Investment Appraisal Practice in the European Union Countries*

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Abstract:

Purpose: The goal of the paper was to perform a literature study, to determine the state of the theory and practice of investment valuation in the countries of the European Union which should be the starting point for further research.

Design/Methodology/Approach: In this paper, an analysis of literature sources was carried out about assessing the effectiveness of investments in European Union countries. The conducted review and description of the found scientific sources is aimed at determining the current state of investment valuation practice, a description of the research carried out so far, which will allow us to determine the starting point for a new study.

Findings: During preliminary research found it profoundly surprising that despite the huge potential impact of better capital allocation, there are two main problems regarding investment appraisal practices in European companies. First and foremost, a large part of even the largest European corporations do not use advanced investment appraisal techniques or apply them only to a limited extent. Secondly, yet there has not been a research into practical applications of investment appraisal methodologies that would cover the entire Single Market, i.e., the European Economic Area and Switzerland.

Practical Implications: Obtained conclusions allowed us to recommend a study of the relationship between investment appraisal practice and company performance for all the countries of the European Single Market.

Originality/value: Further research should identify the differences regarding the use of investment appraisal methods between countries as well as sectors. It is expected that the conclusions from projected future research will considerably broaden the knowledge about a particularly important area of corporate activity – making decisions regarding resource allocation.

Keywords: Capital budgeting, capital cost, risk analysis, investment valuation methods.

JEL classification: D25, F21, O16.

Paper Type: Literature review, research study.

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1. Introduction

Over the last decades key barriers for investment have dwindled and capital can now be transferred to most parts of the globe with a click of the mouse. International capital behaves ever more like a liquid in a system of communicating (connected) vessels – it flows from one economic area to another, constantly searching for the most favourable relationship between risk and return. Fewer barriers to the movement of capital, goods, services and labour allow a better, more efficient allocation of resources, thus increasing overall productivity.

The above four freedoms of movement constitute the very basis of the European Single Market, currently the largest free trade area in the world with over 515 million inhabitants and a total GDP of approx. 20 trillion US dollars. Most economists agree that the Single Market has been and remains fundamental to maintaining Europe's competitiveness in the global economic race, especially in the face of competition from other large markets such as the US and China. However, while the latter are single states with homogenous business environment regulations, economic policies and business culture, Europe remains highly fragmented and diversified in each of these areas. From the perspective of global investment capital this must be viewed as Europe's obvious disadvantage.

While regulations and policies are domains of politicians rather than scientists, and not much can be done to artificially unify business cultures, there is a business language that should be common for all people doing business in Europe, corporations, investment analysts and even SMEs. It is the language of investment appraisal methodologies, with methods based on the most universal language of all – mathematics. If properly calculated, communicated and interpreted, measures such as Net Present Value, Internal Rate of Return and numerous other indicators become the "meta-language" of business, condensing information and allowing to compare expected investment effectiveness between projects and often across sectors and markets, regardless of nationality or corporate culture.

But above all, promoting the use of advanced investment appraisal methodologies in European companies can lead to immense financial benefits and boost the entire continent's investment attractiveness. According to Eurostat, in 2018 annual gross fixed capital formation, i.e., total gross investment in fixed assets, in the European Economic Area exceeded EUR 3.3 trillion, constituting over 20% of the bloc's total GDP. The above amount included nearly EUR 635 billion for purchases of intellectual property products, i.e., intangible assets such as software, databases, intellectual property rights, R&D. A considerable majority of these funds were spent by companies.

According to the European Commission (Affairs AMECO database) in 2017 gross capital formation by corporations amounted to approx. 2,080.46 trillion EUR for the

EEA countries excl. Croatia and Lichtenstein (no data available), including the UK. Gross capital formation includes gross fixed capital formation, changes in inventories and net acquisitions of valuables. At such a scale increasing overall investment effectiveness (profitability) only by a fraction of a percentage point would translate into additional income in the billions of euros per year.

Our research team consisting of, apart from the authors, Magdalena Kisielewska and Przemysław Piechota (2019), in the course of preliminary research found it profoundly surprising that despite the huge potential impact of better capital allocation, there are two main problems regarding investment appraisal practices in European companies. First and foremost, all researchers that have tackled the issue in question on the basis of data for companies from particular European countries arrived at the same conclusion – a large part of even the largest European corporations do not use advanced investment appraisal techniques or apply them only to a limited extent. Secondly, yet there has not been a research into practical applications of investment appraisal methodologies that would cover the entire Single Market, i.e., the European Economic Area and Switzerland.

2. Literature Review

As pointed out by Wiśniewski (2008) investment appraisal methods can be divided into two main groups – traditional methods (sometimes called "simple methods" – own remark), such as Payback Period, Return on Investment, Return on Equity, Accounting Rate of Return or Return on Capital Employed. What is common for all the above is that they do not take into account the time value of money and thus require no discount rate which would reflect, inter alia, market returns or risk. Naturally, it is also their main flaw – especially in the case of investment projects that span over a long period of time. Methods from the second group, i.e., discounting methods, such as Net Present Value, Profitability Index, Internal Rate of Return or Modified Internal Rate of Return, all have the same underlying logic – performing a comprehensive assessment of a given investment's effectiveness requires forecasting the cash flows that it is expected to generate (obviously including the negative ones, especially the initial investment) and then discounting them in order to reflect time value of money.

Net Present Value (NPV), the flagship and still the most comprehensive investment appraisal method, is, by far, not a new concept. According to economic historians Jones and Smith (1982) the first mention of NPV can be traced down to the year 1907, though at first it was used almost solely for calculating the financial effectiveness of engineering projects. It took a few decades for the subject measure – and most importantly, the logic behind it, i.e., taking into account, inter alia, initial investment expenditure, expected returns and cost of capital when making investment decisions – to become popular, but in the 1960s its application by accountants has already been "widespread". Wiśniewski (2008) also noted that the crucial moment for the propagation of NPV and other discounting methods was the

year 1973 in which the destabilization of international fuel markets and a considerable hike of interest rates clearly demonstrated the impact of time on company and investment value. It may therefore seem obvious that five decades later NPV or other comprehensive investment appraisal methods would be deeply integrated into practically every corporation's decision-making processes. Such an assumption, however, turned out to be very wrong.

A recent paper by Markovics (2016) included a comprehensive review of previous research into the subject issue for selected European countries and the US. The paper gathered the results of multiple surveys, conducted over the course of several decades (from 1975 to 2015), and compared key results regarding the popularity of investment appraisal (also referred to as capital budgeting) methods in particular countries. Key results for European countries presented in that paper are shown in Table 1 below.

Table 1. *Capital budgeting methods most frequently used by corporate managers in some European countries*

Method used	UK (2002)	Netherl. (2002)	Netherl. (2002-2003)	Germany (2002)	France (2002)	Finland (2002)	Sweden (2005-2008)	Nordic (2008)	Spain (2011)	Poland (2014)	Serbia (2015)
Payback Period (PP)	69.23%	64.71%	79%	50.00%	50.88%	22.9%	54.40%	25.16%	75%	35%	68.8%
Accounting Rate of Return (ARR)	38.10%	25.00%	2%	32.17%	16.07%	6.3%	23.83%	17.42%	-	15%	8%
Internal Rate of Return (IRR)	53.13%	56.00%	74%	42.15%	44.07%	22.9%	30.05%	19.35%	74.1%	47%	16%
Net Present Value (NPV)	46.97%	70.00%	89%	47.58%	35.09%	18.8%	61.14%	41.29%	65.7%	53%	42%
Profitability Index (PI)	15.87%	8.16%	-	16.07%	37.74%	0.0%	12.44%	-	-	-	58%

Source: Markovics, 2016.

The above results clearly demonstrate that with the exception of companies from the Netherlands, Sweden, Spain and Poland, the most comprehensive investment appraisal method, i.e., NPV, was used by less than half of the surveyed entities! On the other hand, a considerable part of financial managers from different European countries admitted using simple investment appraisal methods that do not take into account the time value of money, such as Payback Period and Accounting Rate of Return.

Significant conclusions in the matter can also be drawn from two surveys performed by Rossi (both in 2014) who first analysed Italian companies of various sizes and then expanded his research to Italy, France and Spain. On the basis of answers

provided during 43 interviews (out of 110 targeted companies) Rossi arrived at the conclusion that investment appraisal methods, especially the more complex ones such as NPV and IRR, were strongly undervalued in smaller companies – SMEs preferred simple measures such as Payback Period. Regardless of the above, Rossi's results showed that particular investment appraisal methods were used by considerably less than 50% of the companies from each size category.

While Markovics' review of previous studies allows to formulate such general conclusions, unfortunately it cannot be treated as a comprehensive analysis of the issue in question. This is because the results of particular surveys are far from comparable – not only do they concern different periods (more than a decade is a very long time as far as business trends are concerned), but they were also carried out according to different methodologies and took into account inherently different types of companies.

While Liljeblom and Vaihekoski (2004) in Finland as well as Daunfeldt and Hartwig (2014) in Sweden surveyed only managers of publicly listed companies, the survey conducted in Serbia by Barjaktarović, Pindžo, Đulić and Vjetov (2015) focused especially on SMEs – out of 30 surveyed entities, 13 were even classified as micro enterprises, 8 were small enterprises and the remaining ones were medium-sized. The subject surveys' results should be compared with utmost caution as company size seems to be a crucial factor impacting investment appraisal method popularity. For example the research performed by Brounen, Jong and Koedijk (2002) was based on answers provided by Dutch companies with over 25 employees and it included a number of fairly small companies in the data sample. A different sample of companies from the same country, however larger on average, analysed by Hermes, Smid and Yao (2007) on the basis of data gathered in 2002 and 2003, provided significantly different answers – the use of ARR was indicated by only 2% of respondents instead of 25%, while the use of IRR and NPV was considerably higher. The results of the latter research, similarly to those carried out by Rossi in 2014, point to the conclusion that the smaller the company, the less frequent the use of advanced investment appraisal methods. Another interesting feature of the second Dutch survey is that it demonstrated a statistically significant relationship between the age of an entity's CFO and the use of NPV – the older the CFO, the less often NPV was applied.

The vast majority of surveys in the subject area carried out in Europe were conducted in Western European countries with a long market economy track record, but it should be noted that the first study of this type in Central and Eastern Europe (CEE) was performed in Poland by Zarzecki and Wiśniewski as early as 1994, only 5 years after the country's transition from central planning to a market economy. Up to date the most comprehensive study taking into account CEE countries was carried out by Andor, Mohanty and Toth (2015) who specified nearly 70 thousand companies with more than 25 employees from 10 CEE countries (Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia),

gathered responses of 400 entities of which 333 used formal capital budgeting procedures and were selected for further analyses. According to a review of other similar studies included in the subject paper, a sample of this size was one of the largest ever gathered in corporate finance studies. Other large data samples indicated by Andor *et al.* (2015) range from 88 to approx. 400 respondents.

Andor *et al.* (2015) also mention a study by Graham *et al.* (2010) which was based on over a thousand pieces of data (in reality nearly 2 000 pieces were used), however, the subject research regarded executives' facial traits and was based on photos of CEOs and CFOs. Andor et al. conclude that investment appraisal methods were used more often by large companies and multinational firms that were more likely to "have the skilled manpower, technical knowledge and expertise, financial resources, and a formal capital budgeting process" than SMEs.

Furthermore, by comparing their results to previous research they stated that discounting methods were more popular in high income countries (the use of discounting methods was indicated by 81%, 71% and 47% of managers from companies operating in high income, upper-middle income and lower-middle income countries respectively). As for studies which aimed at determining the relationship between the use of investment appraisal methods and procedures and investment effectiveness or company performance, the vast majority of such research was performed in the US. Similar studies in Europe have been scarce and were mostly carried out in the UK.

What is more, different researchers arrived at different conclusions. According to Peel and Bridge (1998), who surveyed 150 small and medium UK manufacturing companies, the intensity of strategic investment planning was positively correlated with profitability. On the other hand, Pike (1984), upon having analysed 144 UK listed companies concluded that the relationship between the use of sophisticated investment appraisal techniques and financial performance was consistently negative! Several years later the same author (Pike 1989) once again addressed a similar issue arriving at seemingly contradictory results, his study, however, focused on the relationship between the application of advanced investment appraisal techniques and managers' subjective assessment of capital budgeting effectiveness. The subject study did not include an objective measure of investment effectiveness or company profitability.

3. Conclusions for the Purposes of Further Research

Our review of previous research regarding practical applications of investment appraisal methods led us to the following conclusions:

1) We managed to identify but a single survey which concerned investment appraisal practices in (almost) the entire Single Market – Odgaard, Kelly and

Laird's (2006) study of such practices in 25 EU member states and Switzerland – which, however, was focused solely on the transport sector that, largely due to institutional regulatory requirements, developed fairly homogenous investment appraisal procedures. This is particularly troubling because according to Pike (1988) and Pike (1996) studies concerning crucial companies from the entire US market have been performed as early as 1972 (Klammer) and then, inter alia, in 1978 (Sundem and Geijsbeek as well as Beersema), 1979 (Rosenblatt and Jucker), 1980 (Aggarwal), 1981 (Scapens and Saale), 1983 (Moore and Reichert). We strongly believe that a comprehensive, standardized study of the practical applications of investment appraisal methods in the entire Single Market is not only important, but also necessary, especially in the light of the potential impact of even slight improvements in investment profitability on the European economy. The subject issue becomes even more significant once we consider the necessity to improve resource allocation in the context of climate change.

2) According to Andor *et al.* (2015) one of the key factors impacting investment appraisal methods' popularity is the companies' legal / regulatory environment. Since listed companies with corporate seats in Single Market countries are to a considerable extent subjected to conforming regulations, restricting our research to entities from the Single Market would positively impact data comparability.

3) A comprehensive research on investments appraisal practices in the Single Market needs to take into account company size as previous research pointed to the conclusion that investment appraisal method popularity increases with company size.

4) The business world has undergone drastic changes since the 1970s and 1980s when the first, fragmentary (as far as Europe is concerned and the UK in particular) studies were performed. Due to the fact that multiple sectors now rely mainly on intangible assets and even traditional sectors such as heavy industry often base their productivity growth on investments in such assets, a comprehensive, pan-European study needs to differentiate between different asset types by determining the popularity of investment appraisal methods separately for tangible and intangible assets.

5) The vast majority of previous studies focused on diagnosing the situation, i.e., determining the percentage of companies which used investment appraisal methods in a given sample. For the Single Market study to be comprehensive and truly scientific it needs to determine beyond reasonable doubt what is the impact of applying more advanced investment appraisal methods in business decision-making practice on company financial performance. Especially that previous studies conducted in selected European countries (mostly in the UK) arrived at conflicting results.

6) A comprehensive diagnosis of investment appraisal methods application in the Single Market should be the first step in developing means of monitoring resource allocation effectiveness and promoting the use of modern, advanced approaches in practice.

7) Considering previous field corporate finance research, a data sample of over 100 respondents can be deemed a large data set. The largest survey we identified was based on answers provided by approx. 400 respondents (Graham *et al.,* 2005). Graham *et al.* (2010) analysed nearly 2 000 pieces of data, however, the subject research regarded executives' facial traits and was based on photos.

4. Proposal of Further Research

Based on the above conclusions, our team (which also includes Magda Kisielewska and Przemysław Piechota) formed an idea of research project that stems from our key scientific interests and achievements as well as several decades of close cooperation with multiple businesses and executives responsible for financial management, whether in the character of academics disseminating knowledge or management advisors tasked with solving particular problems. We firmly believe that economics is largely an inherently practical field of science that must always strive not only to observe and measure the business world on a current basis, but also to improve the way it works, while not straying from the scientific method and maintaining impartiality.

Having analysed previous research on the issue of the practical use of investment appraisal methods and on the basis of problems we have been witnessing in multiple companies from different European countries, we are strongly convinced that promoting the understanding and application of a wide spectrum of such methods among executives can lead to a considerable improvement in resource allocation (thus generating tremendous financial gains) at a relatively small cost and effort. What is more, increasing resource allocation efficiency is particularly relevant in the face of climate change and our responsibility for future generations.

Considering the sheer size of the European Single Market, its four freedoms of movement, the considerable and ever progressing harmonization of business legal environment and, on the other hand, the fact that there has not yet been even a single comprehensive study on the practical application of investment appraisal methods which would cover the entire Single Market area (while the first research of this type in the US was carried out as early as the 1970!) led us to the conclusion that performing such a research is absolutely necessary.

Taking the above into account, the main, general goals of our proposed research is to perform a comprehensive diagnosis of the state of investment appraisal methods' application in the business practice of key corporations based in the Single Market countries and determine its impact on company performance. We are convinced that our research will allow us not only to prove beyond any reasonable doubt that applying sophisticated investment appraisal methods leads to higher returns, but also to measure the scale of their impact, thus providing the best possible – financial – incentive for managers to improve how their companies assess investment

opportunities. We also hope that it will draw the attention of numerous other entities, including regulatory bodies, policy makers, business support entities and other research institutions to the issue in question.

We have defined our research objectives in a hierarchical manner. The main research hypothesis which the study is meant to verify is whether there was a statistically significant, positive impact between applying sophisticated (advanced, discounting-based) investment appraisal methods and company performance (profitability). Three additional research objectives were defined to provide further insight into the issue in question by testing multiple analogous hypotheses using data broken down by (additively and in this order) industry (objective 2), geographical region and country (objective 3) and type of investment, separately for investments in tangible and intangible assets. In order to provide even more in-depth insight into how companies from different sectors assess investments and why, our research will also include In-Depth interviews carried out in person with managers from over a hundred entities based in Poland and Norway.

In order for our study to produce measurable and verifiable results we have specified four research objectives which we described in detail below. Our research objectives must be reached in order due to the fact that each subsequent objective is in reality an in-depth analysis of the issue addressed in the previous one.

Research Objective 1: Determine and quantify the relationship between investment appraisal practice and the performance of key Single Market companies.
Hypothesis: The main aim of our research is to prove beyond any reasonable doubt that applying investment appraisal methods has an impact on company financial performance and to measure the strength of this impact. Our hypothesis is that the application of sophisticated (advanced, discounting-based) investment appraisal methods has a significant, positive impact on company financial performance.

Procedure: In order to prove or disprove the above hypothesis two data sets are required:
a) quantitative and qualitative information reflecting what particular investment methods are applied in particular businesses and what is the extent of their use – once gathered by means of carrying out appropriate, standardized surveys conducted among executives responsible for investment appraisal, such information will be compiled into quantitative data regarding the application frequency of particular investment appraisal methods, thus adapting it for use in further analyses;
b) quantitative information regarding relative company performance – on the basis of absolute data obtained from particular companies' financial statements, inter alia, EBITDA, Gross Income, Net Income etc. as well as Net Revenue we will calculate relative performance measures (which take into account a given companies' scale of operations), i.e., EBITDA profitability (EBITDA/Net Revenue) to reflect operating profitability, Gross profitability (Gross Income/Net Revenue) for assessing overall

pre-tax profitability, Net profitability (Net Income/Net Revenue) to reflect overall after-tax profitability.

Obtaining the first of the above types of data will be achieved by conducting a mass web-based survey among selected executives from several thousand listed companies with corporate seats in all Single Market countries. Reaching a relatively high response rate is thus a key success factor of our research, however, even receiving viable answers from approx. 5% of the surveyed entities would place our project among the largest field studies in corporate finance history. Regardless of the above we will employ various professional techniques aimed at achieving a satisfactory response rate, including direct, individual contact if other means prove unsuccessful. As for the second data set, we will gather performance-related financial data using a renown corporate financial database and obtain otherwise unavailable items manually from particular entities' annual reports.

On the basis of the above-described data sets we will construct various types of regression models with performance-related items as dependent variables and data from investment appraisal surveys as key explanatory variables. Having constructed potential models we will perform a series of statistical significance tests and reject models with a statistically insignificant regression or variables. The remaining model or models will be used to verify the research hypothesis.

Research Objective 2: Determine and quantify the relationship between investment appraisal practice and the performance of key Single Market companies depending on industry.
Hypothesis: Within the second research objective we will verify a series of hypotheses analogous to the main hypothesis specified in Research Objective 1, but this time separately for each industry.

The reason for this approach is that the specificity of particular industries, including types and scale of implemented investments, capital-intensiveness, investment attractiveness, investment payback period, company profitability, business culture, internationalization level, share of investments in intangible assets, legal business environment etc. are key factors that determine the need for using investment appraisal methods, the depth of performed analyses (e.g., companies which invest in projects requiring relatively low capital expenditure most probably spend less time and resources on effectiveness analyses than entities investing in large-scale, capital-intensive production installations) as well as typical company performance. Due to the above including industry as a key sample differentiating factor can allow us to specify a series of industry-specific models with high explanatory power.

Research Objective 3: Determine and quantify the relationship between investment appraisal practice and the performance of key Single Market companies depending on industry, region and country.

Hypothesis: Within the third research objective we will verify an even larger series of hypotheses analogous to the ones analysed for the purpose of Research Objective 2, but this time separately for each industry, region (such as Nordic countries, Western Europe, Southern Europe, Central and Eastern Europe) and country.

This basically means adding new dimensions to the study specified in Research Objective, which will considerably increase the number of tested models. The reason for this approach is the attempt to search for regularities not only concerning particular sectors, but also regions and countries. Since particular industries operating within the Single Market should be characterized by a certain level of uniformity in terms of company type, typical investment profile etc. we have decided that breaking down our data samples by industry should take precedence before including geographical locations.

Research Objective 4: Determine the differences between investment appraisal practices in regards to tangible and intangible assets and their impact on key Single Market companies depending on industry, region and country.
Hypothesis: Within the fourth research objective we will verify an even larger series of hypotheses analogous to the ones analysed for the purpose of Research Objective 3, but this time extending our set of independent variables by differentiating between investment appraisal techniques used separately for intangible and tangible assets, of course if our surveys demonstrate that a significant percentage of companies from particular sectors, regions and countries actually use different approaches for assessing intangible and tangible asset investment effectiveness. Such models will also need to include variables reflecting the scale of investments in (separately) tangible and intangible assets.

The reason for this approach is the attempt to further break down our research reflected in models developed for the purpose of Research Objective 3, this time taking into account the fact that different entities, even operating in the same sector, region and country, may not only invest considerably more in different asset types (tangible or intangible), but also apply different procedures and methods when assessing such investments. We consider it highly probable that companies comparable in terms of the above-described characteristics which differ in regard to their relative scale of investing in different asset types may achieve significantly different performance results, e.g., entities from a sector which typically requires much investment in fixed tangible assets that invest heavily in productivity-enhancing intangibles may prove to have higher returns.

5. Conclusion

Summing up, the main goal of our future research is to perform the first comprehensive study on impact of the application of investment appraisal methods in business practice on company performance that would cover publicly listed

companies from all countries included in the European Single Market, i.e., 28 EU Member States, Norway, Iceland, Lichtenstein and Switzerland.

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