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Contents

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Editorial

Topics in the current issue of The EBS Review embrace various issues in finance and economics. The financial markets provide funds to businesses, which in turn expand their operations using the money investors provide. We can indeed trace a large number of specific issues in this process.

It is not surprising that several papers address topics in accounting or taxation. National accounting and disclosure norms vary widely across Europe: practices in Germany, for example, are based largely on statutory law, while the United Kingdom has adopted a less rigid approach to accounting. Corporate America seems to be in a great trouble now, as some firms have gone bust while many are under investigation. Accounting, in most of these cases, is the concern. Tax treatment is also uneven across Europe: there are different taxes and mechanisms for tax collection as well as different double-taxation treaties. We are going to read about how tax policies matter in regard to investment in the Baltic countries.

Trade in securities is another important subject. There is a considerable amount of knowledge available for understanding how this works, but we certainly need more knowledge in order to realize how competition rules the markets. The purchasing of securities involves explicitly challenging someone on the opposite side of the transaction. These investments, as well as many other kinds of investments, usually occur under great uncertainty about the future.

A great deal of interest in the stock market processes has emerged in recent years. Changes in the way we work and patterns in our consumption reflect developments in the economy. The phenomenon of the so-called New Economy has also changed the way investors view companies. Still, we cannot imagine forecasting stock prices without fundamental or technical analysis.

The euro (a product of EMU in the European Union) has reduced many of the barriers to cross-border trading. A common currency reduces the risk associated with an unexpected change in exchange rates and makes cross-border investment more desirable. We have, on the other hand, recently witnessed a wave of consolidation moves in the financial sector both in the Baltic countries and in the Nordic region.

The concern in Estonia, as well the other Baltic markets, was simple: buyers and sellers are few in number and appear sporadically on the market, which means they may not find each other immediately and significant price fluctuations can result. Larger trading volumes are important to markets because of the increased liquidity associated with them.

Thus, Europe's financial markets become more integrated, national stock exchanges dissolve into wider institutions with standardized trading platforms both in their operations and in their stock trading. There is sufficient evidence from related literature that stock exchanges, in general, provide economies of scale both in operations and in trading. This is all supposed to yield trading efficiencies by enhancing market liquidity and reducing market fragmentation.

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Is the Real Options Method Better than the Net Present Value Rule?

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In capital budgeting decisions and in valuation overall, **discounted cash flow** (DCF) analysis has been deemed the best and most-used criterion for many decades. At the end of 1980's, the new powerful theory of **real options (RO)** emerged. For many years, the RO method was claimed to be clearly superior to "plain" NPV and it was generally predicted that the RO method would soon replace the NPV rule. However, at present (summer 2002), the RO rule is not as widely accepted and implemented as was predicted.

The present article will look firstly at the initial reasons for the emergence of the RO method, i.e., the reasons for the dissatisfaction with NPV. In the second part, a brief background and overview of the RO approach will be given. And finally, the RO method will be evaluated, and the main limitations of the approach and reasons for its slow adoption in practice uncovered.

Why Net Present Value is not a Perfect Method

The net present value rule of "accepting a project if its NPV is positive" builds on the time value of money concept. Since a certain amount of money today is worth more than the same amount of money in the future, future cash flows need to be discounted to be comparable to present cash flows. The discount rate used for a project's future cash flows should reflect 1) the return on comparable investments, and 2) the risk of the project. Net present value (NPV) is then the present value of an investment's future cash flows, minus the initial investment.

It is the almost unanimous consensus of academics that NPV is the best criterion to use for project evaluation. Textbooks usually recommend the NPV rule, arguing that it is theoretically superior to other methods. However, many methods other than NPV are often used in practice. As found by numerous empirical surveys, many firms still use the payback method and accounting rates of return, such as ARR, ROE, or ROI.[1]

Since, in spite of NPV's long-argued superiority, companies do use methods other than NPV in practice, one could conclude:

(1) Firms are making suboptimal decisions, or
(2) The assumptions underlying the NPV rule are not met in practice.

In this article, it is assumed that the second conclusion above is correct, i.e., the assumptions underlying the NPV are often not correct. In that case, using multiple criteria is justified. In the case when most of the criteria agree about whether a project should be taken, chances are that the decision will be correct. Ross et al argue: "[b]ecause the true NPV is unknown, the astute financial manager seeks clues to assess whether the estimated NPV is reliable. For this reason, firms would typically use multiple criteria for evaluating a project... [if] different indicators seem to agree [then] it's 'all systems go.'"(Ross, 1995)

Problems with the Discount Rate Used in NPV Analysis

The simplest version of the NPV rule deals with situations where cash flows are known with certainty. In real life, future cash flows are almost never certain. The solution has been to use probabilities and expected values and discount those at the risk-adjusted discount rate. However, many leading researchers have expressed their concerns about

the discount rate's ability to track risk and the way it reflects the cost of capital and capital structure.

As early as 1966, Robichek and Myers questioned the single discount rate usage (Robichek and Myers, 1966), claiming that a single discount rate does not reflect risk appropriately. Discounting the cash flows at a single discount rate implies that the risk associated with any given cash flow will dissipate at a constant rhythm as time passes. However, in reality the risk resolution does vary over time. For example, the cash flows of research and development projects are usually different over time: the cash outflows in the first years are much more certain than the possible cash inflows in the future.

In 1977 Fama continued Robichek's and Myers' work (Fama, 1977). According to Fama, the risk attached to all periods except the last one is "expectations reassessment risk", while the risk in the last period is a realisation risk. Those risks need not be the same across flows. Only if one imposes additional uniformity constraints on "reassessments" and "realisations", is the single rate DCF formula appropriate. Therefore, multiple discount rates seem to be fully justified on a theoretical level.

Lately, the problems concerning single discount rates and the suitability of the weighted average cost of capital (WACC) for the discount rate has been analysed by Mandron in his article "Project Valuation: Problem Areas, Theory and Practice" (2000). The following discussion is largely based on his analysis in that article.

Using the terms of economic science, the positive NPV is a form of "rent" that belongs to shareholders. Rent represents value that is earned over and above the normal "profit", i.e. all revenues minus all costs, including the cost of capital. Providers of loan capital do not expect a share of rent, since their contract with the company provides for fixed and final payments. However, the NPV rule does assume that the rent is shared between both shareholders and creditors. The reinvestment assumption underlying the discounting formula implies that intermediate cash flows are reinvested at the chosen discount rate: usually the weighted average cost of capital (WACC). The latter is equivalent to saying that cash flows are shared proportionally by all fund providers, that is, that the rents are shared by both shareholders and debt holders.

As Mandron points out, rent sharing is not the case in capitalist economies, and concludes that the NPV model does not yield accurate answers. For accuracy, the model that does not assume rent sharing should be preferred, for example, the residual net present value (R-NPV) formula. To use the R-NPV module, the cash flows are divided to "required flows" and "excess flows" and excess flows are discounted separately at the equity cost of capital. In addition to the advantage of there being no unrealistic rent-sharing assumptions, the R-NPV model does not (as opposed to "regular" NPV) assume operating risk to dissipate at a regular rate and does not imply that capital structure be constantly re-balanced.

In summary, there are limitations to the NPV since:

1) the model uses a single discount rate, assuming a constant dissipation of risk over time, whereas in reality this is rarely true;
2) if WACC is used as the discount rate, NPV does not yield accurate answers because of unrealistic rent-sharing assumptions.

The first limitation could be remedied by using multiple discount rates; in the era of widespread computing opportunities and the help of spreadsheets it is not a difficult task. To fix the unrealistic rent-sharing assumption, a better model to use would be the R-NPV model.

Problems with NPV Being Static

In this part, the reasons for the emergence of the real options theory are analysed. Using the NPV rule gives managers a certain single number as a result. Since values may be ranges and not single numbers, managers use a process called project analysis. Project analysis tries to identify the source of positive or negative NPV, and to describe what can happen if things do not go as forecasted. The aim is to point out major uncertainties and be aware of potential problems. Four methods are used most often:[2] 1) sensitivity analysis; 2) scenario analysis; 3) Monte Carlo simulation analysis; and 4) decision tree analysis.

In sensitivity analysis, the manager considers in turn each of the determinants of the project's suc-

cess and estimates how much the present value of the project would change by taking a optimistic view or pessimistic view of that variable. Sensitivity analysis examines how sensitive a particular NPV calculation is to changes in different inputs.

Scenario analysis examines how sensitive the NPV calculation is to changes in different likely scenarios. An alternative and increasingly popular approach to project evaluation is Monte Carlo simulation. In this case one must construct a complete model of the project and specify the probability distribution of each of the determinants of cash flow. The computer program then selects a random number for each of these determinants and works out the cash flows that would result. After repeating the process 100 or more times, one has an idea of the expected cash flow in each year and the spread of possible cash flows.

In practice, companies are constantly modifying their operations. If cash flows are better than expected, the project may be expanded; if they are worse, it may be contracted or abandoned altogether. Decision trees are a convenient way of representing sequential decisions over time in an uncertain environment. Whereas sensitivity, scenario and Monte Carlo simulation analyses help to measure a project's risk, decision tree analysis is concerned with reducing risk.

In summary, although the single result of using the NPV rule can be complemented by results from using scenario and simulation analysis, the latter do not provide the means for assessing variability and the value of flexibility attached to this variability. Scenario and simulation techniques help managers to prepare for different courses of action, but in the evaluation phase they do not provide numerical guidelines as to the value of the project.

The inability of NPV and its complementary analysis tools to incorporate the value of changing circumstances is the main cause for the search for better evaluation methods.

Namely, the NPV rule assumes:

(1) The project approval decision is a "now-or-never" decision, and

(2) There are no means for management to affect the project after it is accepted (i.e., enlarge the project if the conditions turn out to be more profitable than expected, shut down the project if the opposite happens etc.).

In reality, the decision to approve a project may be made now, but also delayed into the future, in order to gather new information and make a more informed decision. Also, the management usually does have the power to influence the project's cash flows: quicken the research, cut down on marketing costs, use alternative inputs etc.

This reality—that the projected cash flows are usually not static nor "written in stone", and that instead, managerial flexibility does exist and is valuable—was the biggest push for researchers to turn to options theory.

The Real Options Reasoning

The real options model recognizes and incorporates uncertainty. In the actual marketplace, realized cash flows will almost certainly differ from what management expected initially. Trigeorgis says: "As new information arrives and uncertainty about market conditions and future cash flows is progressively resolved, management has valuable flexibility to alter its operating strategy in order to capitalize on favorable future opportunities or mitigate losses" (Trigeorgis 1993). Management is often able to defer, expand, contract, abandon, or otherwise influence a project at different stages during its useful operating life. Those future decisions will be contingent on the arriving information. The identification and evaluation of growth options will allow managers to gain a more accurate assessment of the value of the initial investment.

A good example of real options in practise is Copeland's example of apparel manufacturers (Copeland and Weiner, 1990). To respond quickly to consumers' changing colour preferences, some manufacturers produce and hold an inventory of undyed goods. Colour will be added only after they can tell which shades will be most popular. "Keeping their options open" and staying flexible until they have more information allows the apparel manufacturers to reduce their risk of having a large unsaleable inventory.

Building on the pioneering work of Black and Scholes in 1973, researchers have suggested that projects could be viewed as options on real assets and valued as such. Over the past decade, real options theory has been a subject of numerous articles and publications and has gathered support in academia, the consulting industry and corporations.

In addition to a great many specialist textbooks (e.g., Trigeorgis (1996), Amram and Kulatilaka (1999) and Copeland and Antikarov (2001)), the real options method is now covered in most standard finance texts such as Brealey and Myers (2000). For an overview of the literature on real options, the reader can refer to Trigeorgis (1993), Pindyck (1991), Padock, Siegel and Smith (1988), Myers and Majd (1990) among others.

Real Options vs Financial Options

The term 'real option' expresses the idea that there are usually many options when making real investments (investing in real assets like plant and machinery, production lines, or property)—options to defer an investment, abandon an investment, options to expand or contract a project, options to switch use and many others. It also reflects the close theoretical link with options in financial markets. A financial option is the right to buy an asset (a call option), or the right to sell it (a put option), at a predetermined price (exercise price) for a predetermined period. Owners of options only exercise this right if it is in their interest to do so. Thus they exercise a call option if the value of the asset is higher than the exercise price, and exercise a put option if the value is below the exercise price. Ownership of an option represents a right, and therefore has value. The size of this value depends on the value of the option—the cost of exercising it, the time for which it is available, and the degree of uncertainty about the value of the underlying asset and prevailing interest rates.

The evaluation of options is easily comparable to the evaluation of investments under uncertainty. The Black-Scholes option pricing model shows that the value of an option depends on five factors: the stock price, S; the exercise price, X; the time to expiration, t; the risk-free rate of return, r; and the standard deviation of returns on the stock, σ. To value an investment project using the options pricing theory, the project's characteristics could be viewed as the five call option variables (see Figure 1), and the standard option pricing formulae used.

Project	Variable	Call Option
Expenditures required to acquire the assets	X	Exercise price
Value of the operating assets to be acquired	S	Stock price
Length of time decision may be deferred	T	Time to expiration
Riskiness of the underlying operating assets	σ^2	Variance of the returns on stock
Time value of money	r_f	Risk-free rate of return

Figure 1. Project Characteristics vs. Call Option Variables

Source: Luehrman, T. Investment Opportunities as Real Options: Getting Started on the Numbers. - Harvard Business Review. Jul/Aug 1998, p.55

The Expanded NPV: Value of Options Included

The RO method is about conceptualising and quantifying the value of options from active management. Many real options exist inherently (e.g., to defer, shut down or abandon), while others may be developed wilfully at extra cost (e.g., to switch between alternative inputs or outputs or to expand capacity or build growth options).

To see the link between traditional NPV and real options, Trigeorgis suggests the use of an "expanded NPV" rule. An expanded NPV reflects both value components: the traditional (static or passive) NPV of direct cash flows, and the option value of operating and strategic adaptability. The traditional NPV is not abandoned, but rather seen as an important input to an options-based, expanded NPV analysis, as shown in the equation (Trigeorgis, 1990):

Expanded (strategic) NPV = static (passive) NPV of expected cash flows + value of options from active management

Often the RO method can lead to decisions that are opposite to those arrived at using the discounted cash flow methodologies. Professors Avinash Dixit and Robert Pindyck argue, "The net present value (NPV) rule is not sufficient. To make intelligent investment choices, managers need to consider the value of keeping their options open" (Dixit and Pindyck 1994). Tom Copeland and Jon Weiner of McKinsey observe that the "use of options methodology gives managers a better handle on uncertainty" (Copeland and Weiner, 1990). Judy Lewent, chief financial officer of Merck, suggests that all business decisions are real options, in that they confer the right but not the obligation to take some initiative in the future (HBR, 1994).

Is the Real Options Method Flawless?

The strength of the RO method is that it deals with the role and value of managerial initiative and decision-making ability as new information becomes available. However, it is doubtful that the RO method is superior to NPV in all aspects.

It is often very difficult to use the RO framework to value projects. Investment projects, especially long-term ones, are often combinations of assets-in-place and multiple managerial options. Further, these options are not separate and independent, usually there is interaction. Often managers face a sequence of serially dependent choices. Even if the options can neatly be separated from the underlying project, the evaluation of options is quite complex. There are many different techniques to numerically value options, for example, the Black-Scholes formula, the binomial option-pricing model, and others. All those formulae call for sophisticated mathematics and are based on assumptions, many of which might not be true in reality.

When the sources of uncertainty are quantifiable, then a detailed quantitative analysis using real options theory can be performed. For example, when considering whether or not to open a mine, the past volatility of mineral prices may be a good basis to predict the future volatility of mineral prices. There are textbooks that show how to analyse cases like this (Dixit and Pindyck, 1994). However, in most cases the sources of uncertainty are unknown and the quantification therefore difficult if not impossible.

In addition to implementation problems, there is the "clarity" problem. Since real options numerical implementation is complex, and the model used not intuitive, managers are not too eager to accept this new project evaluation criterion. As Mandron says – "Managers show little interest in a solution, the components of which they cannot visualize and identify with (…)" (Mandron, 2000). Therefore, in many cases, the difficulty of performing the calculations, together with the considerable scepticism of managers about analytical models, leads to discarding the new method.

Turning now to assumptions underlying the RO method, one has to conclude that some of the problematic assumptions of the NPV rule are still implied. The current market value of the project (an input for the option pricing model) must be estimated by discounting the projected cash flows to the present, using the exact same method as for calculating the NPV. Therefore, the problems mentioned in the first part of the article (e.g., the single discount rate problem and the rent sharing assumption), still apply.

As discussed in the first part of the article, scenario planning and simulation methods are important tools for managers to plan for contingencies and devise corrective actions for different possible outcomes. However, when preparing the cash flows for finding the market value of the underlying asset, all of the cash-flow altering options should be ignored, since those will be treated separately. Instead of playing out the different scenarios and attaching a probability to each one, only one certain scenario must be created. Therefore, a corporation should now start doing duplicate work – writing out the projected cash flows first as "one scenario plus options" for a real options evaluation, and then many different scenarios for project analysis and strategic planning.

As Mandron argues, the RO model does not in any way help identify specific plausible scenarios, corresponding cash flows and appropriate decisions; instead, those are theoretically taken account of through a choice of a particular statistical process (e.g., a geometric Brownian motion). In that sense, the RO model is more like a black box; it may be useful to determine whether the investment is valuable or not, but it is useless for financial planning purposes (Mandron, 2000).

Conclusion

Viewing the NPV rule as governing all capital budgeting decisions is quite clearly outdated. The NPV rule applies in limited settings in which there are no control problems and in which the projects cease to exist if not undertaken immediately. The NPV rule is not wrong; given that its underlying assumptions are true, it is correct.

While NPV ignores the flexibility and hence often underestimates the value of a project, the real options method does account for the value of flexibility and managerial options inherent in most projects.

Although the RO approach is said to be the most important break-through of the decade in corporate finance, the picture might not be as bright. The NPV method has certain drawbacks and relies in part on quite unrealistic assumptions. The RO method does remedy some of the drawbacks of NPV, but many unrealistic assumptions are still "carried along".

In addition, implementing RO is often difficult, since it requires the use of sophisticated mathematics and approximation of the value of many important input variables. Another significant reason for the low popularity of the RO method among practicing managers lies in the lack of business content, the understandability, and visualization of the approach.

The most important contribution RO theory has made to corporate finance is its emphasis on the value of flexibility and the managerial initiative that the traditional DCF often just ignored. Managerial flexibility and strategic investments were long ago appreciated by experienced managers, real options is a way to put that value into numbers. Even if the complex option evaluation formulae are not used to calculate the exact numbers, the attitude of evaluators has irreversibly been changed to seeing value in flexibility. Since NPV lacks the ability to take into account the flexibility and managerial options, while RO method might be too complicated for practical implementation and every-day use, the quest for finding an optimal project evaluation criterion continues.

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Notes

[1] See, for example, Klammer (1972), Canada and Miller (1984), Stanley and Block (1984), Graham and Campbell (2001), and others

[2] These techniques are described in most advanced finance textbooks, for example, Brealey, R. and S. Myers (2000)

Does the Increased Flexibility in US GAAP Enhance Market Efficiency?

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Abstract: Regulators are faced with the challenge of eliciting value-relevant information, from privately-informed management through disclosures and financial reports, because the asymmetry of information between investors and management is detrimental to the smooth and efficient operation of the financial markets. In this study, we analyze the recent trend in the Financial Standards Accounting Board (FASB), which we call the principal-agent approach of eliciting pre-decision information from management (e.g., FAS 131) and examine its potential effect on efficiency of financial markets.

Key words: Price Efficiency, GAAP, segment reporting

JEL classification: G10, G30, K22, D82

Introduction

The US capital markets provide a model of the world's well-developed markets, when measured according to capitalization, public securities offerings and private placements. Arthur Levitt, the former chief commissioner of the Securities and Exchange Commission (SEC) states:

Our markets are the deepest and most liquid in the world, not because God made them so, but because no other nation has as broad a base of investors as we do. …Accounting standards are a cornerstone of that broad public involvement. People feel more comfortable about investing when they're confident that financial statements aren't pulling any punches. (1998. p.82)

Since its inception in 1934, the SEC views its mandate as the protector of investors to be best fulfilled by ensuring that investors are well-informed, since informed investors are better equipped to protect themselves. "Informed investors are an important ingredient of liquid, stable capital markets" (Levitt (1998), p.79). Improving the quality of public information requires designing appropriate mechanisms that elicit private and superior information from management. Over time, accounting standard setters have been increasing both disclosure and recognition requirements.

These requirements can have potentially critical effects upon the formation and efficiency of stock (and bond) prices. Informational efficiency entails not only rapid and smooth adjustment to information, but also the quality of such information. The higher the quality of information regarding the value of the firm, the higher the market quality of either the bond or stock market (the lower the variance or pricing errors). In recent years, the SEC, the Justice Department and exchanges themselves have been concerned with the issue of transparency and market maker regulation in an attempt to improve market quality. Clearly, a factor at least as important as improving the speed of dissemination of information (see the discussion in the companion paper) and broadening its audience base is ensuring the validity of that information.

The traditional consensus about what is considered high quality in accounting standards systems is tridimensional: relevance, reliability, and comparability. Unfortunately, there is a trade-off between these requirements: "…choices among alternative measurements provided by financial accounting

systems often involve a trade-off between relevance, reliability and comparability." (American Accounting Association's Financial Accounting Standards Committee (1998, pp. 161-162). The challenge is how to process these criteria into working guidelines for standard setters when they deliberate over a given set of alternatives.

Recently, the Financial Standards Accounting Board (FASB) adopted a new approach which recognizes management's fiduciary duty to act as steward to investors, and has the potential to improve the quality of the price by reducing the asymmetry of information between management and investors. [See, e.g., Financial Accounting Statement (FAS) 131: *Disclosures about segments of an enterprise and related information*, which supersedes FAS 14.]

The thesis of this manuscript is that the recent trend in the FASB of increasing the relevance of accounting reports by eliciting private information from management is motivated by the reality of the principal-agent relationship between management and investors. We analyze its benefits and dangers from the perspective of its effect on market price efficiency and speculate on the future repercussions of these moves.

The Principal-agent Approach to Standards Setting

The Approach

The principal-agent approach encapsulates the fact that "fiduciary management is reporting to absentee investors who have no independent means of learning how their representatives are discharging their stewardship" (Paton and Littleton (1940, p.97)). There is a conflict of interest between the two players since the actions that are desirable to the principal are not desirable to the management. Moral hazard arises because the management's production/investment decisions are unobservable, which implies that management might shirk its fiduciary duty without being detected.

The most important feature of the principal-agent relationship is that the principal cannot base a contract with the agent on the latter's unobservable actions (the input). He is reduced to contracting upon the basis of the action's output, which, does not generally have a one-to-one relationship with the actions and thus does not reveal them. (This lack of correspondence may be due to additional intervening factors, such as uncertain macro conditions, measurement noise, and the unpredictable actions of parties that affect the outcome, e.g., competitors, suppliers, customers, regulators, and employees). Consequently, a successful outcome, for instance, does not imply that the agent's decision-making was responsible for the success.[1]

A solution to this problem is to provide managements with incentives to align their own interests with those of investors. Unfortunately, incentive schemes tend to induce management to manipulate accounting numbers. For example, Healy (1985) shows that when the performance of the firm is so low that management knows that it cannot earn a bonus in the current period, managers reduce the reported outcome even further – "taking a big bath" – in order to hoard reported outcome until performance is likely to award them a bonus.

Earnings management is not the only avenue management uses to manipulate market expectations. The firm can manipulate its disclosure strategy as well. In a recent study, Aboody and Kasznik (2000) found that awarding managers stock options at an exercise price that equals current price (as inducement to take actions that maximize the future price when the option is supposed to be exercised), induces an asymmetric voluntary disclosure policy. Bad news is disclosed earlier than good news, and subsequently the exercise price is maintained at a low level.[2]

The agent bases his decisions on his private information: the signals he gets from the "world". In some cases the principal knows enough about the agent to be able to infer the agent's unobservable actions from the mutually observable output and the agent's pre-decision signal. Since the principal does not know this signal, he can only elicit the agent's private information by providing him with incentives to communicate the truth, which can be costly, since the privately-informed agent is likely to earn "information rent."

The Pros of the Principal-agent Approach

The principal-agent relationship between investors and management implies that flexibility in the choice of accounting treatment is beneficial because:

- The choice in itself conveys information that reveals the private information of manage-ment (Demski, Patell, and Wolfson (1984)).
- The delegation of the content of the report to the agent may generate more information. Holmstrom (1979), Dye (1983), Demski (1997), Ronen and Yaari (2001) and others have shown that the principal can reduce the cost of the moral hazard by obtaining additional information variables.

Additional benefits are that:

- It allows management to tailor the accounting-treatment to the economic realities.[3]
- It reduces the costs of implementing a new standard because they already generate the information internally (e.g., Rogero (1998), Wulf and Koski-Grafer (1998), Parfet (2000), and others).
- It alleviates the burden placed on busy regulators of designing precise requirements.

We illustrate these ideas with SFAS 131.
Background: Until 1998, the reporting on segments was guided by FAS 14, which defined reportable segments according to line-of business (LOB) and geographic area.[4] This standard proved to be unsatisfactory. The definition of segment proved to be both too ambiguous and irrelevant in that users noted that the segment information was inconsistent with explanatory information provided in the business review section and the chairman's letter in an annual report. For example, Street, Nichols, and Gray (2000) report that Merck and IBM, which are the fifth and the tenth largest companies in the 1998 U.S. Global 1000, reported only one segment in 1997, which is somewhat unlikely for firms of that size.[5]

The recognition of the principal-agent relationship between management and investors: Both the American Institute of Certified Public Accountants (AICPA) special committee and the Association for Investment Management and Research (AIMR) put great store on the importance of eliciting management's superior information. [FAS 131, Para. 59]. FAS 131 approached the definition of a segment from the perspective of management, by replacing the LOB segment with "operating segments" which are defined by the information generated internally in order for a chief officer to make allocation decisions (FASB 1997, Para. 4). Specifically, operating segments are defined as components of an enterprise (1) that engage in business activities earning revenues and incurring expenses, (2) that are regularly reviewed by management, and (3) for which discrete financial information is available (FASB 1997, Para. 10). The basis of segmentation may be by products and services, geographic area, a combination of both, or another basis that is compatible with the internal organization of segments.[6]

The Success: The relevance of segment reporting has been enhanced. Herrmann and Thomas (2000) and Street, Nichols, and Gray (2000) found that FAS 131 increased the amount of information provided publicly. Herrmann and Thomas collected segment information for 100 of the 250 largest U.S. firms in the 1998 Fortune 500 listing. They found that 68 companies have responded to FAS 131 by redefining their primary operating segments. They also found that 10 firms disclosed segment information for the first time (e.g., Wal-Mart), while others, who previously reported only geographic segments, implying they operated in a single LOB, changed their reporting of operating segments and disclosed segments by products and services (e.g., Intel, Kodak, and Xerox) rather than by geographic area. In addition, they found that more items are disclosed for each operating segment.

The Cons of the Principal-agent Approach

On the down side, increased flexibility may reduce market efficiency because:

- Comparability is sacrificed.
- Flexibility may be abused to manage earnings.
- The increase in the complexity of checking financial statements by auditors and regulators may reduce the probability of detecting manipulation.

The loss of inter-firm comparability is self-evident because if management is given flexibility, then similar firms can present a different picture (see FAS 131, par. 63). FAS 131 states: "Both relevance and comparability will not be achievable in all cases, and relevance should be the overriding

concern" (Para. 65). To reduce the problem of comparability, FAS 131 makes a minimal disclosure requirement to disclose data based on products/services and geographical area [Para. 7].[8] Interestingly, the FASB was concerned that internal segment reporting will use an exotic scheme that does not allow the user to make much of the disclosure.

Since the decision on the report lies in the hands of utility-maximizing managers, they can manipulate reports by changing internal procedures and exercising discretion to their advantage. The FASB was aware that the new classification regime reduces verifiability and comparability (FAS 131, Para 42, 85). Verifiability is reduced because, for example, segment revenues includes sales to others segments, so de-facto, the management has latitude in the allocation of revenues among segments, and because internal accounting does not necessarily comply with Generally Accepted Accounting Principles (GAAP) (FAS 131, Para. 84). There is also the question of earnings management by internal organizations, allocation of expenses between segments, their disaggregation, and inter-segment sales.[9]

Street *et al* found that six companies realigned their organizational structure with a consequent impact on the 1998 segment reporting and that one company was in the process of a realignment that would affect its 1999 segment reporting. The FASB tried to close the door on some obvious opportunities for earnings management by making demands on auditors. "An auditor can determine whether the information reported in the notes to the financial statements came from the required source by reviewing management reports or minutes from meetings of the board of directors. The information need not be provided on a pre-specified basis, but the enterprise is required to explain the basis on which it is provided and to reconcile the segment information to consolidated enterprise totals. Adequate explanation and an appropriate reconciliation will enable a user to understand the information and its limitations in the context of the enterprise's financial statements. The auditor can test both the explanation of segment amounts and the reconciliations to consolidated totals. Furthermore, because management uses that information in its decision-making processes, that information is likely to be highly reliable." [FAS 131, par. 87]

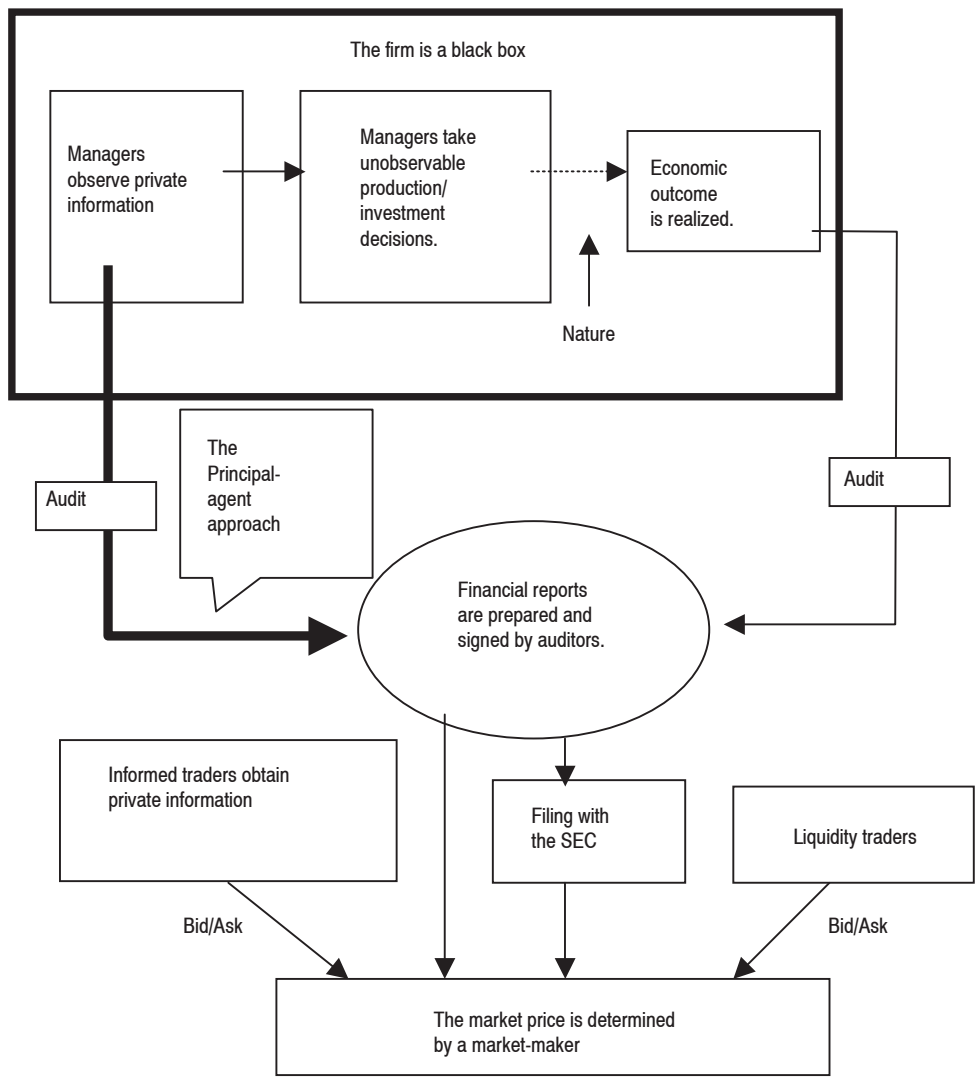
Finally, having more than one choice in reporting implies that the auditor, who is responsible for attesting that the financial reports represent the firm's financial position fairly, faces a much more complex task. We will devote special discussion to the effect of the principal-agent approach on the tasks of regulators and attestors after presenting our model below.

The Concerns: The FASB wondered what it was going to get by letting management classify segments [Para. 62]. Hermann and Thomas found that the majority of firms define their operating segments under SFAS No. 131 by products and services although some firms define their operating segments by geographic area or a combination of both products and services and geographic area. Of the 100 firms in their sample, they found that 71 defined their operating segments by products and services, 12 defined their operating segments by geographic area, and the remaining 17 used a combination of both products and services and geographic area.[10]

[In contrast, under SFAS No. 14, 13 firms reported by LOB and 20 firms reported geographic information, and 57 firms provided both industry and geographic segment information.] The fact that they did not find any firm disclosing an exotic basis of segmentation, such as legal entity, customer type, or management expertise, is not cause to relax since they examine segment reporting close to the promulgation of the FAS, before some firms could make adjustments.

The Model

We propose the following model that links the quality of accounting earnings to price efficiency.



The model links accounting reporting to the stock price, which is set in a noisy rational equilibrium. The market can observe only the financial reports, which, under the principal-agent approach, also contain the private information of the management. The enforcers are the auditors who examine the reports, and the SEC who may require firms to re-prepare reports that are not acceptable because they do not comply with GAAP and/or SEC ruling. The novelty of the principal-agent approach is that pre-decision information is now required to be disclosed and scrutinized by auditors and the SEC. Upon release of the reports and observing market demand, a market-maker sets a price that reflects the publicly available information and the private information of informed traders, who expanded resources to obtain it.

Given that the firm is a black box, the question is: How can the market, auditors, and the SEC guarantee that the principal-agent approach yields superior information and thus enhance market efficiency?

Some mechanisms are already in place. In the US, auditors provide assurance that the financial statements comply with accounting regulations and

every three years, accounting offices are subject to peer reviews by other accounting offices in order to maintain high quality. The SEC monitors financial reports. Dechow, Hutton, and Sloan (1996) and Beneish (1999) found that U.S. companies face a significant stock price penalty if the SEC decides to pursue them for violating accounting standards. Foster (1979, 1987) examined stock price reactions to the publication of articles by Abraham Briloff, an Baruch college professor, who published articles that probed into the adequacy of firms' accounting decisions. He found that firms challenged by Briloff, suffered, on average, an 8% decline in stock price when the article was published.

Unfortunately, market mechanisms cum SEC might not deter earnings and voluntary disclosure management. Ronen and Yaari (2001-2) find that Rule 10b-5 of the 1934 Securities and Exchange Commission does not deter firms from misrepresenting voluntary disclosure when the information is not verifiable.

The reason for the failure of the market to discipline firms is that the market provides firms with incentives to misrepresent: "… I think that almost everyone would agree that, on the average, the market tends to reward companies that achieve stable trends of growing revenues and profitability, and that it penalizes companies that repeatedly fail to deliver on promises and estimates creating more risk and volatility" (Parfet (2000, p. 486)).

Tzur and Yaari (1999) show that since auditing is imperfect, firms can successfully misrepresent financial reports. They devise a new arrangement of financial reporting which allows the market to compare the financial report with a preliminary, unaudited report and penalize big discrepancies. The higher the likelihood of a subsequent discovery of the truth, the lower the required penalties. This analysis leads us to suggest that more flexibility in reporting must be accompanied with more effort on behalf the auditors and the SEC to monitor earnings management.

We speculate that application of the principal-agent approach will require that enforcers check on the actions instead of the outcome. The SEC, for example, announced that it retains the prerogative of asking firms to provide it with internal reports to boards of directors in order to monitor segment reporting.

Summary and Conclusions

Lynn E. Turner (2001), the chief accountant of the Securities and Exchange Commission (SEC), states the following basic rights of investors:

VI. Investors have a right to management that understands that their job is to manage the business, not the earnings.

XVI. Investors have the right to regulators and standard setters who put the investor first, and that encourage rather than impede investor protection and efficient markets.

Right VI explicitly and right XVI implicitly acknowledge the principal-agent relationship between management and shareholders in management-controlled firms, and the fact that market mechanisms are insufficient for protecting investors' rights and intervention by a regulator is thus required.

In this study we analyze the effect of the recent trend of adopting a principal-agent approach to designing accounting standards on market efficiency. We weigh the increased relevance attributed to eliciting the management's superior information with the consequent enhancement of the efficiency of the price and restoration of the faith of investors and with the potential danger of reduced efficiency due to managements abusing their increased flexibility to distort the information released to the public.

Observing the measures already taken, and the insights drawn from previous research, we predict that we will see more involvement by the SEC in firms' internal information flow in order to monitor their disclosures, and that successful monitoring will enhance the smooth and efficient operations of the stock market.

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Notes

[1] For a principal-agent model of financial reporting that is compatible with the old approach that is based on the output, consult Penno (1985). Not surprisingly, he finds that in some instances, more information is redundant.

[2] We focus here on the agency explanation for earnings and disclosure management. Hayes and Lundholm (1996) for example, find that firms that are concerned with the proprietary information revealed to their competitors will manage the disclosure of segment reporting by reporting segments only if they share similar attributes, which implies that the informativeness of this disclosures is lower than that of firms with dissimilar segments had they been induced to reveal segment information.

[3] For example, in the Oil and Gas industry, small companies that were devoted almost exclusively to exploration have used *full costing*, by which the explorations cost of all wells are capitalized and expensed against the revenues from gushing wells, to smooth the perceived riskiness of the reports they present to their lenders. In contrast, big firms that were vertically integrated have used the *successful effort* method, which treated the exploration cost of a dry well as period cost and expensed it right away in order not to attract undesirable attention to their sizable profits (Zeff (1993).

[4] Firms were required to disclose revenues, assets, capital expenditures, depreciation, and earnings by line-of business for any significant segment, where significance was measured by 10% criteria. Similarly, firms were required to disclose revenues, assets, and earnings by geographic segments for any significant geographical segment.

[5] Under FAS 14, IBM claimed to operate 'primarily in the single industry segment that creates value by offering a variety of solutions that include, either singularly or in some combination, services, software, systems, products, financing, and technologies,' and provided only revenue information by classes of similar products/services (information technology clients, information technology servers, peripherals storage, other peripherals, OEM hardware, services, software, maintenance, financing, and other).

[6] For each reportable segment, an enterprise must disclose: segment profit/loss and certain revenues and expenses included in segment profit/loss (to include revenues, interest revenue, interest expense, depreciation/depletion/amortization, amount of non-cash items other than depreciation/amortization that are included in the determination of segment profit/loss, unusual items, equity in the net income of investees accounted for by the equity method, income tax expense/benefit, and extraordinary items); and segment assets (to include assets, expenditures for additions to segment assets, and the amount of investment in equity-method investees included in segment assets.

[7] For example, IBM stated that it operated in a single industry in 1998 as well, but acknowledged that organizationally the company's major operations consisted of three hardware product segments (technology, personal systems, and server), a global services segment, a software segment, a global financing segment, and a series of enterprise investments. IBM labeled the 1998 reportable segment disclosures as "the management system segment view." While IBM's 1997 introductory annual report material and MD&A were not consistent with the company's claim to operate in one LOB, the 1998 MD&A was consistent with the segment data.

[8] To provide some comparability between enterprises, this Statement requires that an enterprise reports certain information about the revenues that it derives from each of its products and services (or groups of similar products and services) and about the countries in which it earns revenues and holds assets, regardless of how the enterprise is organized. As a consequence, some enterprises are likely to be required to provide limited information that may not be used for making operating decisions and assessing performance.

[9] Street et. al state:
While the alignment of segment reporting with an organization's internal management is viewed by FASB as a benefit of SFAS No.131, some commentators have argued that companies would change their organizational structure to avoid segment reporting. For example, a company could require

the head of a smaller segment to report not to the chief decision maker but to another executive, thereby avoiding the need to disclose that unit's results (Springsteel 1998). Harrington (then, Director of Accounting and SEC Technical Services at Coopers & Lybrand) is quoted as stating "I've heard innuendo already that some companies may make some internal reporting changes to get the segment groupings they want, mostly to reduce competitive harm" (Springsteel 1998, 85). This research also addresses whether restructuring by some firms might limit the provision of additional segment information under SFAS No. 131.

[10] Goodyear Tire is an example of firm that reports by a combination approach. It discloses six segments: North American Tire, Europe Tire, Latin America Tire, Asia Tire, Engineered Products, and Chemical Products.

[11] Linsmeier, T.J., Chair; J.R. Boatsman, R.H. Herz, R.S. Jennings, G.J. Jonas, M.H. Lang, K.R. Petroni, D. Shores, J.M. Wahlen.

The Macro Economical Aspects of the Choice in Corporate Performance Measurement Models: Development of the General Model

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Abstract: In this paper the author analyses the development of theoretical treatments of evaluation models used in the field of corporate finance, and differences between the theoretical and practical approaches. The purpose is to discover the reasons for the time gap between the theoretical treatment and implementation of these theories in practice. To accomplish this the author has firstly, studied the development of models evaluating the success of enterprises, secondly, the origins of evaluations among different methods of divisional performance measurement, thirdly, macro economical aspects in the selection of evaluation models and finally, the key criteria of different evaluation models found through comparing inputs of different models to express relationships between them according to evaluation model type.

According to the topic and linkages within the topic, in the final part of the paper the author has developed Copeland's two-dimensional decision-making tool by adding a third dimension, the estimation of the four levels of macro economical uncertainty by Courtney. The result of this study is a three-dimensional model for selecting evaluation methods. The author has called this decision-making framework: 'the general three dimensional model for selecting an evaluation method'.

Keywords: performance measurement models, flexibility, decision-making tools, uncertainty, valuation, real options

Journal of Economic Literature Classification numbers: D80, D81, H43, G31, G39

Introduction

In this article, the author studies developments in the theoretical and practical approaches of evaluation models and differences between these developments used in corporate finance.

The author aims to present important aspects of the time difference between the theoretical treatments and their implementation in practice. For that purpose the author has analysed firstly, the development of models for evaluating corporate performance; secondly, models for measuring divisional performance; thirdly, macroeconomic aspects of selecting an evaluation model based on a determination of macroeconomic uncertainty; fourthly, the key criteria in models according to model type and finally to show the relationships between models and intersections found by comparing the inputs of each model.

In accordance with the topics researched and their inter-connection, in the last part of the article, the author has further developed the two-dimensional method for selecting models described by Copland and the others. The macroeconomic dimension, defined by Courtney and others, has been added to the model giving us four levels of determination in macroeconomic uncertainty.

Depending on why we use macroeconomic uncertainty and the risk derived from it (whether it is used as additional input for measuring the risk or as additional criteria for selecting a model), the further theoretical development could be termed

accordingly as the three-dimensional evaluation method selection model or two-dimensional and five criteria evaluation method selection model. One dimension is always the model itself. This approach is used, because if one knows two dimensions it is possible to determine the third one. The author calls this the three-dimensional evaluation method selection model (framework for decision).

The Development of Corporate Performance Evaluation Models

The basis of present evaluation models like Residual Income (RI) and Economic Value Added (EVATM) is finding the cost of a company's capital. These theoretical approaches were developed at the beginning of 20th century in the U.S.A by comparing theoretical and practical foundations the first opportunity arose for professional statistics to use standardized accounting data.

First, the indicators of profitability like ROE (return on equity), ROI (return on investment) and EPS (earning per share) were studied and further developed, taking into consideration the cost of capital as one input. This approach was put into practice in the middle of the 20th century as a result of the unification of theoretical and empirical study results. This statement is supported by studies using theoretical approaches as a practical tool in corporate finance. It will lead us to the conclusion that the bases for corporate performance evaluation models were set in 1920s. The most influential researchers-developers were Ralph Epstein, J.E. Sterrett's, Leonard Crum, Laurence H. Sloan, Irving Fisher, Jach Hirscleifer, Myron J. Gordon and David Solomons.

Non-traditional approaches like the model for evaluating real options, ROV (real option value), was developed in 1973 when Fischer Black, Myron Scholes and Robert Merton quantified a formula for calculating "free for arbitration" value. "Free for arbitration " value meant that stocks with the same risk level and productivity profile should be identically valued. This simple idea is the basis for the real option value model. This approach was further developed for evaluating real options in non-financial investments.

Evaluation models that are important from the perspective of development phases

According to Goetsmann and Garstka (1999) the main evaluation models that can be emphasised from the perspective of development phases are:

(a) Sloan's EOIC (earning on invested capital) model and the further complex development by Pierre S. DuPont, based on finding relative numbers;
(b) Gordon's Growth Model, based on discounting cash flows with constant growth and discount rates;
(c) Fisher's NPV (net present value) and his Theory of Interests, which became the basis for further study on models considering the cost of money;
(d) Hirschleifer's IRR (internal rate of return) which equalizes net present value with zero to find the corresponding economic profit rate;
(e) Solomon's RI (residual income) defined as NI (net income) minus capital expenses when capital expenses can be expressed in the formula: cost of capital (r) multiplied by the amount of capital (I) leading us to EVATM (economic value added). The main difference between EVATM and Gordon's Growth Model is that EVATM measures the corporate performance of a fixed period while Gordon's model treats several periods as more dynamic and considers the differences of these periods;
(f) The so called non-traditional approach of evaluation - ROV (real option value). The initiators of the current approach have been Trigeorgis, Copeland, Kulatilaka and Keenan but original the idea belongs to Fischer Black, Myron Scholes and Robert Merton.

Closer attention should be paid primarily to the evaluation of profitability derived from the origins of separate corporate economic units and secondly, to study the latest theoretical approaches in the corporate finance field. The aim of the author is to treat these statements from the following perspectives: (a) real options value and financial flexibility and (b) real options based thinking for making strategically important decisions.

The Main Aspects of Divisional Performance Measurement

Company performance, especially divisional performance is one of the most critical aspects of corporate management. With performance measurement it is possible to determine which factors influence the creation of value for a whole company. It is important to emphasize the first special aspect in "that game" – internal company rules. The main parts of the internal rules system according to Jensen and Meckling (1998) are (a) the performance measurement and evaluation system; (b) the rewards and punishment system; (c) the system for partitioning decisions among individuals in an organization.

The main component of a company's internal rules comprises a system of rights. These rights can be divided as follows:

(1) the right to initiate, defined as the right to make suggestions for managing resources;
(2) the right to notification (inform), giving a person the right to inform colleagues and other personnel on coming activities and trends the company is approaching, also it includes giving advice within the decision-making process, related to initiative proposal;
(3) the right to ratification (confirm), defined as the right to confirm conclusions made and decisions on resource allocation meant to be implemented by people participating in the process;
(4) the right to implement which means to implement confirmed decisions using allocated resources;
(5) the right to monitor, which means to have the right to observe the implementation of confirmed decisions, it also includes the right to measure and evaluate the implementation process and accordingly determine additional rewards or penalties.

The main characteristics of the rewards and penalties system are respect, punishment, attention, position, salary and its changes and bonuses.
The measurement and evaluation systems are derived from adding weighted measures or values to components of the rewards and penalties system and the individual rights of judgment system and measuring the results of activities in terms of performance (successes, objectives, projects and other management objects).

Secondly, to separate different types of corporate units: (1) cost centres; (2) revenue centres; (3) profit centres; (4) investment centres; (5) expense centres (supporting cost units)
/Jensen, Meckling 1998 p.5/.

Characteristics of a particular unit should be related to the objectives of activities because otherwise there is no sense in structuring the units. The most important overall objectives according to Jensen and Meckling are:

A) cost centers:
(a) minimise costs on fixed output;
(b) maximise output on fixed costs;
(c) minimise average costs (no fixed output).

B) revenue centers:
(a) maximise total income at fixed price;
(b) maximise total income at fixed amount;
(c) maximise total income (no fixed amount and price).

C) profit centers:
maximise profit at given rights of judgment, list of products(services), amount and price whereby highly variable inputs in that process can be treated separately (like production branches for raw materials with capacious and variably priced products).

D) investment centers:
(a) maximise productivity of assets on fixed capacity of assets;
(b) maximise amount of assets with given productivity;
(c) maximise productivity of total assets (no fixed capacity).

E) expense centers:
(a) fulfil given activities on same quality but more effectively;
(b) fulfil given activities on higher quality but on same costs;
(c) fulfil tasks on fixed amount, dates and costs.

The first step should be to divide people into units according to activity. Secondly, determine the tasks and rights of each unit and allocate resources. Thirdly, determine criteria for evaluating the units'

activity (according to their tasks and objectives). Fourthly, measure and evaluate the implementation of tasks and objectives according to confirmed and determined criteria. Fifthly, determine applicable rewards and penalties while keeping in mind the organization's system of rights. The best way for this system to work is by creating an organizational hierarchy in compliance with the rights. Looking at different units as independent enterprises (together with the given objectives and tasks), we can make a general conclusion that according to a company's business model, the primary performance measurement criteria is still to hold to determined objective and quantified evaluation parameters.

Four Levels of Uncertainty and their Influence on the Selection of an Evaluation Model

In everyday life, top managers are struggling with questions of how to define uncertainty and especially from the aspect of strategic management. To better understand and define uncertainty, three men from a consultant company like McKinsey, Courtney, Kirkland and Viguire, have created a four level framework for approaching uncertainty. These levels are:

a. a clear enough future;
b. alternative futures;
c. a range of futures;
d. true ambiguity.

Courtney and others define a clear vision of the future as the situation where managers can work out one possible future scenario after analysis of their situation using standardized approaches such as researches about the market situation – prices and number of competitors, business analyses, or, Michael Porter's five forces framework. According to previous approaches and based on projected future cash flows, NPV is found. The best competitive advantage is guaranteed by using a strategy inclined towards innovation in the field of products and services, innovation in a company's business systems is also effective since it doesn't change the overall industry.

Level two or alternative futures is defined as the situation where managers cannot work out one particular future scenario after analysis of their situation, instead they have to determine different scenarios and possible future outcomes based on several assumptions. This situation is best described by regulated industries or markets as oligopolistic competition. The best strategy could be to take into consideration the mutual steps by all sides concerned. For every different scenario an evaluation model should be created taking into consideration key indicators of the concrete situation. In that case the central method is scenario analyses together with determined probabilities, followed by accounting the classical NPV. The most effective strategic choice at level two is to move toward an organic increase of business capacity or increased capacity through mergers and acquisitions and after obtaining a "critical mass" (optimal activity capacity), become effective in the company's activities.

Level three or a range of futures is defined as the situation where managers are not able to work out several concrete future scenarios after analysis of their situation, but they can determine possible outcomes on the basis of different assumptions. Companies entering geographically and culturally new markets best describe this situation. The third level analysis is similar to the second level analysis, the only additional task is to choose from among a variety of possible future scenarios, four to five of the most probable scenarios and take into consideration the higher than average risk when realizing these scenarios.

Level four, in other words true ambiguity is defined as the situation where managers are not able to work out any future scenarios on a quantitative level after analysis of their situation, they are limited to certainty on the qualitative level instead. The following situation usually occurs when there is political or regulatory ambiguity as might occur in some politically unstable country or when the company is trying to introduce a new technology. In that case there is only the possibility to determine "key aspects" by which the development of the market can be evaluated and then react immediately by adopting the strategy, this determines who ends up as a winner. Key aspects here could be flexibility and making transactions based on available options, this helps to predict maximal amount of loss. If your company turns out to be winner and the market situation is becoming similar to a situation of oligopolistic competition then it is good to know that you have reached level two and new criteria should be used when making decisions.

Choice in Corporate Performance Measurement Models - Key Criteria for Decision-making

At this point, the author would like to start explaining how different approaches are expressed through mathematical formulas to determine the importance of model inputs on the final outcome. Further, the author has compared the importance of differences between comparable inputs in several approaches according to the model. Next step is to move to complement the general decision model according to the previous treatment.

Broadly, we can divide evaluation models into five groups: relative profitability (growth) evaluation model; model for evaluating economic profit; decision-tree model; model for measuring discounted cash flows; model for measuring real options value.
The general formula for relative profitability or indicator of profitability (relative number, generally estimated in %) model is:

$$X = \frac{Y}{Z}$$, where (1)

- Y – absolute value of the period variable, where the relativity is indicated;
- Z – absolute value of the basis of the period according to which the evaluation takes place.

This model is equally sensitive to changes to the basis and the period variable.

The formula for the economic profit model is:

$$EP = Y/(1+r)$$, where (2)

- Y – absolute value of the period variable, where economic profit is valued;
- r – risk-free interest rate for current period.

This model is equally sensitive to changes to the bases and periods and additionally to changes in the risk free interest rates.

The decision-tree model does not have a mathematical formula. The main value of the model comes when measuring probabilities involved in future scenarios and integrating these with other models.

The formula for measuring discounted cash flows is:

$$PV = C_0 + \frac{C_1}{(1+r)} + \frac{C_2}{(1+r)^2} + ... + \frac{C_n + FV}{(1+r)^n}$$

(3)

where

C_0 – first investment;

$$C_0 = \sum C(1+r_n)^n$$ (3.1)

- FV – future value of investment (market price of the investments in the future);
- C – inflows of the period;
- r – risk-free interest rate for current period;
- n – number of periods.

This model is relatively more sensitive to interest changes and also to future cash flows.

The formula for measuring real options according to Black- Scholes' model for finding the price for a financial option is:

$$\text{ROV} = Se^{-\delta t} * \{N(d_1)\} - Xe^{-rt} * \{N(d_2)\}$$

(4), where according to Leslie, the relative links between the given inputs for the price of financial options and inputs for measuring value of real options are:

$$d_1 = \{\ln(S/X) + (r - \delta + \sigma^2/2)t\}/\sigma * \sqrt{t}$$

and $d_2 = d_1 - \sigma * \sqrt{t}$

- S – stock price: the present value of cash flows expected from the investment opportunity on which the option is purchased;
- X – exercise price: the present value of all the fixed costs expected over the lifetime of the investment opportunity;
- σ – uncertainty: the unpredictictability of future cash flows related to the asset or more precisely, the standard deviation of the growth

rate of the value of future cash inflows associated with it;

t – time until expiry: the period for which the investment opportunity is valid. This will depend on technology (product's life cycle), competitive advantage (intensity of competition), and contracts (patents, leases, licenses);

δ – dividends: the value that drains away over the duration of the option. This could be the cost incurred to preserve the option (by staving off competition or keeping the opportunity alive), or the cash flows lost to competitors that invest in an opportunity, depriving later entrants of cash flows;

r – risk-free interest rate: the yield of a risk less security with the same maturity as the duration of the option.

Looking at the inputs of the ROV model, we can conclude that a rise in the price of stock is increased by uncertainty, its period of usage, risk free interest rate and its option value. This process also works vice versa. The option value is more sensitive in regard to duration and level of uncertainty.

According to treatment of this in literature there is an important difference between traditional and non-traditional approaches in the sense that financial flexibility has value, but how do you set that value. Pindyck (1988) has studied the following topic in his article where he has provided a very detailed treatment of the value of flexibility under the subtitle – "Irreversible Investment, Capacity Choice and the Value of the Firm". Kulatilaka (1993), Smit & Ankum (1993) and Trigeoris (1993) have studied the same fields in their corresponding works. These key papers and treatments give a concluding picture of the importance of flexibility in decision-making, evaluating and making agreements, and generally in all management activities. The purpose of this article is not to discuss these topics in a detailed way, but just to highlight the key words and main conclusions which support the statement that the main difference between traditional evaluation models and ROV is that the first one does not take into consideration the importance of flexibility.

It is also important to leverage flexibility. Leslie and Michaels (2000) have, as a result of an analysis, presented a survey on how flexibility leveraging affects ROV or in other words how managers can increase the value of flexibility by concluding an option based 'treaty'.
This survey contains six points for increasing real options value and these are:

(1) increase NPV of predicted cash inflows;
(2) decrease NPV of predicted cash outflows;
(3) increase uncertainty of predicted cash flows;
(4) increase duration period of an option;
(5) decrease the loss of an option value at duration period by realizing the option at a more suitable time;
(6) increase the risk free interest rate.

Previous treatments illustrate the principle difference between traditional ways of thinking and ways of thinking based on real options. It also illustrates that for increasing flexibility it is effective to invest in rights/will versus obligations (responsibilities). The main conclusion from the survey by Leslie and Michaels, also supported by the author, is that applying discipline to real options analysis in evaluating the results of an investment will affect corporate strategy in four ways. These four ways are:

(a) emphasizing different opportunities;
(b) enhancing leverage;
(c) maximizing rights;
(d) minimizing obligations.

Special attention should be paid to this non-traditional approach from the perspective of making strategically important decisions for the company. For confirmation of this, there is the hypothesis proven by Luehrman (1998), that a company's strategy is a portfolio of real options. Therefore it is practical to approach strategic decisions via the four dimensions of Leslie and Michael.

Macroeconomic Aspects of Choosing a Measurement Model : Developing a General Model

From a macroeconomic perspective, emphasis should be placed on predictions about the economic environment or origins derived from evaluations, especially regarding the question of determining uncertainty and according to that there are certain characteristics for selecting the right type of evaluation model.

To develop the topic further, at first the author divides evaluation models into four main groups by generalizing Copland and Keenan's five-factor structure in two approaches. The first approach is an indicator combining economic profit and NPV discounted cash flows, in as much as we are dealing with models considering the cost of capital the difference remains in whether the period is counted or not. The second approach replaces the profit growth indicator with profitability indicators in the context of the DuPont approach. There are four types of evaluation models:

(1) based on analysis of profitability indicators;
(2) based on discounted cash flows;
(3) based on scenario analysis (decision trees);
(4) based on real options value.

In the second development or dimension, the author uses the same important inputs as Copland and Keenan in the four main groups – size of cash flow, value of risk, aspects proceeding from differences in periods and aspects of flexibility. As a third dimension, the author adds macroeconomic aspects expressed through the four levels from Cortney, Kirkland and Viguire. First, clear enough future (similar to monopolistic market situation); second, alternative futures (similar to oligopolistic market situation); third, a range of futures and finally, true ambiguity. As a result of that reasoning a three-dimensional framework forms, giving directions for selecting a model or models for evaluating corporate performance (investment projects). These methods can be used for evaluating projects in the tactical aspect of strategic management as well as for selecting an evaluation method for measuring corporate performance. This also implies an explanation of why traditional approaches may offer an inadequate evaluation which leads to inadequate decisions.

According to table 1 it seems that the decision- tree model only takes into consideration risks. In the given context the decision-tree model may seem to consider the same risks as other models exhibited in the table, but that is not the way it is. The decision-tree model gives us an understanding of the risks as a method for evaluating and considering the probability of some scenarios happening. Other models described in the table take into consideration the risks of a particular scenario and the subsequent risk measures are used in determining the discount rate for the company, corporate unit or project. This leads us to the conclusion that the decision-tree model is more like a supporting unit than an independent evaluation model. This makes it practical to use along side other models given in the table and when there is only one scenario, and then to evaluate the probability of some macroeconomic risks and take this into consideration when interpreting the value of a result. The other, better-quantified risks should be considered in determining discount rates when an evaluation model consisting of similar inputs is used.

Taking into account the purpose of the current work and theoretical approaches, which have been described, the author has proposed a five-criterion decision-model for selecting the best evaluation method. The fifth criterion involves taking into consideration the level of macroeconomic uncertainty. The main idea of calculating using a third dimension is that it provides a simple theoretical thinking model: the bigger the uncertainty (including the time factor/period, duration of a project, etc.), the more useful a model for evaluating real options is and vice versa. In order too present the three-dimensional model it is good to use two related matrixes, in other words, use matrixes with rows of the same value and columns of different value.

Table 1 . Key factors in the selection of an evaluation method by Copeland and Keenan

Level of uncertainty/Model	Cash flow based	Risk adjusted	Multi-period	Captures flexibility
ROV	Yes	Yes	Yes	Yes
NPV/DCF	Yes	Yes	Yes	No
Decision trees	No	Yes	No	No
Economic profit	Yes	Yes	No	No
Earnings growth	No	No	No	No

Table 2. The level of uncertainty matrix – an aid for the selection of an evaluation model

Level of uncertainty/Model	Clear future Level 1	Alternative futures Level 2	Range of futures Level 3	True ambiguity Level 4
ROV	Yes	Yes	Yes	Yes
NPV/DCF	Yes	Yes	No	No
Decision-tree	Yes	Yes	Yes	Yes
Profitability	No	No	No	No

Table 3. Generalized key factors and decision matrix by Copeland and Keenan

Inputs of model/ Model	Cash flow based	Risk adjusted	Multi-period	Captures flex-ibility
ROV	Yes	Yes	Yes	Yes
NPV/DCF	Yes	Yes	Yes	No
Decision-tree	No	Yes	No	No
Profitability	No	No	No	No

Conclusion

In conclusion, the author can say that the objectives set at the beginning of this work were met. The first part of the article provided an answer to the question of "when will the theoretical approach be used in practice?". The answer is … after empirical study and theory have merged. This illustrates the relevance of this article from the point of view of differences between the non-traditional evaluation method (ROV) and traditional approaches and their convergence with empirical proof. The main value of the present work is to clarify the links between macroeconomic uncertainty and the selection of an evaluation method and emphasize important aspects related to the topic. By emphasize, the author is referring to the practical value of the work for people, who in their everyday work, make decisions about how to manage. The most general conclusion of the article is (expressed in Tables 2 and 3) the so-called suggestive model of conduct for decision- makers. To obtain the best possible evaluation for a company or project, decision-makers must know the objectives (of the company, project, unit etc.), build up internal rules in a system of rights and then use a decision - tree in their decisions (to consider the risks) and choose an additional evaluation model based on existing data (the main criterion is the need for flexibility).

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Economic versus Accounting Income

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This paper emphasizes the comprehension of income concepts and definitions. The author would like to draw attention to the terms *economic income* and *accounting income*. Knowing the correct terminology is the mark of a true professional.

According to the Hicks' approach, income is a change in wealth. According to the FASB[1] approach, income refers to the excess of revenues and gains over expenses and losses for a period. But according to the IASC[2] approach, income refers to both revenues and gains. Figure 1 implies that income is a generic term.

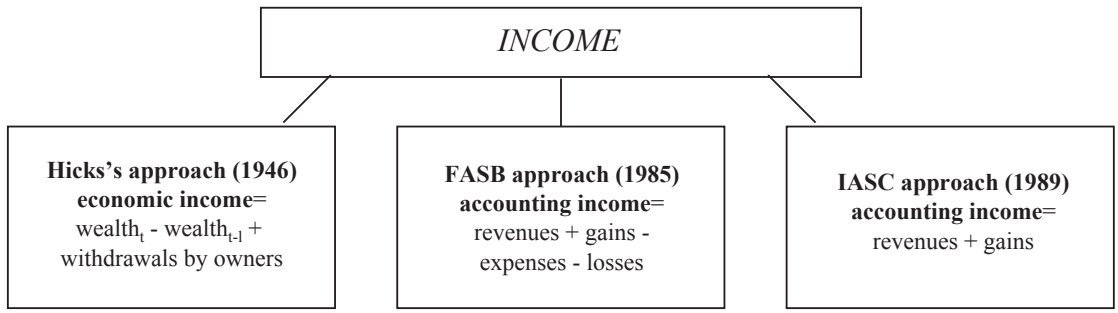

Figure 1: Economic versus accounting income

Hicks Approach

Income is a change in wealth adjusted for withdrawals by owners (Hicks, J. R. 1946. p.172).

Economists have adopted a **wealth maintenance concept** of income. They measure *income* by the difference in wealth at two points in time. They subtract beginning wealth from ending wealth and adjust for any withdrawals by owners during the periodIn the following, wealth Equation 1 and Equation 2 illustrate *quantitative income*:

Change in wealth = income - withdrawals by owners (1)

Equation 1: Change in wealth depends on measuring income during the period.

Change in wealth = wealth$_t$ - wealth$_{t-1}$ (2)

Equation 2: Change in wealth depends on measuring wealth at two points in time t.

Both mathematical sentences have something in common on the left side. Simplifying wealth Equation 1 and Equation 2:

Income = withdrawals by owners + wealth$_t$ - wealth$_{t-1}$ (3)

Equation 3: Economic income consists of consumption and savings by owners

Economic income consists of consumption or withdrawals by owners, and savings, which constitute changes in an owner's wealth. Under the *wealth maintenance concept*, income is the maximum amount that can be consumed during a period and still leave the owners with the same amount of wealth at the end of the period as at the beginning.

One interpretation of Hicks' classical definition states that enterprise would measure not *only quantitative income* but also *psychic income*, which is

defined as a measure of increases in net wealth arising from qualitative factors (Kieso, D.E., and Weygandt, J.J. 1998. p.147).

The author draws attention to the fact that the human resources in the enterprise can both increase and decrease the future economic benefits. For example, if the manager leaves a business enterprise then the difficulty lies in recognizing and measuring the gain or loss. So, items that cannot be quantified with any degree of reliability have been discarded in determining income. The investor's ability to evaluate the decision-making ability of managers is as important as the investment decision itself.

Hicks' wealth is determined with reference to the *current market values of equity* at the beginning and end of the period. Therefore, economic income would fully incorporate market value changes in the determination of periodic return on an investment:

$$\textbf{Periodic return} = \textbf{dividend} + [(\textbf{market value})_t - (\textbf{market value})_{t-1}] \qquad (4)$$

Equation 4: Financial return on an investment consists of dividend and change in market value

The periodic return shareholders get on an investment comes in two forms. First, shareholders may receive some cash from the business enterprise during the year, called a dividend, which is the income component. In addition the second part of the periodic return, called a capital gain or loss, is the unrealized component of any periodic return. If shareholders sell the investment at the end of a period, both the dividend and market value changes are realized components of that periodic return.

The author emphasizes that the continual process of earnings is conceptually straightforward, but application of the *wealth maintenance concept* to short periods is difficult. The allocation of those earnings to individual years, quarters, or months requires estimates. The opposite of the **continuous process approach** is the **complete process approach**, which is the accountants' approach for income accounting. The important reason for the disparity between the economic and accounting measures of income relates to the need for periodic reporting. Investors believe that information can be useful in investment decision-making only if it is relevant and reliable. Since many fluctuations in the market values of equity are matters for conjecture, accountants preclude the recognition of market value changes until realized by a transaction. Accountants have concluded that there must be guidelines for revenue and expense recognition.

FASB Approach

Accountants have defined income by reference to specific events that give rise to recognizable elements of revenue and expense during a reporting period. The events that produce reportable items of revenue and expense comprise a subset of economic events that determine *economic income.* Many changes in the market values of wealth components are deliberately excluded from the measurement of accounting income but are included in the measurement of *economic income.* Accountants have retained *the historical cost model*, which generally precludes the recognition of market value changes until realized by a transaction.

Both accountants and economists understand that the earnings process occurs throughout the various stages of production, sales, and final delivery of the product. However, the difficulty in measuring the precise rate at which this earnings process is taking place has led accountants to conclude that income should normally be recognized only when it is fully realized. Realization generally implies that the enterprise producing the item has completed all of its obligations relating to the product and that collection of the resulting receivable is assured beyond reasonable doubt. For very sound reasons, accountants have developed a reliable system of income recognition that is based on *generally accepted accounting principles* applied consistently from period to period. The interplay between recognition and realization generally means that values on the balance sheet are recognized only when realized through an income statement transaction (Epstein, B.J. and Mirza, A.A. 2000. p.65).

The FASB definition of *comprehensive income* for business enterprises is discussed in the Statement of Financial Accounting Concept No. 6 (SFAC6), *Elements of Financial Statements.*

> *Comprehensive income is the change in equity of a business enterprise during a period from transactions and other events and circum-*

> *stances from non-owner sources. It includes all changes in equity during a period except those resulting from investments by owners and distributions to owners (SFAC6 paragraph 70).*
>
> *Comprehensive income results from (a) exchange transaction and other transfers between the enterprise and other entities that are not its owners, (b) the enterprise's productive efforts, and (c) price changes, casualties, and other effects of interactions between the enterprise and the economic, legal, social, political, and physical environment of which it is part. (SFAC6 paragraph 74).*

The author emphasizes the fact that the FASB *concept of income* is change in owners' equity during the period excluding owners' equity changes through investments of assets by owners and distributions of assets to owners. The changes in comprehensive income result from revenues and gains, expenses and losses, which are classified in the income statement according to business activities:

- *operating income* focuses on the two recurring sources of income. Revenues and expenses result from the primary operating activities of a business enterprise. The secondary operating activity is recurring and incidental or peripheral to the primary operating activity. Gains and losses result from the secondary operating activities. Revenues and expenses are *gross concepts*, whereas gains and losses are *net concepts.* Operating income is realized income. The author points out that many financial statement users care about the operating profitability of a business enterprise. They evaluate its past operating profitability and project its future profitability. Operating income is the best indicator of how successful a business enterprise is.

- *Non-operating income* should not affect ongoing assessments of profitability. Gains and losses result from non-recurring activities. This income component derived from activities that are not expected to be ongoing. The purpose of presenting these items separately is to bring them to the attention of the users of financial statements. These other separate components are discontinued operations, extraordinary items and changes in accounting principles. Income statements report gains and losses of net instead of gross amounts because owners do not need information on the components of either peripheral or nonrecurring income items.

- *price level changes* are unrealized income.

Currently, Hicksian income is probably the understanding of FASB *comprehensive income* from the viewpoint of preferred and common shareholders. Appropriate measurement of income is partially dependent on the vantage-point of the party doing the measuring. From the perspective of outside investors taken as a whole, income might be defined as earnings before any payments to those investors, including bondholders and preferred shareholders, as well as common shareholders. On the other hand, from the viewpoint of the common shareholders, income might better be defined as earnings after payments to other investors, including creditors and preferred shareholders. Companies have issued various capital share classes that differ in their priority ranking in bankruptcy proceedings. Also, accounting standard-setting bodies have issued pronouncements that create new equity accounts for shareholders. An effective analysis of the profitability and risk of a company requires an understanding of the accounting for shareholders' equity.

IASC Approach

According to the IASC's "Framework" a business enterprise's income is defined as follows:

> *Income is increases in economic benefits during the accounting period in the form of inflows or enhancements of assets or decreases of liabilities that result in increases in equity, other than those relating to contributions from equity participants* (IASC's Framework paragraph 70 (a)).

The IASC's "Framework" owes much of its development and direction to the prior work of the FASB. The author emphasizes the fact that the *IASC* conception of *income* is, in other words, increases in equity, which are the result of increases in assets. The IASC clarifies that this definition of income encompasses both revenue and gains. The IASC approach has an Anglo-Saxon influence. In the US, it is usual to use the term *income* for a net amount after the deduction of expenses. In Britain

this restriction is not so observed. In this sense, the term *income* is more general and can be applied in every case to a person or a business enterprise. The IASC's "Framework" states that *profit* is used as a measure of a business enterprise's economic performance. The elements directly related to the measurement of profit are income and expenses.
Surveys of shareholders show that the average investor understands the term *earnings* or *profit* more clearly than *income* (Dyckman, T.R., Dukes, R.E., Davis, C.J., Welsch, G.A. 1992. p.134).

According to *economic substance over form*, income reporting should be the same regardless of *legal form*. Revenues-gains and expenses-losses of a *corporation* are separated from the revenues-gains and expenses-losses of the shareholders. In both the *sole proprietor* and *partnership* form of business enterprise the revenues-gains and expenses-losses identification process is more difficult. Items such as salaries paid to owners or partners may by thought of as distributions of profit rather than expenses. So, the income of owners depends on the legal form of the entity. The IASC approach does not focus only on the income of owners but also focuses on the income of business enterprises.

Conclusion

The author emphasizes the dynamics of accounting. Viewed now from the perspective of the information century, it is difficult to appreciate how far practice will move from any real concern with usefulness.

In 1991, Robert Elliott and Peter Jacobson drew attention to the fact, that accounting must move into the information technology era:

> *Through the ages, mankind has developed three fundamentally different methods of wealth creation: agriculture, industry and information technology. As each new wealth-creation method supersedes the previous one, more sophisticated accounting information is required. Information technology permits leading companies to become more competitive by getting closer to their customers, improving the quality of goods and services supplied, providing a greater variety of product offerings, cutting their product design and production cycle times, downsizing and operating as truly global enterprises* (Elliot, R. K. and Jacobson, P. D. 1991. p.54).

The author would like to support the fact, that the industrial era accounting model results in financial statements insufficient for evaluating information-era companies. New types of investment decisions create the need for new types of accounting information. The more perfect the market the more useful market values will be in measuring income based on changes in the value of assets and liabilities . Companies adapting to the information era are aware that their accounting systems do not provide the information they need.

The author concludes that the philosophy of any accounting course is to teach the concepts of accounting rather than concentrate on teaching codified rules. Students need an appreciation of the dynamics of accounting. This approach provides students with principles that allow them to understand the codified rules better and remember them longer.

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Notes

[1] The Financial Accounting Standards Board (FASB) was formed in 1973 as a private-sector body for leadership in establishing accounting standards in the US.

[2] The International Accounting Standards Committee (IASC) came into existence in 1973, in the same year as the FASB.

Price Continuity and Volatility

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Abstract: One of the obligations specialists have is to maintain price continuity, by which the specialist takes steps to ensure that stock prices move from one price level to the next as smoothly as possible. In this paper, we consider the impact these price continuity rules have on the interdaily and intradaily volatility of market price and return. We show that price continuity rules contribute to volatility reductions by measuring volatility tick by tick, but that they might increase volatility in short time-windows. We then introduce tick-sized reductions and assess their joint interaction with the effects of price continuity rules. We show that reducing tick size compounds the effect of the price continuity rule. These results are important because of their policy implications, and because they explain the literature's previously documented results on volatility reductions.

Key words: Affirmative Obligation, Price Continuity, Tick size, Volatility

JEL classification: G14; G15; G18

Introduction

As explicated in the companion paper (Ronen, Tzur, and Yaari (2002)), the Securities and Exchange Commission (SEC) has taken the mandate for the protection of investors. Practically, one means for approaching this is the microstructure of the US capital markets. For example, specialists on exchanges have an affirmative obligation to maintain orderly markets. One of these obligations is that of price continuity, obligating the specialist to ascertain that stock prices move from one price level to the next as smoothly as possible. Price continuity rules essentially state that prices move in single-tick increments rather than allowing them to "jump" to the next price.

The degree to which prices can move smoothly is clearly related to the minimum tick size adopted in each market. In recent years, the minimum tick size for traded equity issues has carried important policy implications for security exchanges. The Toronto Stock Exchange (TSE), American Stock Exchange (AMEX), New York Stock Exchange (NYSE), and National Association of Securities Dealers Automated Quotations (NASDAQ) have all undergone market-wide tick size reductions in the past few years. Each of these markets eventually reduced their tick size from \$1/8 to \$.01. The U.S. markets reduced the tick size from \$1/8 to \$1/16 then to \$.01. The Toronto Stock Exchange used \$0.05 as an intermediate step.

While numerous papers study the effects of these tick size reductions on the various aspects of market quality, they do not analyze its impact upon price and/or return volatility. A notable exception is the empirical study by Ronen and Weaver (2001), which documents a reduction in interday and intraday return volatility after the tick size reduction from eighths to sixteenths on the American Stock Exchange in May 1997. This study clarifies the mixed theoretical predictions regarding the impact of tick reductions on volatility: One theoretical argument predicts an increase in volatility due to an expected decrease in quoted depths associated with tick reductions: That is, if depths decrease subsequent to a reduction, available liquidity (quoted plus floor depth) may be depleted, which in turn leads to larger price jumps. A competing

argument by Harris (1990) implies a reduction in discreteness-induced volatility following tick size reductions. Ronen and Weaver were able to empirically distinguish between the competing hypotheses since quoted depths do not decrease in their sample; thereby attributing the volatility decreases to the discreteness induced volatility hypothesis.

In this paper, we reconcile the above results and theoretical predictions by attributing observed reductions in volatility to the incremental impact of the specialist's price continuity obligation. Namely, we show that price continuity rules contribute to lower volatility when we measure volatility tick-to-tick. We also show that reducing tick size compounds the effect of the price continuity rule.

The results of this paper have immediate implications. Firms that do not list on a market with a price continuity rule may be forfeiting improved market quality measures for their stock. Clearly, this issue is of interest to both academics and regulators (who must measure the social costs of different trading rules).

This paper is organized as follows. Section II discusses the issues and states our hypothesis. Section III illustrates the effect of the price continuity rules. Section IV concludes.

The Issues

In response to the longstanding debate on the relative merits of specialist versus dealership markets, researchers have investigated the impact of differing market architectures on various aspects of market quality, including volatility. But while several papers address the impact of market structure on transitory volatility, testing for differences in transitory volatility across exchanges or at different times of the day, none directly address the effect of the specialist's affirmative obligations on return volatility.[1]

Recent studies focus on the impacts of tick reductions on market quality measures, including volatility. The theoretical predictions regarding the effect of the tick reduction upon volatility are mixed, being based upon different arguments. One predicts an increase in observed volatility under the assumption that tick reduction decreases quoted depths. This is turn, would lead to available liquidity (i.e., quoted plus floor depth) being reduced, thereby resulting in greater transaction price variations. In Contrast, Harris (1990) attributes price change variance in part to (tick size induced) rounding errors. That is, he argues that discreteness may induce 'sticky' observed prices, unless reservation prices change by at least a tick. This argument implies that tick size reductions should act to reduce (discreteness-induced) volatility.

Clearly, these two predictions may co-exist with potentially confounding effects whenever depths decline as a result of tick size reductions. While recent evidence from the Toronto Stock Exchange does indeed document such depth reductions (for example, Bacidore (1997), and Porter and Weaver, (1997), the results for the U.S. exchanges are mixed: Goldstein and Kavajecz (2000) document depth reductions throughout the limit order book following the July 1997 NYSE tick size reduction from eighths to sixteenths, Ronen and Weaver (2001) do not find that depths decline after the American Stock Exchange's May 1997 switch to 'teenies' but they document decreased levels of return volatility both at the interday and intraday level. The authors are therefore able to empirically distinguish between the two competing hypotheses regarding the impact of tick reductions on volatility. Their observed reductions in transitory volatility are most likely attributed to the discreteness-induced volatility hypothesis.

Bessembinder (1998) finds firms can experience a reduction in volatility (similar to tick size reduction) when they switch from a market without a price continuity rule (NASDAQ) to one with the rule (NYSE). This suggests that some facet of the market structure of the NYSE, has the same impact on volatility as a tick reduction. The NYSE, as well as the American Stock Exchange and Toronto Stock Exchange, are all characterized by continuous trade, facilitated by a specialist with affirmative obligations.

We posit that price continuity reduces transitory volatility. Holding tick size constant, we expect that a market characterized by no price continuity allows for quicker price adjustment (in terms of the number of trades) accompanied by the unfavorable outcome of higher volatility.

The Effect of Price Continuity on Volatility

Consider the following simple numerical example. Assume the existence of two markets, both with a $0.10 tick size. One has a price continuity rule while the other does not. We consider the same stock trading under each alternative system. We assume that the fair price of the stock moves from one dollar to two dollars. While price continuity rules lead to increased instances of price moves at the tick size, markets with no price continuity rules could have prices moving in increments of more than one tick at any time. For simplicity, assume that the price in the market with no price continuity rule reaches its new level in two increments (both a function of the $0.10 tick size). The market with a price continuity rule requires that the new price level be reached in 10 increments (price change divided by the tick size). The pattern of trade prices and returns for the two markets are illustrated in Table 1.

Table 1: The price and return under two diffferent regimes of price continuity

	Without Price Continuity		With Price Continuity	
Date	Price	Return	Price	Return
T=0	$1.00		$1.00	
T=1	$1.00	0%	$1.10	10.00%
T=2	$1.00	0%	$1.20	9.09%
T=3	$1.00	0%	$1.30	8.33%
T=4	$1.40	40.00%	$1.40	7.69%
T=5	$1.40	0%	$1.50	7.14%
T=6	$1.40	0%	$1.60	6.67%
T=7	$1.40	0%	$1.70	6.25%
T=8	$1.40	0%	$1.80	5.88%
T=9	$1.40	0%	$1.90	5.56%
T=10	$2.00	42.86%	$2.00	5.26%
Variance	0.2533	0.0004	0.1100	0.0002
Std. Dev.	$0.50	2.02%	$0.33	1.57%

Table I indicates that both the price and return volatility measured on a transactional basis is always lower in the market where price continuation is enforced, when the window is sufficiently large, from T=0 to T=10.

Note that the size of the window is important. In studies that measure tick-to-tick volatility, continuous price changes reduce volatility. In studies that measure, say, 5 minute changes, price continuity may increase volatility measured at a window of T=0 to T=3, or T=4 to T=9. Another related issue concerns the informativeness of the price. That is, the extent to which the price reflects the firm's true fundamental. We will discuss this issue below at some length.

Next we consider the joint effect of a tick reduction with a price continuity rule. The effect of a tick reduction on a market that has a price continuity rule is to increase the number of increments between price levels. This should further reduce both price and return volatility. Table 2 examines the same change in price levels as Table 1, but assumes a $0.05 tick size instead of $0.10. Only the market with a price continuity rule is considered in Table 2, since the only impact a tick reduction may have on the market with no price continuity rule is to change the intermediate increment price (which will not significantly change the variance of prices or returns).[2]

Table 2: The effect of tick reducton

Price	Return
$1.00	
$1.05	5.00%
$1.10	4.76%
$1.15	4.55%
$1.20	4.35%
$1.25	4.17%
$1.30	4.00%
$1.35	3.85%
$1.40	3.70%
$1.45	3.57%
$1.50	3.45%
$1.55	3.33%
$1.60	3.23%
$1.65	3.12%
$1.70	3.03%
$1.75	2.94%
$1.80	2.86%
$1.85	2.78%
$1.90	2.70%
$1.95	2.63%
$2.00	2.56%
0.0962	0.0001
$0.31	0.74%

Comparing the standard deviation of prices and returns from Table 2 with those of Table 1 reveals that the expected joint impact of price continuity and tick size reduction on volatility is to reduce

volatility even further. In keeping with the literature discussed in section II, a price continuity rule will compound the impact of a tick size reduction on transactional volatility.

We now consider the impact of the price continuity rule on variances measured over a subset limited by the horizons within a day. When volatility is measured on the basis of 24-hour, or even hourly returns, the price continuity rule is not expected to impact all observations. In other words, *some* discrete observations will not have fully adjusted to a new price level at the time a price is observed, which in a rational expectations market affects price informativness.

Consider the following example. As before, assume two different market structures – one with a price continuity rule and one without. Again assume the same stock trading under the two alternative systems and the same tick size of $0.05 applies to both markets. This time, assume daily price observations. In the market without a price continuity rule, prices represent fully adjusted prices. The market with a price continuity rule will have some prices that have not fully adjusted to a new economically correct price level. Since the rule affects price moves in both directions, we arbitrarily and without loss of generality, pick one price decrease (the 6th price observation, T=5) and one price increase (the 10th price observation, T=9) to have not fully adjusted. The results are documented in Table 3.

Table 3: Adjustment of price

	Without Price Continuity		With Price Continuity	
Date	Price	Return	Price	Return
T=0	$10.00		$10.00	
T=1	$10.10	1.00%	$10.10	1.00%
T=2	$10.05	-0.50%	$10.05	-0.50%
T=3	$9.90	-1.49%	$9.90	-1.49%
T=4	$9.85	-0.51%	$9.85	-0.51%
T=5	$9.70	-1.52%	$9.75	-1.02%
T=6	$9.80	1.03%	$9.80	0.51%
T=7	$9.85	0.51%	$9.85	0.51%
T=8	$9.80	-0.51%	$9.80	-0.51%
T=9	$9.90	1.02%	$9.85	0.51%
T=10	$9.85	-0.51%	$9.85	0.00%
T=11	$10.05	2.03%	$10.05	2.03%
T=12	$10.15	1.00%	$10.15	1.00%
Variance	0.018173	0.000126	0.016923	9.74E-05
Std. Dev.	$0.1348	$0.0112	$0.1301	$0.0099

An examination of Table 3 reveals that both price and return volatility are lower under the regime of a price continuity rule, indicating that fixed-point volatilities may be impacted in the same way as transactional variances. The economic implication of Table 3 is that reduced volatility does not necessarily increase the quality of the price as a statistic of economic value, an insight that is counter-intuitive because common wisdom links reduced variability to improved information. [An opposite example can be derived from Table 1. The price in a continuous-price rule regime is more sensitive to an arrival of new information on the value of the firm than the price in a non-continuous price rule regime. This implies that an improved informativeness concerning price is associated with higher variance.]

These examples may be instrumental in explaining Bessembinder's (1998) results that firms switching from NASDAQ to the NYSE experience volatility decreases – the observed phenomenon may well be attributed to having migrated to a market that is characterized by a price continuity regime. Similarly, the decreases in volatility measures (transactional, hourly and daily) documented by Ronen and Weaver (2001) for their sample of AMEX stocks undergoing a reduction in tick size may be attributed to the joint effect of tick size reduction and the existence of a price continuity rule.

Concluding Remarks

The impact of market structure on volatility has long interested researchers. In this paper we consider the impact of price continuity rules, imposed on specialists, upon interdaily and intradaily volatility. We show that price continuity rules contribute to volatility reductions. We then introduce the effects of tick size reductions and assess their joint interaction with the effects of price continuity rules. We show that reducing tick size compounds the effect of the price continuity rule.

This paper has immediate policy implications. Since price continuity rules are found to improve market quality, their absence may impose a social cost of importance to both regulators and academics.

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Notes

[1] Most of these have focused on comparison of transitory price changes at the open and close of the trading day, with intent to uncover impacts of either the trading mechanisms employed at the open and close of trade, or of the continuity of price formation during trading versus non trading hours. See for example, Amihud and Mendelson (1987), Stoll and Whaley (1990), Gerety and Mulherin (1994), and Forster and George (1996), among many others. Several studies compare volatility for firms listed on the NYSE and NASDAQ. Huang and Stoll (1996) and Bessembinder and Kaufman (1997) examine a matched sample of New York Stock Exchange (NYSE) and NASDAQ stocks, while Bessembinder (1998) examines a sample of firms that switch from NASDAQ to the NYSE. All three studies find that volatility levels are lower on the NYSE than on NASDAQ.

[2] This excludes the special case where the intermediate price is such that the transaction returns are exactly equal making the return variance, but not price variance, equal to zero.

Inflow of Foreign Capital: Whether Different Approaches to Tax Reform Matter – Evidence From the Baltic States

(1995 – 2000)

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Introduction

Lithuania, Latvia and Estonia as the object of this economic analysis have not been chosen accidentally. These neighbouring Baltic countries started their transition reforms almost at the same time and from quite similar positions.

Despite obvious common aims, each country has chosen rather different ways of dealing with transition.
One of the peculiarities of the implementation of transition reforms is reflected in the construction of their tax systems. All the countries considered have emphasised the importance of attracting foreign capital and have tried to create a favourable investment environment through appropriate tax concessions. Targeting the same objectives, each of the countries has applied different economic approaches to their own tax reforms. Hence, Latvia developed its tax system according to suggestions from international organisations; Estonia chose an absolutely extraordinary approach to tax reform and Lithuania has found herself at a crossroad having alternative projects for tax reform directed in quite an opposing manner.

The aim of this paper is to compare the approaches to constructing tax systems in Lithuania, Latvia and Estonia and to evaluate their efficiency in terms of attracting foreign investment into the country.

The Methodology of the Analysis

The tax system is quite a notoriously significant tool of regulation in any economy, which affects the propensity to invest. Nevertheless, its explicit impact on the investment environment cannot be measured and must, therefore, alas, be traced only indirectly through an analysis of major economic indicators.

This paper is based on the following approach to the problem. At first, we make the conjecture that the tax systems in all the analysed Baltic Countries were constructed with the aim of attracting foreign direct investment (FDI) and investments of local origin, so taxation of corporate profit will be examined quite thoroughly. Considering that investments of local origin have been limited, FDI will be emphasised in our analysis.

We realise that in all probability, FDI in transition countries can be attracted not only by favourable investment conditions from the point of view of taxes but also by other factors. According to some theories the level of development of an economy is a major factor in attracting FDI (Nagesh Kumar, p.7). We also make the assumption that enlargement of the market share of transnational corporations also provides an important reason to invest.

The rationale behind any analysis of FDI in the context of a valid tax system is obvious: the existence of more favourable conditions than in other

countries should attract international investment capital. In its turn additional capital should induce growth of GDP. Hence, another aim of this paper is to verify if an appropriate relationship actually exists between FDI and GDP. It is possible that the lack of a positive relationship between those indicators reflects the inefficiency of FDI due to the occupation of monopolistic positions in all or some transition countries – a conjecture that we explore below.

The upshot of this comparison should be the actual level of impact taxes have had on investment propensity in Lithuania, Latvia and Estonia. Considering the complexity of the task of evaluating the impact of one factor, especially such a factor as the tax system, on any displayed propensity to invest, we accept the following approach. If growth in FDI is followed by growth in GDP, that could be treated as a situation where FDI attracted by favourable investment conditions induced GDP growth. If increases in FDI weren't followed by any growth of the economy that would mean that FDI simply occupied monopolistic positions and didn't contribute properly to growth, so, the tax system wasn't a major factor in stimulating FDI.

We conclude the paper by evaluating the impact of the different tax systems on the economies of the Baltic States and discuss the policy implications of the analysis.

An Investigation of Different Tax Systems and Investment Processes in the Baltic States

Lithuanian Tax System, FDI and GDP trends

Lithuania actually began its tax reform in 1990, when the Law of Profit Tax for Legal Persons was passed, and a profit tax tariff equal to 35% was set (until then profit share directed to the state budget was determined according the rules of central planning). In 1991 the profit tax tariff was reduced to 29%. In 1993 an important step to stimulate investments was made. Profit invested back into an enterprise attracted reduced taxation. For investments of this kind only a 10% profit tax tariff was applied.

From 1993 to 1995 the conditioning of the legal environment was directed towards differentiated taxation of investments according to the origin of the capital invested. To provide additional benefits for foreign capital an amendment of this law was introduced. According to which, if an enterprise was established (registered) or foreign capital was invested before 31 December 1993, that part of its profit (income) proportional to the share of foreign investment in the enterprise's authorised capital, reinvested in the enterprise and not used for labour costs shall be taxed for five years at a profit tax rate reduced by 70%. After this five-year period that part of profit (income) due to foreign investment shall be taxed for another three years at a profit tax rate reduced by 50%. Consequently, local investors, in spite of the above profit tax deductions on investments, were discriminated against when compared with foreign investors.

In further actions changing the investment environment, the government continued to demonstrate inconsistency. It regulated that in case an enterprise was established or foreign capital invested between 1 January 1994 and 1 August 1995, profit (income) due to foreign investment shall be taxed for a six-year period at a profit tax rate reduced by 50%. At this point business conditioning didn't stop.

The government then changed its attitude to foreign investors in general and emphasised only quite considerable investments. An additional condition was also introduced – if foreign investors have invested foreign capital worth at least $ 2-million before 1 April, such an enterprise shall remain exempt from corporation (profit) tax for three years from the moment the profit is received and will benefit from a 50% reduction in profit tax during the subsequent three years.

In 1998 business conditions for local investors changed completely. It was decided that the application of profit tax on taxable profit used for investment purposes be abolished. Frequent changes to political influences and the lack of deliberated and well grounded long-term economic policy resulted in a situation in which businesses operating in the same market have been subject to different rules of taxation (Table 1).

Table 1. Legal environment for operating a business stipulating stimuli for investment

Date	Origin of Capital	Basic Profit Tax Tariff	Tax Deductions	Comments
Since 1July 1993 until 1 March 1997	No difference	29%	Taxable profit invested is taxed by "10" profit tax tariff	
Before 31 December 1993	Foreign	29%	5 years profit tax reduced by 70%, next 3 years profit tax reduced by 50%	Tax deductions applied with no connection of amount invested
Since 1 January 1994 until August 1995	Foreign	29%	6 years profit tax reduced by 50%	Tax deductions applied with no connection of amount invested
Until 1 April 1997	Foreign	29%	Exempt from profit tax for 3 years from the moment the profit is received and will benefit 50% reduction in profit tax during next three years	Foreign capital invested shall be worth at least $2-million
Since 1 March 1997	No difference	29%	Taxable profit invested is taxed by "0" profit tax tariff	Any additional exemptions for capital of foreign origin
Since 1 January 2000	No difference	24%	Taxable profit invested is taxed by "0" profit tax tariff	Any additional exemptions for capital of foreign origin

It is difficult to judge if it was the complicated scheme of exemptions presented above that stipulated growth of investments. The impact of various profit tax concessions was weakened by loopholes allowing the transfer of funds into various offshore companies and under the guise of consultation and other services, to inflate the costs of operating a business. Only in 1997 a resolution was passed imposing tax on funds transferred to countries with low taxation rates (and only recently has this tax been diminished from 29 to 15%).

Growth of foreign investments in Lithuania could be considered quite significant. This being the case, its positive impact should be reflected in other major economic indicators, especially the growth of GDP (Fig.1).

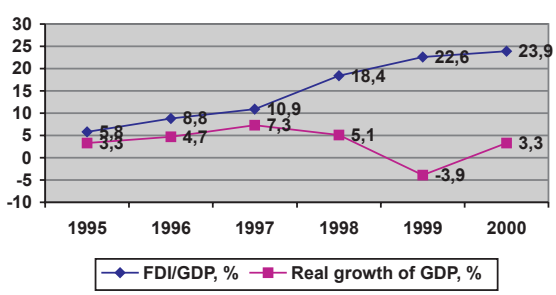

Fig.1. An analysis of the relationship between the growth of FDI measured as FDI/GDP, (%) and real growth of GDP in Lithuania

According to the above presented statistical data, direct foreign investments without any account of investments of local private capital, in the year 2000 comprised 23,9% of GDP. For comparison, according to EU-15 aggregated data, gross fixed capital formation by the private sector, as a percentage of GDP in 1998 was 17,6% and in 1999 17,9% (EUROSTAT).

Despite impressive growth of investments as a share of GDP, the trends of these economic indicators leads to a controversial corollary – stimuli for foreign investments seems to have worked but the corresponding growth of the national economy hasn't been generated. Concerning an interpretation of the current situation several assumptions arise. Firstly, the drop in GDP growth rates has no relationship either to foreign investments or local investments. Secondly, investments haven't been efficient and haven't contributed to an expansion of the national economy. The latter premise seems trustworthy and could be seen as being confirmed by the general concern of the Lithuanian government to attract foreign capital for privatisation of already functioning state enterprises at any price.

Privatisation would offer "quick money" for the budget while investment into the "green field" would only generate macroeconomic results in the long-run prospective. The dynamics of foreign investments growth, measured as a share of GDP, could be treated as the aftermath of a biased economic policy in this field, indicated by the subsequent interest in the privatisation of key monopo-

listic enterprises of strategic industries under extremely favourable conditions. These resulted in easy budget revenue without any guarantees for future economic growth. The 1998 privatisation contract with Amber Teleholdings (a consortium of Swedish "TELIA" and Finnish "SONERA") involving the purchase of 60% of Lithuanian Telecom shares for 2.4 billion litas with an obligation to invest another 884 million over the next two years has been included as an example in point.

Despite the high profitability of Lithuanian Telecom before privatisation the government was obligated to guarantee a monopolistic position for the privatised enterprise until the year 2002. Mazeikiai Oil Refinery is another example of a large-scale privatisation in conditions particularly harmful for the Lithuanian economy. As concerns "green field" investments, they apparently comprise a rather insignificant portion of direct foreign investments.

That confirms that government policy hasn't been directed towards enhancing the production potential of the country, but instead has tried to solve budget problems without sufficient emphasis on the long-run development of the national economy.

A slow down of growth in the national economy as well as increases in the unemployment rate once more riveted government attention to new investments. Their concern resulted in a new Government Program for the years 2000-2004. In it, the abolition of profit tax and taxation of dividends by 24%, instead, was foreseen. An equal approach to foreign and local investments has also been confirmed.

Despite this official tack in the field of tax reform having been set, diametrically opposite opinions concerning future reforms were discussed. One of the reasons for the fall of the government at the end of June was disagreement over general economical policy. So the government formed less than a year ago fell and a new majority in parliament took the power into its hands. A whole new direction was announced, asserting that the introduction of a progressive profit tax and the abolition of all tax concessions on capital invested would be more effective. This new turn in economic policy has not been ratified yet, but still it is obvious that Lithuania hasn't decided what approach to tax reform to accept in order to induce growth of effective investments and growth of GDP.

Latvian Tax System, FDI and GDP Trends

The taxation system in Latvia as opposed to Lithuania has been set up in accordance with recommendations provided by international financial organisations.

The general rules and principles of taxation are described in the Law "On Taxes and Duties" adopted in 1995. The types of taxes are very similar to those of Lithuania, so considering the emphasis of our investigation, we will concentrate on the taxation of profit from business enterprises.

In Latvia, company profit is taxed according to the Corporate Income Tax law adopted on 1 March 1995. Corporate income, or to put in other way – profit – is taxed at 25%. The tax tariff doesn't differ much from that of Lithuania (as shown above, in Lithuania recently a 24% profit tax rate is applied). The main point of interest for the purposes of our comparison involve profit tax concessions directed towards inducing investment stimuli.

So the Latvian policy for stimulating investment is realised through the following profit tax concessions.

The first and the most important tax concession on capital invested is for companies involved in supported investment projects who are granted a 40% reduction on their corporate income tax. The main conditions for qualifying for this tax reduction is that the investment project was approved by the Cabinet of Ministers, the value of the project exceeds 10 million lats, and the investments are completed within a 3 year period. Tax reduction is applied only to the year the investments are completed.

Comparing the Lithuanian and Latvian approaches to managing the investment environment significant differences can be found. Latvia is going to apply profit tax concessions only on projects supported by the government and only after planned large-scale investments are fully implemented. Lithuania, in its turn, offers various special conditions for big projects, and additionally applies tax allowances on any amount of capital invested. In the Lithuanian case natural conjectures arise. For instance, a business could be tempted to inflate its capital costs. The possible result might not necessarily include any increase to the efficiency

of the operation of business. On the other hand, in all probability, the budget revenue collected from profit tax could diminish significantly – a conjecture that we'll explore below.

The second great difference in approaches to tax reform when comparing Lithuania and Latvia is that Latvia from 1st of January 2001 has decided to promote state-of-the-art industries and informatics products. In Latvia, companies producing hi-tech products and hardware-software products are granted a 30% tax reduction of their calculated corporate income tax. This tax break is applicable only in cases, where 75% of a company's output consists of the above-mentioned products and the company has ISO 9000, ISO 9001 or ISO 9002 certification.

The third important difference in the Latvian tax system is that it is oriented towards the development of depressed regions. Enterprises established in special regions that qualify for support could apply additional rates for the depreciation of fixed assets. So, by multiplying the value of fixed assets invested in supported regions by appropriate coefficients ranging from 1,5 to 2 leads to increased depreciation of costs, and accordingly, a reduction in corporate profit tax. Furthermore, businesses who have invested in problematic regions may transfer losses from year to year within a 10-year period.

Such economic tools used in Latvia should presumably induce increases to GDP in the country through attracting investment into less developed regions.

Latvia, unlike Lithuania, also supports various business projects. In Latvia expenses for research and development (including those connected with technical documentation of un-implemented projects, if the value of such projects does not form part of fixed assets), which are connected with the entrepreneurial activities of the taxpayer, are written off in the year they are generated.

Generally, it could be stated that the Latvian approach to corporate profit taxation is based on smaller and more concrete-purpose-oriented concessions.

In Table 3 economic data reflecting the growth of FDI and GDP in Latvia are presented.
Compared to Lithuania, Latvia managed to achieve higher FDI per capita by the year 2000 – as we saw in Table 2, in Lithuania FDI per capita was $ 727 versus $ 875 in Latvia. Concerning FDI growth rates, in Lithuania during the period 1995-2000 FDI per capita increased almost 6 times compared with an increase of 3,4 times in Latvia.
Hence, the corollary could be made that Lithuania had stronger stimuli for attracting FDI into the country. Concerning the effectiveness of those investments, the growth of GDP together with the growth of FDI should be considered (Fig.2).

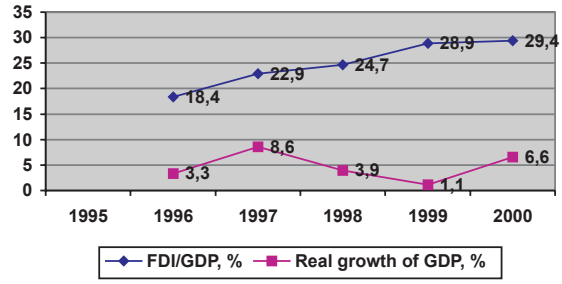

Fig.2. An analysis of the relationship between the growth of FDI measured as FDI/GDP, (%) and the real growth of GDP, (%) in Latvia

A comparison of the changes to FDI and GDP leads to the corollary that in Latvia, FDI affected the growth of GDP insufficiently, though slightly more than in Lithuania.

In Latvia in the mid-1990s major investments were made in port facilities and telecommunications, largely on the basis of privatisation processes. Later due to an acceleration of the privatisation process, investments in manufacturing increased. In 1988 major investments were made in the financial sector and the development of the wholesale/retail trade network. Common to both the Latvian and Lithuanian pattern of FDI growth is the high proportion of FDI that come through the privatisation process.

So generally speaking, it could be said that FDI attracted both by privatisation and the creation of favourable investment conditions haven't guaranteed the appropriate acceleration of GDP growth. A slightly closer relationship between the share of FDI in GDP and GDP growth in Latvia could signal that the tax system oriented towards the achievement of more concretely formulated purposes worked a little more efficiently. Nevertheless, taking into account that the tax system is not the only factor affecting propensity to invest we will make a final decision about tax policy implications after consideration of the Estonian tax system and corresponding trends in FDI and GDP change.

Estonian Tax System, FDI and GDP Trends

Considering Estonia's approach to tax reform we need to clearly say from the beginning that it differs a lot from its neighbours Lithuania and Latvia.

Estonia from the very beginning of transition focused upon stimulating FDI. In 1994 special tax incentives granted to companies with foreign investment were abolished.

In October 1997, the Parliament adopted a law with amendments to the income tax law allowing the Government to determine regional investments subject to tax concessions. Companies could deduct expenses incurred in the acquisition or upgrading of fixed assets and equipment from their taxable income. From January 1998 until 31 December 1999, tax concessions were applied to investments made in depressed regions. Corporate entities were able to deduct from their taxable payments the losses attributable to this incentive.

From 1 January 2000, resident companies and permanent establishments belonging to foreign entities (including branches) have been subject to income tax only in respect to all disbursements (both actual and deemed). In other words, from January 2000, instead of taxing profit earned by legal persons, the distribution of profits as well as transactions, which can be treated as the hidden distribution of profits, have been taxed. This means that corporate profits have been set free from income tax. The basic idea underlying the income tax exemption is to promote the development of the Estonian economy and enterprises while making extra funds available for investments. The regional income tax incentives introduced for under-developed regions of Estonia in 1998 were abolished from 1 January 2000.

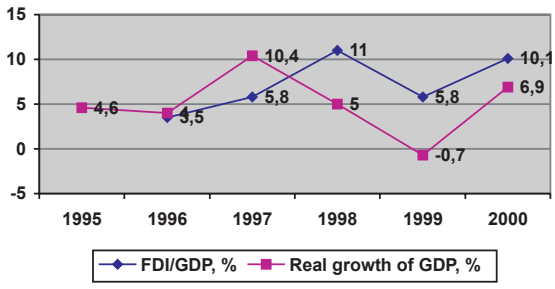

Fig.3. An analysis of the relationship between the growth of FDI measured as FDI/GDP, (%) and the real growth of GDP,(%) in Estonia

This unprecedented approach Estonia has taken towards corporate profit tax has come in for a lot of criticism. The main arguments against such an extraordinary economic reform are as follows. Firstly, a lack of evidence coming from other countries was emphasised. Secondly, taking into account Estonian efforts to join the European Union, this absolutely different tax system seemed a little bit unexpected (though directives from the European Union do not raise any special requirements concerning corporate profit tax). Thirdly, some doubts were expressed about the difficulties involved in the implementation of such an unusual law in practice.

Anyway, in evaluating the efficiency of tax reforms in Estonia it should be emphasised that in this Baltic State the growth of the percentage of FDI in GDP is followed by an appropriate increase in GDP. That could be treated as a healthy tendency corresponding to the economic rationale. Furthermore, in Estonia the smallest FDI/GDP ratio corresponds to the highest GDP growth rate. As shown above, for example, for the year 2000 Lithuania's FDI/GDP was equal to 20,8% with a corresponding 3,3% of GDP growth. In Latvia those indicators were 29,4 and 6,6, while in Estonia an FDI/GDP share of 10,1% was found together with 6,9% of GDP growth.

An Evaluation of the Impact of the Tax System on Foreign Investments and Growth in Young Transition Countries

Economic rationale says that additional inflow of investment should bring about an increase in GDP. Comparing the economic data from Lithuania, Latvia and Estonia revealed quite a controversial situation: Lithuania displays the lowest efficiency for a rather high index of FDI; even more growth of FDI seems to be followed by further slow down in GDP growth. This tendency reached a peak in Lithuania in 1999, when a high FDI/GDP rate (22.6%) appeared together with a significant drop in the growth of GDP (by 3,9%).

The Latvian situation differs slightly. Latvia's slightly higher rate of FDI (29,4%) brings about a rate of GDP growth twice as high (as mentioned, 6,6% in the year 2000). In general, Latvian FDI

and GDP trends signal a rough correspondence with economical rationale.

Estonia, with some deviation, could be treated as a country developing according to economic logic. Increases in GDP could be considered sufficiently sensitive to any growth in FDI, which, in turn, measured in FDI/GDP terms, is much more modest.

So we have revealed quite a controversial situation in the field of FDI and GDP growth in the young Baltic Countries. The question arises … why does Lithuania, in the first instance, with the most favourable tax system for investors display the worst results, and then Latvia, having less favourable, but still quite an investment oriented tax system, displays a slightly better situation, and finally Estonia, which only in the year 2000 turned her tax policies from having quite insignificant investment stimuli, managed to achieve the best results.

Considering this situation the following conjecture arises. In young transition economies tax systems based on tax concessions for investments don't play a proper role in attracting investments. In newly formed markets investments are stipulated by other factors, such as privatisation of enterprises already having a significant share of market. This being the case, the share of FDI, directed to the occupation of monopolistic positions, gains twice. Firstly, such firms based on foreign capital can receive profit due to their special position in the market rather than increased efficiency; and secondly, being in monopolistic positions in a country with significant tax concessions on investments means that they can also enjoy low taxes. So when a significant share of GDP is attracted by privatisation the situation described above could arise.

Let's explore our conjecture. According to data from privatisation agencies in the countries under consideration, during the period 1996-1999 36% of all FDI in Lithuania was received as a result of privatisation (e.g. in 1999 even as much as 99% of all FDI comprised income from Telecom monopoly privatisation, corresponding to -3,9% GDP growth); in Latvia during the same period 30% of FDI resulted from privatisation, while in Estonia only 17% of FDI was received due to privatisation of national objects.

This data tends to confirm our conjecture that – significant tax concessions on investments in transition economies did not turn out to be as powerful a tool for inducing economic growth as expected. The conditions surrounding privatisation also play a very important role in determining the future efficiency of FDI. If the transition country allows an investor to retain a monopolistic position for the immediate future that can hardly lead to an increase in operating efficiency in the market. It is very likely that in transition countries the conditions of the privatisation process may be established due to a high level of corruption.

According to an evaluation announced by Transparency International in its Annual Report for 2000, the Corruption Perception Index for Lithuania was equal to 3,8; for Latvia and Estonia respectively it was equal to 3,4 and 5,7 (the higher the score the better the result; e.g. for Denmark it was equal to 10,0; for Finland – 9,8). So, this evaluation of corruption also confirms our conjecture – Estonia being less corrupt compared to its neighbours, displays a higher FDI efficiency.

Comparison of the composition of FDI by country and FDI by sectors of the economy in Lithuania, Latvia and Estonia also bears some information relevant to the propensity to invest in the Baltic States. This data (Table2 and, 3) sends unambiguous signals that this cluster of countries (Sweden, Denmark, Finland and USA) demonstrate almost identical interests (in communication, manufacturing, financial sector and trade) in Lithuania, Latvia and Estonia. That one more time confirms that in transition economies significant tax concessions on investments were not as effective as expected.

Table 2. Composition of FDI by countries

FDI by Country, 2000 (% of total)	Lithuania	Latvia	Estonia
1. Sweden	21	10,2	37,6
2. Denmark	15	14	4,1
3. Finland	12	*	28,7
4. USA	9	9,3	4,5

Table 3. Composition of FDI by sectors of economy

FDI by Sector, 2000 (% of total)	Lithuania	Latvia	Estonia
1. Communication	27,7	24,5	27
2. Manufacturing	25	21	24
3. Financial Sector	**	21,5	23
4. Trade	19,7	17	16

* Large investments in Latvia were made by Denmark, however, the majority of the Danish investment is represented by the consortium, SOWERA, from Finland.

** in the process of privatisation

Before considering tax policy implications of the analysis, one more aspect of various approaches to investment stimuli should be deliberated upon – the impact of tax concessions on the national budget structure. The point of such an analysis of the structure of budget revenue is to retain or reject the argument that tax concessions on investments in the long term do not affect budget revenue.

So, for example, in Lithuania it has been repeated time and time again that tax concessions on investments had to induce growth of production, which in the long term would subsequently stipulate the same volume of taxable profit and, if not increase then at least stabilise the same revenues from profit tax. Hence, in Fig.4 trends concerning the share of GDP (%), in the national budgets of Lithuania, Latvia and Estonia are presented.

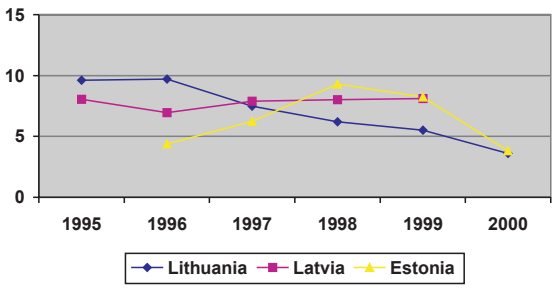

Fig.4. The share of corporate profit tax in the national budgets of Lithuania, Latvia

Tendencies for the share of GDP to change disposes of the argument that tax concessions on investments in a young transition country induces growth of production and maintains a certain level of taxable profit. On the contrary, the greater the tax concessions, the greater the drop in taxable profit. Latvia, for example, with less significant tax concessions has not experienced such a drop in the share of profit tax in their national budget. Estonia, in turn, lost profit tax revenue after the tax reform at the beginning of the year 2000.

Conclusions

The main upshot of this comparison of tax systems in the Baltic States is that, in general, young transition countries with especially favourable investment conditions, from the point of view of taxes, grow more slowly than countries applying more modest investment stimuli.

Such a corollary might seem controversial for developed countries, but the situation in which young independent states found themselves after segregation from the Soviet Union was different. They were all at the very beginning of the process of creating market relationships, enterprises of state capital dominated this, private capital was still at the stage of being created and everyone operated in relatively non-competitive environment. Such a situation, on the one hand, stipulated intensive processes of privatisation, and, on the other hand, offered other developed countries a chance to enter new markets actually free of strong rivals. The natural process of expanding an activity into hereto unoccupied markets stipulated FDI.

Another characteristic feature of the entrance of foreign capital was that, at first, it flew into monopolistic spheres of the economy. Favourable conditions for occupation of monopolistic positions were fostered by governments, who desperately needed money and offered incredibly favourable conditions of privatisation (that Lithuanian Telecom, which could be referred to as the most profitable enterprise in the Baltic countries, was privatised with guaranteed monopolistic conditions until 2003 is a classic example).

So the process of privatisation, sometimes followed by signs of corruption, stipulated that growth of FDI has not induced a corresponding level of growth in GDP. This tendency was especially obvious in Lithuania, where the role of privatisation in attracting FDI was the greatest and the level of corruption the highest. Hence, we can conclude that the role of tax incentives in young transition countries case is diminished by other factors, and strongly investment oriented tax policies in early stages of the development of the market can lead to a diminishing of budget revenues from profit tax.

This comparison of tax systems in the Baltic States Lithuania, Latvia and Estonia yields the following

tax policy implications. The tax system, especially providing favourable investment conditions in young transition economies does not play the role, which it was predetermined to. So there is no point in introducing special tax incentives in the form of tax concessions on capital invested. As concerns the tax rates in particular, countries are free to adopt any tariff. The authors of this paper support progressive profit tax tariffs accepting that this is quite a subjective matter.

The main thing to keep in mind is that, according to economic logic, a strong relationship exists between the profit received from enterprise and the volume of capital invested. So the main emphasis should be put on creation of favourable conditions for operating businesses without any distinction of the origin of the capital invested. Firms, which balance on the edge of profit and loss do not gain from tax concessions on capital invested at all, while profitable firms have the possibility to escape taxes through inflating capital costs.

So instead of tax concessions on capital invested, young transition countries should concentrate on attracting "green field" investments by guaranteeing stable business conditions once they are implemented, continuity of reforms and, last but not least, reducing bureaucratic hurdles and increasing the transparency of decisions made by civil servants.

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A Rent Seeking Society, a Rent Providing Government and Social Goals

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Hayek essay competition

The welfare of the people, like the happiness of man, depends on a great many things that can be provided in an infinite variety of combinations.
(F. Hayek "The Road to Serfdom")

A Rent Seeking Society

In the Soviet time, or especially just before the collapse of the system, according to Hayek, the common enemy (the system itself) was the one which kept society as a group moving towards a common aim — liberty. Thinking about liberty few of us were able to make any distinction between the independence of the state and personal liberty or freedom of choice[1]. So all kinds of changes with an economic or social origin that could be seen as a move towards an independent state were seen as valuable changes moving towards the common aim.

After 10 years of independence, society has diverged into many interest groups, all with their own aims mainly realised through self-satisfaction and monetary means. Independent utility maximizers, who under the previous system had basically one choice — to belong or not to belong to the communist party — now have multiple disparate goals. Instead of the institutional constraints of a totalitarian regime, in the "new society" constraints are monetary. So in the "new society" high income and profit are the proxies of liberty or freedom. The "new order" rests on the well known assumption that people prefer "more to less" and thus they seek the means that provide more. Let us use the word as a proxy for all kinds of monetary means. So by preferring more, people are seeking higher profit. This kind of profit seeking will inadvertently bring society some desired results[2]. These desired results can be measured according to the efficiency of the allocation of resources, but also according to the variety of combinations the society provides "for the happiness of man". Of course there are also constraints in the "new society".

The behaviour of profit-seekers is constrained by ethics, law and by other profit seekers — institutions and competitors. Thus for the sake of higher profit there is always some kind of demand for weaker constraints — less competition, more of those institutions that restrict competition and less of those who promote competition etc. If profit-seekers devote resources to weakening the aforementioned constraints instead of seeking an efficient use of resources under existing constraints, then profit seekers turn into rent seekers. The profit seeker's inadvertent, desired result for a society turns into a rent-seeker's inadvertent and undesired result. These undesired results may be monopolistic structures, laws written for a specific interest group (which contradicts with the idea of the state of law), corruption, insider trade, and so on.

This story could apply to almost any post-socialist country. The cost of a rent seeking society, measured in unrealised value, can become an obstacle for the overall evolution of the society. How is it possible to fight against the evolution of a rent seeking society? One typical way, I guess, is that after recognising the evolution of a rent seeking society, countries start to blame weak institutions or weak central control. So it is evident that the demand for strong government or more central planning creates a certain tension. Recent changes, where

many previous communist party members won positions in the government or in parliament are illustrative examples.

If somebody is able to earn profit by rent seeking — rent seeking will become an optimal strategy for all players. Of course if monopolistic rents or other superior conditions are given to somebody, competitors will struggle to have those unequal conditions abolished. So there will also emerge rent seekers whose optimal strategy will be strengthening instead of weakening institutional constraints and competition. But competition is usually a public good, so it may happen that incentives to fight for more competition do not eventuate with the result being less "for competition" than "against competition".

Those who devote resources, but are not the "winners of the political lottery", can only blame the society for the waste created. They see neither the dynamic institutions nor the lack of moral principles in society as the reason for the bad result, but (more or less) liberal society itself. So a group will also emerge interested in restricting the liberal or parliamentary state, which can be blamed for institutional weaknesses and institutional changes in favour of certain interest groups or institutional stability that limits growth possibilities. Criticism of the government can also result in criticism of the parliamentary state in general.

In every society there is demand for rent. Whether there is also sufficient *supply* to meet *demand* is a vital question concerning learning societies' "undesired outcomes". If government restricts competition for rent, then it shows direct favouritism towards certain groups in the society. If society sees wealth as a result of effective rent-seeking and poverty as a result of ineffective rent seeking, the market mechanism is bound to be suspect[3]. So we deal with an imperfect or failing market and the question of optimal government interference arises. But if government is providing rent itself, …?

A Rent Providing Government

The politician in a democratic society is someone who makes a living by winning elections[4]. So the government consists of profit-seekers who devote resources to win elections. The more they devote before or during elections, the greater the revenue they seek after winning government. The desired results of the governmental procedure are hard to measure, so the profitability of being politician depends on the opportunity costs. If the profitability of being a politician is higher than the opportunity cost, then we are dealing with political rent seekers.

If the investments made by political candidates to win elections were comparatively low 10 years ago (the opportunity cost of being a politician was also low), then today, after having realised the opportunities the position offers for "increasing the happiness of man" by being near information sources and the decision-making mechanism, the investments are much higher and the expected return is also higher[5].

So it seems that politicians are less moral or more wicked than they were or at least more so than people in general. Of course as Hayek confirms, [that] … "not the best reach to the top, but the opposite"[6], this can be true not only in a totalitarian society, but also in political arenas in a democracy. But, for example, a politician offering well-paid positions in politics to family members or friends can be seen as either a rent-seeker or a "principal" solving a "principal-agent" problem, both may or may not be correlated with his "degree of wickedness". Society has always blamed politicians for being self-interested instead of taking care of general interests. This statement is as correct in a transition economy as in any other.

Of course, if politicians are or were able to earn rent, then the number of rent-seeking politicians may increase, the personal contributes may go down[7]. Also, when the "golden times of privatisation" and the period when the public sector is the major agent in transactions is over, the possibilities for rent earning will also decrease. Still the system is very costly. The higher the competition for political positions and the smaller the opportunities for rent earning, the greater the total cost of political rent-seeking in society.

Although it is perhaps less apparent, it would, nonetheless, be equally absurd to think that a politically determined allocation of resources could be frozen once and for all so that resource owners-entrepreneurs would not continually seek more profitable opportunities in politics as in markets[8]. So political rent seekers try to find new interest groups

or newcomers entering into the political arena to strengthen the competition for rent. Today's rent-earners do realise soon that rent they earn today is nothing for granted tomorrow. The logical reaction of rent-earners today is to attempt to fix the allocation somehow.

The other possibility for political rent-seekers, who feel the pressure of competition and at the same time narrower possibilities for the reallocation of resources, is to create new political positions in order to enlarge the scope of activities that are controlled by the public sector. So as Buchanan noted rent-seeking activity is directly related to the scope and range of government activity in the economy, and so to the relative size of the public sector[9]. So the result of a rent-seeking government can also be indicated by an increased tax burden or current increased state borrowing from abroad to finance public sector enlargement.

If the rents earned by politicians do exist (even if those rents are earned unintentionally or by accident) the political cabinets can change very quickly, because each newcomer is ready to devote more and promise more to market rent-seekers. So the interest groups, in whose favour political changes are often made, also change quickly.

Sometimes change can be too swift to allow any transactions or make any changes to formal institutions in favour of political interest groups; or, sometimes the change can be too quick to even allow any amendment of the institutional settings that enhance technological possibilities for overall economic growth. That cabinets change quickly, is a notable characteristic in transition economies. So the government is often inefficient in making even incremental or gradual changes to institutional settings in favour of the economy not to mention the continuous changes or so called reforms.

If politicians are rent-seekers themselves, then they also have an incentive to offer rents to the markets. If we look at a typical transaction between a rent-providing politician and market rent seeker it is Pareto efficient for both parties. Despite this we still have to bear in mind the inadvertent and undesired results that this kind of "private-public partnership" will offer society.

"General Interest" or "Social Contract"

There have already been three or four major weaknesses of a democratic economy under transition mentioned that will create a stagnant economy when we have demand and also supply for rent . Typical shortcomings of a rent seeking government or democratic system in general in a rent seeking society include the following:

1. government is not providing a stable environment for entrepreneurs and other profit-seekers to grant effective allocation of resources
2. government policy goals are abstract (discretion rather than rules) and this can lead to increased government activity in the economy
3. the moral or ethical values are missing thus government is corrupted or at least consists of rent-providing politicians
4. the government does not support the necessary legal or regulatory environment for faster economic growth.

Criticism of the public sector even if we have only noticed one or two government blunders or mistakes can lead our mind to ponder the idea of a "better world" or the idea of an "optimal medicine" to heal the diseases of the public sector or parliamentary state under transition. Of course the scope of the "better world" idea is much more ambitious than the idea of healing the society. But the latter matches well with the attitude — "democracy is a luxury" or "the supply of public goods is income elastic" at least in the transition economy where living standards are low or moderate at least compared with welfare states. "Medicine seeking" can easily lead to the idea of a restricted state or even a bit further to the idea of restricted democracy. The former is something desirable and the latter is not.

One possible idea for finding an "optimal medicine" has been orthodoxy — rules versus discretion. In such a case the main problem is — who will set the rules in order to restrict discretion? Of course we have some examples in the monetary reforms (which belong to the era of a non-rent seeking society or to the first years or even months of independence among post-soviet nations) where central banks and governments themselves restricted their policy choices by choosing currency boards as monetary institutions. (Unfortunately this example

is in transition countries almost unique). But under discretion few politicians if any have the incentive to change discretion to rules. Another example, where the initiative for restricting governmental discretion comes from "unions of enterprises", and has worked out comparatively well in Ireland's case, is the idea of a "social contract".

A "social contract" should be an agreement between entrepreneurs, labour unions, NGOs and political parties. The agreement should fix resources for certain fields and to a certain time frame. All parties should agree upon the public investment schedule and fiscal policy in general and the aim of this agreement is to sustain a certain productivity growth. And most of all a "social contract" will not offer any possibilities for providing rent to different interest groups, because a "social contract" will be something like an umbrella that all the political parties are dependent on. The supporters of this idea argue that a parliament and government under a "social contract" can devote time and resources to fulfil common aims like structural reforms and other changes to formal institutional constraints that promote economic growth.

What is Desirable for a Society?

When using rules to restrict government we are creating a society with static formal (internal) institutions, which may be growth generating or growth restricting, but most important of all rent-providing opportunities are minimised. Rules creation belongs more to the category of — finding the common interest of society by restricting *rent-providing* opportunities — but there is also a possibility to "heal" society by — finding the common interest of society by restricting *rent-seeking* opportunities. The first will deal with the supply side of rents, the latter with the demand side of rents. Is the "social contract" something that belongs to the category of restricting *rent-providing* opportunities or something that prevents *rent-seeking*? If we limit the competition for rents, by fixing the allocation of resources, we are choosing an unequal distribution of income. If, instead, competition is allowed, income distribution is more equal, but a lot of social waste is generated[10]. If we are speaking about a rent-providing government, the solution of restricting rents is probably a short-run solution and will be overcome when new political parties take over after elections. So the alternative is to limit the supply of rents. In limiting the supply we are also cutting off the political opportunities for running domestic policies under the majority rule (as in the case of Currency Boards).

What is preferable — a restricted democracy through a "social contract" or a rent providing government? Isn't this the same question today's "developed countries" were facing after the First World War, or if not exactly the same then at least very similar? I do think that the threats in transition economies who have passed through a fast development phase after liberalisation and who also survived the first drawbacks such as social inequality and business cycles, are opposite to the same questions faced by many states after World War I or The Great Depression. A "Social contract" is of course a very different form of public sector intervention than socialism or the planned economy in general, but the warnings Hayek had for society in many cases apply here.

If we declare that productivity is our aim and democracy is constraining our achievements, then we are already walking on thin ice. Examples of descriptions of similar developments of thought can be found in the fifth chapter of the "infamous" book. If the market mechanism is already suspect it can lead to greater and greater interventions, more and more rent-providing until the so called vicious circle of rent-seeking-rent-providing is the result. Under such conditions a "social contract" can have short run advantages for the transition economy despite restricting democracy. As always, the choice is between two "evils". It may happen under certain conditions that we are ready to restrict the variety of combinations, which lead us to the "happiness of man".

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Notes

[1] Of course this claim in not true in all transition countries (e.g. Russia, China, Latin America), where national independence was not the leading idea behind the economic changes.

[2] J. Buchanan "Rent Seeking and Profit Seeking" (1980): 4

[3] look also A. Krueger "Political Economy of The Rent-Seeking Society" (1980): 51-70

[4] G. Tullock "People are people: The Elements of Public Choice" (2000), IEA Readings 51: 3-4.

[5] idea is taken from the G. Tullock "Rent-Seeking as a Negative-Sum Game" (1980): 25.

[6] idea in taken from the 10th chapter of F.A.Hayek "Road to Serfdom" (1991): 110-113.

[7] result is taken from G. Tullock "The Efficient Rent-Seeking" (1980): 103.

[8] J. Buchanan "Rent-Seeking and Profit Seeking" (1980): 10-11

[9] ibid p. 11.

[10] also A.Krueger "Political Economy of the Rent-Seeking Society" (1980): 69-70.

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