



ELSEVIER

Contents lists available at ScienceDirect

# Emerging Markets Review

journal homepage: [www.elsevier.com/locate/emr](http://www.elsevier.com/locate/emr)



## Capital budgeting practices: A survey of Central and Eastern European firms<sup>☆</sup>



Gyorgy Andor<sup>a</sup>, Sunil K. Mohanty<sup>b,\*</sup>, Tamas Toth<sup>a</sup>

<sup>a</sup> Department of Finance, Budapest University of Technology and Economics, Budapest, Hungary

<sup>b</sup> Department of Finance, Brooklyn College, City University of New York (CUNY), Brooklyn, NY 11210, United States

### ARTICLE INFO

#### Article history:

Received 17 November 2013

Received in revised form 22 February 2015

Accepted 2 April 2015

Available online 10 April 2015

#### JEL classification:

G31

G32

F23

#### Keywords:

Capital budgeting

Cost of capital

Central and Eastern Europe

### ABSTRACT

We survey 400 executives in ten countries in Central and Eastern Europe (CEE) and report the results of their companies' capital budgeting practices. We find that capital budgeting practices in CEE countries are influenced mostly by firm size, multinational culture, firms' goals, and the presence of code of ethics, and to a lesser extent, by executive ownership, number of projects analyzed, and target leverage. We compare our results with prior studies and find significant variations in capital budgeting practices across 35 countries, among high, upper middle, and lower middle income countries, and across seven geographic regions.

© 2015 Elsevier B.V. All rights reserved.

### 1. Introduction

Capital budgeting decisions are among the most important decisions that the financial manager of a firm has to make. Capital budgeting process refers to the process of selection of investment projects that maximize shareholder value. Prior studies related to capital budgeting practices have mostly focused on developed

<sup>☆</sup> The authors would like to thank William G. Christie, John Cantwell, and John Graham for useful comments. The authors gratefully acknowledge the comments from Krueger Philipp and from Joaquim Ferrão (the discussants) and session participants at the 2011 European Financial Management Association Annual Meeting and 2012 Portuguese Finance Network Conference. The second author is grateful to the Budapest University of Technology and Economics (BUTE) for providing a research scholar grant for this project. The financial support of the Opus College of Business at the University of St. Thomas and Brooklyn College of City University of New York (CUNY) is gratefully acknowledged. The contribution made by the individuals who gave freely of their time in responding to phone interviews is also greatly appreciated. The authors are grateful to Teresa Marchant for providing additional survey data for Canadian firms and to Jing Zhang for providing excellent research assistance. The authors remain responsible for any errors.

\* Corresponding author.

E-mail addresses: [andor@finance.bme.hu](mailto:andor@finance.bme.hu) (G. Andor), [skmohanty@brooklyn.cuny.edu](mailto:skmohanty@brooklyn.cuny.edu) (S.K. Mohanty), [toth@finance.bme.hu](mailto:toth@finance.bme.hu) (T. Toth)

economies (e.g., U.S., Canada, Australia, and Western European countries). However, much less is known about how capital budgeting decisions are made in transitional economies (e.g., post-communist countries in Central and Eastern Europe), which is the topic of this paper.

Previous research (e.g., [Bennouna et al., 2010](#); [Brounen et al., 2004](#); [Graham and Harvey, 2001](#)) addresses how corporate finance theories have been adopted by financial managers in practice. However, one would argue that most of the stylized facts are likely to be rooted in the U.S. and Western European empirical evidence. Several studies document fundamental differences between financial markets, legal systems, and institutional settings, when comparing the U.S. with Western Europe (e.g., [La Porta et al., 1997, 1998](#)). Among countries and regions, there are significant differences in the extent to which investors are protected from expropriation by managers (e.g., [La Porta et al., 2000](#)). [Rajan and Zingales \(2003\)](#) indicate that institution-heavy relationship-based system is more prevalent in continental Europe, while the market-intensive arms' length system is more prevalent in the U.S. and Canada. [Chew \(1997\)](#) finds that market-based corporate governance system differs significantly from the insider-based or relationship-based governance system. For example, [Brounen et al. \(2004\)](#) provide survey evidence that firms in the U.K. and the Netherlands strive to maximize shareholders' wealth, while German and French firms attach a low priority to this corporate goal. [Licht et al. \(2005, 2007\)](#) show how culture, law, and corporate governance mechanisms affect corporate management decisions. [Stulz and Williamson \(2003\)](#) suggest that corporate financial practices are influenced by national culture. Similarly, [Li et al. \(2013\)](#) provide theoretic model and empirical evidence on how national culture influences corporate risk-taking behavior. Finally, most of corporate finance theories have been developed under the assumption that capital markets are "semi-strong" efficient. However, this assumption seems to be questionable when it is applied to emerging markets that are typically characterized by higher information asymmetries, higher transaction costs, relatively concentrated ownership with small and medium enterprises, and relatively low market liquidity. For example, [Maquieira et al. \(2012\)](#) and [Mendes-Da-Silva and Saito \(2014\)](#) find evidence that capital budgeting practices of firms in Latin America where capital markets are still emerging are significantly different from those of developed countries.

In this study, we conduct a comprehensive survey that asks business executives from a wide range of firms in the Central and Eastern Europe (CEE) region<sup>1</sup> to describe their choices related to capital budgeting analysis and decisions. We measure the extent to which corporate finance theories explain the capital budgeting practices in Central and Eastern European countries. The CEE region consists of several small, open economies where most of the GDP is produced by small- and medium-sized companies with a strong interdependence on multinational companies. We include ten CEE countries in our survey. These countries are considered either high or middle income countries based on the OECD classification.<sup>2</sup> CEE countries are characterized by diverse culture, languages, legal systems, institutional settings, and corporate governance mechanisms. These countries tend to have a well-developed banking system, but they tend to have less developed capital markets that are likely be less efficient and less liquid than developed capital markets. The levels of economic and financial development in CEE countries tend to be lower than those of developed countries in North America and Western Europe. Most firms in CEE countries tend to be small or medium private enterprises. Given the significant differences between developed and emerging economies; between efficient and less-efficient capital markets; between market-based and relationship-based corporate governance systems; between levels of economic and capital market development; and given significant differences across national cultures, we argue that capital budgeting practices in CEE countries are likely to be different from those in the U.S. or Western Europe.

Prior studies indicate that the difference in the level of economic development between two countries can significantly affect corporate finance practices (e.g., [Hermes et al., 2007](#); [Rajan and Zingales, 2003](#)), so we also investigate whether capital budgeting practices differ significantly across country income groups and geographic regions. We compare our results with that of prior field studies which examine capital budgeting practices of firms in North America: the USA, and Canada ([Bennouna et al., 2010](#); [Graham and Harvey,](#)

---

<sup>1</sup> Central and Eastern European (CEE) countries in this article (Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Slovenia) are referred to as the Eastern bloc countries west of the post-WWII border with the former Soviet Union. These countries made the transition from communist to capitalist systems and experienced rapid socio-economic and cultural changes over the past two decades while gradually integrating into the European Union (EU).

<sup>2</sup> High-incomes: Croatia, Czech Republic, Latvia, Lithuania, Poland, Slovak Republic, and Slovenia; upper-middle-incomes: Bulgaria, Hungary, and Romania. (Source: The World Bank, <http://data.worldbank.org/about/country-classifications>, 2013.)

2001); in South America: Argentina, Brazil, Chile, Colombia, Ecuador, Uruguay, Peru, and Venezuela (Maquieira et al., 2012; Mendes-Da-Silva and Saito, 2014); in East Asia and Pacific: Australia, China, Hong Kong, Indonesia, Malaysia, the Philippines, and Singapore (Hermes et al., 2007; Kester et al., 1999; Truong et al., 2008); in South Asia: India (Singh et al., 2012); in Africa: South Africa (Correia and Cramer, 2008); and in Western Europe: the U.K., the Netherlands, Germany, France, Finland, and Sweden (Arnold and Hatzopoulos, 2000; Brounen et al., 2004; Daunfeldt and Hartwig, 2014; Hermes et al., 2007; Holmén and Pramborg, 2009; Liljeblom and Vaihekoski, 2004).

Our paper contributes to the corporate finance literature in a number of ways. First, we use the field study method in finance, which to date remains a relatively rare approach in corporate finance literature. Second, many previous studies applying comprehensive survey approaches focus only on developed countries such as the USA, U.K. and Western Europe. In this study, we survey a large number of financial executives in ten countries in Central and Eastern Europe (CEE) and report the results of their companies' capital budgeting practices. We examine the use of different capital budgeting methods, and the relation between capital budgeting practices and the general goals of firms. Therefore, our survey results are useful to both practitioners and investors because they will learn more about capital budgeting practices of firms in CEE countries. To our knowledge, none of the empirical studies has yet addressed capital budgeting practices of firms in CEE countries that are next to the most developed economies in terms of GDP per capita except for [Hernádi and Ormos' \(2012\)](#) study which provides an analysis and discussion on capital structure decisions in CEE countries. Third, this study is broader in scope than other capital budgeting surveys. We compare the corporate finance practices of 35 countries in seven geographic regions (Central and Eastern Europe, Western Europe, North America, South America, East Asia and Pacific, South Asia, and Africa) around the world. We also compare capital budgeting practices among countries by economic development (high income, upper middle income, and lower middle income).

We sample a large cross section of approximately 70,000 firms (excluding micro-firms) representing a wide variety of firms and industries across ten CEE countries — Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Slovenia. We collect 400 responses by conducting a telephone survey. Then, we restrict our analysis to 333 sample firms that follow a formal capital budgeting practice and thus create a sample size representing one of the largest survey samples in the financial literature.<sup>3</sup> We analyze responses conditional on several key firm characteristics such as firm size, number of projects analyzed in a year, executive ownership, code of ethics, target leverage, and the role of Western management culture. We also examine the relation between capital budgeting practices and general goals of the companies. Our empirical evidence is consistent with several theoretical predictions and empirical findings of earlier studies. The main results of our survey indicate that the use of discounted cash flow (DCF) method in CEE countries is positively related to firm size (e.g., [Brounen et al., 2004](#); [Graham and Harvey, 2001](#); [Hermes et al., 2007](#)), management culture, and business ethics (e.g., [Li et al., 2013](#); [Licht et al., 2005](#); [Stulz and Williamson, 2003](#)), and to a lesser extent, to the executive ownership, number of projects analyzed, and target leverage. Our survey results suggest that top executives of firms in CEE countries are mostly concerned with the long-term performance (stability) and solvency (liquidity) of their firms instead of maximization of shareholder wealth. These findings are consistent with our predictions that national culture (e.g., [Li et al., 2013](#)), legal systems, institutional settings, and corporate governance mechanisms (e.g., [Brounen et al., 2004](#); [Chew, 1997](#); [La Porta et al., 2000](#); [Rajan and Zingales, 2003](#)) influence corporate capital budgeting practices. One of the interesting findings of our survey results shows that despite the use of advanced capital budgeting techniques a good project can be rejected by top management due to several reasons such as lack of financial resources, lack of strategic fit, lack of trust in analysts, or credible data sources.

We compare the use of discounted cash flow (DCF, hereafter), payback period (PP, hereafter), and accounting-based (AB, hereafter) methods in CEE countries with 25 other countries. We also compare our results with those of lower middle income, upper middle income, and high income countries and with capital

<sup>3</sup> The following field studies on corporate finance use large-sized samples: [Graham et al. \(2010\)](#) more than 1000 CEOs and CFOs; [Graham et al. \(2005\)](#) 401 financial executives; [Graham and Harvey \(2001\)](#) 392 CFOs; [Brav et al. \(2005\)](#) and [Brav and Lehavy \(2003\)](#) 384 financial executives; [Brounen et al. \(2004\)](#) 313 CFOs; [Moore and Reichert \(1983\)](#) 298 large firms; [Maquieira et al. \(2012\)](#) 290 firms; [Daunfeldt and Hartwig \(2014\)](#) 193 respondents; [Holmén and Pramborg \(2009\)](#) 143 respondents; [Mendes-Da-Silva and Saito \(2014\)](#) 91 respondents; and [Bennouna et al. \(2010\)](#) 88 respondents.

budgeting practices of six other geographic regions (e.g., Western Europe, North America, South America, East Asia and Pacific, South Asia, and Africa). Consistent with findings of previous studies (e.g., [La Porta et al. \(1997, 1998, 2000\)](#), [Hermes et al. \(2007\)](#), and [Maquieira et al. \(2012\)](#)), we report significant variations in capital budgeting practices across geographic regions and levels of economic development.<sup>4</sup>

The paper is organized as follows. In the next section, we provide a brief overview of prior studies on capital budgeting practices. In [Section 3](#), we present our methodology and describe our data set, sample design, and collection procedure. In [Section 4](#), we offer a comprehensive overview of the survey results for CEE countries and how they compare with findings of previous international studies. Finally, in [Section 5](#), we offer some concluding remarks.

## 2. Prior studies on capital budgeting practices: a brief overview

Over the past four decades, numerous capital budgeting surveys have been conducted to confront corporate finance theory with practice by financial managers. The following includes a summary of major studies on capital budgeting practices around the world.

[Graham and Harvey \(2001\)](#) conduct a comprehensive field study on the practice of corporate finance. They survey financial executives who are members of the Financial Executives Institute (FEI) and have held policy-making positions as CFOs, treasurers, and controllers in 8000 companies throughout the USA and Canada. They sent questionnaires to 4440 FEI members (including 313 CFOs of Fortune 500 companies). They received 392 completed questionnaires with a response rate of nearly 9%. Approximately 67% of the responding firms were publicly traded and about half of them had sales greater than 500 million USD. In later years, [Graham et al. \(2005\)](#) surveyed 401 U.S. financial executives on corporate financial reporting, [Brav et al. \(2005\)](#) surveyed 384 financial executives to determine the factors that drive dividend and share repurchase decisions, and more recently [Graham et al. \(2010\)](#) surveyed more than 1000 CEOs and CFOs to understand how capital is allocated and decision-making authority is delegated within firms.

Another study includes [Bennouna et al. \(2010\)](#) who conducted a mail survey in Canada. The survey population included the 500 largest firms that were listed in the Financial Post magazine. Their sample contained 88 firms with a response rate of 18.4%. The sales revenues of the sample firms varied from 1000 to 1999 million Canadian dollars.

[Brounen et al. \(2004\)](#) chose 6000 firms in the U.K., Germany, and France and 500 firms in the Netherlands for a total of 6500 firms. These firms were publicly traded as well as privately held. Their sample firms included demographic data about the CFOs from the Amadeus data sets. The response rate for their survey was only 5% (313 responses), which is quite low compared to other surveys. Only 30% of the responding firms were publicly listed and about half of the responding firms had sales more than 100 million Euros.

[Hermes et al. \(2007\)](#) conducted a survey on China and the Netherlands that mostly focused on listed companies. They received 42 responses from Dutch firms of which 69% were publicly traded firms, while 93% of Chinese responding firms were publicly traded ones. Almost half of the Dutch firms had sales more than 500 million Euros (36% were above one billion), whereas 84% of the Chinese sample firms had sales under 500 million Euros. Neither had sales above one billion.

[Kester et al. \(1999\)](#) surveyed the capital budgeting practices of Australia, Hong Kong, Indonesia, Malaysia, the Philippines, and Singapore. They sent questionnaires to the executives of the listed companies from each country's stock exchange. They received 226 responses.

[Maquieira et al. \(2012\)](#) examined the capital budgeting practices of Latin America. They obtain their 290 responses mainly from alumni of MBA, a Master in Finance programs and from firms registered at the Chilean Stock Exchange. [Mendes-Da-Silva and Saito \(2014\)](#) examined the Brazilian practice of listed and not listed firms and they received 91 responses.

<sup>4</sup> In our study, we compare our survey results to those of Argentina, Australia, Brazil, Canada, Chile, China, Colombia, Ecuador, Finland, France, Germany, Hong Kong, India, Indonesia, Malaysia, the Netherlands, Peru, the Philippines, Singapore, South Africa, Sweden, the United Kingdom, the United States, Uruguay, and Venezuela.

### 3. Methodology and data

Comparing capital budgeting practices among firms in developed countries (e.g., the USA and Western European countries) with those of CEE countries is challenging because CEE countries are less developed; the average GDP per capita in the CEE region is about half the amount of that of the most developed countries. When determining the methodology of the survey, the comparability of our survey with prior studies was one of the most important criteria. Therefore, we study prior surveys related to corporate budgeting practices that will provide us with some useful information to conduct a comparative study at the country level. As a benchmark to our study, we choose related journal articles that have received the highest citation rate in the Web of Science database. The top paper on this topic with hundreds of citations is the one written by [Graham and Harvey \(2001\)](#) for the USA and Canada,<sup>5</sup> followed by [Brounen et al. \(2004\)](#) for the United Kingdom, the Netherlands, Germany, and France. In addition, we also examine other recent surveys on this topic to obtain comparable research results to a wider variety of countries. [Table 1](#) summarizes economic development and GDP data at the country level for ten CEE countries and their comparisons with selected reference countries.

#### 3.1. Sample design

The first and foremost goal of our study is to select a sample of firms that maximizes representation and minimizes firm-specific differences across the ten CEE countries. Our second goal is to include an adequate number of firms representing small, medium, and large companies<sup>6</sup> (that have been operating over the past two decades in the CEE region). Our third goal is to select a sample that represents firms from ten countries, while accounting for either a country's total population or its GDP. Since our interest in this survey lies in the CEE region, we treat the group of ten countries as one large country. Therefore, we select randomly the appropriate number of firms in proportion to a country's GDP purchasing power parity (PPP) data (see [Table 1](#)).<sup>7</sup>

[Table 2](#) summarizes the number of Forbes 500 and Forbes 2000 companies by country. For the purpose of international comparison, we create 'Number of Forbes 500/2000 companies per 1000 billion USD GDP' indexes. As can be seen in [Table 2](#), the weights of these countries in terms of their GDPs are not negligible. However, the number of large companies present in our sample countries is extremely low compared to the USA or Western Europe. While the 'Forbes 2000 company/1000 billion USD GDP' index is between 28–33 on average for Western Europe and Northern America, and 13 for the East Asia and Pacific region; it is only 5 for the CEE region. Looking at the 'Forbes 500 company/1000 billion USD GDP' index, the difference is quite high with an average index of 11, 10, and 3 for Western Europe, North America, and the East Asia and Pacific regions respectively. In contrast, the same index is close to zero for Central and Eastern European countries.

It is also important to note that a few large firms (Forbes 500 or Forbes 2000) that belong to CEE countries are not internationally well-known.<sup>8</sup> Looking at other studies on the large firms in this region, e.g., [Deloitte Central and Eastern Europe Top 500 \(Deloitte, 2011\)](#), we find that a significant number of companies have strategic alliances with a number of foreign Forbes 2000 companies (e.g., BP in Poland; General Electric in Hungary; Volkswagen in Poland; Nokia in Hungary; Panasonic in Czech Republic; Samsung in Hungary; Kia Motors in Slovakia; Siemens Group in Czech Republic; Philip Morris in Poland; and Nestle in Poland). Large firms that contribute to the economic growth in the CEE region are usually multinationals.

While it is logical to study the capital budgeting practices of the listed firms in the Western economies, it does not make sense to focus on the listed firms in the CEE region for two reasons. First, the multinationals operating in this region contribute significantly to the GDP of the CEE region, but they are not usually listed in local stock exchanges. Thus, listed firms in local stock exchanges do not necessarily represent a sample of major companies operating in the CEE region. Second, the use of listed firms as the representative sample

<sup>5</sup> The authors received the Jensen Prize for the best corporate finance paper published in the *Journal of Financial Economics* in 2001.

<sup>6</sup> All state-owned companies are excluded from our sample.

<sup>7</sup> Among GDP indexes, the PPP-adjusted GDP index seems to best represent the region. GDP PPP per capita reflects the economic differences among CEE countries.

<sup>8</sup> E.g. CEZ, MOL, OTP Bank, PKO Bank Polski, PGE Polska Grupa, PKN Orlen, Pgnig Group, KGHM Polska Miedz, and Grupa Lotos.

**Table 1**

Data for the ten CEE countries and their comparison with selected reference countries.

Source of 'Development,' 'Population,' and 'GDP (PPP)': Country and Lending Groups' Data, World Bank, 2013. ([www.data.worldbank.org](http://www.data.worldbank.org)).

Country	Region	Development	Population (m)	GDP PPP (mUSD)	GDP PPP per Cap. (USD)
Bulgaria	Central & Eastern Europe	Upper middle income	7,265,115	115,810	15,941
Croatia	Central & Eastern Europe	High income	4,252,700	88,899	20,904
Czech Republic	Central & Eastern Europe	High income	10,521,468	287,702	27,344
Hungary	Central & Eastern Europe	Upper middle income	9 897 247	226 424	22,878
Latvia	Central & Eastern Europe	High income	2 013 385	46 364	23,028
Lithuania	Central & Eastern Europe	High income	2 956 121	75 135	25,417
Poland	Central & Eastern Europe	High income	38 530 725	896 795	23,275
Romania	Central & Eastern Europe	Upper middle income	19 963 581	372 017	18,635
Slovak Republic	Central & Eastern Europe	High income	5 414 095	141 386	26,114
Slovenia	Central & Eastern Europe	High income	2 060 484	58 308	28,298
Finland	Western Europe	High income	5 439 407	208 061	38,251
France	Western Europe	High income	66 028 467	2 436 930	36,907
Germany	Western Europe	High income	80 621 788	3 493 479	43,332
Netherlands	Western Europe	High income	16 804 224	729 366	43,404
Sweden	Western Europe	High income	9 592 552	417 597	43,533
United Kingdom	Western Europe	High income	64 097 085	2 320 104	36,197
Canada	North America	High income	35 158 304	1 520 493	43,247
United States	North America	High income	316 128 839	16 800 000	53,143
Brazil	South America	Upper middle income	200 361 925	3 012 197	15,034
Argentina	South America	Upper middle income	41 446 246	609 889	14,715
Chile	South America	High income	17 619 708	386 071	21,911
Colombia	South America	Upper middle income	48 321 405	597 781	12,371
Ecuador	South America	Upper middle income	15,737,878	164,756	10,469
Peru	South America	Upper middle income	30,375,603	357,684	11,775
Uruguay	South America	High income	3,407,062	66,743	19,590
Venezuela	South America	Upper middle income	30,405,207	553,190	18,194
Australia	East Asia and Pacific	High income	23,130,900	1,007,353	43,550
China	East Asia and Pacific	Upper middle income	1,357,380,000	16,157,704	11,904
Hong Kong	East Asia and Pacific	High income	7,187,500	382,396	53,203
Indonesia	East Asia and Pacific	Lower middle income	249,865,631	2,388,413	9559
Malaysia	East Asia and Pacific	Upper middle income	29,716,965	692,335	23,298
Philippines	East Asia and Pacific	Lower middle income	98,393,574	642,764	6533
Singapore	East Asia and Pacific	High income	5,399,200	425,155	78,744
India	South Asia	Lower middle income	1,252,139,596	6,774,441	5410
South Africa	Africa	Upper middle income	52,981,991	662,470	12,504
C & E Europe			102,874,921	2,308,841	231,834
Western Europe			242,583,523	9,605,537	241,624
North America			351,287,143	18,320,493	96,390
South America			387,675,034	5,748,311	124,059
East Asia and Pacific			1,771,073 770	21,696,119	226,790
South Asia			1,252,139 596	6,774,441	5410
Africa			52,981,991	662,470	12,504
<i>Total in the sample</i>			4,160,615,978	65,116,213	938,610
<i>World</i>			7,124,543,962	101,827,928	14,293

for our study is also problematic because the number of listed firms per country varies widely across these ten CEE countries. Therefore, we do not focus on listed firms in our sample.

Our sample firms are drawn from the Amadeus database of Bureau Van Dijk (2008), the same one used by Brounen et al. (2004). This dataset covers all firms in Europe. According to the European Union (2003), we categorize the firms into 'micro,' 'small,' 'medium,' and 'large' groups. From these categories we drop the micro-firms because we only include firms with more than 25 employees.<sup>9</sup> The primary criterion for the

<sup>9</sup> This restriction is very important considering the number of firms because the ratio of micro-firms to the total number of firms is above 90%.

**Table 2**

Forbes 500 and Forbes 2000 companies in the CEE countries and in the selected reference countries.

Source of 'Forbes 500 company' and 'Forbes 2000 company': Forbes.com, Business, 'The World's Leading Companies', Global 500, Global 2000, ([www.forbes.com](http://www.forbes.com)).

Country	Region	Forbes 500 company	Forbes 500 company/1000 billion USD GDP	Forbes 2000 company	Forbes 2000 company/1000 billion USD GDP
Bulgaria	Central & Eastern Europe	–	–	–	–
Croatia	Central & Eastern Europe	–	–	–	–
Czech Republic	Central & Eastern Europe	1	3	1	3
Hungary	Central & Eastern Europe	–	–	2	9
Latvia	Central & Eastern Europe	–	–	–	–
Lithuania	Central & Eastern Europe	–	–	–	–
Poland	Central & Eastern Europe	–	–	8	9
Romania	Central & Eastern Europe	–	–	–	–
Slovak Republic	Central & Eastern Europe	–	–	–	–
Slovenia	Central & Eastern Europe	–	–	–	–
Finland	Western Europe	2	10	12	58
France	Western Europe	27	11	64	26
Germany	Western Europe	23	7	50	14
Netherlands	Western Europe	10	14	24	33
Sweden	Western Europe	9	22	26	62
United Kingdom	Western Europe	30	13	95	41
Canada	North America	23	15	65	43
United States	North America	159	9	543	32
Brazil	South America	6	2	31	10
Argentina	South America	–	–	–	–
Chile	South America	–	–	9	23
Colombia	South America	1	2	6	10
Ecuador	South America	–	–	–	–
Peru	South America	–	–	2	6
Uruguay	South America	–	–	–	–
Venezuela	South America	–	–	1	2
Australia	East Asia and Pacific	14	14	42	42
China	East Asia and Pacific	31	2	136	8
Hong Kong	East Asia and Pacific	8	21	46	120
Indonesia	East Asia and Pacific	2	1	9	4
Malaysia	East Asia and Pacific	2	3	20	29
Philippines	East Asia and Pacific	–	–	8	12
Singapore	East Asia and Pacific	6	14	20	47
India	South Asia	10	1	56	8
South Africa	Africa	4	6	19	29
C & E Europe		1	0	11	5
Western Europe		101	11	271	28
North America		182	10	608	33
South America		7	1	49	9
East Asia and Pacific		63	3	281	13
South Asia		10	1	56	8
Africa		4	6	19	29
<i>Total in the sample</i>		368	6	1295	20
<i>World</i>		500	5	2000	20

classification of a company being 'small,' 'medium,' or 'large' is based on the number of employees that the firm has, and the two secondary criteria are total assets and sales revenue. Firms with number of employees between 25 and 50 (and with sales revenue and/or total assets above 1 million Euros) are classified as small firms (1st population); firms with number of employees between 51 and 250 (and with sales revenue and/or total assets between 10 and 50 million Euros) are classified as medium firms (2nd population). The remaining firms, those with more than 250 employees (and with sales revenue and/or total assets above 50 million Euros), are classified as large firms. To design a more representative sample, we further divide large firms into three additional categories (roughly equal populations by number of employees): firms with number

**Table 3**

Design and selection of sample firms from CEE countries.

Country	Bulgaria	Croatia	Czech Republic	Hungary	Latvia	Lithuania	Poland	Romania	Slovakia	Slovenia	Total
Number of firms in the data set	4434	3676	13,467	2682	2359	3533	16,055	18,547	3242	1918	69,913
1st population (25–50 employees)	1706	138	5174	968	794	1242	372	8864	888	663	25,399
Responses from the 1st population	2	2	6	4	1	1	14	6	3	1	40
Responses with formal analysis from 1st population	0	2	2	4	0	1	11	3	3	0	26
2nd population (51–250 employees)	1721	1841	6759	1252	1294	1979	9034	8174	1888	949	34,891
Responses from the 2nd population	3	2	8	7	2	2	21	9	4	2	60
Responses with formal analysis from 2nd population	3	3	6	7	2	1	19	7	2	0	50
3rd population (251–375 employees)	334	152	511	156	91	104	1101	503	155	102	3209
4th population (376–650 employees)	339	152	511	155	90	104	1100	503	156	102	3212
5th population (650 employees)	335	152	511	151	90	104	1100	503	155	102	3203
Responses from the 3rd, 4th, and 5th pop.	5–5–5	4–4–4	15–14–14	12–12–11	2–2–2	4–3–4	36–36–36	14–14–14	6–6–6	3–3–4	300
Responses with formal analysis from 3rd, 4th, and 5th	5	11	28	32	4	10	105	36	16	10	257
Total responses	20	16	57	46	9	14	143	57	25	13	400
Responses with formal analysis	8	16	36	43	6	12	135	46	21	10	333



**Table 4**

Correlations among firm characteristic variables of the survey.

	Size <sup>a</sup>	Number of analyzed projects <sup>b</sup>	Ownership <sup>c</sup>	Code of ethics	Leverage target	Western management culture <sup>d</sup>	Reject/support good/bad projects	Cost of capital calculation <sup>e</sup>	Profit <sup>f</sup>	Dividend <sup>f</sup>	Market value <sup>f</sup>	Sales <sup>f</sup>	Stability <sup>f</sup>	Assets <sup>f</sup>
Number of analyzed projects <sup>b</sup>	0.145**													
Ownership <sup>c</sup>	-0.216***	-0.301***												
Code of ethics	0.094*	0.055	-0.026											
Leverage target	0.082	0.092	-0.066	0.158***										
Western management culture <sup>d</sup>	0.111*	0.093	-0.060	0.139***	0.005									
Reject good projects	0.094*	0.133***	-0.139**	0.043	0.078	0.011								
Cost of capital calculation <sup>e</sup>	-0.057	0.022	-0.115*	0.064	0.024	0.175**	0.058							
Profit	-0.094*	-0.050	0.083	0.072	-0.030	0.016	-0.050	0.094						
Dividend	-0.017	0.016	-0.063	0.000	0.033	-0.048	-0.005	0.016	0.294***					
Market value	0.007	-0.004	-0.012	0.131**	0.112**	0.028	-0.026	0.077	0.052	0.148***				
Sales	0.041	-0.083	-0.003	0.028	0.122**	-0.060	-0.051	0.031	0.048	-0.017	0.125**			
Stability	-0.040	-0.003	0.074	-0.016	0.051	-0.053	0.038	0.052	0.066	0.032	0.025*	0.112**		
Assets	0.004	-0.027	0.014	0.100*	0.000	0.045	-0.124**	-0.045	0.130***	0.166***	0.104	0.049	0.092*	
Liquidity	-0.042	0.020	0.021	0.002	-0.005	0.036	-0.007	0.039	0.144***	0.100**	0.240***	0.074	0.237***	0.153***

Index of Phi is reported. This statistic measures the correlation of bivariate values.

<sup>a</sup> Large firms have sales of at least 10 million Euro.<sup>b</sup> Many is more than 10 in a year.<sup>c</sup> High is greater than 5%.<sup>d</sup> Western: Western Europe, USA and Canada.<sup>e</sup> For projects or for the whole company.<sup>f</sup> Answers 'very important' are reported.

\*\*\* Denotes a significant difference at the 1% level.

\*\* Denotes a significant difference at the 5% level.

\* Denotes a significant difference at the 10% level.

of employees between 251 and 375 belong to the 3rd population, large firms with number of employees between 376 to 650 belong to the 4th, and large firms with number of employees over 650 are put into the 5th population. We drop the firms with missing data. As a result, we lose about 10% of the total firms from the data set. However, the number of firms included in each population is at least ten times larger than the expected response numbers. Finally, we include only those firms that conduct formal capital budgeting analysis.

The number of expected responses for each population is determined in advance. Our goal is to collect 400 usable responses that represent small, medium, and large firms from each of the ten CEE countries. We choose 10% of the total responses from the first population, 15% from the second population, and 25% from each of the third, fourth, and fifth populations. This implies that our sample consists of 100 responses (that is, 25%) from smaller companies and 300 (that is, 75%) from larger companies – considering the typical company size for this region. Table 3 reports the population and expected number of responses from each of the five populations for each country. A separate row in Table 3 shows the number of respondent firms from each of the ten countries. For example, the largest number of firms represented in our sample is drawn from Poland (143 firms), while the smallest number of firms is drawn from Latvia (9 firms).

### 3.2. *Delivery and response*

Following Graham and Harvey's (2001) survey, we initially developed our questionnaires in English and then have them translated into ten languages. This process has raised some challenging issues here. Although these countries have relatively small populations and are located in close proximity to each other, languages spoken in the CEE region vary significantly across countries. Moreover, there is no common spoken language in the CEE region even though the knowledge of English has become increasingly important over the past decade. Given the low level of proficiency and comprehension of the English language among native people in this region, we do not use an English form of the questionnaire. Instead, we develop questionnaires in ten native languages for each country in the CEE region. However, when we translate the questionnaires we face several other challenges. First, even though business managers from CEE countries are more likely to be familiar with modern corporate finance literature in terms of their local language, they are less likely to be familiar with the terminology written in the English language. Second, business managers may use special words in their local language as the equivalent to a given English term. Third, there have been large gaps between newly developed academic jargons and everyday slangs used by local managers in these countries. To overcome such challenges encountered in translating the survey questionnaires, we conduct a phone survey in the respondents' native languages instead of conducting mail surveys. Oral interviews provide us the opportunity to interact with respondents and help them understand the terminology and special meanings associated with corporate finance theory and practice.

Phone interviews were carried out during the 2007–2009 period with the assistance of a multinational polling company that had a professional call center. Operators are native speakers of the local languages and are trained on the corporate finance aspects of the survey by the authors of this study. For example, prior to conducting any phone interviews, each caller had to take part in a special professional course presented by authors of this paper. In addition, we also sought assistance from faculty members of finance departments at other universities from these ten CEE countries. Native operators were allowed to make some changes to the translation after the first few interviews.<sup>10</sup>

One of the main advantages of conducting the phone survey is that the number of expected responses for each basket is determined in advance. The call center is programmed in such a way that several companies are randomly dialed from each basket until the expected numbers of responses are recorded. When the operator reaches a target person (CEO, CFO, or other person responsible for capital budgeting analyses), he or she is asked general questions first that can be answered by all high-ranking managers (e.g., questions about sales revenue, ownership structure, and company goals). The key question for each respondent is: "Do you make any formal (written, based on quantitative data) capital budgeting analyses?" When the answer is "No,"

<sup>10</sup> The problem associated with the use of phone interviews as opposed to mail-in surveys is discussed by Brounen et al. (2004). In their survey, respondents had the option to fill out a questionnaire. In the end, 19% of their responses came from phone conversations; half were received by mail or fax, and 30.3% through their web page. Therefore, they investigated whether the returned questionnaires contained a bias caused by the type of response medium (mail, fax, telephone, or Internet). They analyzed both the average responses and the distributions within each cluster, and they found only a very small variation in answers based on the response medium.

details about capital budgeting practices are not asked at all, and we collect these questionnaires separately. Our survey finds that 83% of the respondents (333 out of 400 sample firms) do make formal capital budgeting analyses. It is surprising that some of the large firms in the CEE region make capital budgeting decisions without making any formal written or quantitative analyses. These findings may be attributed to lack of availability of reliable data.

## 4. Survey results

### 4.1. Correlation analysis of demographic variables

We use several binary dummy variables to describe sample firm characteristics. The variable used to measure the effect of firm size is 'size.' Size is equal to one (large) if a firm's sales revenue is greater than 10 million Euros; otherwise it is zero (small). Based on this criterion, our survey shows that one-third of our sample firms in CEE countries are 'small' and two-thirds of our sample firms are 'large.' The variable used to describe the number of projects analyzed by a firm in a given year is 'number of analyzed projects.' Number of analyzed projects is equal to one (many) if a firm analyzes more than ten projects in a year<sup>11</sup>; otherwise it is zero (few). The variable used to measure the effect of executive ownership is 'ownership.' Ownership is equal to one (high) if the management owns more than 5% of the company; otherwise it is zero (low). Firms respond 'yes' to the question related to code of ethics if they have written documents on ethical considerations.<sup>12</sup> 'Code of ethics' is equal to one (yes) if a firm adheres to a written code of ethics; otherwise it is zero (no). Similarly, if the firm has a target financial leverage ratio, the variable 'leverage target' is equal to one (yes); otherwise it is zero (no).<sup>13</sup> The 'Western management culture' variable is used to measure the influence of Western management culture on capital budgeting practices of CEE firms. Western management culture is equal to one (yes) if the company reports a dominance of a foreign management culture that is rooted in Western culture such as Western Europe, USA, or Canada<sup>14</sup>; otherwise it is zero. The variable 'reject (support) bad (good) project' is designed to address other factors beyond formal capital budgeting analysis that may affect management decisions on the rejection of a 'good' project or acceptance of a 'bad' project.<sup>15</sup> Reject (support) bad (good) project is equal to one (yes) if the firm rejects a good project or accepts a bad project; otherwise it is zero. We also ask whether firms use a given value for cost of capital for all projects or different costs of capitals for each project. The response to the 'cost of capital calculation' variable is 'projects' when the company makes calculations for each project and 'cost of capital calculation' is 'company' when firms make only one calculation for the entire firm and use this rate for all its projects. 'Cost of capital calculation' variable is equal to one (projects); otherwise it is zero (company).

Table 4 presents correlations among the demographic variables. The results show that large firms have a lower proportion of management ownership, which is consistent with evidence reported in [Graham and Harvey \(2001\)](#) study. Even though large companies operating in CEE countries are more likely to evaluate a higher number of projects than small–medium firms, a number of good projects can be rejected by top management due to several reasons such as lack of availability of financial resources, lack of strategic fit, ethical consideration, lack of trust in analysts, and lack of credible data or methods. The correlation results reported in Table 4 indicate a significant positive association between firm size and Western management culture. Consistent with findings of prior studies (e.g., [Li et al., 2013](#); [Stulz and Williamson, 2003](#)), this evidence suggests that capital budgeting practices among large firms in CEE countries are likely to be influenced by multinational Western management culture.

<sup>11</sup> Survey question: Approximately how many projects are evaluated with a quantitative analysis in your company a year?

<sup>12</sup> Because of the language and cultural problems, the question was much more complex: 'Is there any written document on your company values in relation with the followings issues: a) society or the wider community; b) suppliers; c) employees; d) shareholders; e) customers?'

<sup>13</sup> 'Does your firm have a target value for the leverage ratios (debt/total asset ratio in book value)?'

<sup>14</sup> 'Which country's management culture dominates in your firm (besides the local one)?'

<sup>15</sup> 'Does it happen that a project is supported or rejected in spite of the result of the above outlined analysis?'

**Table 5**

Survey responses to the question: how frequently does your firm use the following techniques when deciding which projects to pursue?

	Size <sup>d</sup>		Number of analyzed projects <sup>e,f</sup>		Ownership <sup>g</sup>		Code of ethics		Leverage target		Western management culture <sup>h</sup>		
	Small	Large	Few	Many	Low	High	No	Yes	No	Yes	No	Yes	
	N = 333	N = 108	N = 225	N = 133	N = 160	N = 238	N = 95	N = 123	N = 210	N = 222	N = 111	N = 238	N = 95
Frequent <sup>a</sup> users of DCF	0.61	0.56	0.64	0.60	0.65	0.62	0.59	0.52	0.67 <sup>***</sup>	0.63	0.58	0.58	0.71 <sup>**</sup>
Frequent users of PP	0.80	0.73	0.83 <sup>**</sup>	0.79	0.84	0.81	0.78	0.75	0.83 <sup>*</sup>	0.79	0.82	0.77	0.86 <sup>*</sup>
Frequent users of AB	0.72	0.70	0.72	0.71	0.71	0.71	0.74	0.67	0.75 <sup>**</sup>	0.70	0.76	0.72	0.72
Not frequent <sup>b</sup> users of these	0.05	0.08	0.04	0.05	0.06	0.05	0.06	0.09	0.03 <sup>***</sup>	0.05	0.07	0.07	0.02 <sup>*</sup>
Frequent users of DCF & PP	0.53	0.46	0.56 <sup>*</sup>	0.52	0.60	0.55	0.49	0.45	0.58 <sup>**</sup>	0.54	0.51	0.49	0.64 <sup>**</sup>
Frequent users of DCF & AB	0.47	0.46	0.48	0.48	0.49	0.48	0.45	0.37	0.54 <sup>***</sup>	0.49	0.44	0.45	0.54
Frequent users of PP & AB	0.60	0.55	0.63	0.59	0.61	0.60	0.60	0.53	0.64 <sup>**</sup>	0.58	0.64	0.58	0.64
Frequent users of all three	0.41	0.39	0.42	0.41	0.45	0.42	0.38	0.32	0.47 <sup>***</sup>	0.42	0.40	0.38	0.48 <sup>*</sup>
Occasional <sup>c</sup> users of SA	0.40	0.27	0.47 <sup>***</sup>	0.35	0.47 <sup>**</sup>	0.45	0.29 <sup>**</sup>	0.37	0.42	0.35	0.51 <sup>***</sup>	0.39	0.43
Occasional users of RO	0.17	0.17	0.18	0.20	0.14	0.16	0.22	0.11	0.21 <sup>**</sup>	0.15	0.23 <sup>*</sup>	0.16	0.21

DCF means discounted cash flow method; PP means payback method; AB means accounting based approach, SA means sensitivity analysis approach, and RO implies real option method.

<sup>a</sup> Almost always or always (= 1).<sup>b</sup> Never or sometimes (= 1).<sup>c</sup> Sometimes, almost always or always (= 1).<sup>d</sup> Large firms have sales of at least 10 million Euro.<sup>e</sup> Many is more than 10 in a year.<sup>f</sup> Sum of usable answers is less than 333.<sup>g</sup> High is greater than 5%.<sup>h</sup> Western: Western Europe, USA and Canada.

\*\*\* Denotes a significant difference at the 1% level.

\*\* Denotes a significant difference at the 5% level.

\* Denotes a significant difference at the 10% level.

#### 4.2. Capital budgeting methods in Central and Eastern Europe

According to the theory of capital budgeting, it is generally accepted, that the proper method for investment project valuation is based on the DCF technique. There are two basic types of DCF approaches: (1) the internal rate of return (IRR, hereafter) method and (2) the net present value (NPV, hereafter) method. The IRR method examines whether the project future cash flows produce higher average yearly yield than the average capital market investment with similar risk.

The NPV method examines whether the present value of the discounted project's future cash flows is higher than the present value of the investment cash flows. Despite the fact that the two methods are theoretically identical, the two concepts were treated separately, mainly due to the multiple root problem associated with the IRR approach. While the NPV calculation has always a mathematically unique result, the IRR calculation can be derived only from trial and error, and as the function is a polynomial of order  $n$ , it has  $n$  roots. Recent studies, however, solved this issue (e.g. Hazen, 2003; Osborne, 2010; Weber, 2014 have provided solutions to this hundred-year-old debate). The findings of the above studies imply that a proper IRR always exists. It is unique, and can be compared to the cost of capital of the project. Thus, both IRR and NPV approaches used to make capital budgeting decisions are consistent. Hence, our survey is different from the earlier studies. In this study, we do not distinguish between the uses of the two methods. Further, our study does not distinguish between the use of NPV and IRR because previous studies do not find any survey evidence on the use of only one method.

According to the corporate finance theory there are many versions of NPV calculation, such as adjusted present value (APV), free cash flow (FCF), or equity cash flow (ECF) methods. All these methods are built upon the shareholder value paradigm advanced by Marshall, Markowitz, Sharpe, Modigliani, Miller, Fama, Treynor, Black etc., and all build on the same DCF concept. We believe that if both methods are correctly used capital budgeting decisions will lead to the same result. However, the DCF method does not account for the flexibility of the project's investment. In such case, capital budgeting decisions call for the real option (RO, hereafter) method. In addition to DCF analysis, corporate managers sometimes use sensitivity analysis (SA) method which is considered to be a more sophisticated approach to measure project's risk.

To study capital budgeting practices in the CEE region, we ask respondents whether they conduct any formal capital budgeting analysis. Next, we ask whether they use any kind of DCF technique such as IRR, profitability index (PI, hereafter), NPV or its variants like APV, ECF or FCF. Then we ask separately whether they use the simple PP method since this method is based on cash flows but does not utilize a discounting technique.<sup>16</sup> For this reason, the discounted payback period (hereafter, DPP) is considered as a type of DCF method.<sup>17</sup>

Then we ask whether they use any kind of accounting-based (AB) such as accounting rate of return (ARR), return on investment (ROI), return on assets (ROA), and simple earnings multiples.<sup>18</sup> These valuation methods do not use any kind of discount rates, and the calculations are mainly based on accounting data. Following Graham and Harvey (2001) and Brounen et al. (2004), we also ask respondents whether they use more advanced methods ('modern' techniques) like sensitivity analysis (SA) and real option (RO) analysis.<sup>19</sup> Finally, we ask respondents whether it is possible that a project can be rejected due to a variety of other reasons such as lack of financial resources, strategic considerations, ethical issues, or lack of credible data or analyses.

Table 5 shows the results of univariate analyses on survey responses conditional on several firm characteristics including size, number of projects per year, managerial ownership, code of business ethics, target leverage, and Western management culture. These results shed light on corporate finance practices among business firms in CEE countries and may have implications on various corporate finance theories and practices. We perform a Chi-square test for each of the above firm characteristic variables and present our results in Table 5.

<sup>16</sup> Survey question: Do you always or almost always calculate payback period? (Simple, not discounted)?

<sup>17</sup> Survey question: Do you always or almost always use some kind of DCF-based (discounted cash flow-based) analysis technique (e.g., NPV and IRR)?

<sup>18</sup> Survey question: Do you always or almost always calculate some kind of accounting-based index or rate?

<sup>19</sup> Survey questions: Do you (sometimes) make sensitivity analyses? Do you (sometimes) make real option analyses?

**Table 6**  
Conditional proportions of capital budgeting techniques.

	DCF	PP	AB	SA	RO
If DCF is used, then ... is also used	–	0.87	0.78	0.50	0.30
If PP is used, then ... is also used	0.69	–	0.75	0.44	0.21
If AB is used, then ... is also used	0.69	0.84	–	0.45	0.23
If SA is used, then ... is also used	0.78	0.87	0.81	–	0.36
If RO is used, then ... is also used	1.00	0.86	0.86	0.72	–

'Used' means at DCF, PP, and AB; 'frequently used' (almost always or always), at SA and RO; 'sometimes used' (sometimes, almost always or always).

Our results reported in column (1) of Table 5 indicate that only 61% of respondents use DCF-based capital budgeting techniques frequently. It is worth highlighting that the other 39% of respondents who make formal capital budgeting analyses do not (or rarely) use DCF-based analysis.

Our analysis reveals some interesting results when we examine the responses conditional on firm size and management ownership characteristics. Large firms are significantly more likely to use DCF (56%) methods than small–medium firms (45%). Results reported in Table 5 show that there is no significant difference in the DCF or AB method used by large firms and small firms. Large companies are also significantly more likely to use SA (47%) than small–medium firms (22%). This evidence is consistent with prior studies (e.g., Pike, 1996; Sangster, 1993, for U.K. firms; Graham and Harvey, 2001, for U.S. and Canadian firms) that find a significant positive association between size and the use of advanced capital budgeting techniques. Large firms that use sophisticated capital budgeting techniques such as SA and RO analyses are significantly more likely to use target debt ratio for their firms to avoid any potential bankruptcy problem in a bad economy. Large firms are also more likely to analyze more than ten projects in a year and use advanced capital budgeting techniques such as SA than small–medium firms. Our survey results show that only 17% of our sample firms that follow a formal capital budgeting practice use the RO analysis occasionally. The use of RO analysis seems to be less popular among CEE firms. Our results reported in Table 5 show that there is no significant difference in the use of the RO analysis between large and small firms. It is possible that some managers do not make such complex real option valuations, which are suggested in textbooks (e.g., with volatility estimations and Black–Scholes/binomial option pricing models), but they indicate or evaluate the option-like flexibility features in other (e.g., descriptive) ways.

It is also possible that large firms that are influenced by the Western management culture are significantly more likely to use DCF methods than small–medium firms. Capital budgeting practices in small–medium firms in the CEE region are more likely to be influenced by local culture. Large and multinational firms endowed with managerial talent and financial resources are more likely to use DCF methods and other advanced capital budgeting techniques that are linked to value-based management models. Further, large firms that have written documents on code of ethics are significantly more likely to use several capital budgeting techniques including DCF, PP, and AB methods compared to small–medium firms that have no written documents on code of ethics. Finally, conditional analyses show that there is no significant difference in capital budgeting methods used by firms with high and low executive ownership.

It is likely that companies simply do not choose one of the above capital budgeting techniques. Our survey results show that firms choose a portfolio approach using more than one capital budgeting technique at a time. The summary results reported in Table 6 indicate that among the respondents who use DCF-based analysis, 87% of them are frequent users of the PP technique while 78% of them are frequent users of the AB technique. Among those firms that do not utilize DCF analysis, 50% of them use SA, while 30% of them use RO analysis. Firms that use sensitivity or real option analysis are more likely to use risk-adjusted discount rates.

The survey results also indicate that large, medium, and small firms rely on simple capital budgeting techniques such as PP and AB methods. These results shed light that different capital budgeting methods used by CEE firms provide a variety of pertinent information to management for making investment decisions. For example, the PP method offers a measure for both liquidity and risk of a capital investment project.

In our survey, we include a question related to the importance of various stakeholders and company goals. We ask our respondents how important the following goals are for their firm on a scale of 1 to 4 (1 being 'not

**Table 7**  
Survey responses to the question: how important are the following goals for your firm?

	Profit		Dividend		Market value		Sales		Stability		Assets		Liquidity		
	Not so important	Very important	Not so important	Very important	Not so important	Very important	Not so important	Very important	Not so important	Very important	Not so important	Very important	Not so important	Very important	
	N = 333	N = 155	N = 178	N = 241	N = 92	N = 137	N = 196	N = 108	N = 225	N = 76	N = 257	N = 252	N = 81	N = 89	N = 244
Frequent <sup>a</sup> users of DCF	0.61	0.59	0.63	0.62	0.59	0.61	0.62	0.69	0.58*	0.59	0.62	0.61	0.62	0.62	0.61
Frequent users of PP	0.80	0.77	0.82	0.80	0.78	0.77	0.82	0.81	0.80	0.86	0.78	0.79	0.83	0.81	0.80
Frequent users of AB	0.72	0.76	0.68*	0.74	0.65	0.66	0.76*	0.71	0.72	0.70	0.72	0.70	0.78	0.64	0.75*
Not frequent <sup>b</sup> users of these	0.05	0.05	0.06	0.05	0.05 <sup>d</sup>	0.05	0.06	0.02	0.07**	0.05	0.05 <sup>d</sup>	0.06	0.05 <sup>d</sup>	0.04	0.06 <sup>d</sup>
Frequent users of DCF & PP	0.53	0.47	0.58**	0.54	0.51	0.51	0.55	0.58	0.51	0.55	0.53	0.52	0.56	0.53	0.53
Frequent users of DCF & AB	0.47	0.48	0.47	0.49	0.43	0.45	0.49	0.55	0.44*	0.49	0.47	0.46	0.51	0.47	0.48
Frequent users of PP & AB	0.60	0.61	0.59	0.61	0.57*	0.54	0.64	0.62	0.59	0.61	0.60	0.57	0.69*	0.52	0.63*
Frequent users of all three	0.41	0.38	0.44	0.41	0.40	0.37	0.44	0.47	0.38	0.45	0.40	0.39	0.47	0.39	0.42
Occasional <sup>c</sup> users of SA	0.40	0.47	0.34**	0.42	0.36	0.35	0.44	0.40	0.40	0.45	0.39	0.40	0.42	0.42	0.40
Occasional users of RO	0.17	0.15	0.20	0.17	0.20	0.17	0.18	0.17	0.18	0.16	0.18	0.15	0.23*	0.18	0.17

<sup>a</sup> Almost always or always.

<sup>b</sup> Never or sometimes.

<sup>c</sup> Sometimes, almost always or always.

<sup>d</sup> Chi-square results may be invalid. (More than 20% of cells in this sub-table have expected cell counts less than five.)

\*\* Denotes a significant difference at the 5% level.

\* Denotes a significant difference at the 10% level.

**Table 8**

Survey responses to the question: does it happen that a project is supported or rejected in spite of the result of the above outlined analysis? Why?

	Reason														
	Reject		Lack of financial resources		Because of strategic goals		Due to ethical considerations		Distrust of analysts		Distrust of data		Distrust of methods		
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	
	N = 333	N = 129	N = 204	N = 189	N = 144	N = 250	N = 83	N = 149	N = 184	N = 143	N = 190	N = 146	N = 187	N = 179	N = 154
Frequent <sup>a</sup> users of DCF	0.61	0.53	0.66**	0.61	0.61	0.59	0.69	0.56	0.65*	0.55	0.66**	0.55	0.66*	0.58	0.65
Frequent users of PP	0.80	0.79	0.80	0.83	0.76	0.80	0.80	0.78	0.82	0.79	0.81	0.78	0.81	0.79	0.81
Frequent users of AB	0.72	0.67	0.75*	0.70	0.74	0.71	0.73	0.70	0.73	0.69	0.74	0.70	0.73	0.70	0.73
Not frequent <sup>b</sup> users of these	0.05	0.06	0.05	0.04	0.07	0.06	0.05 <sup>d</sup>	0.07	0.04	0.06	0.05	0.07	0.04	0.06	0.05
Frequent users of DCF & PP	0.53	0.48	0.56**	0.55	0.51	0.52	0.58	0.49	0.57	0.49	0.56	0.49	0.57	0.51	0.56
Frequent users of DCF & AB	0.47	0.39	0.53**	0.47	0.48	0.45	0.55*	0.42	0.52*	0.41	0.53**	0.42	0.52*	0.44	0.51
Frequent users of PP & AB	0.60	0.57	0.62	0.61	0.58	0.60	0.59	0.57	0.63	0.58	0.62	0.58	0.62	0.59	0.61
Frequent users of all three	0.41	0.35	0.45*	0.42	0.40	0.40	0.46	0.36	0.45	0.36	0.45	0.36	0.45	0.39	0.44
Occasional <sup>c</sup> users of SA	0.40	0.31	0.46***	0.34	0.49***	0.38	0.46	0.32	0.47***	0.32	0.46***	0.32	0.47***	0.38	0.43
Occasional users of RO	0.17	0.14	0.20	0.12	0.24***	0.17	0.19	0.14	0.20	0.15	0.19	0.13	0.21*	0.15	0.21

<sup>a</sup> Almost always or always.<sup>b</sup> Never or sometimes.<sup>c</sup> Sometimes, almost always or always.<sup>d</sup> Chi-square results may be invalid. (More than 20% of cells in this sub-table have expected cell counts less than five.)

\*\*\* Denotes a significant difference at the 1% level.

\*\* Denotes a significant difference at the 5% level.

\* Denotes a significant difference at the 10% level.



important' and 4 being 'very important'): profit, dividend, market value, sales, stability, and assets.<sup>20</sup> Survey responses reported in Table 7 show that long-term survival of the firm is by far the most important goal (257 out of 333 responses), indicating that stability of performance is very important for a typical CEE firm. The second and third most important goals of firms in the CEE region are liquidity (244 out of 333 responses) and sales (225 out of 333 responses), respectively. The two least popular goals for firms operating in the CEE region are maximization of dividends (92 out of 333 responses) and maximization of assets (81 out of 333 responses). These results differ substantially from Brounen et al. (2004) who surveyed corporate governance practices in Western Europe (the U.K., the Netherlands, France, and Germany). Their study finds that maximization of accounting profit is the most important goal for Western European firms followed by sustainable growth and maximization of market share goals. Their study finds that maximization of shareholders' wealth is an important goal for British and Dutch firms, but German and French firms consider the goal of shareholders' wealth maximization to be less important than optimizing financial leverage.

One of the most important results revealed from survey responses was conditional on several important company goals. Firms that believe in maximizing profits as an important goal are less likely to use AB methods and are more likely to use DCF and PP methods. Firms that prefer to maximize sales revenue are significantly more likely to use the DCF method. These findings suggest that when financial managers have short-term goals (profit or sales maximization goals), firms are more likely to use simple capital budgeting techniques such as payback period (PP) or discounted payback period (DPP) rather than NPV or IRR methods that are considered risk-adjusted discounted cash flow methods. DCF approaches are based on the value maximization concept. When firms focus on the profit maximization goal, they are less likely to use sophisticated capital budgeting techniques such as sensitivity analysis. Not surprisingly, the results reported in Table 7 show that firms that consider liquidity as the most important goal are significantly more likely to use AB and PP methods than other firms.

We further analyze the survey responses by asking the following question in our survey: "Does it happen that a project is supported or rejected by top management despite an unfavorable (favorable) decision based on formal capital budgeting analyses?" There are several reasons why a good project is rejected by top management including lack of financial resources, strategic considerations, ethical (moral) reasons, and lack of reliable data or credible analyses (e.g., availability of appropriate market index data or equity beta of the firm). Survey results reported in Table 8 confirms this hypothesis: a project can be rejected due to a variety of reasons despite being supported by DCF-based analysis, which contradicts the theory. The most popular response is the senior management's distrust in analysts and/or lack of credible sources of data used by such analysts.

The second most popular response for disapproval of a project despite being supported by data is ethical or moral considerations. It is possible that some projects may be accepted based on DCF analysis or other sophisticated capital budgeting techniques such as sensitivity analysis and real option analysis, but they may be rejected by senior management due to ethical and moral issues involving those projects. These results are consistent with prior studies (e.g. Li et al., 2013; Licht et al., 2005) indicating that corporate managerial decisions are influenced by national culture, legal and corporate governance system.

#### 4.3. Cost of capital calculation methods in Central and Eastern Europe

According to traditional textbook approach, the discount rate calculations in DCF methods are based on capital asset pricing model (CAPM). The discount rate reflects the relevant risk associated with an activity or an asset. In the APV or ECF methods, the CAPM is adequate to calculate the discount rates (one for equity and one for debt), in FCF method the weighted average of cost of capital (WACC) reflects the mix of equity and debt financing.

We continue our analysis by focusing on those firms that formally use DCF-based analyses. We also explore how the cost of capital of a firm is estimated. We are most interested in whether companies consider company-wide risk or project risk when evaluating their projects. Then we ask how they calculate the

<sup>20</sup> "How important are the following goals for your firm?"

**Table 9**

Survey responses to the question: what kind of method do you use to calculate this discount rate for the project (or for all projects of the company)?

	Calculation for		Size <sup>b</sup>		Number of analyzed projects <sup>c</sup>		Ownership <sup>d</sup>		Code of ethics		Leverage target		Western management culture <sup>e</sup>		
	Company	Projects	Small	Large	Few	Many	Low	High	No	Yes	No	Yes	No	Yes	
	N = 203	N = 72	N = 131	N = 59	N = 144	N = 79	N = 104	N = 147	N = 56	N = 64	N = 139	N = 139	N = 64	N = 136	N = 67
Calculate WACC	0.33	0.33	0.34	0.25	0.37	0.27	0.38*	0.36	0.27	0.33	0.34	0.34	0.33	0.34	0.33
Calculate CAPM	0.10	0.13	0.09	0.12	0.10	0.11	0.09	0.13	0.04*	0.11	0.10	0.10	0.11	0.09	0.13
Calculate WACC or CAPM <sup>a</sup>	0.08	0.04	0.10	0.14	0.06*, <sup>f</sup>	0.09	0.09	0.06	0.13 <sup>f</sup>	0.14	0.05*	0.07	0.09	0.10	0.04
Calculate, but not WACC or CAPM	0.04	0.06	0.04 <sup>f</sup>	0.03	0.05 <sup>f</sup>	0.05	0.03 <sup>f</sup>	0.03	0.09*, <sup>f</sup>	0.06	0.04 <sup>f</sup>	0.06	0.00**, <sup>f</sup>	0.06	0.01 <sup>f</sup>
Do not calculate	0.44	0.44	0.44	0.46	0.43	0.48	0.41	0.42	0.48	0.36	0.47	0.42	0.47	0.42	0.48
Calculations for the whole company	N = 72			0.40	0.34	0.33	0.34	0.39	0.25*	0.31	0.37	0.35	0.37	0.30	0.47*
Calculations by projects	N = 131			0.60	0.66	0.68	0.66	0.61	0.75*	0.69	0.63	0.65	0.63	0.70	0.53*

<sup>a</sup> Sometimes WACC, sometimes CAPM.<sup>b</sup> Large firms have sales of at least 10 million Euro.<sup>c</sup> Many is more than 10 in a year.<sup>d</sup> High is greater than 5%.<sup>e</sup> Western: Western Europe, USA and Canada.<sup>f</sup> Chi-square results may be invalid. (More than 20% of cells in this subtable have expected cell counts less than five.)

\*\* Denotes a significant difference at the 5% level.

\* Denotes a significant difference at the 10% level.

**Table 10**  
International comparison of use of capital budgeting methods by countries.

Country	Publication, (number of responses)	DCF FrU%	NPV FrU%	NPV Use%	NPV Mean	IRR FrU%	IRR Use%	IRR Mean	PP FrU%	PP Use%	PP Mean	AB FrU%	AB Use%	AB Mean
Bulgaria	This paper, (17)	<b>50%</b>	37%	68%	1.76	37%	68%	1.76	<b>100%</b>	100%	3.85	<b>75%</b>	94%	3.02
Croatia	This paper, (13)	<b>63%</b>	48%	75%	2.11	48%	75%	2.11	<b>69%</b>	90%	2.82	<b>63%</b>	86%	2.62
Czech Republic	This paper, (50)	<b>58%</b>	43%	72%	1.97	43%	72%	1.97	<b>83%</b>	100%	3.28	<b>64%</b>	87%	2.65
Hungary	This paper, (35)	<b>47%</b>	35%	66%	1.68	35%	66%	1.68	<b>67%</b>	89%	2.75	<b>81%</b>	98%	3.22
Latvia	This paper, (5)	<b>67%</b>	51%	77%	2.21	51%	77%	2.21	<b>50%</b>	77%	2.19	<b>100%</b>	100%	3.85
Lithuania	This paper, (10)	<b>50%</b>	37%	68%	1.76	37%	68%	1.76	<b>67%</b>	89%	2.75	<b>58%</b>	82%	2.45
Poland	This paper, (120)	<b>64%</b>	48%	76%	2.13	48%	76%	2.13	<b>87%</b>	100%	3.41	<b>63%</b>	86%	2.62
Romania	This paper, (50)	<b>72%</b>	55%	80%	2.35	55%	80%	2.35	<b>76%</b>	95%	3.05	<b>85%</b>	100%	3.35
Slovak Republic	This paper, (22)	<b>67%</b>	51%	77%	2.21	51%	77%	2.21	<b>76%</b>	95%	3.05	<b>86%</b>	100%	3.38
Slovenia	This paper, (11)	<b>60%</b>	45%	73%	2.02	45%	73%	2.02	<b>80%</b>	98%	3.18	<b>100%</b>	100%	3.85
Finland	Liljebloom and Vaihekoski (2004), (46)	54%	36%	<b>62%</b>	<b>1.74</b>	43%	<b>82%</b>	<b>1.97</b>	51%	<b>77%</b>	<b>2.23</b>	3%	<b>23%</b>	<b>0.64</b>
France	Brounen et al. (2004), (61)	<b>55%</b>	<b>35%</b>	70%	<b>1.86</b>	<b>44%</b>	79%	<b>2.27</b>	51%	83%	<b>2.46</b>	<b>16%</b>	54%	<b>1.11</b>
Germany	Brounen et al. (2004), (132)	<b>60%</b>	<b>48%</b>	78%	<b>2.26</b>	<b>42%</b>	76%	<b>2.15</b>	<b>50%</b>	79%	<b>2.29</b>	<b>32%</b>	65%	<b>1.63</b>
Netherlands	Brounen et al. (2004), (52)	<b>78%</b>	<b>70%</b>	89%	<b>2.76</b>	<b>56%</b>	80%	<b>2.36</b>	<b>65%</b>	84%	<b>2.53</b>	<b>35%</b>	60%	<b>1.40</b>
Netherlands	Hermes et al. (2007), (42)	100%	<b>89%</b>	104%	<b>3.50</b>	<b>74%</b>	93%	<b>2.98</b>	<b>79%</b>	96%	<b>3.10</b>	<b>2%</b>	36%	<b>0.24</b>
Sweden	Daunfeldt and Hartwig (2014), (193)	<b>69%</b>	<b>61%</b>	84%	<b>2.53</b>	<b>30%</b>	61%	<b>1.42</b>	<b>54%</b>	79%	<b>2.30</b>	<b>24%</b>	54%	<b>1.10</b>
Sweden	Holmén and Pråmberg (2009), (143)	56%	<b>49%</b>	<b>69%</b>	<b>2.11</b>	<b>34%</b>	<b>62%</b>	<b>1.73</b>	<b>57%</b>	<b>79%</b>	<b>2.39</b>	<b>38%</b>	<b>65%</b>	<b>1.84</b>
United Kingdom	Brounen et al. (2004), (68)	<b>68%</b>	<b>47%</b>	80%	<b>2.32</b>	<b>53%</b>	79%	<b>2.31</b>	<b>69%</b>	89%	<b>2.77</b>	<b>38%</b>	69%	<b>1.79</b>
United Kingdom	Arnold and Hatzopoulos (2000), (96)	<b>96%</b>	<b>63%</b>	<b>84%</b>	<b>2.67</b>	<b>68%</b>	<b>83%</b>	<b>2.77</b>	<b>46%</b>	<b>77%</b>	<b>2.16</b>	<b>41%</b>	<b>66%</b>	<b>1.92</b>
Canada	Bennouna et al. (2010), (69)	100%	<b>94%</b>	<b>97%</b>	<b>3.35</b>	<b>88%</b>	<b>95%</b>	<b>3.16</b>	<b>79%</b>	<b>94%</b>	<b>2.85</b>	<b>36%</b>	<b>69%</b>	<b>1.63</b>
USA, Canada	Graham and Harvey (2001), (392)	<b>97%</b>	<b>75%</b>	95%	<b>3.08</b>	<b>76%</b>	96%	<b>3.09</b>	<b>57%</b>	84%	<b>2.53</b>	<b>20%</b>	59%	<b>1.34</b>
Argentina, Brazil, Chile, Colombia, Ecuador, Peru, Uruguay, Venezuela	Maquieira et al. (2012), (290)	93%	<b>72%</b>	92%	<b>2.93</b>	<b>70%</b>	92%	<b>2.90</b>	<b>62%</b>	85%	<b>2.57</b>	<b>15%</b>	51%	<b>0.93</b>
Brazil	Mendes-Da-Silva and Saito (2014) (91)	100%	81%	98%	<b>3.20</b>	74%	93%	<b>2.98</b>	61%	84%	<b>2.54</b>	20%	56%	<b>1.20</b>
Australia	Kester et al. (1999), (57)	100%	80%	<b>96%</b>	<b>3.17</b>	80%	<b>96%</b>	<b>3.17</b>	53%	<b>93%</b>	<b>2.29</b>	30%	<b>73%</b>	<b>1.51</b>
Australia	Truong et al. (2008), (77)	94%	<b>86%</b>	<b>96%</b>	<b>3.34</b>	<b>64%</b>	<b>81%</b>	<b>2.55</b>	<b>59%</b>	<b>90%</b>	<b>2.61</b>	<b>19%</b>	<b>57%</b>	<b>1.22</b>
China	Hermes et al. (2007), (45)	94%	<b>49%</b>	84%	<b>2.51</b>	<b>89%</b>	102%	<b>3.38</b>	<b>84%</b>	97%	<b>3.16</b>	<b>9%</b>	52%	<b>1.00</b>
Hong Kong	Kester et al. (1999), (29)	72%	51%	<b>88%</b>	<b>2.21</b>	59%	<b>86%</b>	<b>2.50</b>	81%	<b>100%</b>	<b>3.20</b>	42%	<b>80%</b>	<b>1.92</b>
Indonesia		100%	83%	<b>94%</b>	<b>3.30</b>	78%	<b>94%</b>	<b>3.10</b>	50%	<b>81%</b>	<b>2.20</b>	20%	<b>56%</b>	<b>1.20</b>

Table 10 (continued)

Country	Publication, (number of responses)	DCF FrU%	NPV FrU%	NPV Use%	NPV Mean	IRR FrU%	IRR Use%	IRR Mean	PP FrU%	PP Use%	PP Mean	AB FrU%	AB Use%	AB Mean
Malaysia	Kester et al. (1999), (16)	91%	72%	<b>91%</b>	<b>2.90</b>	69%	<b>89%</b>	<b>2.83</b>	71%	<b>94%</b>	<b>2.88</b>	37%	<b>69%</b>	<b>1.76</b>
Philippines	Kester et al. (1999), (35)	100%	67%	<b>81%</b>	<b>2.75</b>	87%	<b>94%</b>	<b>3.42</b>	72%	<b>100%</b>	<b>2.90</b>	41%	<b>78%</b>	<b>1.90</b>
Singapore	Kester et al. (1999), (35)	85%	60%	<b>86%</b>	<b>2.53</b>	71%	<b>88%</b>	<b>2.89</b>	71%	<b>98%</b>	<b>2.89</b>	47%	<b>80%</b>	<b>2.07</b>
India	Singh et al. (2012), (31)	44%	11%	<b>50%</b>	0.90	52%	<b>79%</b>	2.27	38%	<b>68%</b>	1.78	0%	<b>39%</b>	0.38
South Africa	Correia and Cramer (2008), (28)	100%	<b>82%</b>	99%	3.25	<b>79%</b>	97%	3.14	<b>54%</b>	79%	2.31	<b>14%</b>	52%	1.00
Total in the sample	(2415)	84%	57%	84%	2.54	71%	91%	2.90	63%	86%	2.62	19%	56%	1.20

Mean: mean values on a scale of 0–4 (never–almost never–sometimes–almost always–always); FrU%: response rates provided by sample firms that frequently (almost always or always) use a method; DCF: any discounted cash flow method; NPV: net present value method; PP, payback method, AB: accounting-based (accounting rate of return) method. Bold numbers: values from surveys; italic numbers: calculated values.

Notes for Table 10:

1. The following scales are considered as a scale of 0–4 (never–almost never–sometimes–almost always–always): never–rarely–often–mostly–always in Arnold and Hatzopoulos (2000), and not applicable–not important–moderately important–important–very important in Truong et al. (2008).
2. The following scales are converted to a scale of 0–4 (never–almost never–sometimes–almost always–always): 0–3 (never–almost never–almost always–always) in Bennouna et al. (2010); 0–3 (never–in some cases–secondary–primary) in Liljeblom and Vaihekoski (2004); 0–5 (not used–unimportant–...–very important) in Both Mendes-Da-Silva and Saito (2014) and Kester et al. (1999). 0–1 (not used–used) in Singh et al. (2012).
3. Three regression equations are used at calculations:  $FrU\% = -0.16 + 0.30 \text{ mean}$ ;  $use\% = 0.31 + 0.21 \text{ mean}$ ; and  $DCF FrU\% = -0.16 + 0.19 (NPV \text{ mean} + IRR \text{ mean})$ . (If there were no NPV mean and IRR mean values, equal values for both were supposed.)

discount rate for the firm or project.<sup>21</sup> We specifically ask whether firms use the WACC or the CAPM to calculate the cost of capital.<sup>22</sup> Companies using only CAPM for calculating cost of capital presumably use APV or ECF methods (or they do not utilize debt). Only 4% of respondents reported 'special' cost of capital calculation methods that are different from WACC or CAPM.

Table 9 contains some surprising results. Thirty-five percent of our sample firms (72 out of 203 responses) that frequently use DCF-based models use a single, company-wide discount rate to evaluate a project even though different projects are likely to have different risk characteristics. However, approximately 65% (131 out of 203 responses) of firms that use DCF analyses are more likely to use risk-adjusted discount rates to evaluate their projects. This approach is consistent with the corporate finance theory that calls for the use of appropriate risk-adjusted discount rate based on the individual project risk. This evidence suggests that the theory–practice gap is bridging as practice moves toward theory. For example, Graham and Harvey (2001) reported that only 51% of the firms in the U.S. and Canada used always (or almost always) project specific discount rates.

We also examine the survey responses on the estimation of cost of capital conditional on DCF analysis and present some very interesting results. As can be seen in column (2) of Table 9, 33% of the firms that employ a single discount rate for all projects use WACC, while only 13% use the single CAPM. In contrast, 34% of sample firms use risk-adjusted discount rates to evaluate a project use WACC, while 9% of sample firms use the CAPM

<sup>21</sup> Survey question: Do you use only one given value of cost of capital in the company, or do you use different values for the different projects?

<sup>22</sup> Survey question: What kind of method do you use to calculate the discount rate for the project (or for all projects of the company)? (Possible answers: "We use the weighted average cost of capital (WACC)."; "We use the capital asset pricing model (CAPM) to calculate the discount rate for the firm.").

**Table 11**

International comparison of use of capital budgeting methods by regions and income levels.

Region/Income level	Population (m)	GDP PPP (mUSD)	GDP PPP per Cap. (USD)	Forbes 500/ GDP	Forbes 2000/ GDP	Nr. of responses	DCF FrU%	NPV FrU%	IRR FrU%	PP FrU%	AB FrU%
Europe (Central & Eastern)	102,874,921	2,308,841	22,443	0	5	333	62%	47%	47%	80%	72%
Europe (Western)	242,583,523	9,605,537	39,597	11	28	833	66%	49%	48%	54%	28%
North America	351,287,143	18,320,493	52,152	10	33	461	97%	75%	76%	57%	20%
South America	387,675,034	5,748,311	14,828	1	9	381	93%	72%	70%	62%	15%
East Asia and Pacific	1,771,073,770	21,696,119	12,250	3	13	348	95%	56%	85%	78%	14%
South Asia	1,252,139,596	6,774,441	5,410	1	8	31	44%	11%	52%	38%	0%
Africa	52,981,991	662,470	12,504	6	29	28	100%	82%	79%	54%	14%
High income in the sample	695,337,244	31,335,524	45,065	10	32	1742	85%	65%	65%	58%	26%
<i>High income</i>	1,299,500,000	52,223,548	40,187	–	–						
Upper middle income in the sample	1,864,879,933	23,975,071	12,856	2	9	591	71%	39%	66%	62%	10%
<i>Upper middle income</i>	2,390,200,000	32,451,607	13,577	–	–						
Lower middle income in the sample	1,600,398,801	9,805,618	6,127	1	7	82	47%	35%	35%	67%	81%
<i>Lower middle income</i>	4,913,600,000	29,474,528	5,999	–	–						
Total in the sample	4,160,615,978	65,116,213	1,010,106	6	20	2415	84%	57%	71%	63%	19%
<i>World</i>	7,124,543,962	101,827,928	14,293	5	20						

Notation, notes, and sources: see Tables 1, 2, and 10.

approach. Thus, the preferred approach to estimate the cost of capital for firms that utilize DCF methods to evaluate a project is the WACC method.

Not surprisingly, the use of the single CAPM method to estimate the discount rate seems to be less popular because most companies in CEE countries are not publicly traded. As discussed earlier, most CEE firms are typically privately held small–medium firms, and the equity beta of a private firm could only be estimated via analysis of a comparable publicly traded firm, which is difficult without having similar publicly traded reference companies. It is interesting to note that 44% of the sample firms do not calculate their cost of capital. Again, these firms are more likely to be privately held small–medium firms owned by company founders or family members. In contrast, firms that analyze more than ten investment projects in a year tend to be large, and they are significantly more likely to use the WACC method to calculate the cost of capital of a company or project than small–medium firms with limited resources. Companies with high executive ownership tend to be small–medium firms, and they are significantly less likely to use the CAPM method to estimate the discount rate of the firm. Finally, the results reported in Table 9 suggest that large firms whose corporate culture is dominated by Western management style are more likely to use a single discount rate for all projects.

#### 4.4. Use of capital budgeting methods: an international comparison

Prior studies (e.g., Chew, 1997; La Porta et al., 1998; Rajan and Zingales, 2003) show that laws and regulations and corporate governance systems related to shareholder protection vary significantly across countries depending on the development of capital markets, institutional settings, and legal systems.<sup>23</sup> These studies report that institutional settings can lead to an international variation in corporate finance practices. In this section, we compare the capital budgeting practices of firms in CEE countries with that of Graham and Harvey (2001) for U.S. and Canadian firms; Bennouna et al. (2010) for Canadian firms; Brounen et al. (2004) for firms in the U.K., the Netherlands, Germany, and France; Arnold and Hatzopoulos (2000) for

<sup>23</sup> Comparing the U.S. with Europe, La Porta et al. (1998) find that the difference between the two legal systems encompassing both continents is significant. Rajan and Zingales (2003) emphasize the continental differences by comparing the financial systems: the institution-heavy relationship-based financial system is more prevalent in Europe, and the market-intensive arms-length financial system is more prevalent in the United States. Chew (1997) shows how the Anglo-Saxon, market-based corporate governance system differs significantly from the relation-based system, which is most widespread in Europe.

firms in the U.K.; Holmén and Pramborg (2009) and Daunfeldt and Hartwig (2014) for Swedish firms; Liljelblom and Vaihekoski (2004) for firms in Finland; Hermes et al. (2007) for the Dutch and Chinese firms; Truong et al. (2008) for Australian firms; Maqueira et al. (2012) for firms in Argentina, Chile, Colombia, Ecuador, Peru, Uruguay, and Venezuela; Mendes-Da-Silva and Saito (2014) for Brazilian firms; Correia and Cramer (2008) for South African firms; Singh et al. (2012) for Indian firms; and Kester et al. (1999) for firms in Australia, Hong Kong, Indonesia, Malaysia, the Philippines, and Singapore. Our goal is to generate a consistent set of results from these studies so that we can draw an international comparison on the use of capital budgeting methods among various countries, geographic regions, and income groups.

We encounter some major problems when comparing the previous survey results with ours. Most surveys ask how frequently firms use the different capital budgeting techniques on different scales. We consider the scale of 0–4 used by Graham and Harvey (2001) as the standard scale and ordinal variables: ‘0—never’, ‘1—almost never’, ‘2—sometimes’, ‘3—almost always’, ‘4—always’, where ‘almost always’ and ‘always’ are considered as ‘frequently used’. That standard scale is adopted by Brounen et al. (2004), Correia and Cramer (2008), Daunfeldt and Hartwig (2014), Hermes et al. (2007), Holmén and Pramborg (2009), and Maqueira et al. (2012). Arnold and Hatzopoulos (2000) use a similar approach: ‘never’, ‘rarely’, ‘often’, ‘mostly’, ‘always’. On the other hand, Truong et al. (2008) use a 0–4 scale but with different ordinal variables: ‘not applicable’, ‘not important’, ‘moderately important’, ‘important’, ‘very important’. Although, the scale used by Bennouna et al. (2010) is similar, they use a 0–3 scale (‘never’, ‘almost never’, ‘almost always’, ‘always’). Therefore, we transform their results into a 0–4 scale by multiplying their mean values by 4/3. While Liljelblom and Vaihekoski (2004) use the 0–3 scale, their ordinal variables (‘never’, ‘in some cases’, ‘secondary’) differ from that of Bennouna et al. (2010). Both Mendes-Da-Silva and Saito (2014) and Kester et al. (1999) use a 0–5 scale, however the latter’s ordinal variables are similar to Truong et al. (2008) such as ‘0—not used’, ‘1—unimportant’, ‘2—somewhat important’, ‘3—important’; and ‘4—very important’. We transform their results by multiplying their mean values by 4/5.

After adjusting all the survey results to a standard 0–4 scale, we focus on the ‘frequently used’ (‘almost always’ and ‘always’) answers. In some prior studies we can find ‘frequently used’ responses separately, but in some cases we have to estimate those rates with the help of the (sometimes adjusted) mean values presented in these studies. Many surveys provide both mean values and frequency of responses for ‘almost always and always’ (or those can be calculated from other data), and we estimate that means of the survey results on a 0–4 scale and the frequency of responses for ‘3’ or ‘4’ are found to be highly correlated (Corr = 0.98; R-square = 0.96; Regression:  $a = 0.16$ ,  $b = 0.30$ ). Accordingly, where ‘frequently used’ data is missing, we are able to estimate those figures (and vice versa).

The second problem we encounter is related to the use of NPV, IRR, and the DCF method. It is very likely that a firm that uses the DCF method would also use NPV, IRR, or both. One of the goals of our survey is to investigate whether there is any gap between the capital budgeting theory and practice. Further, we are interested in learning whether firms frequently use (‘almost always or always’) any DCF method. Similar to Graham and Harvey (2001) and Brounen et al. (2004), we ask respondents whether they ‘almost always or always’ use any DCF method. While survey results are consistent in the case of the U.S. and Canada, survey results associated with the Netherlands, Germany, France, Sweden, and the U.K. (that used either NPV or IRR instead of the use of any DCF method) were adjusted to reflect the use of DCF approach.<sup>24</sup> Together with our 333 usable responses, we gather 2415 usable survey responses for 35 countries and report survey evidence on capital budgeting practices in Table 10.

We also present survey evidence comparing capital budgeting practices across seven geographic regions and three income groups in Table 11.

Survey evidence presented in Tables 10 and 11 indicates that there are significant differences across countries regarding the use of different capital budgeting techniques. For example, firms in the Netherlands, the USA, the U.K., Australia, Indonesia, the Philippines, Malaysia, and China utilize DCF methods as their most frequently used capital budgeting technique and, on average, they have response rates above 90%. In contrast, when we examine firms in Europe (mostly in Germany, France, Sweden, Finland, and in many of the CEE countries), we find that the DCF approach is not frequently used. The response rate for the use of DCF method ranges from 50% to 67% in these countries.

<sup>24</sup> We find a high correlation (corr = 0.89; R-square = 0.80; regression:  $a = -0.16$ ,  $b = 0.19$ ) between the ‘frequent use of DCF’ and the ‘sum of the mean of NPV and the mean of IRR’ from previous survey results.

We then explored whether such differences in the use of the DCF approach could be attributed to a country's geographic region. We find that the use of DCF methods is less popular in Western Europe (especially in Germany and France) as well as in Central and Eastern European countries than in North American, Asian and Pacific countries. Thus, the theory–practice gap continues to remain as a recurrent theme in the capital budgeting literature, in particular with respect to the use of the DCF method in Germany, France, Sweden, and Finland, and CEE countries. Our results seem to be consistent with the findings of prior studies (e.g., Chew, 1997; La Porta et al., 2000; Li et al., 2013; Licht et al., 2005, 2007; Rajan and Zingales, 2003) that suggest corporate finance practices may vary across countries or geographic regions due to differences in corporate governance and legal systems, institutional settings, and national culture.

Next, we turn to the use of PP method which seems to be quite popular (about 80% on average) in both CEE countries (former communist countries) and China. These results are not surprising for three reasons. First, our survey results show that firms in CEE countries prefer liquidity and stability as their most important goals and the payback method is generally perceived to be related to liquidity and stability goals of such firms. Second, since emerging markets (e.g., China and CEE countries) are known to suffer from higher market volatility in general, firms from emerging economies tend to emphasize payback method. Third, Danielson and Scott (2006) suggest that small firms suffer from capital constraints and therefore, they rely on PP approach because it focuses on liquidity. Moreover, most firms in CEE countries tend to be small in comparison to those in North America. Therefore, it makes sense why PP method is the most prevalent capital budgeting technique in CEE countries.

The international comparison results presented in Table 11 show that the use of AB and PP methods vary widely across countries, geographic regions and income groups. The response rate for the use of AB methods is significantly higher in CEE countries (72% on average) than that of Western European countries (23% on average). Prior studies related to capital budgeting practices find that the PP method is widely used in China (e.g., Hermes et al., 2007) and Latin America (Maquieira et al., 2012). Above findings have significant implications for capital budgeting practices in emerging markets. Capital markets in emerging economies are more volatile and relatively less liquid than those in developed economies. Moreover, emerging economies are dominated by mostly small–medium firms that face capital constraints, and require liquidity as their top priority when evaluating capital budgets. Hence, corporate managers are primarily concerned with liquidity needs for their firms (e.g., Maquieira et al., 2012). Therefore, our findings suggest that corporate managers from emerging markets are more likely to use PP method as their preferred capital budgeting technique than those from developed markets.

Prior literature (e.g., Hermes et al., 2007) suggests that levels of economic developments have significant impact on corporate finance practices. Consistent with Hermes et al. (2007) findings, our international comparison results reported in Table 11 (with 2415 responses) indicate a positive relation between the level of economic development and the use of 'modern' capital budgeting techniques such as DCF method. In the case of the high income countries, the response rate for the use of the DCF method is the highest (85%), while the response rate for the upper-middle-income countries is lower than that of high income countries (71%). In the case of the lower-middle income countries, the response rate for the use of DCF method is the least among all three groups (47%). In contrast, the response rate for the use of non-DCF method such as PP in the case of high-income countries is lowest (58%), while the response rate for the use of PP for the upper-middle-income countries is higher than that of high-income countries (62%). In the case of the lower middle-income countries, response rate for the use of PP method is the highest (67%) among these three groups. We attribute these results to several factors related to the level of economic, financial, human capital, and technological development among three income groups (lower middle, upper-middle, and high income countries).

## 5. Conclusions

Ours is the first field study that focuses on capital budgeting practices of firms in Central and Eastern European (CEE) countries. We provide survey evidence on capital budgeting practices in ten CEE countries. Our survey results indicate that corporate finance practices in CEE countries are influenced mostly by firm size, management culture, and code of ethics and, to a lesser extent, by executive ownership, number of projects analyzed per year, and target leverage. The same is true for estimation of the cost of capital and the use of CAPM. These results suggest that large firms as well as multinational firms are more likely to have the skilled manpower, technical knowledge and expertise, financial resources, and a formal capital budgeting

process in place than small–medium firms. Large and multinational firms are more likely to use DCF and other sophisticated techniques than small and medium firms. One of the interesting findings of our survey is that despite the use of advanced capital budgeting techniques, including DCF methods and sensitivity analysis or real option analysis, a good project that is selected based on DCF analysis can be rejected by top management due to several other factors such as ethical and moral considerations, lack of financial resources, strategic fit, trust in the analysts or credible sources of data.

We compare capital budgeting practices across 35 countries, three income groups (high, upper middle, and lower middle income countries), and seven geographic regions (Central and Eastern Europe, Western Europe, North America, South America, East Asia and Pacific, South Asia, and Africa). We find significant variations in the capital budgeting practices across countries, income groups, and geographic regions. Corporate finance practices across countries, income groups, and geographic regions might differ from one country to other, from high income countries to lower-middle income countries, or from one geographic region to another due to the diversity of institutional settings, level of economic developments, different national culture, different corporate governance systems, and to the degree of influence of multinational companies' culture on local firms.

We hope our findings fill a gap in the corporate finance literature and will lead to the development of new theories or modification of existing ones. We also believe that further research is needed to increase our understanding of the theory and practice of corporate finance in CEE countries. As a next step, it would be interesting to extend our work by making direct comparison between the capital budgeting practices of small–medium firms in the Central and Eastern European and Asia-Pacific countries. Are there significant variations in capital budgeting practices of small–medium firms across emerging economies in CEE and Asia-Pacific countries and between the two geographic regions? These questions are beyond the scope of the current paper but definitely deserve further research.

## References

- Arnold, G., Hatzopoulos, P., 2000. The theory–practice gap in capital budgeting: evidence from the United Kingdom. *J. Bus. Financ. Account.* 27, 603–626.
- Bennouna, K., Meredith, G., Marchant, T., 2010. Improved capital budgeting decision making: evidence from Canada. *Manag. Decis.* 48 (2), 225–247.
- Brav, A., Lehavy, R., 2003. An empirical analysis of analysts' target prices: short-term informativeness and long-term dynamics. *J. Financ.* 58 (5), 1933–1968.
- Brav, A., Graham, J., Harvey, C., Michaely, R., 2005. Payout policy in the 21st century: the data. *J. Financ. Econ.* 77 (3), 483–527.
- Brounen, D., De Jong, A., Koedijk, K., 2004. Corporate finance in Europe: confronting theory with practice. *Financ. Manag.* 33 (4), 71–101.
- Bureau Van Dijk, 2008. Amadeus database. Bureau Van Dijk
- Chew, D., 1997. *Studies in International Corporate Finance and Governance Systems: A Comparison of the U.S., Japan, and Europe*. Oxford University Press, Oxford.
- Correia, C., Cramer, P., 2008. An analysis of cost of capital, capital structure and capital budgeting practices: a survey of South African listed companies. *Meditari Account. Res.* 16 (2), 31–52.
- Danielson, M., Scott, J., 2006. The capital budgeting decisions of small business. *J. App. Financ.* 16 (2), 45–56.
- Daunfeldt, S.-O., Hartwig, F., 2014. What determines the use of capital budgeting methods? Evidence from Swedish listed companies. *J. Financ. Econ.* 2 (4), 101–112.
- Deloitte, 2011. Top 500 Central Europe. Deloitte Central Europe.
- European Union, 2003. European Union Directives. Directive 2003/361/EU, European Union.
- Graham, J., Harvey, C., 2001. The theory and practice of corporate finance: evidence from the field. *J. Financ. Econ.* 60 (2), 187–243.
- Graham, J., Harvey, C., Rajgopal, S., 2005. The economic implications of corporate financial reporting. *J. Account. Econ.* 40, 3–73.
- Graham, J., Harvey, C., Puri, M., 2010. A corporate beauty contest. *National Bureau of Economic Research*, No. w15906.
- Hazen, G.B., 2003. A new perspective on multiple internal rates of return. *Eng. Econ.* 48 (1), 31–51.
- Hermes, N., Smid, P., Yao, L., 2007. Capital budgeting practices: a comparative study of the Netherlands and China. *Int. Bus. Rev.* 16 (5), 630–654.
- Hernádi, P., Ormos, M., 2012. Capital structure and its choice in Central and Eastern Europe. *Acta Oecon.* 62 (2), 229–263.
- Holmén, M., Pramborg, B., 2009. Capital budgeting and political risk: empirical evidence. *J. Int. Financ. Manag. Account.* 20, 105–134.
- Kester, G., Chang, R.P., Echanis, E.S., Haikal, S., Isa, M., Skully, M.T., Tsui, K.C., Wang, C.J., 1999. Capital budgeting practices in the Asia-Pacific region: Australia, Hong Kong, Indonesia, Malaysia, Philippines, and Singapore. *Financ. Pract. Educ.* 9 (1), 25–33.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R.W., 1997. Legal determinants of external finance. *J. Financ.* 52, 1131–1150.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R.W., 1998. Law and finance. *J. Polit. Econ.* 106 (6), 1113–1155.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R.W., 2000. Investor protection and corporate governance: an international comparison. *J. Financ. Econ.* 58, 3–27.
- Li, K., Griffin, D., Yue, H., Zhao, L., 2013. How does culture influence corporate risk-taking? *J. Corp. Financ.* 23, 1–22.
- Licht, A.N., Goldschmidt, C., Schwartz, S.H., 2005. Culture, law, and corporate governance. *Int. Rev. Law Econ.* 25, 229–255.
- Licht, A.N., Goldschmidt, C., Schwartz, S.H., 2007. Culture rules: the foundations of the rule of law and other norms of governance. *J. Comp. Econ.* 35, 659–688.
- Liljeblom, E., Vaihkoski, M., 2004. Investment evaluation methods and required rate of return in Finnish publicly listed companies. *Finn. J. Bus. Econ.* 54, 9–24.



- Maquieira, C.P., Preve, L.A., Sarria-Allende, V., 2012. Theory and practice of corporate finance: evidence and distinctive features in Latin America. *Emerg. Mark. Rev.* 13 (2), 118–148.
- Mendes-Da-Silva, W., Saito, R., 2014. Stock exchange listing induces sophistication of capital budgeting. *Rev. Adm. Empres.* 54 (5), 560–574.
- Moore, J., Reichert, A., 1983. An analysis of the financial management techniques currently employed by large US corporations. *J. Bus. Financ. Account.* 10 (4), 623–645.
- Osborne, M.J., 2010. A resolution to the NPV–IRR debate? *Q. Rev. Econ. Financ.* 50 (2), 234–239.
- Pike, R., 1996. A longitudinal survey on capital budgeting practices. *J. Bus. Financ. Account.* 23 (1), 79–92.
- Rajan, R., Zingales, L., 2003. The great reversals: the politics of financial development in the twentieth century. *J. Financ. Econ.* 69 (1), 5–50.
- Sangster, A., 1993. Capital budgeting appraisal techniques: a survey of current usage. *J. Bus. Financ. Account.* 20 (3), 307–332.
- Singh, S., Jain, P.K., Yadav, S.S., 2012. Capital budgeting decisions: evidence from India. *J. Adv. Manag. Res.* 9 (1), 96–112.
- Stulz, R., Williamson, R., 2003. Culture, openness, and finance. *J. Financ. Econ.* 70, 313–349.
- Truong, G., Partington, G., Peat, M., 2008. Cost of capital estimation and capital budgeting practice in Australia. *Aust. J. Manag.* 33, 1–6.
- Weber, T.A., 2014. On the (non-)equivalence of IRR and NPV. *J. Math. Econ.* 52, 25–39.
- The World Bank, 2013. Data by Country. <http://data.worldbank.org/about/country-classifications>, The World Bank.