.7	4.2	16.3	8.4	9.2	2.9
2004II	583	10.5	11.4	84.5	4.3	15.5	8.9	9.8	2.7
2005	719	10.8	11.7	85.8	3.8	14.2	8.8	9.6	1.8
2005II	742	10.3	11.0	86.5	4.0	13.5	7.9	8.6	1.8
2006	777	10.5	11.2	86.5	4.4	13.5	7.9	8.6	2.0
2006II	807	10.7	11.3	86.8	5.0	13.2	7.8	8.4	2.2
2007	862	11.0	11.7	86.2	5.4	13.8	8.2	8.8	2.7
2007II	895	10.8	11.8	83.8	4.5	16.2	8.3	9.3	2.2
2008	906	12.1	13.7	79.9	4.9	20.1	8.5	10.1	1.6

2008II	910	9.3	11.7	73.6	2.4	26.4	5.4	7.7	-1.3
2009	929	10.3	12.5	77.3	2.6	22.7	8.1	10.2	0.5
2009II	950	10.6	12.4	80.2	2.7	19.8	8.9	10.7	1.1
2010	953	15.0	17.9	81.2	2.2	18.8	12.2	15.0	-0.3
2010II	953	14.4	16.6	83.4	2.3	16.6	11.4	13.6	-0.4
2011	1,007	12.4	14.4	82.7	2.0	17.3	8.3	10.2	-1.7
2011II	1,008	10.4	12.2	82.2	1.4	17.8	6.1	7.9	-2.5
2012	1,047	9.8	11.6	82.8	1.1	17.2	7.1	8.9	-1.4
2012II	1,055	9.7	11.4	83.4	1.1	16.6	7.2	8.8	-1.2
2013	1,089	9.9	11.4	84.3	1.6	15.7	7.3	8.8	-0.8
2013II	1,100	9.5	10.6	85.8	1.9	14.2	7.4	8.5	0.0
2014	1,160	9.2	10.3	86.3	1.7	13.7	7.5	8.5	0.1
2014II	1,190	8.1	9.3	85.1	1.2	14.9	6.9	8.1	0.1
2015	1,236	7.6	8.7	84.7	1.4	15.3	7.3	8.4	1.1
2015II	1,257	7.4	8.7	83.5	1.2	16.5	7.0	8.3	0.8
2016	1,247	6.0	7.3	82.8	0.7	17.2	5.3	6.5	0.0
2016II	1,285	6.8	8.1	83.1	0.8	16.9	5.3	6.6	-0.6
2017	1,151	8.5	10.1	83.5	0.9	16.5	5.9	7.4	-1.5
2017II	1,069	7.8	9.1	83.9	1.0	16.1	4.9	6.2	-1.7

Table B.35: Data for United Kingdom. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	2,653	10.6	11.2	74.2	7.3	25.8	7.0	7.6	3.8
2000II	2,911	11.1	12.1	73.8	6.5	26.2	7.4	8.3	2.9
2001	2,868	11.6	13.0	73.9	5.8	26.1	7.9	9.3	2.3
2001II	3,012	13.0	15.2	73.8	5.0	26.2	10.5	12.6	2.7
2002	2,918	12.5	14.2	75.2	5.3	24.8	11.0	12.8	4.0
2002II	3,037	12.0	14.6	73.0	3.6	27.0	9.9	12.5	1.7
2003	2,872	11.6	14.1	73.6	3.5	26.4	8.9	11.3	1.0
2003II	3,070	11.5	13.3	77.2	3.9	22.8	9.3	11.1	1.8
2004	2,996	11.6	13.2	78.7	4.2	21.3	9.1	10.7	1.8
2004II	3,242	12.3	13.9	79.3	4.3	20.7	8.9	10.5	1.3
2005	3,502	15.1	17.3	79.5	4.6	20.5	11.8	13.9	1.6
2005II	3,562	14.8	16.7	79.9	5.0	20.1	10.6	12.5	1.1
2006	3,747	14.5	16.2	80.4	5.7	19.6	10.3	12.0	1.8
2006II	3,796	13.9	15.6	79.8	5.3	20.2	10.9	12.6	2.6
2007	3,942	14.5	16.2	80.3	5.4	19.7	11.6	13.3	2.8
2007II	3,974	14.1	16.3	78.3	4.5	21.7	10.6	12.7	1.3
2008	4,054	14.0	16.9	75.9	3.6	24.1	9.3	12.2	-0.6

2008II	4,019	13.8	18.0	71.4	2.9	28.6	10.0	14.1	-0.6
2009	3,924	14.7	19.8	70.8	2.8	29.2	15.4	20.5	3.4
2009II	4,005	14.5	18.2	74.7	3.1	25.3	14.6	18.4	3.2
2010	4,086	14.7	18.4	76.0	2.9	24.0	12.4	16.0	0.8
2010II	4,146	15.0	18.7	77.0	2.4	23.0	13.6	17.2	1.2
2011	4,237	14.0	16.9	78.5	2.8	21.5	10.9	13.7	0.0
2011II	4,361	13.6	17.3	76.2	1.6	23.8	9.8	13.3	-1.9
2012	4,380	13.3	16.6	77.8	1.6	22.2	10.7	13.9	-0.7
2012II	4,522	13.0	16.3	77.4	1.4	22.6	11.0	14.3	-0.4
2013	4,493	13.1	16.0	78.7	1.8	21.3	11.4	14.3	0.3
2013II	4,718	13.1	15.7	79.5	2.3	20.5	11.6	14.1	0.9
2014	4,692	12.9	15.3	80.1	2.2	19.9	11.0	13.4	0.5
2014II	4,817	12.2	14.7	79.0	2.1	21.0	10.5	12.9	0.6
2015	4,842	11.5	14.0	78.5	2.0	21.5	11.5	14.0	2.0
2015II	4,861	11.2	13.9	76.2	2.1	23.8	10.8	13.6	1.8
2016	4,817	11.3	14.6	75.5	1.6	24.5	10.2	13.4	0.5
2016II	6,060	11.5	14.5	75.6	2.0	24.4	9.8	12.8	0.4
2017	4,261	12.7	15.6	77.5	2.4	22.5	10.2	13.1	0.2
2017II	4,217	13.4	16.5	77.4	2.6	22.6	11.1	14.1	0.5

Table B.36: Data for United States. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	996	10.2	11.0	69.6	7.5	30.4	6.4	7.2	3.7
2000II	1,092	10.0	11.4	68.2	6.5	31.8	7.1	8.4	3.6
2001	1,231	10.2	12.1	67.9	5.4	32.1	7.1	8.9	2.4
2001II	1,261	10.9	13.1	67.4	5.3	32.6	8.5	10.7	3.1
2002	1,320	10.2	12.3	70.0	4.5	30.0	8.3	10.3	2.6
2002II	1,362	10.2	12.9	68.0	3.6	32.0	8.2	10.9	1.8
2003	1,375	9.8	12.2	70.2	3.4	29.8	7.8	10.1	1.6
2003II	1,416	9.6	11.6	72.8	3.8	27.2	8.1	10.0	2.4
2004	1,512	9.7	11.3	74.8	4.2	25.2	8.3	9.9	2.8
2004II	1,596	9.9	11.9	76.2	3.4	23.8	7.8	9.7	1.4
2005	1,784	11.3	13.6	76.6	3.2	23.4	9.4	11.7	1.4
2005II	1,844	11.1	13.1	78.0	3.5	22.0	9.0	11.0	1.6
2006	1,936	11.3	13.1	78.0	4.1	22.0	8.9	10.7	1.9
2006II	1,966	10.9	12.7	77.4	4.0	22.6	8.8	10.5	2.0
2007	2,057	11.3	13.1	77.7	4.2	22.3	9.4	11.2	2.5
2007II	2,084	11.0	13.3	75.2	3.6	24.8	8.7	11.0	1.5
2008	2,137	11.1	14.1	71.3	3.2	28.7	7.7	10.6	0.1

2008II	2,164	11.5	16.4	64.9	2.6	35.1	8.2	12.9	-0.4
2009	2,177	12.1	17.5	64.9	2.4	35.1	11.6	17.1	2.0
2009II	2,197	12.7	17.6	68.8	2.5	31.2	12.9	18.0	2.7
2010	2,235	13.8	19.0	70.0	2.4	30.0	12.4	17.6	1.1
2010II	2,225	13.8	18.9	71.0	2.2	29.0	12.4	17.5	1.0
2011	2,289	13.2	17.9	71.3	2.5	28.7	11.1	15.7	0.5
2011II	2,295	11.7	16.2	69.4	1.9	30.6	9.2	13.6	-0.4
2012	2,347	11.4	15.6	70.9	1.6	29.1	9.4	13.6	-0.2
2012II	2,397	11.1	15.3	70.7	1.4	29.3	9.6	13.8	0.0
2013	2,435	11.0	14.5	72.5	1.8	27.5	9.8	13.3	0.7
2013II	2,493	11.0	14.1	73.7	2.1	26.3	9.3	12.4	0.6
2014	2,539	10.5	13.5	74.1	1.9	25.9	8.3	11.2	-0.1
2014II	2,581	9.7	12.5	74.0	1.6	26.0	7.7	10.4	-0.3
2015	2,659	9.2	11.7	75.0	1.5	25.0	8.3	10.8	0.7
2015II	2,690	9.0	11.6	74.0	1.6	26.0	8.4	10.9	1.0
2016	2,709	9.1	12.0	73.3	1.1	26.7	8.4	11.3	0.5
2016II	2,787	9.0	11.7	73.9	1.4	26.1	7.9	10.6	0.4
2017	2,170	9.8	12.5	75.4	1.6	24.6	7.9	10.6	-0.1
2017II	2,108	10.1	12.8	76.0	1.7	24.0	8.1	10.7	-0.1

Table B.37: Data for Consumer Discretionary. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	414	10.0	10.6	71.4	7.3	28.6	5.7	6.3	3.1
2000II	450	9.5	10.6	69.4	6.4	30.6	6.2	7.3	3.2
2001	502	9.7	11.4	69.3	5.3	30.7	6.2	7.8	1.9
2001II	512	10.0	12.0	68.0	5.2	32.0	7.4	9.3	2.6
2002	520	9.5	11.3	70.6	4.4	29.4	7.2	9.1	2.3
2002II	540	9.1	11.5	68.7	3.4	31.3	7.0	9.3	1.4
2003	540	8.8	10.9	69.9	3.3	30.1	6.5	8.6	1.2
2003II	552	8.9	10.7	71.8	3.6	28.2	7.2	9.0	2.1
2004	596	9.0	10.5	73.9	4.1	26.1	7.5	9.0	2.7
2004II	619	8.9	10.7	74.4	3.4	25.6	6.7	8.5	1.3
2005	705	9.8	11.8	74.8	3.3	25.2	7.7	9.8	1.4
2005II	712	9.7	11.4	75.3	3.7	24.7	7.5	9.3	1.7
2006	741	10.0	11.5	75.7	4.2	24.3	7.5	9.1	1.9
2006II	757	9.5	11.0	75.7	4.2	24.3	7.3	8.8	2.1
2007	785	10.0	11.6	76.8	4.3	23.2	8.1	9.6	2.5
2007II	792	9.7	11.7	74.6	3.8	25.4	7.3	9.2	1.5
2008	813	10.0	12.3	72.3	3.3	27.7	6.3	8.6	-0.1

2008II	824	10.6	14.3	67.2	2.8	32.8	7.0	10.6	-0.5
2009	830	11.2	15.3	66.9	2.7	33.1	10.5	14.6	2.0
2009II	835	11.4	15.1	70.2	2.7	29.8	11.5	15.2	2.9
2010	839	12.0	16.1	70.6	2.6	29.4	10.6	14.6	1.2
2010II	853	11.8	15.8	71.3	2.4	28.7	10.3	14.2	1.0
2011	880	11.2	14.7	71.7	2.7	28.3	9.0	12.4	0.6
2011II	896	10.0	13.4	69.9	2.0	30.1	7.5	10.8	-0.3
2012	919	9.6	12.9	70.9	1.7	29.1	7.5	10.8	-0.2
2012II	919	9.3	12.6	70.7	1.5	29.3	7.8	11.0	0.1
2013	938	9.5	12.3	72.8	1.9	27.2	8.3	11.1	0.8
2013II	943	9.6	12.2	73.6	2.2	26.4	7.9	10.5	0.6
2014	952	9.3	11.8	74.1	2.0	25.9	7.1	9.5	-0.1
2014II	967	8.7	11.0	74.6	1.7	25.4	6.6	8.9	-0.3
2015	986	8.5	10.7	75.2	1.7	24.8	7.5	9.6	0.7
2015II	992	8.5	10.6	75.1	1.8	24.9	7.7	9.8	1.0
2016	988	8.7	11.0	75.1	1.4	24.9	7.8	10.0	0.6
2016II	1,002	8.7	10.8	75.8	1.7	24.2	7.4	9.6	0.5
2017	708	9.4	11.6	77.6	1.9	22.4	7.4	9.5	0.0
2017II	679	9.5	11.5	78.7	2.0	21.3	7.3	9.3	-0.1

Table B.38: Data for Consumer Staples. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	264	10.3	10.8	77.1	7.0	22.9	7.0	7.5	3.8
2000II	282	10.4	11.2	77.6	6.3	22.4	6.9	7.7	2.9
2001	294	10.7	11.8	77.8	5.7	22.2	7.1	8.1	2.3
2001II	300	11.5	13.2	74.5	5.2	25.5	9.0	10.7	2.9
2002	302	11.1	12.7	75.9	5.2	24.1	9.3	10.9	3.5
2002II	309	10.6	12.9	73.3	4.0	26.7	8.1	10.3	1.6
2003	313	10.0	11.9	75.0	3.8	25.0	7.1	9.0	1.1
2003II	363	9.7	11.1	79.3	3.9	20.7	7.7	9.0	2.0
2004	400	10.0	11.1	82.4	4.0	17.6	8.1	9.1	2.1
2004II	454	9.6	10.5	84.5	3.8	15.5	7.0	7.9	1.3
2005	554	12.4	13.6	86.4	3.6	13.6	9.8	11.0	1.3
2005II	590	13.2	14.3	88.0	3.8	12.0	10.1	11.2	1.0
2006	674	13.2	14.2	88.0	4.4	12.0	9.8	10.8	1.2
2006II	707	12.6	13.8	86.9	4.2	13.1	10.0	11.1	1.8
2007	765	13.8	15.0	86.6	4.4	13.4	11.4	12.6	2.2
2007II	805	13.2	14.6	85.6	3.8	14.4	10.3	11.6	1.1
2008	843	12.7	14.2	84.6	3.3	15.4	8.8	10.2	-0.3

2008II	861	14.4	17.4	77.8	2.6	22.2	10.6	13.6	-0.8
2009	902	16.0	19.8	76.8	2.4	23.2	15.2	19.1	1.8
2009II	948	14.6	17.3	80.8	2.6	19.2	14.0	16.7	2.0
2010	978	17.0	20.0	81.6	2.5	18.4	14.7	17.6	0.4
2010II	998	16.9	19.7	82.3	2.4	17.7	14.7	17.5	0.5
2011	1,063	15.9	18.1	84.1	2.5	15.9	12.6	14.7	-0.5
2011II	1,093	15.1	17.9	81.6	1.6	18.4	11.7	14.4	-1.4
2012	1,111	14.0	16.7	81.6	1.5	18.4	11.8	14.4	-0.4
2012II	1,129	13.7	16.6	80.3	1.5	19.7	11.9	14.8	-0.2
2013	1,138	13.1	15.8	80.4	1.8	19.6	11.4	14.1	0.3
2013II	1,149	12.9	15.4	80.5	2.2	19.5	11.2	13.6	0.6
2014	1,169	12.0	14.3	80.7	2.1	19.3	9.9	12.2	0.2
2014II	1,187	11.5	14.2	77.8	1.8	22.2	9.8	12.4	0.2
2015	1,155	11.5	15.1	74.8	1.7	25.2	10.8	14.4	1.0
2015II	1,140	10.8	15.2	70.8	1.6	29.2	9.9	14.3	0.8
2016	1,063	11.2	16.2	71.3	1.2	28.7	10.0	15.0	0.1
2016II	1,196	11.4	15.5	73.6	1.5	26.4	9.8	13.8	0.0
2017	814	12.2	15.9	76.1	1.8	23.9	10.0	13.7	-0.2
2017II	782	12.3	15.9	76.8	1.9	23.2	10.2	13.8	0.0

Table B.39: Data for Energy. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	758	9.8	10.7	61.2	7.4	38.8	5.4	6.2	3.1
2000II	831	9.7	11.1	61.7	6.6	38.3	6.1	7.5	3.1
2001	838	9.7	11.6	61.8	5.7	38.2	6.0	7.9	2.3
2001II	889	10.0	12.7	61.3	5.1	38.7	7.3	9.9	2.5
2002	890	9.8	12.3	62.0	5.1	38.0	7.7	10.2	3.2
2002II	948	9.1	12.5	60.5	3.6	39.5	6.8	10.1	1.4
2003	923	8.9	12.3	61.0	3.5	39.0	6.4	9.7	1.1
2003II	1,005	8.9	11.8	62.9	3.8	37.1	7.0	9.8	2.0
2004	1,044	9.0	11.6	63.7	4.1	36.3	7.1	9.6	2.2
2004II	1,167	9.3	11.9	64.3	4.0	35.7	6.6	9.2	1.5
2005	1,343	10.5	13.7	64.9	4.1	35.1	7.9	11.1	1.7
2005II	1,352	10.4	13.2	65.3	4.5	34.7	7.4	10.1	1.6
2006	1,428	10.8	13.4	66.2	5.1	33.8	7.6	10.1	2.0
2006II	1,447	10.5	13.0	66.0	5.0	34.0	7.9	10.3	2.5
2007	1,538	11.1	13.7	66.4	5.1	33.6	8.7	11.3	2.8
2007II	1,563	10.7	14.1	63.6	4.3	36.4	7.7	11.0	1.5
2008	1,617	10.5	15.0	60.0	3.7	40.0	6.4	10.7	-0.2

2008II	1,614	10.3	16.1	55.8	3.0	44.2	6.5	12.1	-0.5
2009	1,635	11.0	17.2	57.2	2.8	42.8	10.4	16.7	2.3
2009II	1,630	11.1	16.5	60.1	3.1	39.9	10.7	16.1	2.7
2010	1,682	11.8	17.5	61.3	2.8	38.7	9.6	15.2	0.8
2010II	1,698	11.9	17.8	62.0	2.6	38.0	10.0	15.8	0.9
2011	1,748	11.1	16.0	62.8	2.9	37.2	8.2	13.1	0.2
2011II	1,753	9.8	15.0	60.9	1.9	39.1	6.6	11.7	-1.1
2012	1,793	9.7	14.7	62.7	1.8	37.3	7.3	12.2	-0.4
2012II	1,810	9.5	14.3	63.7	1.6	36.3	7.5	12.3	-0.3
2013	1,837	9.9	14.3	65.4	2.0	34.6	8.3	12.6	0.5
2013II	1,851	10.2	14.2	66.6	2.3	33.4	8.4	12.4	0.7
2014	1,894	9.7	13.6	66.8	2.1	33.2	7.7	11.5	0.2
2014II	1,902	8.9	12.6	66.1	1.9	33.9	7.2	10.8	0.2
2015	1,931	8.7	12.3	66.8	1.8	33.2	8.1	11.7	1.2
2015II	1,958	8.5	12.0	65.7	1.9	34.3	7.7	11.3	1.2
2016	1,958	8.2	12.3	64.6	1.4	35.4	7.1	11.2	0.4
2016II	2,065	8.5	12.2	66.0	1.8	34.0	7.0	10.7	0.4
2017	1,472	9.9	13.6	68.2	2.1	31.8	7.4	11.1	-0.2
2017II	1,403	10.4	14.3	68.5	2.3	31.5	7.9	11.7	0.0

Table B.40: Data for Financials. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	412	10.8	11.1	87.3	6.6	12.7	7.9	8.2	3.8
2000II	522	11.6	12.1	88.1	5.8	11.9	8.5	9.0	2.8
2001	512	12.3	13.0	87.5	5.0	12.5	9.2	10.0	2.2
2001II	572	14.1	15.0	87.9	4.6	12.1	12.0	13.0	2.7
2002	559	12.9	13.8	88.1	4.4	11.9	11.5	12.4	3.1
2002II	621	12.9	14.2	85.5	3.1	14.5	10.9	12.2	1.3
2003	584	12.2	13.6	85.9	3.0	14.1	10.0	11.2	0.9
2003II	673	11.8	12.6	89.1	3.3	10.9	9.9	10.8	1.6
2004	695	11.8	12.6	90.5	3.5	9.5	9.9	10.6	1.7
2004II	784	12.4	13.2	90.5	3.4	9.5	9.8	10.5	1.0
2005	889	14.7	15.7	89.8	3.3	10.2	12.1	13.2	1.0
2005II	906	13.7	14.5	90.3	3.6	9.7	10.6	11.5	0.9
2006	981	13.4	14.2	90.2	4.3	9.8	10.1	10.9	1.3
2006II	1,000	12.6	13.3	90.1	4.1	9.9	10.1	10.8	1.8
2007	1,077	13.5	14.2	90.6	4.3	9.4	11.2	12.0	2.2
2007II	1,113	13.3	14.2	89.7	3.6	10.3	10.4	11.2	0.9
2008	1,139	13.1	14.2	88.1	3.0	11.9	9.1	10.2	-0.7

2008II	1,154	13.9	15.7	85.3	2.4	14.7	10.3	12.0	-0.9
2009	1,172	14.9	16.9	84.9	2.2	15.1	14.7	16.7	2.0
2009II	1,189	14.2	15.7	87.3	2.4	12.7	14.1	15.6	2.3
2010	1,228	15.4	17.2	87.6	2.1	12.4	13.4	15.2	0.4
2010II	1,251	15.3	17.0	87.9	1.9	12.1	13.7	15.4	0.5
2011	1,299	14.5	16.0	88.2	2.1	11.8	11.6	13.1	-0.4
2011II	1,342	13.7	15.5	86.5	1.4	13.5	10.5	12.2	-1.4
2012	1,348	13.0	14.6	87.0	1.4	13.0	10.8	12.5	-0.6
2012II	1,409	12.7	14.3	87.5	1.2	12.5	11.0	12.6	-0.4
2013	1,421	12.6	14.1	88.1	1.4	11.9	11.3	12.7	0.1
2013II	1,521	12.6	13.8	89.0	1.6	11.0	11.1	12.3	0.3
2014	1,563	12.4	13.5	90.2	1.4	9.8	10.6	11.7	-0.2
2014II	1,649	11.7	12.8	89.8	1.2	10.2	10.2	11.3	-0.1
2015	1,721	10.8	11.8	90.0	1.2	10.0	10.5	11.5	0.9
2015II	1,781	11.0	12.1	89.2	1.2	10.8	10.6	11.7	0.8
2016	1,805	11.4	12.7	88.1	0.9	11.9	10.5	11.8	0.2
2016II	1,903	11.3	12.6	87.8	1.1	12.2	10.0	11.3	0.0
2017	1,323	13.3	14.7	89.1	1.4	10.9	11.2	12.6	-0.5
2017II	1,281	14.0	15.4	89.3	1.5	10.7	11.9	13.3	-0.3

Table B.41: Data for Health Care. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	1,322	9.9	10.9	65.7	7.5	34.3	7.7	8.6	5.3
2000II	1,440	9.5	10.9	64.8	6.3	35.2	7.6	9.0	4.5
2001	1,561	9.7	11.8	65.2	5.4	34.8	7.6	9.7	3.4
2001II	1,587	10.3	12.6	64.0	5.4	36.0	8.9	11.2	4.0
2002	1,624	9.6	12.0	65.8	4.4	34.2	8.5	10.8	3.3
2002II	1,681	9.4	12.4	63.4	3.5	36.6	8.0	10.9	2.2
2003	1,679	9.2	11.8	66.6	3.4	33.4	7.7	10.2	1.9
2003II	1,752	9.2	11.3	69.7	3.7	30.3	8.0	10.1	2.6
2004	1,851	9.4	11.1	72.1	4.1	27.9	8.2	9.9	3.0
2004II	1,952	9.7	12.0	74.0	3.3	26.0	7.9	10.1	1.5
2005	2,150	10.9	13.5	75.0	3.1	25.0	9.3	11.8	1.5
2005II	2,198	10.8	13.0	76.9	3.4	23.1	9.1	11.2	1.8
2006	2,311	11.3	13.2	77.4	4.1	22.6	9.1	11.0	2.0
2006II	2,365	10.9	12.8	76.9	4.0	23.1	8.9	10.9	2.2
2007	2,448	11.4	13.3	78.1	4.2	21.9	9.8	11.6	2.6
2007II	2,506	11.4	13.7	76.2	3.7	23.8	9.2	11.5	1.6
2008	2,621	11.5	14.3	73.4	3.2	26.6	8.1	10.9	0.1

2008II	2,625	11.9	16.5	67.0	2.6	33.0	8.7	13.1	-0.4
2009	2,664	12.5	17.7	65.9	2.4	34.1	12.0	17.3	2.0
2009II	2,674	12.7	17.6	68.8	2.5	31.2	13.0	17.9	2.8
2010	2,709	13.8	19.0	69.5	2.4	30.5	12.5	17.7	1.2
2010II	2,731	13.9	19.1	70.1	2.3	29.9	12.6	17.8	1.1
2011	2,771	13.4	18.0	71.1	2.5	28.9	11.3	15.8	0.5
2011II	2,771	11.7	16.3	68.1	1.8	31.9	9.4	13.9	-0.4
2012	2,833	11.5	15.9	69.0	1.6	31.0	9.6	14.0	-0.1
2012II	2,848	11.1	15.7	68.8	1.4	31.2	9.8	14.3	0.1
2013	2,916	11.0	14.9	70.6	1.7	29.4	10.0	13.9	0.8
2013II	2,941	10.8	14.2	72.7	2.0	27.3	9.3	12.7	0.6
2014	2,988	10.5	13.6	73.8	1.7	26.2	8.4	11.5	-0.1
2014II	2,998	9.8	12.8	73.3	1.5	26.7	7.9	10.9	-0.3
2015	3,054	9.4	12.2	74.1	1.4	25.9	8.6	11.4	0.7
2015II	3,056	9.1	12.0	72.7	1.4	27.3	8.6	11.5	1.0
2016	3,067	9.0	12.3	72.1	1.0	27.9	8.4	11.7	0.5
2016II	3,103	8.9	11.7	73.5	1.3	26.5	8.0	10.8	0.4
2017	2,275	10.0	12.9	75.7	1.4	24.3	8.3	11.1	-0.1
2017II	2,174	10.4	13.0	77.3	1.5	22.7	8.6	11.2	-0.2

Table B.42: Data for Industrials. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	809	11.1	11.5	87.0	6.4	13.0	8.8	9.2	4.2
2000II	942	12.1	12.9	85.9	5.6	14.1	9.7	10.5	3.3
2001	996	13.0	14.3	83.1	4.7	16.9	10.6	11.9	2.5
2001II	1,060	14.6	16.2	83.2	4.4	16.8	12.9	14.5	2.9
2002	1,058	13.4	15.0	82.8	4.0	17.2	12.3	13.8	2.9
2002II	1,113	13.5	15.7	80.2	3.0	19.8	11.9	14.0	1.5
2003	1,099	12.6	14.4	82.0	2.8	18.0	10.8	12.6	1.2
2003II	1,187	12.4	13.7	85.8	3.0	14.2	11.0	12.3	1.7
2004	1,256	12.0	13.1	86.8	3.3	13.2	10.6	11.6	2.0
2004II	1,344	12.8	14.1	87.7	2.9	12.3	10.7	11.9	0.9
2005	1,568	14.8	16.3	87.4	2.7	12.6	12.8	14.3	1.0
2005II	1,629	13.7	14.9	88.0	3.0	12.0	11.4	12.6	1.0
2006	1,744	13.3	14.3	88.7	3.5	11.3	10.7	11.8	1.2
2006II	1,777	12.6	13.6	87.8	3.5	12.2	10.5	11.6	1.6
2007	1,875	13.1	14.1	88.2	3.6	11.8	11.3	12.4	2.0
2007II	1,915	13.2	14.4	87.2	3.1	12.8	10.8	12.1	0.9
2008	1,968	13.3	14.9	85.3	2.6	14.7	9.8	11.4	-0.5

2008II	1,980	14.0	16.7	80.8	2.0	19.2	10.8	13.4	-0.9
2009	1,996	14.9	17.9	81.0	1.8	19.0	14.6	17.7	1.5
2009II	2,022	14.9	17.6	83.3	1.8	16.7	15.1	17.9	2.0
2010	2,057	16.0	18.9	84.1	1.7	15.9	14.6	17.4	0.4
2010II	2,067	16.2	19.0	84.5	1.6	15.5	15.0	17.7	0.4
2011	2,097	15.8	18.3	85.3	1.7	14.7	13.5	15.9	-0.3
2011II	2,154	14.4	17.0	83.7	1.2	16.3	11.8	14.4	-1.1
2012	2,187	14.0	16.5	84.5	1.1	15.5	12.2	14.6	-0.6
2012II	2,242	13.5	16.0	84.0	1.0	16.0	12.1	14.6	-0.3
2013	2,274	12.8	14.9	85.1	1.1	14.9	11.7	13.8	0.2
2013II	2,303	12.4	14.1	86.6	1.3	13.4	10.9	12.6	0.0
2014	2,369	12.0	13.5	87.4	1.2	12.6	10.1	11.6	-0.5
2014II	2,444	11.4	12.9	87.2	1.0	12.8	9.7	11.2	-0.6
2015	2,530	10.9	12.4	87.3	1.0	12.7	10.4	11.8	0.4
2015II	2,560	11.0	12.5	86.7	1.0	13.3	10.6	12.1	0.6
2016	2,591	11.2	12.9	86.3	0.7	13.7	10.6	12.3	0.2
2016II	2,740	10.8	12.4	86.2	0.9	13.9	9.8	11.4	0.0
2017	2,016	11.8	13.3	87.6	1.1	12.4	10.2	11.7	-0.4
2017II	1,937	12.3	13.7	88.3	1.1	11.7	10.5	12.0	-0.4

Table B.43: Data for Information Technology. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	654	10.0	10.8	69.3	6.9	30.7	5.3	6.1	2.4
2000II	707	9.8	11.0	68.4	5.9	31.6	5.9	7.1	2.1
2001	754	9.8	11.7	68.1	5.0	31.9	5.8	7.6	1.1
2001II	761	10.5	12.7	67.0	4.9	33.0	7.1	9.2	1.8
2002	760	9.6	11.9	68.3	4.2	31.7	6.6	8.8	1.3
2002II	765	9.2	11.9	66.4	3.4	33.6	6.3	9.0	0.7
2003	741	8.6	11.0	68.2	3.3	31.8	5.9	8.2	0.7
2003II	841	8.6	10.3	74.1	3.4	25.9	6.5	8.2	1.4
2004	915	8.9	10.2	76.4	3.7	23.6	7.2	8.5	2.1
2004II	1,040	9.5	11.2	80.0	2.9	20.0	7.2	8.8	0.7
2005	1,234	11.4	13.3	81.6	2.7	18.4	9.2	11.0	0.7
2005II	1,350	11.8	13.3	83.5	3.0	16.5	9.3	10.8	0.7
2006	1,426	11.8	13.1	84.6	3.4	15.4	8.9	10.2	0.7
2006II	1,506	11.5	12.8	85.1	3.2	14.9	9.1	10.3	0.9
2007	1,574	12.7	13.9	86.3	3.4	13.7	10.5	11.7	1.4
2007II	1,673	12.6	14.0	85.7	2.8	14.3	10.0	11.3	0.3
2008	1,819	12.7	14.3	84.4	2.4	15.6	9.0	10.7	-0.9

2008II	1,932	14.7	17.4	80.4	2.0	19.6	11.1	13.8	-1.2
2009	2,096	16.3	19.3	81.5	1.8	18.5	15.4	18.3	0.9
2009II	2,190	15.0	17.4	84.4	1.9	15.6	14.5	17.0	1.4
2010	2,265	17.3	19.9	85.3	1.7	14.7	15.2	17.7	-0.1
2010II	2,323	17.3	19.8	86.4	1.7	13.6	15.1	17.5	-0.3
2011	2,443	17.0	19.2	87.1	1.8	12.9	13.9	16.0	-1.0
2011II	2,523	15.9	18.2	85.8	1.3	14.2	12.8	15.0	-1.4
2012	2,570	14.4	16.6	85.8	1.1	14.2	12.3	14.5	-0.7
2012II	2,561	14.3	16.6	85.3	1.1	14.7	12.6	14.8	-0.5
2013	2,605	13.3	15.5	84.7	1.3	15.3	11.8	13.9	0.0
2013II	2,568	13.5	15.4	84.7	1.6	15.3	11.6	13.6	-0.1
2014	2,540	12.3	14.3	84.2	1.5	15.8	9.9	11.8	-0.7
2014II	2,554	11.5	13.4	83.3	1.3	16.7	9.4	11.3	-0.6
2015	2,503	10.8	12.7	82.8	1.2	17.2	9.7	11.5	0.1
2015II	2,510	9.9	11.9	81.4	1.3	18.6	8.7	10.7	0.1
2016	2,459	10.3	12.4	82.3	1.0	17.7	9.1	11.1	-0.1
2016II	2,574	10.4	12.2	83.7	1.2	16.3	8.9	10.8	-0.1
2017	1,985	11.0	12.7	85.7	1.3	14.3	8.9	10.6	-0.6
2017II	1,918	11.3	12.9	86.5	1.4	13.5	9.2	10.7	-0.6

Table B.44: Data for Materials. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	222	9.7	10.5	58.4	7.6	41.6	5.5	6.3	3.5
2000II	234	9.3	10.7	57.4	6.9	42.6	6.2	7.6	3.9
2001	263	9.2	11.0	58.4	5.9	41.6	5.2	7.0	2.1
2001II	268	9.5	11.9	57.7	5.6	42.3	6.6	8.9	2.8
2002	283	9.2	11.3	59.6	5.3	40.4	7.0	9.1	3.3
2002II	284	8.4	11.4	56.5	4.0	43.5	6.2	9.1	1.9
2003	296	8.2	11.2	57.7	3.9	42.3	5.9	8.8	1.7
2003II	319	8.4	10.8	59.4	4.4	40.6	6.6	9.0	2.7
2004	372	8.5	10.6	62.0	4.6	38.0	6.8	8.9	3.0
2004II	413	8.5	10.7	62.6	4.3	37.4	6.2	8.3	2.1
2005	518	9.5	12.3	64.0	4.2	36.0	7.4	10.1	2.1
2005II	527	9.7	12.1	64.3	4.5	35.7	7.1	9.6	2.1
2006	590	10.3	12.7	64.9	5.2	35.1	7.4	9.8	2.4
2006II	600	9.9	12.4	65.3	5.0	34.7	7.7	10.1	2.9
2007	656	10.5	13.2	65.2	5.1	34.8	8.7	11.3	3.4
2007II	663	10.1	13.9	60.0	4.5	40.0	7.6	11.2	2.1
2008	694	9.8	14.7	54.0	4.0	46.0	6.0	10.8	0.4

2008II	685	9.2	16.5	45.5	3.5	54.5	5.7	12.7	0.1
2009	710	9.4	17.4	45.3	3.4	54.7	8.6	16.6	2.6
2009II	700	9.9	16.7	49.8	3.7	50.2	9.4	16.2	3.1
2010	748	10.7	18.0	52.2	3.3	47.8	8.6	15.9	1.3
2010II	749	10.9	18.1	53.2	3.2	46.8	9.0	16.1	1.4
2011	775	10.2	16.3	54.1	3.4	45.9	7.4	13.4	0.7
2011II	779	8.7	14.9	50.8	2.4	49.2	5.8	11.8	-0.3
2012	800	8.6	14.3	53.8	2.2	46.2	6.4	12.1	0.2
2012II	817	8.2	13.6	54.3	2.0	45.7	6.4	11.7	0.3
2013	841	8.8	13.7	56.7	2.5	43.3	7.4	12.2	1.1
2013II	875	8.9	13.4	57.3	2.8	42.7	7.2	11.6	1.2
2014	905	8.5	12.8	58.5	2.5	41.5	6.5	10.7	0.6
2014II	931	7.7	11.7	59.0	2.1	41.0	6.1	10.0	0.5
2015	971	7.5	11.2	59.6	1.9	40.4	6.8	10.6	1.3
2015II	995	7.1	10.6	59.1	2.0	40.9	6.4	9.9	1.3
2016	998	6.9	10.8	59.6	1.4	40.4	6.1	9.9	0.6
2016II	996	7.1	10.7	59.8	1.8	40.2	5.8	9.4	0.6
2017	698	8.0	11.7	62.5	2.2	37.5	5.8	9.4	0.1
2017II	671	8.3	12.0	62.9	2.3	37.1	6.0	9.6	0.2

Table B.45: Data for Real Estate. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	60	10.1	10.7	77.9	6.9	22.1	6.4	7.0	3.3
2000II	66	10.7	12.0	76.2	6.4	23.8	6.9	8.1	2.7
2001	66	10.9	12.7	69.9	6.0	30.1	7.0	8.8	2.3
2001II	68	11.8	14.6	68.1	5.3	31.9	8.6	11.3	2.3
2002	77	10.7	13.4	62.4	5.6	37.6	8.2	10.9	3.2
2002II	80	10.6	14.1	61.9	4.2	38.1	7.9	11.3	1.7
2003	78	10.5	13.6	67.7	3.8	32.3	7.8	10.8	1.3
2003II	84	10.5	12.8	72.3	4.2	27.7	8.5	10.8	2.4
2004	92	10.2	12.0	75.2	4.4	24.8	8.3	10.0	2.6
2004II	98	10.7	12.6	74.4	4.4	25.6	8.0	9.8	1.9
2005	112	12.3	14.7	75.3	4.6	24.7	9.8	12.1	2.3
2005II	115	11.6	13.6	76.0	4.8	24.0	8.7	10.6	2.1
2006	120	11.5	13.1	76.2	5.7	23.8	8.4	9.9	2.7
2006II	124	11.1	12.7	76.1	5.4	23.9	8.6	10.1	3.1
2007	130	12.2	13.8	77.8	5.6	22.2	9.9	11.5	3.5
2007II	132	12.1	14.1	76.4	5.0	23.6	9.1	11.1	2.2
2008	140	12.0	14.6	72.6	4.4	27.4	7.7	10.2	0.4

2008II	141	12.1	16.1	67.0	3.9	33.0	8.0	11.9	0.1
2009	143	12.0	16.1	66.2	3.7	33.8	10.9	15.0	2.7
2009II	147	11.8	15.2	69.1	3.8	30.9	11.2	14.5	3.2
2010	147	12.3	16.1	70.5	3.6	29.5	10.1	13.8	1.5
2010II	149	12.1	15.9	70.7	3.4	29.3	10.0	13.7	1.4
2011	149	11.8	15.1	70.0	3.9	30.0	8.7	11.9	0.9
2011II	152	10.9	14.9	66.3	2.8	33.7	7.6	11.5	-0.2
2012	158	10.3	14.2	66.8	2.6	33.2	7.9	11.7	0.3
2012II	154	9.3	13.4	64.2	2.2	35.8	7.3	11.3	0.3
2013	163	9.5	13.6	65.4	2.6	34.6	8.0	12.1	1.2
2013II	157	10.0	13.4	68.5	3.0	31.5	8.4	11.8	1.6
2014	163	10.2	13.4	71.1	2.6	28.9	8.6	11.8	1.1
2014II	168	9.5	12.6	70.7	2.1	29.3	8.2	11.3	0.9
2015	173	9.5	12.7	70.9	2.0	29.1	9.1	12.2	1.6
2015II	175	9.1	12.1	69.2	2.1	30.8	8.5	11.6	1.5
2016	176	8.6	12.2	68.0	1.6	32.0	7.8	11.4	0.9
2016II	187	8.4	11.8	67.5	1.8	32.5	7.2	10.5	0.7
2017	98	10.0	13.3	71.2	2.3	28.8	7.8	11.0	0.3
2017II	94	9.8	13.2	70.7	2.5	29.3	7.5	10.9	0.4

Table B.46: Data for Telecommunication Services. Source: Own calculations based on Bloomberg's data.

Half year	# Firms	WACC	Cost of Equity	Weight of Equity	Cost of Debt	Weight of Debt	WACC Real	Cost of Equity Real	Cost of Debt Real
2000	157	9.1	10.2	56.9	7.5	43.1	5.1	6.2	3.6
2000II	161	8.9	10.4	58.0	6.7	42.0	4.9	6.3	2.8
2001	174	9.2	11.0	60.3	6.0	39.7	5.2	7.0	2.2
2001II	178	9.4	12.0	57.1	5.6	42.9	6.1	8.6	2.5
2002	181	9.0	11.3	57.6	5.4	42.4	6.4	8.6	2.9
2002II	179	8.1	11.6	52.8	4.2	47.2	5.5	8.9	1.7
2003	175	8.0	11.4	53.3	4.2	46.7	5.2	8.5	1.5
2003II	189	8.2	11.0	58.0	4.6	42.0	6.1	8.9	2.5
2004	201	8.4	10.9	60.7	4.8	39.3	6.5	8.9	2.9
2004II	213	8.4	10.7	62.3	4.6	37.7	5.8	8.0	2.1
2005	223	9.4	12.2	63.2	4.6	36.8	6.8	9.6	2.2
2005II	228	9.8	12.3	65.6	4.8	34.4	6.8	9.3	2.0
2006	236	10.2	12.5	66.7	5.6	33.3	7.0	9.2	2.5
2006II	238	10.0	12.3	68.2	5.2	31.8	7.4	9.6	2.7
2007	250	10.9	13.1	70.0	5.4	30.0	8.5	10.6	3.0
2007II	257	10.7	13.3	69.3	4.7	30.7	7.6	10.1	1.7
2008	268	10.8	13.9	67.5	4.2	32.5	6.4	9.4	0.1

2008II	272	10.7	14.8	63.5	3.4	36.5	6.8	10.7	-0.3
2009	276	10.9	15.2	63.1	3.5	36.9	10.2	14.4	2.8
2009II	281	10.6	14.3	64.5	3.7	35.5	10.4	14.1	3.5
2010	290	11.2	15.5	64.5	3.4	35.5	9.2	13.4	1.5
2010II	292	10.7	15.0	64.2	3.2	35.8	8.7	13.0	1.4
2011	295	10.4	14.2	64.2	3.5	35.8	7.4	11.1	0.7
2011II	300	9.5	13.9	61.3	2.5	38.7	6.3	10.5	-0.5
2012	307	8.9	13.4	60.4	2.4	39.6	6.5	10.8	0.1
2012II	311	8.5	12.9	60.4	2.1	39.6	6.5	10.9	0.2
2013	319	8.7	12.9	61.6	2.5	38.4	7.2	11.4	1.1
2013II	323	8.9	12.9	61.8	3.1	38.2	7.3	11.3	1.6
2014	332	8.5	12.4	62.3	2.7	37.7	6.6	10.5	1.0
2014II	330	8.0	11.9	61.9	2.3	38.1	6.3	10.2	0.7
2015	333	8.1	11.9	61.5	2.2	38.5	7.4	11.2	1.6
2015II	335	7.8	11.6	59.9	2.4	40.1	6.9	10.7	1.6
2016	335	7.5	11.7	60.2	1.8	39.8	6.5	10.6	0.9
2016II	334	7.5	11.0	61.0	2.2	39.0	6.1	9.6	0.9
2017	220	8.2	12.1	60.4	2.4	39.6	6.0	9.9	0.4
2017II	210	8.3	12.0	60.7	2.6	39.3	6.1	9.8	0.6

Table B.47: Data for Utilities. Source: Own calculations based on Bloomberg's data.

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