UNIVERSITY OF LJUBLJANA
FACULTY OF ECONOMICS

ANDREJ SRAKAR

ECONOMIC ANALYSIS OF DEACCESSIONING

DOCTORAL DISSERTATION

Ljubljana, 2015

UNIVERSITY OF LJUBLJANA

FACULTY OF ECONOMICS

ANDREJ SRAKAR

ECONOMIC ANALYSIS OF DEACCESSIONING

DOCTORAL DISSERTATION

Ljubljana, 2015

AUTHORSHIP STATEMENT

The undersigned **Andrej Srakar,** a student at the University of Ljubljana, Faculty of Economics, (hereafter: FELU), declare that I am the author of the doctoral dissertation entitled **Economic analysis of deaccessioning**, written under supervision of **Prof. Dr. Michael Rushton** and co-supervision of **Prof. Dr. Liljana Ferbar Tratar**.

In accordance with the Copyright and Related Rights Act (Official Gazette of the Republic of Slovenia, Nr. 21/1995 with changes and amendments) I allow the text of my doctoral dissertation to be published on the FELU website.

I further declare

- the text of my doctoral dissertation to be based on the results of my own research;
- the text of my doctoral dissertation to be language-edited and technically in adherence with the FELU's Technical Guidelines for Written Works which means that I
    - cited and / or quoted works and opinions of other authors in my doctoral dissertation in accordance with the FELU's Technical Guidelines for Written Works and
    - obtained (and referred to in my doctoral dissertation) all the necessary permits to use the works of other authors which are entirely (in written or graphical form) used in my text;
- to be aware of the fact that plagiarism (in written or graphical form) is a criminal offence and can be prosecuted in accordance with the Copyright and Related Rights Act (Official Gazette of the Republic of Slovenia, Nr. 55/2008 with changes and amendments);
- to be aware of the consequences a proven plagiarism charge based on the submitted doctoral dissertation could have for my status at the FELU in accordance with the relevant FELU Rules on Doctoral Dissertation.

Date of public defence: 27 February 2015
Committee Chair: prof. dr. Andrej Sušjan
Supervisor: prof. dr. Michael Rushton
Co-supervisor: prof. dr. Liljana Ferbar Tratar
Member: prof. dr. Aleksandar Kešeljević,
Member: prof. dr. Lidija Zadnik-Štirn

Ljubljana, 27 February 2015   Author's signature: Andrej Srakar

SUMMARY

Museums play a more important role than ever before in contemporary society (Frey and Meier, 2006). Deaccessioning which is defined (McKinney, 2000) as "permanent removal or disposal of an object from the collection of the museum by virtue of its sale, exchange, donation or transfer by any means to any person" brought to light many controversies as a practice. In one of the first cultural economics' articles on this topic, J. M. Montias (1973) advocates for its usage, while there has been and is to this day also a considerable opposition to deaccessioning in the museum world (Besterman, 1991; Cannon-Brookes, 1996). The practice has been questioned from legal and moral issues (see e.g. Rohner, 2010) while its economic aspects have remained unexplored and unmodeled. The practice has been brought to light particularly in past years in the USA as many museums tried to implement it as a solution to problems brought to light by the financial crisis.

This dissertation, therefore, proceeds by firstly providing a comprehensive overview of the field of cultural economics. We then present the problem of deaccessioning in its broadest overview, including its legal, moral and economic aspects, as well as several US case studies. In the third chapter, we present our main conceptual apparatus for the analysis from the field of microeconomic analysis of the principal-agent problem and contract theory. We focus on presentation and short analysis of our focal problem, the agency costs of free cash flow in firms.

In the fourth chapter, we perform an extensive mathematical analysis of principal-agent problem in deaccessioning situations and demonstrate that the problem clearly leads to three main types of agency costs: principal has stronger incentives for the agents' effort than the agent herself, higher deaccessioning is associated with lower revenues than optimal, and higher deaccessioning leads to lower effort than optimal. We prove the existence of such costs for both risk-neutral and risk-averse principal. Generalisation of our findings to the case of non-profit firms is immediate: excess endowments lead to agency costs problems for the nonprofit firm.

In the fifth chapter, we perform an econometrical study of effects of excess endowments for the performance of US museums. We use a panel sample of 283 US museums for years 2002-2011 and apply the analysis of Core, Guay and Verdi (2006) to effects of excess endowments for the performance of US museums. We show that excess endowments indeed lead to lower revenues, lower program to total expenses ratio and to higher manager's perquisites, which is fully in accordance with theories of Jensen (1986).

In the final chapter, we point to two main paths for future research in the area. Firstly, Jensens' hypothesis would have to be also proved for the case of private "for-profit"

firms. Secondly, different possible solutions for the problems of deaccessioning and excess endowments in general would also have to be analyzed in light of contract theory and mechanism design.

The thesis is to our knowledge the first formal analysis of management problems of deaccessioning and excess endowments in nonprofit firms in general and probably, also, the first mathematical modeling and partial proof of renowned Jensen's conjecture on agency costs of free cash flow in firms. It, therefore, brings a lot of open questions as well as first solutions to a field that was up to now analysed only in the empirical manner. It is also to our knowledge one of the first doctoral theses in cultural economics in Slovenia, and we hope it will provide ground for more research in this area in the future.

Keywords: deaccessioning, museums, cultural economics, contract theory, principal agent problem, moral hazard, agency costs, free cash flow

POVZETEK

Muzeji igrajo v tem trenutku morda pomembnejšo vlogo kot kadarkoli poprej v naši družbi (Frey in Meier, 2006). Deaccessioning oz. odsvojitev muzejskih del, opredeljen kot (McKinney, 2000) "trajna odstranitev ali odtujitev predmetov iz zbirke muzeja na podlagi njihove prodaje, izmenjave, donacije ali prenosa s kakršnimi koli sredstvi" je kot praksa prinesel s seboj številne polemike. V enem izmed prvih kulturno-ekonomskih prispevkov o tej temi ameriški ekonomist John Michael Montias (1973) zagovarja njegovo uporabo, medtem ko je bil (in je še vedno) s strani muzejskega sveta deležen precejšnjega nasprotovanja (glej npr. Besterman, 1991; Cannon-Brookes, 1996). Praksa odsvojitve muzejskih del je postala vprašljiva zaradi številnih pravnih in moralnih vprašanj (glej npr. Rohner, 2010), medtem ko so njeni ekonomski vidiki ostali neraziskani in s formalnega modelskega (pa tudi empiričnega) vidika neraziskani. Odsvojitev muzejskih del je postala posebej zanimiva in aktualna v zadnjih letih v ZDA, ko so jo številni muzeji poskušali uporabiti kot rešitev za finančne težave v času velike gospodarske krize.

Ta disertacija torej najprej predstavlja celovit pregled področja kulturne ekonomike po njegovih posameznih področjih, kjer ne sledi uveljavljenim klasifikacijam (npr. Throsby, 1994; Blaug, 2001) pač pa uporabi novo, precej bolj razdelano klasifikacijo po posameznih ekonomskih in umetnostnih področjih te discipline. V nalogi nato predstavimo problem odsvojitve muzejskih del v njegovem najširšem vidiku, vključno s pravnimi, moralnimi, umetnostnimi in predvsem ekonomskimi vidiki, ter nekaj študij primerov v ZDA. V tretjem poglavju predstavljamo glavni ekonomski pojmovni in analitski aparat, ki ga uporabljamo v nalogi, predvsem s področja mikroekonomske analize problema principala in agenta in teorije pogodb. Posebej se osredotočimo na predstavitev in kratko analizo našega osrednjega ekonomskega problema, agentskih stroškov prostega denarnega toka v podjetjih.

V četrtem poglavju izvedemo obsežnejšo matematično analizo problema principala in agenta v situacijah odsvojitve muzejskih del in dokažemo, da problem jasno vodi v tri glavne vrste agentskih stroškov: principal ima močnejše spodbude za večje delo agenta kot agent sam; večji deaccessioning vodi k nižjim prihodkom od optimalnih; ter večji deaccessioning vodi k manjšemu vložku delu s strani agenta, kot bi bilo optimalno. Obstoj vseh navedenih oblik agentskih stroškov dokažemo tako za do tveganja nevtralnega kot za tveganje občutljivega principala. Posplošitev naših ugotovitev za primer neprofitnih organizacij je takojšen: presežno premoženje organizacij vodi k jasnim agentskim stroškom za neprofitne organizacije.

V petem poglavju opravimo še empirično, ekonometrično študijo učinkov presežnega premoženja za uspešnost ameriških muzejev. Pri analizi uporabimo panelni vzorec 283 ameriških muzejev v letih 2002-2011, pri čemer sledimo metodologiji predhodne

analize avtorjev Corea, Guaya in Verdija (2006). Uspemo pokazati, da presežno premoženje organizacij dejansko privede do nižjih skupnih prihodkov organizacije, nižjega razmerja med programskimi in skupnimi stroški ter višjih kompenzacij menedžerjev, kar je v celoti skladno z izhodiščnimi teorijami Jensena (1986) in drugih avtorjev.

V zaključnem poglavju opozorimo na dve glavni možnosti nadaljnjih raziskovanj na tem področju. Prvič, Jensenovo hipotezo bi bilo potrebno v formalnem, matematičnem smislu pokazati tudi za zasebna profitna podjetja. Drugič, različne možne rešitve za probleme odsvojitve muzejskih del in presežnega premoženja nasploh bi bilo prav tako potrebno raziskati in analizirati v okviru teorije pogodb in mikroekonomskega oblikovanja mehanizmov (angl. mechanism design).

Naša disertacija je, kolikor vemo, nasploh prva formalna modelska analiza upravljalskih problemov pri odsvojitvi muzejskih del in presežnega premoženja v neprofitnih organizacijah nasploh. Prav tako prinaša verjetno prvo formalno matematično analizo in delni dokaz znamenite Jensenove teze o agentskih stroških prostega denarnega toka v rokah menedžerjev. Prav tako je kolikor vemo tudi ena prvih doktorskih disertacij na področju kulturne ekonomike v Sloveniji, ki bo upamo predstavljala dober temelj za nadaljnje raziskave na tem področju v prihodnosti.

Ključne besede: odsvojitev, muzeji, kulturna ekonomika, teorija pogodb, problem principala in agenta, moralni hazard, agentski stroški, prosti denarni tok

TABLE OF CONTENTS

LIST OF TABLES

1   INTRODUCTION

1.1   Motivation

In the doctoral thesis, we investigate deaccessioning of museum works as a possible strategy for financing museum activities and/or its survival. Deaccessioning, which has been used as a practice due to legal reasons mostly in American museums, has been a problem in economics of museums ever since the groundbreaking work of J. M. Montias (1973), M. Feldstein (1991) and W. Grampp (1996). Still it has remained unclear whether deaccessioning should (and could) be used to provide necessary resources to museums in times of economic problems. There have been considerations (Montias, 1973; O'Hagan, 1998) that accepting deaccessioning as a common practice could lead to moral hazard on the side of museum managers. There is present a widespread opposition to deaccessioning on the side of both museum personnel and art curators (Besterman, 1991; Cannon-Brookes, 1996). Nevertheless, deaccessioning has been proposed as a viable museum survival strategy by several noted economists, most of all Montias (1973), Weil (1990), Borg (1991) and Grampp (1996).

Though deaccessioning has been noted as an important topic in the field of economics of museums since its very beginnings, and though it addresses important economic questions of moral hazard, public vs. private in the provision and ownership of cultural goods and incentives and decision rights in public institutions, there don't exist many formal economic models, which would help us better understand the problems of this daily museum's consideration in light of economic theory. We therefore try to appropriately model this problem in our thesis, using the conceptual underpinnings of contemporarily microeconomic theories that deal with problems of principal and agent relationships – mostly contract theory and analysis of principal-agent problem.

1.1.1   Cultural Economics

I want to shortly present the field of cultural economics as it is rarely represented in Slovenian economic and social sciences. Modern cultural economics began to emerge with the monograph of Baumol and Bowen (1966) in which they argued that performing arts suffer from "cost disease", namely that costs of the performances rise disproportionately with the benefits, brought by (non)developments and advances in the field. Their conclusion was that because of such productivity lag the state must finance performing arts institutions if it is desired that they survive. There has been to date several attempts to test and/or answer to Baumol and Bowen's problem (e.g. Schwarz and Peters, 1983; Cowen, 1996; Towse, 1997; Heilbrun, 2001); nevertheless this question (apart from it being influential in many other economic fields) marks the beginning of cultural economics as serious discipline. Since 1966, there have been

numerously economic analyses of cultural phenomena, which have been summarized in an influential article by Mark Blaug into eight subfields (Blaug, 2001): 1) Taste and its formation; 2) Supply and demand for cultural goods; 3) Organization of cultural activities; 4) Arts markets; 5) Economic history of the arts; 6) Labor market in the arts; 7) Baumol's cost disease; 8) Public subventions for the arts. Although cultural economics has a short history and perhaps somewhat loose framework, based on propositions of the theory of rational choice (Frey and Pommerehne, 1989), it has addressed number of key problems in the provision of cultural goods and has been growing steadily in importance throughout decades (which is shown among others in the spreading membership of the main organization in the field, Association for Cultural Economics International (ACEI)).

1.1.2 Deaccessioning and Economics of Museums

Museums play a more important role than ever before in our society (Frey and Meier, 2006). Economic approach to thinking has been applied to the case of museums in cultural economics, meaning that (ibid.) "the individuals are assumed to pursue their utility within the constraints imposed by institutions and the environment, especially the scarce resources." The economic approach to museums often relies on (neo)classical economic theories (such as e.g. rational choice theory) and the analysis focuses on markets and market relationships which are assumed to function well. But with regard to the institutions in the context of museums, it is important to go beyond the market, and use tools of political economy, neo-institutional economic theory, psychology, and other theories, and analyze behavior of governments and public administrations, as well as behavior of individuals, as being not merely rational but subject to possible anomalies and to some extent being other-regarding in a pro-social way (ibid.).

There have been a number of publications in the field in past decades, to mention just a few: very early contribution of German and Kindermann (1903); books or chapters in Robbins (1963, 1971), Baumol and Bowen (1966), Peacock (1969), Blaug (1976), Frey and Pommerehne (1989) and several others; influential articles and papers by Montias (1973), Peacock and Godfrey (1974), Feldstein (1991), Frey (1994), O'Hagan (1995, 1998), Grampp (1996), Benhamou (1997), Meier and Frey (2002), Madison and Foster (2001), Prieto Rodriguez and Fernandez Blanco (2006). A literature review is used in the thesis to delineate the characteristics of behavior of relevant actors in museums.

Frey and Meier (2006) attempt to compare views of two traditions in economic science on museum behavior. Neoclassical approach assumes rational actors maximizing utility of a museum in a benevolent way. The model, which is based on Throsby's article (Throsby, 1994), where the author presents a model explaining the

behavior of firms in the performing arts assumes that the directorate of the museum maximizes the museum's utility function. Crucial parameters in the model are the objectives and goals of the museum, quality of exhibitions and number of audience. It is found (ibid.) "museums engage in increased quality beyond the point where marginal grant income is equal to the marginal cost of increasing the quality by one unit," and, secondly, that managers of non-profit museums receive additional satisfaction from an increased number of visitors. In a similar way Prieto-Rodriguez and Fernandez-Blanco (2006) implement the principal-agent model to the behavior of key museum actors, and determine the optimal incentive structures in cases of symmetric and asymmetric information.

The second, institutional model, is trying to answer to critiques posed to the neoclassical model. It argues that managers and key personnel in museums may behave more selfishly than assumed in the neoclassical model; it also argues that managers are primarily interested in maximizing their reputations in reference groups. The institutional approach, therefore, considers museums according to their form of organization and to various types of possible incentives and relations that depend on the type of the museum. It argues that the museum's staff decision of raising the income through ancillary activities, to manage their collection with the help of the market, or to charge the entry fees depends crucially on the ownership (i.e. type) of the museum (cf. Frey and Meier, 2006).

Deaccessioning as a practice brought to light many controversies. In one of the first cultural economics' articles on this topic, J. M. Montias (1973) advocates for its usage: "If the Metropolitan resources are as depleted as Mr. Hoving (the director) makes them out to be, and if the exhibition space is fixed to the present wall capacities for the foreseeable future, then his decision – to sell essentially duplicate items to make room for paintings and sculptures that will fill serious gaps in the Museums collection – appears largely justified". Later works often advocated for its usage as well (e.g. Weil, 1990; Borg, 1991). There has been and is to this day also a considerable opposition to deaccessioning in the museum world (Besterman, 1991; Cannon-Brookes, 1996). It has to be noted, first, that the subject is not well researched, especially in light of economic modeling of actual situations and problems it brings for museum management, and second, that it indeed brings controversies, which can be seen in the fierce debates in contemporary American intellectual and art scene.

Deaccessioning has been defined by McKinney (2000) as "permanent removal or disposal of an object from the collection of the museum by virtue of its sale, exchange, donation or transfer by any means to any person". Some basic reasons for the debate on deaccessioning have been summarized by O'Hagan (O'Hagan, 1998):

1) Many art museums have a "trustee status", which protects art works given in trust from being sold; by blocking the most efficient use and allocation of its available resources, donor restrictions can therefore seriously hinder the attempt of museum trustees to keep the museum solvent;

2) Because collections demand space, protection, and maintenance, it seems sensible for the museum with precarious finances to deaccession artworks that are unexhibitable and unwanted;

3) Once allowing deaccessioning the politicians might insist on the sale of further works of art as the quid pro quo of further subsidy (although the opposite is more likely to apply, namely a large public outcry against the use of the money from the sale for anything other than the purchase of more art);

4) The issues concerning the process of deaccessioning: what conditions apply, who decides how it is to be disposed of, and how the proceeds are to be allocated.

There is also an intense debate in the American art circles on the proper rules guiding deaccessioning practices. Several proposals on the rules that should guide the practices have been developed, mostly restricting the purposes under which deaccessioning of artworks can be made, as well as proposing institutions (and processes) that should regulate the proper conduct of the practices.

To our consideration, the key observation has been stated already by Montias (1973): "The purpose of this discussion is to determine whether a rule barring the sale of major works would cause museum managers to accomplish their mission more efficaciously." The problem of deaccessioning when considered in light of economics deals with questions of efficacy of museum management, and with (appropriate) incentives posed to the managers. In the economics literature, moral hazard occurs when one party saved from the risk would behave differently if it would be fully exposed to the risk. We claim that when making decisions on deaccessioning, the managers of museums are in a position of asymmetric information towards their principals, which results in moral hazard possibilities and incentives for non-optimal (from the principals and societal viewpoint) behavior and efficacy.

We evaluate this hypothesis in light of microeconomic theoretical models, formed on the basis of contract theory and analysis of principal-agent problem. Contract theory provides us with insights into managerial incentives in light of asymmetric information and moral hazard – the theory of agency costs of free cash flow in firms, developed by Jensen and Meckling (1976), Easterbrook (1984) and Jensen (1986) forms the ground stone for our exploration. Modeling and evaluating of the hypothesis is made on the basis of a classical principal-agent situation that occurs in deaccessioning: board of trustees as a principal is interested in the performance of the museum while the manager as agent is motivated by his own selfish interests (salary,

perquisites, etc.). By this, we follow Frey and Meier's (2006) institutional explanation for the behavior of museum managers. We mostly analyse the situation when deaccessioning acts as a buffer to remedy for possible liquidity problems of the museum (see e.g. Fisman and Hubbard, 2003).

1.1.3   **Principal – Agent Problem in the Microeconomics of Museums**

In economics (as well as in related social sciences), the principal-agent problem or agency dilemma treats the difficulties that arise under conditions of incomplete and asymmetric information when a principal hires an agent, such as the problem that the two may not have the same interests, while the principal is, presumably, hiring an agent to pursue the interests of the former. The problem arises when a principal rewards an agent for performing certain activities that are useful for the principal and demand costly effort from the agent and where there are certain elements of the performance that demand costly resources to be observed. The principal-agent problem is found in most employer / employee relationships.

As noted before, the principal-agent analysis has been used in the economics of museums in a recent article by Prieto-Rodriguez and Fernandez-Blanco. In our thesis, we similarly analyse the problem of deaccessioning in light of agency problems. As museums are very often non-profit organizations (though they could be both part of the state or private companies), our considerations have to make note on the literature on non-profit endowments.

As stated by Fisman and Hubbard (2003), "In a for-profit organization, shareholders act as the residual bearers of risk. Because nonprofits, by definition, have no residual claimants, there must be some other means of absorbing shocks that exist in the world of uncertain donations and uncertain needs for program expenditures. However, a desire for "production smoothing" naturally leads to a search for an alternative buffer. Thus, nonprofit organizations will hold precautionary savings in the form of endowment fund balances, to protect against adverse revenue shocks." Moreover, several other authors (Core, Guay and Verdi, 2006; Fisman and Hubbard, 2003; Harris and Raviv, 1990) have noted that too big discretion given in the hands of (non-profit as well as for-profit) managers can and does lead to problems of moral hazard, non-optimal managerial incentives and by that to non-optimal management. Core, Guay and Verdi empirically show that abnormal endowments are accompanied by significant agency problems. As museum artworks form part of the museum's endowment, these and similar findings are be used to point to problems of non-optimal management when deaccessioning is allowed as a practice in museums.

1.1.4 Contract Theory in Cultural Economics

The concept of contract has become essential to economics in the last 30 years. Three main theoretical frameworks arose: incentive theory, incomplete-contract theory and transaction-costs theory. These frameworks have enabled scholars to renew their analysis of microeconomic coordination problems and yielded implications for various fields in economics. Analyses of the performance of market economies and the institutional framework were also renewed (Brousseau and Glachant, 2002).

Contract theory and principal-agent problems have been applied in cultural economics, particularly in the last decade, where work of Richard E. Caves (2000) on the contracts in creative industries has to be noted. Caves' comprehensive survey examines the economics of art, focusing specifically on how art comes to the market and how artists (and publishers, recording labels, films studios and the like) are remunerated for their work. Caves uses concepts from the field of incomplete contract theory such as incentive, implicit and relational contracts, bounded rationality, switching costs and option contracts, to provide a detailed description of relations among actors in the art world. Caves talks about museums mostly in relation to filtering and storing durable, creative goods. More focused is a recent work by Prieto-Rodriguez and Fernandez-Blanco (2006) who consider optimal pricing and grant policies for museums.

1.2 Purpose and goals

The purpose of the doctoral thesis is to investigate the issues of deaccessioning of cultural goods in museums, in light of microeconomic theoretical models and empirical analysis.

The first goal of the thesis is to define the relevant microeconomic models (contract theory, principal-agent modeling) to explain deaccessioning of cultural goods in museums, as well as more general behavior of cultural actors in museums. Then we establish some novel explanations of deaccessioning in museums, as well as answer to the problems of deaccessioning in light of read literature and proposed models.

The main purpose of the thesis is to evaluate the primary hypothesis that "Deaccessioning as a practice entails issues of moral hazard, which as a consequence lead to non-optimal museum management." We also provide more elaborated models on deaccessioning of cultural goods in museums, modeling the possible legal rules and other characteristics that guide (or could guide) the decisions on deaccessioning practices.

Finally, we empirically analyse the problem of deaccessioning through data on endowments in museums and will try empirically to verify the main hypothesis using data from American museums taken from large database of National Centre for Charitable Statistics (NCCS) with panel dataset for 283 American museums in the years 2002-2011.

1.3 Main hypotheses

The main research hypothesis to verify is:
  ➢ Hypothesis 1: Deaccessioning as a practice entails issues of moral hazard, which as a consequence lead to non-optimal museum management.

Furthermore, we evaluate (on the basis of formal modelling and empirical considerations) whether deaccessioning and excess endowments in museum lead to problems for the performance of the museum. In the empirical analysis we, therefore, try to verify the following three additional hypotheses:

  ▸ Hypothesis 1a: Excess managerial compensation and perquisite consumption are greater for museums with excess endowment assets, ceteris paribus.
  ▸ Hypothesis 2a: Expenditures on production of the not-for-profit good are lower for museums with excess endowment assets, ceteris paribus.
  ▸ Hypothesis 3a: Total revenues and other performance measures are lower for museums with excess endowment assets, ceteris paribus.

1.4 Data and methodology

In order to understand both economics of museums as well as microeconomic modelling tools of principal-agent problem, we begin with a literature review. We firstly present the field of cultural economics, with particular emphasis on the economics of museums. We then review the literature on deaccessioning with all the different aspects it entails.

In defining the models for behaviour of actors in museums in light presence of moral hazard, viewed from the aspect of contract theory, we examine the literature on contract theory. After defining the characteristics of actors in museums and their mutual interrelations, we proceed by defining the appropriate models in contract theory, which best describe the behaviour of relevant actors. To best describe the relations in terms of rules for museum managers, we use tools from general contract theory as well as agency costs of free cash flow theory elaborated in works by Jensen, Meckling and Easterbrook (Jensen, 1986; Jensen and Meckling, 1976; Easterbrook, 1984). We make a comparative static analysis to estimate the relationships of

variables in the formal mathematical model and will present several propositions with proofs, addressing both risk-neutral and risk-averse principal cases.

In the final part of the dissertation, we present results of the empirical study showing that persistently large endowments in museums have significant agency costs in the form of lower revenues of the analysed museums. We use a large database downloaded from the website of National Centre for Charitable Statistics with data for 20 main variables for 283 American museums in years 2002-2011. For the empirical analysis, we use regression methods in a two-stage regression framework, including econometric models of ordinary and weighted least squares and instrumental variables (2SLS and GMM) regression model specifications to correct for the presence of measurement error in a two-stage regression framework.

1.5 Limitations of the study

As deaccessioning is a "barely legal practice" (see e.g. Rohner, 2010) and has been also until recently left almost unexplored on an economic level there are limitations to the present study. Firstly, the mathematical model could be more rich and developed. Firstly, the museums also receive penalties for using deaccessioning and such penalties should be included in more developed formal analysis.

Secondly, in our model we specify manager's utility only in terms of his expected benefits from wage and disutility from effort. The manager's utility also depends on bonding actions and value of the museum and in this manner one would have to include in the manager's utility function also the utility from the value of museum (its revenues and most of all its endowment). As Grossman and Hart (1982) clearly state, the firm's market value is in the manager's own interest, and his utility function could (or should) be made dependent on the value of the museum. One could also argue about the choice of principal and agent in our model – it is possible to argue that museum has multiple principals: both the board of trustees as well as the donors can serve the role of principals. It would be interesting to include multiple principals (or even multiple agents) in our principal-agent problem following work of e.g. Bernheim and Whinston, 1986; Li, 1993; Martimort, 1996; Waterman and Meier, 1998; Gailmard, 2002; taking into account the externalities of one principal-agent relation for another principal-agent relation. One could furthermore argue that museums follow versatile objectives besides revenue maximization and are motivated by educational, aesthetic and other purposes as well. To this task, the extensions following Holmström and Milgrom's 1991 multitasking model would be most appropriate.

Finally, one could also again speculate whether the proof in the mathematical part of our thesis is sufficient to prove the Jensen's agency costs of free cash flow conjecture

which on our opinion remains to be conclusively shown for the case of private "for-profit" firms. There is at least one big difference of our model and the Jensen's case, namely, free cash flow in general is an endogenous variable in the model (it can be influenced by the revenues of the firm) while deaccessioning does not behave in the same manner (as explained in detail in the following chapters). The endogenous nature of this variable has significant influence over our calculations, and we are, therefore, at this point not permitted to generalise the propositions also for the general, endogenous case.

Also, the empirical study has significant drawbacks. Although the used sample should be representative (all museums satisfying the most basic inclusion criteria are included) there is a problem in what we measured as endowment. Namely, the artworks (and objects in museum collections in general) that are the key to the verification of our hypotheses are not included in the 990' forms of US museums. There is to our knowledge no acceptable way to include them in the valuation of endowments as it is extremely hard to estimate their value. There are to our knowledge no existing empirical databases which would allow us to generalise our empirical findings to the objects in museum collections. Therefore, the empirical analysis of deaccessioning practices remains as a problem, to be hopefully solved by future research.

1.6   Structure of the thesis

In the first, introductory chapter of the thesis, we provide the basic information on the thesis, main hypotheses to be verified, the main information on the data and the used methodology, purposes and goals of the study, as well as most basic scientific background to the problem of the thesis and main drawbacks of the study.

In the second chapter, we firstly provide an extensive overview of the field of cultural economics, followed by another extensive overview of the economics of museums and mainly the problem of deaccessioning in all its legal, moral, artistic, managerial and economic aspects. We also provide four detailed case studies to illustrate the problems that deaccessioning practices bring to museums, particularly in the United States.

In the third chapter, we provide an extensive overview into the microeconomics of principal-agent problems and contract theory in general. We present brief history of the field and then present the most basic theoretical and modeling findings. In the last part of this chapter, we focus on the problem of agency costs of free cash flow in firms and present the background and the main findings on the issue.

In the fourth chapter, we present a detailed mathematical modeling analysis of the problem and show three main propositions, demonstrating the economic agency problems which practices of deaccessioning (and excess endowments in general) can bring to the museum. We prove the propositions for both the risk-neutral as well as risk-averse principal case.

In the fifth chapter, we perform an empirical analysis on the issue, using a dataset of 283 US museums in years 2002-2011. The data allow us to construct a mildly-unbalanced sample, sufficient to verify our three additional hypotheses. We are able to confirm all three hypotheses and, therefore, bring additional light to our propositions from the previous chapter. We are also able to remedy for the presence of measurement error, not taken into account in previous studies, using the instrumental variables technique.

In our final, conclusive chapter, we reflect on the findings and set some guidelines for future research on the issue.

2 DEACCESSIONING AS MUSEUM PRACTICE

2.1 Cultural economics

Cultural economics is a common name for studies that use economic methodology to study the characteristics of cultural production, distribution and consumption. As stated by Ruth Towse (2010), "Cultural economics is a branch of economics but it is also part of the wider investigation of the world of the arts and culture by other related disciplines, especially the sociology of culture and arts management". According to Towse, "there is considerable overlap of subject matter with media economics as well, especially in the area of the broadcasting, audiovisual and publishing industries." (ibid.) Bruno Frey notes two possible approaches to studying relationship of culture and the economy: firstly, institutional approach that studies the relationship between two different sectors or spheres of society, and secondly, rational choice approach, to study the arts with the help of economic analysis (Frey, 2009).

Several notable economists of 19th and 20th Century have already included economic considerations of culture and the arts in their works. Adam Smith, John Ruskin and John Maynard Keynes have been speaking about culture in economic sense in their notable works, yet despite some of them being closely related to arts (Keynes was even named as the first chairman of the Arts Council of Great Britain) none of them presented any systematic view on the relationship of culture and economics.

We can therefore say that first real attempt of systematical address of the topic was made by American economist John Kenneth Galbraith in one of the sections of his

work The Liberal Hour, where he addressed the economic condition of the artists and the influence of the attractive visual image of the products on enhancement of the export of American firms. Only few years later similar ideas have been presented by the British economists Lionel Robbins and Alan Peacock, who considered economic role of the state by supporting the galleries and museums and the role of art subventions from the perspective of welfare economics.

Modern cultural economics began to emerge with the monograph of Baumol and Bowen (1966) in which they argued that performing arts suffer from "cost disease," namely that costs of the performances rise disproportionately with the benefits, brought by (non)developments and advances in the field. Due to technological advances in industrially oriented sectors of the economy the wages of these sectors should be rising proportionally with the lowered average costs. The live arts which are lagging in productivity (one still needs the same amount of working practice to perform a Mozart concert or a Shakespeare theatre performance) can therefore maintain the pace of rising wages only if a third instance (e.g. state) intervenes in the process. Conclusion of Baumol and Bowen was that because of such productivity lag the state must finance performing arts institutions if it is desired that they survive. The authors note that by itself, this is no argument for public support to the arts as it doesn't say anything about the arts worth and its public good characteristics – it merely notes that they cannot keep pace in the technological development of the contemporary society (Baumol, 2003; Frey, 2003).

There has been to date several attempts to test and/or answer to Baumol and Bowen's problem (e.g. Schwarz and Peters, 1983; Cowen, 1996; Towse, 1997; Heilbrun, 2001), some authors (e.g. Cowen, 1996) even go as far as to question the validity of Baumol's cost disease in general, nevertheless this problem (apart from being influential in many other economic fields) marks the beginning of cultural economics as serious discipline.

Since 1966, there have been numerous economic analyses of cultural phenomena, which have been summarized in an influential article by Mark Blaug into eight subfields (Blaug, 2001): 1) Taste and its formation; 2) Supply and demand for cultural goods; 3) Organization of cultural activities; 4) Arts markets; 5) Economic history of the arts; 6) Labour market in the arts; 7) Baumol's cost disease; 8) Public subventions for the arts. Although cultural economics has a short history and perhaps somewhat loose framework, based on the propositions of the theory of rational choice (Frey and Pommerehne, 1989), it has addressed number of key problems in the provision of cultural goods and has been growing steadily in importance throughout decades (which is shown among others in the spreading membership of the main organization in the field, ACEI).

In the following, we will shortly present different subfields of work in cultural economics, following not so much the classifications in other relevant literature, but mostly the divisions used in a number of conferences in the field. We will therefore firstly present the subfields of cultural economics by economic classification, and later also the subfields according to their addressing of different sectors of culture and the arts.

2.1.1 Creativity and innovation in the arts

Studies of creativity and innovation in the arts are studying the fundamental and defining characteristic (*differentia specifica*) of the field of culture and the arts: creativity. Some studies (e.g. Castañer and Cavotta, 2010; KEA, 2009) point out that in the literature on organizational theory, almost exclusively authors talk only about innovation and rarely on creativity. Addressing this problem, a 2009 study by KEA attempted to identify the characteristics and components of the concept of creativity in the arts. Already in 2002, Castañer and Campos studied innovation in arts organizations (Castañer and Campos, 2002), and thus laid the foundations for research in the field to study concepts including knowledge both from the organisational theory and social psychology.

In addition to this field of research, our analysis would not be complete without mentioning one of the most important fields of research in cultural economics in recent years: creativity and clustering of creative energy in cities. The starting point for the study are works of the notorious American theorist Richard Florida (Florida, 2004; Florida, 2005), which in his deliberations argues the existence of so-called creative class, and that those sites and cities that manage to attract more representatives of this class are thereby attracting a key competitive advantage and leveraging future development. This theory was mostly opposed by evidence from cultural and urban economics and its probably most outspoken critic Edward Glaeser (2004) says that Bohemianism effect (another name for the "creative class effect") in USA is driven entirely by two specific metropolitan areas; there is no evidence to suggest that there is anything to the diversity or Bohemianism, once you control for human capital. Additional critiques have been provided by Peck (2005), Markusen (2006) and Hoyman and Faricy (2009).

Despite all of the contrary evidence, the articles on the creative class and creative cities are numerous, in past years especially in East Asia, particularly in Japan and South Korea (e.g. Oh Lim, 2010; Kawasaki, 2010; Sasaki, 2010; Matsushima, 2010). Another area of study has been econometric studies of clustering of creative energies, where authors related to Trinity College in Dublin have gained recognition in past years (e.g. Borowiecki and O'Hagan, 2013; O'Hagan and Hellmanzik, 2008).

2.1.2 The taste and its formation

Theories of taste and its central role in shaping the social and class structure of contemporary society got a big echo particularly in the work of French sociologist and anthropologist Pierre Bourdieu. In cultural economics, the debate became particularly lively after the publication of the article "De Gustibus Non Est Disputandum" published by the notorious "Chicago boys" (i.e. neoclassical and monetarist economists) and Nobel Prize winners Gary Becker and George Stigler in the American Economic Review in 1977. In the article the authors argued that all people have the same taste at all times, with differences in economic and cultural preferences that have been observed being merely the result of different social norms and circumstances of the situation when it comes to the expression of preferences.

However, cultural economists oppose this neo-classical conception – according to them, taste is the result of a cumulative process, curve of taste for cultural activities being highly inclined to the right, which means that dealing with cultural activities and visits to cultural events is increasing rapidly with increased exposure and in particular with better knowledge of culture and the arts. Some of the most relevant studies in the field were made by McCain and Cameron (McCain, 1979; McCain, 1981; McCain, 1995; Cameron, 1999).

2.1.3 The value of culture

The value of culture has become one of the core areas of cultural economics in past years, leading some authors (e.g. Klamer, 2002) to talk about it even as a "research program". Culture and the arts as understood by cultural economics have roughly three types of values: the use-value (what is commonly also named as "market value"); the non-use values, which are primarily estimated by contingent valuation studies; and cultural values, i.e. values that an artifact embodies regardless of its place in the economic system. At the end of the past and the beginning of this century, the discussion in cultural economics mainly focused on contingent valuation and non-use values, while in recent years, the abundance of published contingent valuation studies spurred a shift of focus to the cultural values and methods of their estimation. The debate was mainly driven by works of cultural economists Arjo Klamer and David Throsby (Klamer, 1996; Klamer et al., 2008; Throsby, 2001). Also, notable works by some other economists have to be mentioned: Jeanette Snowball (Snowball, 2008), Michael Hutter and Bruno Frey (2010) and Hutter and Throsby (2008).

2.1.4 Industrial organisation of culture and the arts

Organization and structure of the market (or as it is called in the economy: industrial organization) became very popular in the field of cultural economics in past years.

The discussion included findings and analysis of the principal-agent modelling (Prieto Rodriguez and Fernandez Blanco, 2006), models of transaction costs' economics, theory of contracts and game theory. One of most recent findings was presented at the 2010 ACEI conference in Copenhagen, where Bruno Frey and Lasse Steiner (Frey and Steiner, 2010) proposed a new method of charging for entrance to the museum, where visitors would pay at the exit depending on the time spent in the museum, the so-called pay-as-you-go principle.

Another important area of cultural economics which attracts applications of industrial organisation theory is the organization of cultural institutions. Interestingly one of the most researched fields is again the organization of museums (e.g. Frey and Pommerehne, 1989) and, to a little lesser extent, organization of theatres and concert halls (Frey and Pommerehne, 1990). Interesting question studied by the researchers so far is the impact of public subsidies on the work of arts organizations, where one of the findings shows that public subsidies are of an ambiguous nature and are not always positive in promoting and improving the functioning of cultural organizations (Netzer, 1978; Blaug, 2001).

2.1.5 Studies of supply and demand in the arts

Preferences of individuals in the arts are aggregated in the functions of market demand and supply. Throughout the history of the field, these functions have been among primary tools for studying the economics of cultural activities. The text included in the compendium *Cultural economics: the arts, the heritage, and the media industries* edited by Ruth Towse in 1997 includes more than half of a dozen studies of demand (e.g. Withers, 1980; Gapinski, 1986; Cameron, 1990; Throsby, 1990). Also, Throsby (1994) and Blaug (2001) include the study of supply and demand as one of the cornerstones of cultural economics.

Studies indicate numerous and very diverse factors that affect the level of demand for and supply of various forms of artistic goods. The studies confirm (in line with economic intuition) that cultural artefacts are luxury goods and the demand for them is often disproportionately rapidly increasing with increasing income. They also note that cultural goods are price inelastic and that consumers despite a possible increase in the price are harder to reverse their decisions in spending on cultural goods. However, researchers also note some differences here, e.g. Moore (Moore, 1966) and Gapinski (Gapinski, 1984; Gapinski, 1986) confirm the price inelasticity of demand for theatre performances, while on the other hand Cameron (Cameron, 1990) and Fernandez-Blanco and Banos-Pino (Fernandez-Blanco and Banos-Pino, 1997) find high price elasticity of cinema visits.

2.1.6 Public subsidies and Baumol's cost disease

As mentioned above, Baumol's cost disease is one of the few insights which marked the area of cultural economics and its influence on general economics. However, some authors pointed out that, although there is still a deficit, this happens not because of the labour costs, but due to disproportionate growth of other costs, for example, material or advertising costs of arts organizations. Even Baumol himself in later articles (e.g. in: Towse, 1997) realized that his findings point primarily to necessity of a change in the structure of spending and that Baumol's cost disease does not mean the necessity of state interference as the only remedy for a cost non-competitiveness of arts organizations. Also, some other authors find many other recipes to cure the Baumol's cost disease: a) different pricing policies; b) more efficient allocation of labour; c) the income derived by the use of new media (shows on TV, radio, Internet); and d) faster transport, which enables artists to participate and perform multiple projects at the same time (Throsby, 1994; Throsby, 2001; Frey, 2003; Throsby, 2010). However, Baumol's findings remain the starting point of any consideration of economics and culture and with words by Mark Blaug (2001) "a crown jewel of cultural economics."

2.1.7 Financing of the arts

Financing of the arts is perhaps the one issue with which cultural economics as a field is very often confused. Nevertheless, it is merely one of the topics within the field of cultural economics, in which the authors, notably through the tools of macroeconomic analysis, observe how culture is being financed. In this area, some of the studies carried out at European level are well known, especially the study of Klamer and colleagues (Klamer, Petrova and Mignosa, 2006) and study of Belgian consultancy KEA European Affairs in the same year (KEA, 2006). Klamer and colleagues (2006) find that in the EU, "governments (local and central) still remain the largest supporters of culture in comparison to the other sector. Nevertheless, the three spheres – government, market and third (non-profit) sphere – operate simultaneously, and their intermingling is more the rule than the exception." Numerous studies have also been conducted at the national level in recent years, and the interest has been raised in particular for the study of cultural funding in so-called post-socialist countries. Several studies have been done that do not particularly apply to the field of cultural economics in the academic sense and are mostly based on pragmatic purposes of European and other financiers.

2.1.8 Tax incentives for private investments in the arts

Investing in art is divided primarily into the conventional capital investments in culture (that have been recently associated with public-private partnership as a form

of investment in culture); sponsorships, which are a form of reciprocal, two-sided beneficial business relationship between the investor and cultural organization; patronage, which is a form of support where the patron receives mainly psychological satisfaction, although there are also some forms of longer term business collaborations; and donations, where culture is financed by the private donor who as a consequence of the relationship doesn't in principle get anything except a sense of charity and pride – the donors sometimes remain even unnamed (cf. Čopič and Srakar, 2010).

Main topics in this field in last years have been explorations of the reasons of donors and other private investors in culture and the opportunities and viability of different incentive schemes of donations, including in particular tax reliefs (credits and rebates). Notable study in this field has been a book by Feld, O'Hare and Schuster (1983) which showed that donations can be an effective decentralising device for financing of the arts, and also showed the contrary evidence to the myth of cultural subsidies benefiting the very rich on the expense of the very poor. It is also worth mentioning following Čopič et al. (2011) that in several countries (particularly in English-speaking language area) many different mechanisms exist to support private investments in public goods (e.g. matching grants or. matching funds where the state doubles or directly adds to funds given by a private party). Studies in cultural economics also suggest that such schemes can be more effective than indirect tax incentives, and some authors (e.g. Rushton 2008) tend to attribute this to psychological reasons.

2.1.9 The copyright in the arts

Copyright has been for more than a decade an important topic in cultural economics. Initial studies of copyright and its diversity in English, German and French-speaking areas and substantive debate about the pros and cons of this mechanism (see e.g. Landes, 2003) have been replaced by modern, methodologically-oriented econometric analysis. Also, the copyright analysis in cultural economics began to deal ever more with piracy and other aspects of copyright in the electronic media and digital content (see e.g. Liebowitz, 2006; Handke, 2012). In recent years there has been a significant rise in debates on copyright in cultural economics which received its peak in 2008 with a speech by the former president of the ACEI, English economist Ruth Towse at the ACEI conference in Boston, where she tried to justify the thesis that cultural economics had hitherto neglected the concept of copyright (that she justified by the fact that the latter has not yet been thematised in terms of cultural policy). The topic in its broader form of intellectual property protection has become the subject of numerous other studies and even university' research groups and great attention is paid to it also at the international level (e.g. UNESCO).

2.1.10 The labour market and incomes in the arts

The labour market in the arts is always one of the central themes in cultural economic contributions, being named as such in review articles by Blaug (2001) and Throsby (1994). Labour market in the arts is in many ways fundamentally different from the labor markets in other activities. Firstly, incomes in the arts are highly skewed, which can be attributed to Caves's A-list/B-list property: there are few artists (named as "superstars," following Sherwin Rosen (1981)) who earn extremely high incomes, while most of the artists earn very low incomes much below the average incomes in society.

Secondly, while in most other activities the employees follow mainly the maximization of income, in the culture and the arts the situation is somewhat different. Because it is much harder to earn a living with artistic activities alone the individuals in the arts often perform other, more lucrative (in words of Richard Caves (2000): "humdrum") professions. However, as these activities become more and more profitable the individuals want to devote more and more time to artistic activities, so very strong presence of the difference between normal/humdrum and artistic pursuits can be noted, where individuals perceive the former as particularly instrumental in facilitating the latter. An interesting finding was contributed by the Dutch researcher Hans Abbing, who in his influential book (Abbing, 2002) made the argument that measures to support the artistic profession such as to increase subsidies to artists mean a disproportionate number of people choosing an artistic career, and can thereby even exacerbate the low level of income in the arts professions.

2.1.11 Studies of participation in artistic activities

Studies of participation in artistic activities are another important part of empirical work in cultural economics. Usually resting on the microeconomic assumption that the individual maximizes his utility, economic studies of participation in artistic activities are addressing mainly the demand side of the economic analysis. The studies mainly rest on the application of multivariate econometric models estimating the effects of different factors on the participation in the arts. As stated by Gray (Gray, 2003), the key factors that explain participation in artistic activities are age, education, spatial factors (e.g. clustering), personal income, gender, and race. Also in explaining other factors some of the findings are in accordance with economic theory, while some are shying away from simple, direct response. Some other empirically oriented studies (e.g. McCarthy et al., 2001; McCarthy and Jinnett, 2001) bring further evidence to the field. Some researchers also apply the findings of urban economics and theories of the creative class in the study of participation in artistic activities (e.g. Bille, 2008).

2.1.12 Management and marketing of culture and the arts

Although management of the arts sometimes sounds synonymous to cultural economics, at least to the general art public, both management and marketing of culture and the arts are separate areas that are different from cultural economics. Thus, cultural management examines in particular the management, leadership and surveillance over cultural organizations, which often forms the basis of information on which to build theoretical and empirical findings of cultural economics. From the point of view of management, artistic activities are specific and have some different characteristics than other commodities: they have production-flow discontinuities (each work of art is a process on its own); they are usually managed with a smaller staff structure, which, as stated by François Colbert (Colbert, 2003), requires charismatic leaders with very strong personal leadership styles; usually two-tiered governance structure is applied, which includes programming and business manager, and the board of directors; immateriality of art assets and their value and importance to the heritage of the nation. These characteristics are not applicable in all arts organizations, but they can serve as a useful basis for the study of management and other functions of work in arts organizations (ibid.).

2.1.13 Cultural tourism

The phenomenon of cultural tourism and economic studies of cultural tourism are another growing area that gain influence with the growing numbers of cultural tourists and gaining recognition of cultural tourism especially in Europe, which is, according to UNESCO, the destination with the highest number of cultural attractions in the world (see e.g. Srakar, 2010). In exploring cultural tourism authors most often apply the classical economic tools of supply and demand. Despite the growing interest in cultural tourism all over the world, the number of destinations in Europe where the owners are trying to attract cultural tourists increased disproportionately in relation to the number of tourists themselves and today significantly exceeds the level of demand (Richards, 1996). Therefore, some organizations have attempted to set new standards of so-called sustainable tourism in order to maintain the quality of cultural destinations.

Another economic area that overlaps with cultural tourism is the study of economic impact of cultural activities. Unfortunately, this area has been so far prevailed by the economic impact studies with all their problems of overblown results and incorrectly applied economic methodology (see e.g. Seaman, 1987), so, as stated by Baró and Bonet (1997), these studies do not provide a basis for comparison between different projects and neither a justification of the potential public investment in projects of cultural tourism (Baró and Bonet, 1997). As stated previously, the evaluation of

cultural projects should take into account also passive (i.e. non-use) values and contingent valuation studies as the basis for estimation of such results.

2.1.14 Cultural and creative industries

One of the focal areas of cultural economics is also cultural and creative industries. Cultural economics does not understand them only in a negative sense which is attributed to the work of Frankfurt's school of critical theory. Cultural industries in cultural economics very often denote an area (sector) of artistic activity, characterized by the mass production of goods and services that possess enough artistic features that can justify its artistic importance (Towse, 2003).

Within sociology and political economy many authors discuss the difference between high and low culture, the latter being, of course, synonymous to mass production and cultural industries in general. This is a cultural divide that economists generally oppose, for example, Tyler Cowen (Cowen, 1998) who in this regard speaks about cultural pessimists (that would most certainly follow the findings of Frankfurt school) and cultural optimists and in the title of his work boldly sets his side for the cultural industries. Cowen shows that the conditions of cultural production in recent decades (especially in the U.S.) have improved, and the cultural industries and artists themselves have never had so many options and improved conditions for their work. It is worth noting that there are at least three closely related terms in cultural economics indicating very similar concepts − in addition to the cultural industries economists frequently also speak about creative industries (Caves, 2000) and copyright industries (Towse, 2003; Towse, 2010). An interesting and often quoted model of cultural industries using concentric circles has been developed by Throsby (2001) and has been used in numerous studies (e.g. KEA, 2006; Murovec et al., 2012).

2.1.15 Economic history of culture and the arts

Economic history of culture and the arts encompasses studies that try to understand and interpret the history of the arts with the lens of economic analysis. Like some other areas, it also emerges from the work of William Baumol whom at the beginning of the 1970's explored Elisabethan theatre in terms of economic relationships. This was followed by his works about the Athenian drama (1971), Mozart (1994), and the work of Michael Montias on art in Delft in the Netherlands' 17th Century (Montias, 1979; Montias, 1982; Baumol and Baumol, 1994). In recent years, seventeenth-century Dutch art, characterized by intense commercial activity was included as one of the frequently researched topics of cultural economists (see e.g. Ginsburgh and Menger, 1996). Beside it other topics of research included other periods of prosperity

of the arts and the art market such as the history of the Renaissance and Elizabethan theatre (e.g. Kovač, 2001).

2.1.16 The economics of the performing arts

Already the initial work of the whole cultural economics, the famous monograph of Baumol and Bowen of 1966 focused mainly on studying economic relations in the performing arts. It was based on a disproportionate increase in the cost for theatre and opera performances in relation to other costs (mainly labor-intensive) of activities in the economy on the basis of which Baumol and Bowen concluded on the existence of Baumol's cost disease, which falls within the scope of all areas of so-called live art.

Another important topic of research in the field of economics of performing arts studies how supply and demand determine price and income elasticities of attending theatre performances. In a very thorough review, Seaman counted as many as twenty-nine studies that have presented results on the basis of calculation of either income or price elasticity of attending theatre performances. Studies of Throsby (1990), Abbé-Decaroux and Grin (1992), Urrutiaguer (2002), Tobias (2004), Krebs and Pommerehne (1995) and Lévy-Garboue and Montmarquette (1996) addressed the various factors that affect the quality of theatre performances and visits to the theatre. Similar findings were also discussed by Zieba (2008), who found that on one hand theatre performances are luxury goods in economic terms so that their income elasticity is greater than one, but has also noted the significant opportunity cost of time devoted to visiting performances: with the increase in income the cost of time is disproportionately rapidly increasing.

The third area that may be mentioned in exploring the economics of the performing arts is industrial organization of performing arts industry, considered in works such as Frey and Pommerehne (Frey and Pommerehne, 1989). The basic message of their work is that institutional differences systematically affect the behavior of managers of institutions in the performing arts (theatre, opera, ballet and classical music).

2.1.17 Economics of music

The economics of music might be further split into the economics of classical music, economics of music industry and economics of opera. All three areas are well represented in cultural economics. Economics of classical music and opera economics is often considered primarily within the studies of performing arts. Specific topics most commonly found in the analysis of the economics of classical music and opera are Baumol's disease (e.g. Volpe, 1991; Brooks, 2000), economic history of art

(Roselli, 1984) and some other issues, particularly in the context of microeconomic analysis and industrial organization.

A different, specific topic is the economics of the music industry, which mainly concerns topics that have already been mentioned in the context of cultural and creative industries. It, therefore, applies microeconomic analysis to study the relationships in the music industry, using principal and agent analysis and the theory of contracts (e.g. Caves, 2000), transaction cost economics (Burke, 1997), analysis of (mostly oligopolistic) structure of the industry (Cox and Felton, 1995) and analysis of the income in the music industry (Burke, 1995; Towse, 1997). Recently, important topics in the field have also become economics of the music on electronic media and economics of music played over the Internet (e.g. Cowen, 2008).

2.1.18 Economics of ballet and contemporary dance

Economics of dance could perhaps be separated into two parts (similarly as economics of music): economics of ballet and economics of contemporary dance. However, studies of the economics of dance in cultural economics are very rare, and we can mainly mention the German author Jörg Schimmelpfennig (Schimmelpfennig, 1995; 1997; 2003). The themes are similar to those in the performing arts: industrial organization and structure of the market, economic history of ballet and various tools of microeconomic analysis. Among the major findings, one should mention in particular the public nature of the art of dance, and the existence of non-use values that prevent the ballet (or dance in general) to be seen purely as a private, market commodity.

2.1.19 Economics of the visual arts

Economics of visual arts (sometimes also called economics of the fine arts) is directly linked to topics that are dealt in the economics of the art market and art auctions, economics of museums and economics of cultural heritage. In its separate meaning, it primarily uses microeconomic analysis of the organization and structure of the market in the visual arts and more macro-oriented analysis of funding of organizations in the field (e.g. Velthuis, 2003). Industrial organization' studies of the visual arts, in addition to analyzing the operation of galleries and museums, also bring an interesting division of the field of visual arts into the primary market, where the artists sell their work directly, as well as a secondary market, where sales are made through auction houses and galleries.

2.1.20 Art markets and art auctions

Studies of the art market are again among most frequently addressed topics in cultural economics. Among first important studies in this field, we have to mention the study by the doyen of the field William Baumol. In his paper of 1986 (Baumol, 1986) he has spoken on the comparison of investing in works of art in relation to traditional financial instruments such as stocks and bonds, and laid claim that number of subsequent studies failed to refute: investing in the arts is not a good substitute for traditional financial investments.

Another interesting fact that many studies in cultural economics (e.g. Goetzmann, 1993; Mei and Moses, 2002; Worthington and Higgs, 2007; Frey, 2003) note is the relative independence of trends in the art market from general trends in other markets. A certain degree of correlation between the markets, of course, exists, but this is not enough to argue that the developments in the market of financial instruments are directly transmitted to the market of artworks.

2.1.21 Economics of museums

Museums are an important topic of cultural economics, especially due to numerous different relationships between agents in the museum world and the relative stability of these relationships. Among the most interesting issues we certainly have to mention three: superstar museums; charging for visitors of the museums, and deaccessioning i.e. selling of museum artworks. The first topic has become important related to works of Swiss economist Bruno S. Frey and success of several "extra-large" museums, the Guggenheim in Bilbao (and other cities), Louvre, Tate Gallery and Tate Museum, museums in Vienna Museumsquartier, etc. Second topic mainly deals with the question whether charging for admission to museums is an economically viable way of funding museums, as recent two decades brought many evidences showing that a more preferred option should be free entry to museums.

Another important issue is deaccessioning of works from the museum collection, which has been debated in cultural economics ever since the early article by Michael Montias (Montias, 1973). At least initially, economists have argued in favor of deaccessioning as a means of financing museums, especially in times of economic crisis, despite the opposition from the museum sector. Later, several authors have expressed doubts, some from the legal or moral view, while other also in economic terms, but without a formal modeling perspective (or even econometric evidence).

2.1.22 Economics of cultural heritage

The economics of cultural heritage is inextricably linked with contingent valuation studies. The latter offers an effective and specific method of valuation of cultural heritage on the one hand and gives a justification for public intervention in the administration of the estate, and, on the other hand, provides estimates of the value that the cultural heritage estate occupies in the eyes of the inhabitants of the area, where it is situated. The key work in this area is certainly a compendium by Navrud and Ready (Navrud and Ready, 2002) which was the first to summarize all of the key studies in this area. A follow up was provided by a special issue of Journal of Cultural Economics in 2003.

Cultural heritage is perhaps one of the most illustrative examples of public goods in the field of culture, as it can easily be shown to satisfy the conditions of nonexcludability and nonrivalry (which are fundamental for naming a good public in economic sense). Because of this, as stated by Benhamou (2003), economics of cultural heritage lies very close to environmental economics.

2.1.23 Economics of festivals

Festivals have become an important topic in cultural economics with the work of legendary Swiss cultural economist Bruno S. Frey (e.g. Frey and Pommerehne, 1989; Frey, 2000; Frey, 2003). As stated by Frey, festivals have become a widespread form of artistic projects, especially in an attempt of recovery of certain art forms and venues. An important paradox has to be noted, namely that as the arts in general have dealt with major financial difficulties the financial support to the festivals has growned which is analysed in recent studies (e.g. Frey, 2000; Frey, 2003).

Festivals are commonly analyzed by conventional analysis of the factors affecting supply and demand. Because of its positive characteristics and its specificity, the art festivals have become one of the mechanisms used in revitalizing the urban centers or towns as well as the overall artistic genres, and, perhaps as stated by Frey, even another answer to the already mentioned Baumol's cost disease.

2.1.24 Economics of books and publishing

Despite the important place in the cultural sector, not much attention was devoted from cultural economists so far to the economics of the book market and publishing. One of the first attempts to model the book market was provided by the Danish author Christian Hjorth-Andersen in 2000. Among his main conclusions was that the book market is an example of monopolistic competition, where products on the market (books) are close but not perfect substitutes (Hjorth-Andersen, 2000).

As also identified by Hjorth-Andersen, there are substitutes that are slowly, but steadily replacing reading of the books.On the other hand, internet has a largely positive impact on the market of books – because it democratizes the market of books and causes the "long-tail effect," where bestsellers have lower relative sales on Internet as compared to less successful books, and the readership and sale of books via the Internet is becoming longer and more and more books are getting fewer and fewer readers. Despite being refuted by some notable authors the presence of this effect (firstly noted by Anderson, 2004) has been confirmed e.g. by a study of French authors Peltier and Moreau (Peltier and Moreau, 2010). Another important study in the area of book markets is Canoy et al. (2006).

2.1.25 Economics of the film industry

A comprehensive overview study in the field of film economics has been written by an Australian economist Jordie McKenzie (McKenzie, 2009). It notes that the literature in this area can be roughly divided in two parts: micro and macro. Speaking about the first, it became clear that the film industry in relation to cultural industries in general is mainly characterized by great uncertainty of success of its products (also noted by e.g. De Vany, 2006), so each film project is major financial undertaking and requires a good understanding of the factors that can affect its success (if this is possible at all, as noted by De Vany, 2006).

On the other hand, macroeconomic studies primarily examine the aggregate dynamics of film performances that offer useful clues for studying the general structural changes within and outside the film industry. These changes are particularly important in determining changes in viewing habits, study and spread of piracy in the film industry, as well as other structural changes in the film industry.

2.1.26 Economics of the audiovisual media

Several important issues in this area study the public character of this field and the possible need to regulate this part of the culture and the cultural industries. As stated by an Australian researcher Glenn Withers (Withers, 2003) the media are a key sector in modern society and as such are studied not only for their economic, but also their cultural, social and political characteristics and are frequently subject to state regulation. Some researchers discuss the evidence of externality- and meritorious character of this kind of cultural goods, which in themselves serve for justification on public intervention in this field. Classical problem of principal and agent occurs: principals, therefore, viewers and listeners have no clear mechanism on communicating their preferences to the agent to the public media, which often leads to favouring preferences of the agent, prior to preferences of the principals.

2.1.27 Economics of the internet and new media

The last area that we will mention is the economics of the Internet and new media. In 2008, at the plenary lecture at the conference of cultural economists in Boston, professor Tyler Cowen (2008) began his talk with the words: "What can my eighteen-year stepdaughter teach me about cultural economics?" Great importance in the age of the Internet and new media receive the copyright issues, as it becomes less and less clear who is the author or owner of a particular cultural artifact, and more and more becomes unclear whether the internet leads to increasing diversification or homogenization of products. Fabrice Rochelandet in one of the papers in this field states three different methods of payment and billing via the Internet: a) uniform payment; b) payment in terms of the volume of downloaded content; and c) paying depending on the nature and characteristics of the service user (Rochelandet, 2003). An interesting question is whether the state - for obvious externalities and asymmetric information effects – should interfere on the internet realm, which would be in great contrast with some of the basic principles of the Internet (e.g. heterarchic and decentralized structure of the Internet).

2.2 Economics of museums and deaccessioning

Museums are a very special field of research in cultural economics, and they pose numerous micro- and macroeconomic problems. These problems have been subject of several studies in past years. The studies were aiming at providing answers to questions on price and income elasticities of visiting of museums, industrial organisation of museums, various different demand and supply characteristics of museums, financing of museums and some other related topics (e.g. deaccessioning).

One of the main findings from the literature in museum management and economics is that museums have been changed in their main characteristics and most of all in the mission they serve: they have come to be customer-oriented, and their main task has become education and not simply preserving the dedicated objects anymore (Whitting-Looze, 2010). Fernandez-Blanco and Prieto-Rodriguez divide activities of museum into three main areas (Fernandez-Blanco and Prieto-Rodriguez, 2011):

1) Collection, which includes the identification, documentation, expansion and preservation of museum contents.
2) Exhibition, which makes funds available to citizens for use as purely aesthetic enjoyment and/or entertainment experiences as well as for education, training and research.
3) Other Services, a much broader and more varied category in content; for example, it includes catering and merchandising. Such services emerge and evolve as museums are reoriented toward better serving visitors, and thus, these services become increasingly important as a funding source.

Fernandez-Blanco and Prieto-Rodriguez are keen to note that we could add a fourth area of museum output, namely economic impact of the museum, following works by Mairesse and Vanden Eeckaut (2002) and Plaza (2010).

2.2.1 Demand and supply of museum services

As stated by Frey and Meier (2006) the demand for museums originates from two sources. Firstly, there is private demand as exerted by the visitors. They may be interested in the exhibits as part of their spare time and associated leisure activities or as part of their professional activities as art dealers or historians. The visitors of the museum may be individuals or families, or it may be part of an organised event, e.g., by firms or schools. Empirical research on private demand for museum services is mainly focused on visitor characteristics and attendance rates. In general studies conclude that an individual's museum attendance increases with the level of income and education and age, at least until the median age and among women (Dickenson, 1992; Peterson, Hull and Kern, 2000; both quoted in: Fernandez-Blanco and Prieto-Rodriguez, 2011). There are also studies that include qualitative determinants of museum demand, such as the positive impact of the quality of the collection or repeated visits (Luksetich and Partridge, 1997; Darnell and Johnson, 2001).

Finally, another field of research estimates museum demand functions and discusses price elasticities with the aim of understanding the impact of introducing or increasing admission fees. These studies conclude that the demand for museums is price-inelastic (O'Hagan, 1995; Luksetich and Partridge, 1997). Fernandez-Blanco and Prieto-Rodriguez note that such results can be biased due to imperfections in the sampling procedure. They quote another study by Prieto-Rodríguez, Romero-Jordán and Sanz-Sanz (2005) which found that the demand for cinema, theatre, concert, ballet and museum tickets when considered together can be elastic.

Secondly, "social" demand also comes from persons and organisations benefiting from a museum. This type of demand is usually based on economically external effects (i.e. externalities) or direct effects on the economic activity (Frey and Meier, 2006). Such effects can be measured by using the concept of non-use values, which can be separated into five broad components (Frey and Pommerehne, 1989): existence value, bequest value, option value, educational value and prestige value.

Non-use values and benefits (and costs) can be empirically measured by using three different techniques (Frey and Meier, 2006):
1) Firstly, one can estimate them using contingent valuation methodology, conducting surveys measuring the willingness-to-pay of both visitors and non-visitors of a museum. The survey questionnaires have to be carefully designed in order to elicit the true willingness-to-pay (following guidelines of e.g. Arrow et

al., 1993) for the various use and non-use values produced and/or embodied by a museum.

2) Other possible techniques rely on the revealed behaviour of individuals (contingent valuation is contrast is commonly associated by expression of stated preferences of individuals), for example, by estimating the extent to which property values increase in a city containing a museum (assuming that people are willing to pay more for an apartment or house located near a museum compared to an equivalent apartment/house located remote from such a museum. Methods most commonly used are hedonic pricing methodology (Navrud and Ready, 2002) and compensating variation method (Clark and Kahn, 1988; Frey and Meier, 2006).

3) A third approach for capturing social demand and social values is to analyse the outcome of popular referenda on expenditures for museums. Such method has been frequently used by Swiss economists studying results of referenda in Switzerland (e.g. Frey and Pommerehne, 1989; Schulze and Ursprung, 2000).

Social demand and external effects are also commonly related to studies of economic impact of a certain cultural object or event. Such studies are commonly done using Keynesian multipliers and input-output analysis and provide estimates of economic effects of the operation of a certain cultural organisation or event on industrial production and revenues of firms, employment, added value and tax revenues. They have been subject to numerous critiques in past decades starting from frequently quoted work by Seaman (1987) and followed by works of e.g. Madden (2001); Sterngold (2004); Seaman (2003; 2006); Frey (2005); Snowball and Antrobus (2006); Snowball (2008). As stated by Frey and Meier (2006), such studies are addressing the wrong questions, as museum's main raison d'etre is not to stimulate the economy but securing a "unique service of providing a certain type of cultural experience to its visitors, as well as providing non-user benefits."

Museums have several characteristics in their cost structure that differentiate them from other institutions. As suggested by Fernandez-Blanco and Prieto-Rodriguez, the most accurate approach to the museum is a multi-output production function with a cost structure similar to other cultural firms that have very large fixed costs, while variable costs account for a small percentage of the total costs (in the short run the operating costs of museums tend to be independent of output). Moreover, marginal costs, that is, a change in total cost due to an additional visitor are close to zero. However, in some circumstances (e.g. so-called "blockbuster" exhibitions), additional visitor may impose significant congestion costs as estimated by e.g. Maddison and Foster (2001). Thirdly, some museums have sometimes been claimed to suffer from Baumol's cost disease (Towse, 1997) however as stated by Frey and Meier no empirical study on this topic has confirmed this thesis, and it is possible to speak about productivity advances in museums: items can be viewed on the Internet;

surveillance and control can be undertaken by cameras; increased reliance may be placed on volunteers; activities may be provided out-of house; or changes can be made in institutional settings (Frey and Meier, 2006). There is, therefore, no ground on which we could conclude that museums are subject to Baumol's cost disease' productivity lag. On the other hand, the collections in museums have quite large opportunity costs: the value of the collection is usually very high (although hardly ever estimated by any museum due to difficult and expensive valuation procedures) and one could perhaps do better to sell the collection and spend the money more profitably. Other opportunity costs are the value of the building and its alternative uses. Such opportunity costs can become a serious problem when the museum is facing a financial crisis and is forced to get money from every possible source to cover its costs.

Also, the presence of economies of scale in museums can be verified, although in the largest museums, the situation can sometimes be reversed so that we see diseconomy of scale (Jackson, 1988; in: Fernandez-Blanco and Prieto Rodriguez, 2011). Finally, Fernandez-Blanco and Prieto-Rodriguez report on the empirical evidence of technical and scale inefficiency in museums (Mairesse and Vanden Eeckaut, 2002; Basso and Funari, 2004; Bedate, Herrero and Sanz, 2009), although inefficiency is higher when the museum is focused on preservation than when oriented to visitors or external objectives. Bishop and Brand (2003) consider technical inefficiency to be directly related to public grants and volunteer activities.

As stated by Frey and Meier, in Europe and the United States, in general the non-profit organisational form predominates for museums, while non-profit museums are open to both public and private ownership. In Europe, since a great portion of museums includes collections originally developed by the Church, royalty or nobility, public ownership can be found more frequently than in the United States, where the majority of museums are privately owned. Public ownership can provide stability to a museum as well as a certain lack of incentive to develop economically efficient management. Private ownership can improve economic efficiency, but it increases risk and uncertainty. Trying to exploit the advantages of both sides while simultaneously avoiding their disadvantages, the hybrid model (Schuster, 1998) incorporates a mix of public and private governing authorities and provides more opportunities for the autonomous management of museums.

2.2.2 Financing of museums

Museums can get their revenues from admission prices, the sale of items besides admission, public grants (three most important sources), new sources of revenue linked to merchandising, restoration and selling of ancillary goods (financing sources also addressing the people that do not necessarily visit the museum itself as well as

towards people that are attracted to visit the collection only after they visit the museum café or its shop), and other means of finance, such as lending out items from the collection (Fernandez-Blanco and Prieto-Rodriguez, 2011).

Charging for entrance to museums proved to be an extremely interesting topic for economists. Due to welfare theoretical considerations and Pareto-optimal pricing principle, the appropriate admission cost should be zero, due to zero marginal costs of marginal visitor. There is also another argument for zero-entrance price arguing that there are some positive external effects related to the museum and, therefore, the museum should be compensated for this service by public funds. There does not seem to be any evidence that this measure hits groups in low-income categories disproportionately (Frey and Meier, 2006; O'Hagan, 1998). A discussion can be traced back to Sir Hans Sloane, whose donation at his death in 1753 led to the establishment of the British Museum, but with the explicit constraint not to charge any entrance fees. Even today, for historical, economic and other reasons most British and some American museums do not impose any admission fees upon their visitors (Frey and Meier, 2006).

But the opinions vary as some argue that fixed costs of the museums should also be taken into consideration, and most of all that congestion costs should be accounted for, which can change the long-run marginal costs to differ from zero. As noted before, a new proposal has been made at the 16th Conference of ACEI by Bruno S. Frey and Lasse Steiner (Frey and Steiner, 2010), that the fees should be charged when leaving the museums according to the time spent in the museum (the so-called pay-as-you-go principle).

The pricing strategies in museums vary according to previously mentioned debates. Many economists argue for price discrimination (e.g. Frey, 1994). Many museums, even those not charging the entrance fees for visitors of their permanent collection, impose higher entrance fees for special exhibitions. Additionally, the museums could be more efficient by charging more for visitors at weekends and less for visitors during summer holidays. Tourist visitors could be charged more than local residents. Some visitors wanting to spend only a short time in a particular museum could be charged less. In periods of high demand when the art museum is stretched to capacity, high and low entrance fees could be set. Such price differentiation often has benefits for all categories of visitors (it is better suited to their specific needs, e.g. they can enter the museum more quickly) as well as for the museum, which can raise its revenue. There are also a variety of other pricing options besides free admission: donations given after visiting of museums, seasonal tickets (applying zero marginal pricing) or a free-day policy (an empirical result from Steiner's study showed that a free day is not an optimal pricing strategy as the revenues generated by ancillary sources do not cover the admission funds forgone, see Steiner, 1997).

In addition, Prieto-Rodriguez and Fernandez Blanco studied the financing of museums in a principal agent modelling framework. Although we will present their results in more detail later, they manage to find another argument for the inelastic pricing strategy of museums in presence of asymmetric information. Furthermore, they find that manager of the museum should not be left to decide the ticket price for admission into that museum. Rather, as stated by Prieto-Rodriguez and Fernandez-Blanco (2006), "the public agency must regulate these prices in accordance with social valuation and use grants as an incentive mechanism to achieve optimal managerial effort."

2.2.3   Models of museum behaviour

Frey and Meier also present an analysis of different models of museum behaviour. They classify the models into neoclassical (assuming managers that benevolently optimize the museum's utility function) and institutional (taking into account the different institutional characteristics of the managers, e.g. their self-oriented behaviour). In our thesis, we will combine both approaches into a principal agent model of the museum as a firm.

Frey and Meier take a simple model from Throsby's 1994 article where he analysed a model for the behaviour of performing arts firm. The model of Frey and Meier therefore states that the manager solves the following optimisation problem:

$$\max_{y,q} U(y, q) \qquad (1)$$

subject to:

$$p(y)y + g(q) + h(y) - c(y, q) = 0 \qquad (2)$$

with U denoting the utility function of the museum, with arguments y denoting the number of visitors to the museum, q denoting the quality of exhibitions in the museum, p denoting the revenue function from the visitors' fees, g the level of government grants and donations, which depend exclusively on the quality of the museum, h denoting the income from ancillary goods (from the shop and restaurant or café), which, of course, depends on the number of visitors, and c denoting the cost function of the museum, which depends on cost and quality.

The first order conditions of the optimisation problem are stated below (λ denoting the Lagrangian multiplier on the constraint, the subscripts denote the partial derivatives):

$$\frac{U_y}{\lambda} + p_y y + p(y) + h_y = c_y \qquad (3)$$

$$\frac{U_q}{\lambda} + g_q = c_q \qquad (4)$$

$$p(y)y + g(q) + h(y) = c(y, q) \qquad (5)$$

There are two main findings from the analysis of Frey and Meier's model. Firstly, results demonstrate that managers of a non-profit museum receive utility from a higher number of visitors. They, therefore, set the entrance fee in such a way that marginal revenue from entrance fees and complementary goods is less than marginal costs, which explains why museums set too low a price compared to the optimality condition. Secondly, museums invest in quality beyond the point where marginal grant income equals the marginal cost of increasing the quality by one unit. This behaviour is due to the utility the museum gets from an increase in quality. Museums are, therefore, likely to provide too high quality at too low price, compared to the optimality condition (Frey and Meier, 2006).

As noted already by Frey and Meier, the model has several doubtful assumptions. For example, it assumes that the managers are acting in a benevolent, museum's utility maximising way. This can obviously be dubious as the managers and key personnel of museums are likely to behave more selfishly than assumed by the model, and museum managers are primarily interested in their reference group and try to maximise their respective reputations (ibid.).

They, therefore, propose that behaviour of museum managers is analysed differently in different institutional contexts. Managers of purely public museums rely exclusively on public grants, and they are, therefore, demotivated for commercial success of the museum as any additional revenue produced would go straight into the public treasury. Furthermore, their success in making a profit for the museum would cost them reduction in public subsidies in the next years (apart from being an institutional fact this finding has been empirically confirmed by Maddison, 2002).

According to Frey and Meier this would have three main consequences:
1) Public museums will not engage in selling paintings from their art collection because the management is prevented from using the income generated as it would wish, and selling part of the collection would leave management vulnerable to criticism from outside;
2) Directors of public museums will have little interest in the number of visitors;
3) Visitors' amenities in public museums will be poorly developed, and little attention will be paid to the profitability of museum shops, restaurants and cafeterias.

On the other hand, the managers of purely private museums have incentives to increase their income (and perquisites) because their survival depends on self-generated revenues. Frey and Meier therefore predict the following behaviour by the managers of the private museums:

1) They will actively sell paintings that no longer fit into the collection and use the money to buy new works of art;
2) They will actively seek to gain additional revenue from museum shops, restaurants and cafeterias, and will be prepared to host non-artistic events such as corporate meetings in their facilities to gain additional revenues,
3) They will be concerned with attracting visitors by means of "blockbuster" exhibitions and exhibitions well arranged from a didactic point of view and appealing to a large crowd,
4) They will emphasise amenities to visitors, such as cafeterias and clean restrooms.

Finally, managers of museums dependent primarily on donation revenues are predicted to act in the following way (ibid.):

1) They will try to satisfy the donors by allowing them certain amount of interfering in the programming, or allowing them to set strictly binding constraints on the ways in which works they donate can be used;
2) Museums must make the impression that donations are well used so that donors will have the feeling that they are contributing to a worthwhile cause. This therefore means additional focus on well established reputation with the public and the media;
3) Donors will also prefer dealing with non-profit organisations, which by definition act under a "non-redistribution constraint" (i.e. prohibiting personal appropriation of the profits). Minimising the profit goal avoids the problem of managers cheating on the donors to a certain extent (see e.g. Hansmann, 1981).

In their article in 2006 Prieto-Rodriguez and Fernandez-Blanco present a model that takes into account the possible selfish behaviour of the manager of the museum. They are able to put it into a principal agent framework. The latter can be used to estimate the models in situations where the agent makes some action that also benefits the principal. In their model, the principal is the public agency while the agent is the manager of the museum.

Prieto-Rodriguez and Fernandez-Blanco's model posits that the principal solves the following optimisation problem:

$$\max_{e, s(n_i), t_{i=0,1,2,\ldots,N}} \sum_{i=0}^{N} p_i(e) B[\theta n_i - s(n_i)] \qquad (6)$$

$$s.t. \quad \sum_{i=0}^{N} p_i(e)u[n_i t + s(n_i)] - v(e) \geq \underline{U} \qquad (7)$$

where:

$\underline{U}$ – reservation utility

N – set of non-controllable environmental variables

n_i – number of visitors

t – ticket price

e – agent's effort

$p_i(e)$ – probability of getting a certain number of visitors

B – principal's benefit function

$s(n_i)$ – public grant to the museum

θ – positive constant that represents the public sector's valuation of any visitor

u – utility/benefit function of the agent

v – disutility from effort' function of the agent

Prieto-Rodriguez and Fernandez-Blanco analyse the model in two parts. Firstly, they analyse it in the situation of symmetric information and present the analysis separately for each variable over which the maximisation takes place – public grant, ticket price and effort.

As is observed by both authors, the public sector has to cover the shortfall in the museum budget in the presence of symmetric information when not fully covered by ticket sales. Furthermore, if the museum receives enough ticket income to secure the required budget, it will not need any subsidy and the subsidy may even be negative (implying that the museum is a positive source of finance for the public sector) (ibid.: 174). Also, the elasticity of demand will be equal to or less than one. Only when the public agency would not have any interest in the visitors ($\theta = 0$) will the maximizing point be where the elasticity of demand is equal to one, which proves to be also the condition for maximisation of ticket revenues and minimisation of public subsidy (assuming that the principal is risk neutral).

When the information is asymmetric, the public agency should not use the grants to fully insure the manager because the latter has incentives to be inefficient by reducing his effort. The best choice for the public agency is to use grants to give efficient incentives for the manager to improve his effort level and thereby achieve more efficient museum management. Furthermore, the existence of moral hazard (based on asymmetric information) does not affect the optimal ticket price (ibid.: 179).

Authors also note two possible solutions for setting the budget of the museum (ibid.):
1) The market solution: allowing managers to fix the ticket price and permitting them to keep a share of the total ticket revenue; this solution unfortunately

implies fixing prices where private benefits (i.e. marginal revenues) are equal to the marginal costs and does not take into account social benefits, implying too high prices;

2) The "social" solution: incentives have to be controlled using public grants that must be based on the 'social value' or the 'external effects' produced. However, to avoid other kinds of inefficiencies, the authors write that grants associated with low results could even be negative.

Based on the fact that existence of asymmetric information doesn't affect the ticket prices the authors found a confirmation and explanation of inelastic pricing strategies commonly observed in museums. The optimal ticket price is always Pareto optimal in the sense that it equalizes expected social marginal benefit with the marginal cost. However, public grants and museum budgets would be affected, moving the equilibrium away from the Pareto optimum situation. Even with a risk-averse manager and a risk-neutral public agency, budgets and grants will depend on results because higher budgets associated with good results provide the main incentives to increase the level fo effort of the manager (ibid.: 180).

The authors, therefore, conclude that transferring ticket pricing policy to the manager is not a correct way to introduce adequate incentives. The public agency must regulate the ticket prices in accordance with the social valuation and use grants as an incentive mechanism to achieve the optimal managerial effort (ibid.).

2.3 Deaccessioning in Museums

2.3.1 Literature Review

As defined by Marie Malaro (1991), deaccessioning denotes "the permanent removal of an object that was once accessioned into a museum collection." Similar but more extensive definition is to be found in McKinney: "permanent removal or disposal of an object from the collection of the museum by virtue of its sale, exchange, donation or transfer by any means to any person" (McKinney, 2000). As stated by Malaro (Malaro, 1995): "little more than a decade ago there were many who did not accept the practice of deaccessioning; they viewed museums essentially as mausoleums dedicated to preserving, intact, the accumulations of successive generations." On the other hand, the same author states that "we have been engaged in deaccessioning for years and if there has been debate – and there has been – it has not been over terminology, but the practice that the term describes" (Malaro, 1991).

Malaro notes three key reasons for deaccessioning (Malaro, 1995):

1) Growth may be possible only through exchange. Deaccessioning practices and exchanges of secondary holdings for the purpose of acquiring additions for core collections may present the only viable means of growth for a museum on a limited budget.

2) It is possible that the mission of the museum requires changes. Museums with missions to focus on contemporary art or culture have a mandate constantly to adjust to changing times. Such museums, if they remain loyal to their purposes, need to implement policies ensuring that their collections change to encompass what is truly contemporary.

3) Financial difficulties may force consolidation. The sale of a few collection objects is a temptingly efficient way to solve a financial emergency. But this is all the more reason to exercise extreme caution because such a solution allows the museum to dispose of part of its very purpose for being. Deaccessioning with the purpose different than improving collections raises not only legal but also serious ethical questions.

According to Malaro, museums which consider the possibility of deaccessioning objects from their collection should keep one thought at the forefront: they exist to serve their public, and to be truly effective, they must maintain the confidence of these beneficiaries (Malaro, 1995: 220). In the eyes of experts, the decision to sell a particular work may be well-justified, but if the public feels otherwise caution should be exercised. Because of this added dimension, according to Malaro (ibid.: 221), "a museum's deaccession process should be flexible; it should consider not just purely legal issues but also what might be called the human factors."

The same author names several key aspects that should be given proper care when deciding for deaccessioning (cf. Malaro, 1995):

1) *The Need to Establish the Museum's Clear and Unrestricted Title to the Object under Discussion.* If title is uncertain, problems could be compounded by attempting to dispose of an object, for instance, if an object is sold, and years later the museum determines that it did not pass good title, the museum could find itself subject to a breach-of-warranty action with potentially dire consequences.

2) *The Proper Authority to Approve a Decision to Deaccession.* The rule advised by Malaro (1995) is "that the level of authority needed to remove an object from the collection should be equal to or higher than the level of authority needed to accession such an object." What that level should be depends on numerous factors such as the price of the object, its value as a research object, and the extent of the proposed deaccession. If either the object under consideration is of major significance or if a substantial portion of the museum's holdings is being considered for deaccessioning, some thought

should be given to discussing the matter with the general office of the state attorney.

3) *Documentation Needed to Support Proposed Deaccessions.* Number of issues that should be studied when reviewing a deaccessioning proposal and the required extent of documentation must be governed by the quality and quantity of the objects at issue. Different documentation should be available (Malaro, 1995): documentation on acceptable reasons for removal; guidance as to when outside opinions or appraisals should be sought; documentation on actions of those authorized to advise on or approve proposed deaccessions; and other documentation. The records should be indefinitely kept by the museum.

4) *The Appropriate Method of Disposal.* Particular care should also be given to selecting an appropriate method of disposition where there doesn't exist a uniformly correct method. Based on its particular circumstances and the nature of its holdings, a museum should be able to arrive at general guidelines regarding methods of disposal for its objects. Museum should consider the interests of the museum's beneficiaries (the public it serves) as well as the interests of the general public, the need to maintain public trust in the management of the museum, and any further unusual considerations that may influence the selected method of disposal.

5) *Notification to Donor of Deaccession.*
If an object has been given with non-binding (precatory) language bearing on deaccessioning, the museum may want to follow deaccessioning with caution. Although the decision to deaccess still rests with the museum, such cases may present situations when consultation with the donor or his heirs strengthens trust in the fairness of the museum's ultimate decision. If, on the other hand, an object is given with legally binding restrictions that affect the museum's ability to deaccess, the museum should not take whatever removal action before first consulting the legal counsel.

6) *Use of Proceeds Derived from Deaccessions.*
The common museum practice is to use proceeds from deaccessions for the acquisition of new collection material. Such a practice usually serves the best interests of the public because it lessens the temptation to drain collections in order to meet support expenses. This commonly adopted practice has been and continues to be the subject of intense debate as museums experience the difficult financial climate of recent decades.

Although deaccessioning is also considered in other countries (e.g. UK, France, Germany, Netherlands) it has become a forefront problem of the museum community especially in USA. As stated by Malaro (1995): "very little law in the United States inhibits deaccessioning and a tremendous variety of museums are governed mainly by independent boards composed of private citizens. Accordingly, we have had all sorts of museums experimenting with deaccessioning under a wide variety of

circumstances. And everyone comments on the ethics of each particular situation with little law defining which is actually enforceable."

Most of the museums in USA are nonprofit organisations. The nonprofit sector is deeply connected with the American tradition, and one of the main reasons for its popularity lies in the diversity it provides. Anyone in the United States can establish a museum for any objective as long as the objective falls within the broader definition of "service to the public." United States, therefore, have nonprofit museums of every size and shape. The well known Smithsonian Institution and Metropolitan Museum of Art are non-profit institutions.

Under the US laws, a nonprofit organization has an extended range of powers. First is the ability of the disposal of assets under the surveillance of its governing board. In this manner, any museum organized as a nonprofit has the right to deaccession objects unless its charter specifically limits this right. Added to this is the factor that the United States, with highly limited exceptions, never saw itself fit of restricting the movement of cultural objects located inside its borders.

But not everything is left to the free market system in US museum system after all. Museum profession frequently discusses ethics and public accountability. Several major American professional organisations (Association of Art Museum Directors, American Association of Museums) implement codes of ethics that include deaccessioning as one of their main propositions. In general, the codes and regulations recognize deaccessioning as a valid practice but impose guidelines for its implementation.

The code of American Association of Museums imposes the following key points about deaccessioning (Malaro, 1991: 52):

1) All museums should provide public statements about their policies of deaccessioning;
2) When considering deaccessioning, museums must take into account and carefully weigh interests of the stakeholders that they serve;
3) When considering deaccessioning, museums should give proper consideration of the museum community in general as well as the wishes and needs of the institutions themselves;
4) Special focus should be given not just to the governing board but also to the recommendations of the curatorial staff about the compatibility and pertinence of the considered object to the museum's mission.

While the code by Association of Art Museum Directors sets out the following key points regarding the same topic (Malaro, 1991: 53):

1) Deaccessioning should be related to longer term policies, not merely to the necessities and considerations of the moment;
2) Procedures for the practices of deaccessioning should be similarly strict as for the purchase of major artworks;
3) While the final decisions are in the domain of the museum's governing board, full justification for disposals should be provided by the responsible curator and the director of the museum;
4) Funds secured by disposal must be used with the sole purpose to improve the collection.

Both organizations, therefore, require from a museum to accept a policy regarding deaccessioning, they both assign final decision making responsibility to the governing board and both demand that the board pays attention to the curatorial opinion.

There are a number of changes in American society that lead to higher attention given to deaccessioning practices (cf. Malaro, 1991). Firstly, there was a change in a very active and profitable market not only for the art but also for other collectibles, which has presented an added pressure not only to the art museums but to all types of museums. Secondly, there were changes in the United States tax laws that discouraged donations of museum objects to museums and forced museums to think about buying objects as a way to adjust their collections. Finally, with the rise of museum quality and general standard in society, people started demanding more from museums and questioning the quality of management and governance in museums. Many institutions have, therefore, started to devote more careful focus on their collecting and found themselves with objects remotely connected to their missions. Also, because of raised concern about storage'quality and conservation the institutions were considering the validity of retaining objects that were not clearly furthering the goals of the museum. Because of all of the above, according to Malaro (1991), we "see more deaccessioning activity in the United States and also renewed debate about the practice."

2.3.2 Examples of Deaccessioning in US museums

2.3.2.1 The National Academy Museum

The National Academy Museum and School of Fine Arts was established in 1825 by leading artists of the time to "promote the fine arts in America through instruction and exhibition" (National Academy, 2009; in: Rohner, 2010). The institution serves three roles – a membership organization for elected artists, a school of fine arts, and a museum. It is led by the member artists, called the "Academicians." Due to the institution's long history in New York City, the National Academy Museum holds one of the finest collections of American art in the world.

On December 5, 2008, it was revealed that The National Academy of Art had just deaccessioned and sold two paintings to cover programs, operations, fundraising initiatives and gallery improvements (Rosenbaum, 2008). Frederic Edwin Church's, "Scene on the Magdalene," and Sanford Robinson Gifford's, "Mt. Mansfield," were sold by Sotheby's to a foundation that agreed to display the works publicly. Both paintings sold for $13.5 million. In July 2008, Ms. Carmine Branagan became Interim Director of the Academy and was given Directorship the following December. She was given this position despite having no previous museum or art history experience. Between July and December Branagan quickly realized how dire was the financial situation the Academy was in, describing it to the press as a "chronic operating deficit." The 2009 budget shortfall was estimated at about $1 million dollars, with a $4 million operating budget. The Academy has a $10 million endowment, which it has been borrowing from heavily (Pogrebin 2008). The negative financial situation was not atypical for the institution. General expense deaccessioning had previously occurred at the Academy in the 1990s. To try and solve the problem, the museum considered selling its Fifth Avenue building and moving to a less expensive location. This proposal was quickly rejected by the Academicians. Instead, the Academicians voted 181 to 2 in favor of selling the two works from the Academy's collection, with the possibility of selling two additional paintings, John White Alexander's "Portrait of Mrs. Thomas Hastings" and Robert Blum's "Study for a Japanese Beggar" (Pogrebin, 2008). No legal roadblocks existed to stop the sale. The National Academy was incorporated in 1828 by the state legislator directly; therefore the institution was not subject to Education Law 216 of the New York State Board of Regents. As a result, the Academy was free to deaccession as it deemed necessary and to use the funds as the institution decided was correct.

Branagan, aware that deaccessioning would not be in line with AAM and AAMD policies, pulled the Academy's membership from both organizations. Despite this action, AAMD sent an e-mail to its 190 members nationwide reprimanding the Academy for "breaching one of the most basic and important of AAMD's principles." AAMD (Finkel, 2008) also asked member organizations to "suspend any loans of works of art to and any collaborations on exhibitions with the National Academy." The request by AAMD to member organizations had substantial implications for the Academy. To make matters worse, after the deaccessioning was announced, Branagan and the Academy were vilified in the press. Many members of AAMD spoke out saying their action was reprehensible, and the Academy's reputation was damaged. Due to this action by the Academy and other museums, on March 17, 2009 Assemblyman Richard Brodsky introduced proposed legislation that would apply to all museums, not just those incorporated under the Board of Regents.

Realizing the vast negative implications for the Academy, Carmine Branagan met with Dan Monroe, Chairman of the AAMD's Art Issues Committee, and other representatives on March 11, 2009 to discuss a potential reconciliation. After the talks were completed it was stated (Pogrebin, 2009) that the groups had made progress towards allowing the Academy to "regain its footing as a member in good standing of the American art museum community." The Academy agreed to not sell the two additional paintings for $1.5 million that the institution was considering, to improve the institution's financial planning and oversight system, to increase fund-raising efforts by the board, and to create a more stringent collections management policy. Despite the meeting, both sides said there was not closure on the issues, and that talks would continue over the next few months (AAMD, 2009).

2.3.2.2   The Barnes Foundation

Founded in 1922, The Barnes Foundation was established in Merion, Pennsylvania and financed by Dr. Albert C. Barnes. The Barnes Foundation contains one of the finest art collections in the U.S., including works by many post-impressionist and early modern artists. Upon founding the institution, Dr. Barnes formed a trust that established stringent specifications on the collections and operations of the institution. Due to the stringent restrictions of the trust, The Barnes Foundation was unable to participate in certain fundraising or other financially beneficial activities. By 1991, this left the Foundation in a dire financial state (Gerstenblith, 2008: 278). As a result, on March 20, 1991, the Foundation asked the Montgomery County Orphans' Court whether it could go against Dr. Barnes' restrictions and publish a collection catalogue, charge a higher entrance fee (that, at that time, was set at $1), and hold development events at the museum (D'Arcy, 1991). In addition, the Foundation asked for permission to deaccession and sell 15 works in the collection (Babb, 2007). All of these measures sought to raise the funds needed to properly maintain and operate the museum and increase the size of the Foundation's endowment.

AAMD and a group called the "Friends of the Barnes Foundation" strongly spoke out against the decision. AAMD issued a brief that stated that funds should only be used for the collection of additional art, and not for maintenance (Babb, 2007). Further, the "Friends of the Barnes Foundation" issued a petition stating that, for a charitable trust, selling the paintings would be an "unprecedented grant of power" (Seattle, 1991).

Due to the public outcry, the Foundation dropped the request to sell the paintings on July 11, 1991 stating that the action "reflects its view that the mounting adverse publicity surrounding this request is prejudicial to its case and distorts and undermines the sound and reasonable basis on which it rests." The Foundation stated (Glueck, 1991) that it would explore, "alternative means of raising the revenues necessary to carry out its mission."

2.3.2.3   The Rose Art Museum

Founded in 1961, The Rose Art Museum is dedicated to, "collecting, preserving and exhibiting the finest of modern and contemporary art" (Rose Art Museum, 2009). Despite being less than 50 years old, the Rose has become a leading contemporary art museum in the northeast, surpassing the collections of many larger universities in the area. The museum is officially a part of Brandeis University, subject to the Board of Trustees of the University.

In 2008, the Rose was financially self-sustaining, and plans were underway to continue the museum's growth. On January 26, 2009, the President of Brandeis University, Jehuda Reinharz, announced that the University Board had decided to close the museum, sell the collection, and use the proceeds towards increasing Brandeis' endowment. Citing the financial crisis, and the University's focus on its educational mission, the President stated (Brandeis University, 2009), "These are extraordinary times," and, "We cannot control or fix the nation's economic problems. We can only do what we have been entrusted to do—act responsibly with the best interests of our students and their futures foremost in mind." Due to the recession, Brandeis' endowment fell by approximately 25%, from $712 million to $549 million (Edgers, 2009), and major donors, including the Carl and Ruth Shapiro Family Foundation (which had previously made large donations), were no longer giving, as a result of dropping portfolios and money lost with renowned financial ponzi-schemer Bernard Madoff (Boehm, 2009). Further, the University faced a $10 million operating deficit. The Brandeis administration stated that the Rose would be turned into a teaching center with a gallery and studio space (Kennedy and Vogel, 2009).

Deaccessioning, both for general expenses and otherwise, was not new to the Rose and Brandeis University. In 1991, eleven works had been sold at Christie's from the Rose, generating $3.65 million (Tully, 2009), which may have had an impact on the 2009 decision to close the museum and sell the collection. Further, Brandeis' administration was not ignorant of the ethical rules on deaccessioning.

After the January 26, 2009 announcement, the Rose Art Museum's Director Michael Rush stated that he had not been informed prior to the decision by the board, and was told of the decision one hour prior to the University issuing its press release on the matter. As a result, public outcry ensued. Supporters of the museum and members of the Museum's Board of Overseers had announced that they were exploring ways in which they could stop the action by the University. Students began planning demonstrations on campus against the action. Nationwide, alumni wrote in to express their feelings. Art museum professionals also spoke out against the decision. Aside from a few donors who gave permission to sell their artwork, donors primarily responded in a negative manner. Pledges were withdrawn, and some artists even

asked for works back. The State Attorney General's office of Massachusetts immediately responded to the public outcry, and stated that it would investigate the sale. AAMD also immediately issued a statement condemning the University's decision.

Two days after the announcement, on January 28, the University changed its position. Instead of selling the entire collection, the University said that it planned to sell just a few of the works. On October 14, 2010, a judge denied Brandeis' motion to dismiss the Overseers' lawsuit, and trial dates have been set for summer of 2010 (Schnapp, 2009). Whether Brandeis University will be forced to keep the Museum open is unclear, as is whether the University may sell artwork in the future.

2.3.2.4   Indianapolis Museum of Art

The Art Association of Indianapolis was founded in 1883 by May Wright Sewell, her husband Theodore and a small group of art-minded citizens. The association's first exhibit took place on November 7, 1883. In 1895, the association received a $225,000 bequest from the estate of John Herron to build an art gallery and school. The association opened the doors of the gallery and school in 1906. In 1969, they changed the name to the Indianapolis Museum of Art (IMA) and moved to their present location in 1970. Since their relocation, IMA has evolved into the fifth largest general art museum in the country.

A series of major donations over the course of 125 years established the IMA's permanent collection. The more than 50,000 works in IMA's permanent collection consist of African art, American and European painting and sculpture to 1945, Ancient art of the Americas and the Mediterranean, architectural sites, Asian art, contemporary art, design arts, Native American art, Oceanic art, and textile and fashion arts. The museum's collection of prints, drawings and photographs comprise more than 26,000 of the works (IMA, 2010).

On March 16, 2009 the Indianapolis Museum of Art launched a new addition to their extensive, and very interactive, website – a database of objects deaccessioned from the collection. As stated by the museum (IMA, 2009): "In light of the recent economic downturn and the resulting financial strain experienced by museums, the topic of deaccessioning has become a front-burner issue, making institutional transparency more vital than ever. This searchable database will evolve to include information regarding how the IMA uses funds from deaccessioned works to enhance and shape the Museum collection."

IMA maintains an admirable attitude about works of art that have left the museum, or are destined to leave. The works are leaving the institution, but not secretly. The items

listed in the database include all pertinent object information, such as artist, materials, credit line, as well as a brief reason for deaccessioning, the method of transfer (such as the name of the auction house and upcoming auction date), and the estimated value of the object. Some of the objects have links to newly acquired works of art, showing the direct link between the sale of a deaccessioned item and the object the funds from the sale helped to purchase. The IMA's use of funds from these sales is within the clearly defined limitations of the codes of ethics from the American Association of Museums (2000), and the Association of Art Museum Directors (2001a). IMA is a member of both professional associations.

Immediate reactions from art and culture blogs varied greatly. Rosenbaum's 2009 blog entry suggested an attitude of outright elation. Rosenbaum (2009) went on to assert, "This should become the Association of Art Museum Directors' new gold standard for deaccession transparency."

Another positive reaction came from Green (2009), who was impressed by the museum's use of the database as a tool to increase museum-public transparency. "This web-feature isn't a nice thing. For art museums that deaccess -- or might -- it should be an imperative thing." He viewed the database as a means through which IMA can clearly associate deaccessioning with refining and building a collection.

However, not all people from the American blogosphere reacted positively. Donn Zaretsky (2009) was not nearly so enthusiastic or supportive, decrying the database as the museum's very public betrayal of trust: "The Indianapolis Museum of Art has put up a searchable database of all the works it held "in trust" for the public… until it decided to sell them."

In general Whitting-Looze (2010) believes "IMA's database of deaccessioned objects is an amazing example of transparency that should be developed as a model for other museums around the country." IMA's use of technology works toward resolving issues about transparency, and includes an important element of the dialogue with the community (locally as well as worldwide). Although confusion or bitterness will certainly continue as the museum publicly engages with their stakeholders over this new level of deaccessioning transparency the general step has been done in a proper way to answer some of the legal and moral problems commonly associated with deaccessioning.

2.3.3   Deaccessioning – Legal and Moral Problems

Whenever an art museum chooses to deaccession an artwork, whether to pay for general expenses or not, there are many considerations it should carefully consider.

The art museum's legal standing and reputation are at stake when making such a decision.

The first legal consideration a museum must take into account is whether an object has any restrictions previously mandated by its donor. These restrictions could include many different provisions, such as having a collection that must be shown together, that objects cannot be loaned, and (which is most important) that an object cannot be deaccessioned. In order for a museum to break charitable gift terms, it can petition the court to use the *cy pres* doctrine, which allows certain rules on charitable gift to be violated. However, this ruling is a difficult one to obtain as courts typically protect the intentions of donors.

Secondly, courts are also interested in whether the fiduciary obligations of museum trustees are being upheld. These obligations are often confusing yet upholding them should be of particular importance to an art museum. The first fiduciary obligation a board member of an art museum is required under law to exercise is a "duty of loyalty." When considering deaccessioning, an art museum should verify that trustees cannot purchase the works of art that are deaccessioned, and that they do not personally benefit from the object being deaccessioned. Either of these cases could be interpreted as a breach of the duty of loyalty. Furthermore, an art museum's board member must exercise a "duty of care," exercising reasonable care and diligence in the management of the museum's assets. These assets include the collections of the art museum. Finally, the law also cautions art museum trustees about a "duty of obedience," denoting the obligation to focus on a specific mission of the organization. This includes an art museum establishing a collections management policy within the confines of the museum's charter and selecting goals of the art museum in a careful and thought-out manner (cf. Rohner, 2010).

There are very few actual federal or local laws regarding deaccessioning in the U.S. A renowned case of legal intervention in deaccessioning practices is surely the New York case. New York State has a law on deaccessioning under the Board of Regents of The University of the State of New York. This is the only state law in the U.S. on deaccessioning. New York State museums are required to incorporate under Education Law 216, subject to the Board of Regents. In 2006, this Board passed a law stating that a museum must have a collections management policy and funds from deaccessioning are to be used only for the acquisition, preservation, protection or care of collections. In December of 2008, the Board attempted to amend the law to allow deaccessioning to be used to defray debt, but, after an outcry by the museum community, it dropped this provision.

The New York State Board of Regents is currently enforcing 'emergency rules,' which state that museums can only deaccession an item that is not relevant to the

mission of the institution, has failed to retain its identity or has been lost or stolen and not recovered, has duplicates of other items or material in the collection and is not for research or educational purposes, or if the institution is unable to conserve the item or material in a responsible manner (Board of Regents 2009). Beyond the current Board of Regents law, New York State is also currently considering legislative action on deaccessioning. This law would apply to all New York State museums. The proposed bill was supported in the 2009 legislative session by New York State Assemblyman Richard Brodsky and New York State Senate member Jose Serrano. The bill (New York State Assembly, 2009) sought to limit the use of deaccession funds only to "protection and expansion of collections."

An art museum is under the purview of the institution's state Attorney General and must recognize the legal power wielded by the Attorney General when considering deaccessioning. Despite the lack of legislation, Attorney General Offices can bring legal actions against art museum trustees if these offices feel as though the trustees are acting improperly through deaccessioning objects from the collection (Weil, 1990).

Beyond the legal issues, an art museum must also consider the ethics of deaccessioning when deciding whether or not to deaccession. As already noted, The American Association of Museums (AAM) and the Association of Art Museum Directors (AAMD) are two primary U.S. professional membership organizations that enforce guidelines for art museums. AAM accepts membership from all museums and its rules its rules must therefore be broad enough to apply to all of these institutions. AAMD, however, only offers membership to art museums through their directors, and one must be invited to join. Although joining these organizations, and subsequently following the rules set by them, is voluntary, a large amount of pressure exists in the museum world to join and maintain membership. As a result, art museums take these considerations very seriously and try to uphold the policies set by these organizations, including those about deaccessioning.

In addition to the ethical guidelines put forth by professional organizations, it is vitally important that museums consider donors and their intent when reviewing gift agreements. If an art museum decides to move forward with deaccessioning despite a donor's wish that it does not take place, the museum may be accused of unethical behavior, which can damage its reputation with the public. One way in which the museum could attempt to act in a more ethical manner would be to approach a donor or his or her heirs, and ask if a piece were deaccessioned. Of course if a gift agreement contains specific rules about an object or collection that was obtained, those rules must legally be followed until a court ruling states otherwise. In other cases, a donor suggests a preference for, but does not forbid deaccessioning of his or her donated object by a museum. These restrictions are known as precatory and can be broken without legal ramifications (Weil, 1990).

Another ethical consideration is the level of transparency a museum will allow about their process of deaccessioning. It can be very beneficial to an art museum to keep a high level of transparency throughout the process. The public often views museums as repositories for objects in perpetuity, and thus become shocked or upset when they discover that an art museum is deaccessioning a piece from its collection. To help the public understand why a deaccessioning is taking place, it is, therefore, helpful to provide as much information as possible. Rules of AAM state that a museum should consider the effect of deaccessioning on the museum's public relations and should formulate answers to certain questions before going public, to help control the message. Similar, although slightly less restrictive rules hold for the AAMD.

Finally, museums must also consider that, according to some, deaccessioning violates the public trust. The American public (Miller, 1997) "assumes museums accept donations because they believe the work should be preserved in perpetuity for the general good." When this assumption is violated, there can be substantial negative ramifications for an art museum. Such reasons include financial (when a museum deaccessions, many view the process as the U.S. taxpayers losing the benefit of the artwork that they effectively paid for with their tax dollars) and moral (some believe that it is a violation of the public trust to remove an item from the collection and risk its removal from the public sphere, as e.g. those who would like to study the artwork may no longer have the opportunity to do so) reasons.

2.3.4 Economic problems of deaccessioning practices

But, of course, in our thesis the main argument of interest will be an economic one. The main form of deaccessioning that is of concern for economic thinking is deaccessioning as a form of covering museum operation and other expenses. As stated by Rohner (2010), "one benefit of general expense deaccessioning is the budgetary assistance it provides to an art museum." Due to the 2008-2009 economic recession in the U.S., many museums had substantial deficits and were thus cutting hours, programming, and staff, to help offset these financial difficulties. Many believe that it is in the public's best interest to allow general expense deaccessioning to occur in order to obtain funds if a museum is no longer able to serve the public due to a lack of funding (ibid.). American economist O'Hare conducted a valuation of the Art Institute of Chicago' collection, and determined that the Art Institute could endow free admission to the museum in perpetuity by selling less than 1% of its collection, showing the positive effects of a very slight deaccessioning activities. In addition, a museum suffering financially may not be able to care for its collections; furthermore, if a museum would close to the public, bowing to financial pressures, its collections could also be endangered. Finally, with budgetary assistance, art museums could continue to employ staff, which can suffer substantial cuts because of the recession.

There are still further benefits to general expense deaccessioning. One is the ability to continue programming (Rohner, 2010: 56). The professional organization rules for deaccessioning state that funds should be used for acquisitions or care of collections, and do not state that funds can be used for programming expenses. As such, during times of financial difficulty, museums may be forced to cut programming that allows them to connect with the public.

Another benefit that could be gained from practicing general expense deaccessioning is the cost savings in storage and conservation of the sold artwork. An art museum can pay for storage and conservation costs of other pieces from proceeds. Directing funding toward these costs could create substantial savings for an art museum, especially in light of large museum collections which are mostly stored – Rosenbaum (2004) reports that The Museum of Modern Art displays only about one tenth of its 3,500 paintings and sculptures, similar numbers were given in previous studies (e.g. Feld, O'Hare and Schuster 1983). Even lower number is reported by Grampp (1996) who states that The Art Institute of Chicago exhibits only 3 percent of the 300.000 objects in its collection. General expense deaccessioning would not only cut down on the amount of artwork needing storage and conservation, but would provide general operating funds to help defray these costs.

Despite this, general expense deaccessioning can lead to severe negative effects on an art museum including a loss of giving from individuals (as demonstrated by Di Gaetano and Mazza, 2012). Those who consider general expense deaccessioning a proper fundraising tool will wonder why they should give their money to a museum that can simply sell another artwork from storage. Further, an individual who does not consider general deaccessioning appropriate will not want to support a museum that places artwork up for sale during financially difficult times. Still further, donors who would give to a museum that practiced general expense deaccessioning would most likely place stringent restrictions on their gifts in order to verify their artworks could not be deaccessioned for general expenses in the future (Rush, 2009).

An increase in general expense deaccessioning could create legal backlash in the form of legislation against general expense deaccession as exemplified in the so-called Brodsky Bill. If a further increase in general expense deaccessioning occurs within the art museum community, it is reasonable to assume that further legislation would follow.

General expense deaccessioning could also put serious pressure on art museums to capitalize their collections. Despite AAM being against the practice in recent years, there have been efforts by government entities once again to force museums to capitalize collections. If general expense deaccessioning increasingly occurred within

the art museum world, the Financial and Government Accounting Standards Boards may require art museums to capitalize collections in the future. For museums that had already deaccessioned for general expenses, this would mean pressure to sell more of their artworks if the valuation of their collections were publically available.

An art museum that practices general expense deaccessioning may furthermore lose the respect of the community it serves. As stated by Weil a museum that raids its collection for general expenses may need to do so repeatedly, effectively giving the public no reason to support the museum any longer. Furthermore, a particular harsh ramification of a loss of community respect could be a loss of volunteers, which U.S. museums greatly depend on (ibid.: 66).

Art museums that practice general expense deaccessioning will be sanctioned by both the AAM and AAMD, which both have specific rules against this type of activity. For AAM, this means the potential loss of accreditation. Losing these and other benefits could greatly impact an art museum's reputation and financial standing. For AAMD, this would mean punishment of art museums that practice general expense deaccessioning. These sanctions could not only damage the reputation and financial standing of an art museum, but could also mean the cancellation of exhibits, and the programming associated with those exhibitions. Once an art museum undertakes general expense deaccessioning, the pressure to do so at other institutions would also be great. The public will recognize that museums have many objects that they can sell to generate revenue, and, although other institutions may not want to participate in general expense deaccessioning, they may be forced to do so due to a lack of support from the public. Finally, Weil (1990) states that the effect of general expense deaccessioning can provide demand for more programming and an increase in salaries.

At the end two possibly positive or negative effects of general expense deaccessioning (according to Rohner, 2010) have to be noted. Firstly, it could potentially affect an art museum in a negative or positive manner about its accomplishment of its mission. The mission of most art museums, before exhibiting, educating and completing other activities, centers on a collection. If a museum begins selling the objects that constitute its foundation, its mission could be compromised. On the other hand, general expense deaccessioning could allow a museum to regain a solid financial base, and continue completing its mission.

Finally, one last implication of general expense deaccessioning that could result in both positive and negative effects is future scholarship that could take place on an artwork. Many artworks are kept in collections, even if they only sit in storage, in order to avoid the possibility that an artwork would move abroad or become part of a private collection, and thus make it exceptionally difficult to research. However, the

decision to practice general expense deaccessioning is often based on an art museum's financial difficulties, which surely creates a question how good artworks in the collection are being cared for. General expense deaccessioning would therefore not only allow an art museum to pay its general expenses, and allow for conservation of works that are not sold, but it would allow artworks to be transferred to a location where they could be given better care (cf. Rohner, 2010: 71-73).

2.3.5 Deaccessioning in cultural economics

Deaccessioning was probably firstly addressed in cultural economics in an article by John Michael Montias in 1973 (Montias, 1973). As stated by Montias (ibid.): "If art historians are to be consulted on major museum decisions… economists may perhaps be pardoned for butting into a controversy about which they may also feel they have some competence." Montias (ibid.) is also of the opinion that "few economists, if any, would support the view, widespread among academic art historians that museums should desist from selling major works when their directors and trustees believe that such sales would be legal and in the best interest of their institutions."

Key question that interests Montias (ibid.) is "to determine whether a rule barring the sale of major works would cause museum managers to accomplish their mission more efficaciously." The main focus of Montias's article is not on general expense deaccessioning but on deaccessioning with the purpose of buying new works. In most of the article Montias, therefore, reviews different reasons for and against such form of deaccessioning. He explicitly addresses (Montias, 1973):
1) questions of taste and selection of artists to be represented in the collection of the museum;
2) financial resources at disposal of the museum director to build the collection;
3) relation (ratio) of works in reserve to works exhibited;
4) strong feelings of donors to the works they have donated to the museum;
5) privileged tax status given to non-profit museums;
6) no apparent incentives for the museum director to refuse a bequest.

He finally makes a proposal of an auction scheme. His proposal is that every donated work that donors wish to deduct from income taxes should be sold at public auction. After deducting a certain percentage that is paid to the auction house, the sum of auction price of the artwork would be provided to the public institution designated by the donor. If this public institution were also the top bidder for the item, the work would be acquired by it at a net cost equaling the share of the auctioning house in the gross amount of the sales. In this manner according to Montias, the institution that will receive the donation would be able to obtain a work at a nominal price, but the museum could also allow the work to go to another institution that would provide

better use of the acquisition if the receiver of the donation had better options to spend the money (cf. Montias, 1973: 79).

Two articles addressing deaccessioning appeared (in the same book edited by Ginsburgh and Menger) in 1996. Firstly, museum curator Peter Cannon-Brookes notes that in the museum world there is a division between object-based and concept-based institutions. The former (Cannon-Brookes, 1996: 264) "epitomize the traditional role of museums as archives of objects, collected for their information value and conserved, researched and made available for study by the community" while the latter is associated with totalitarian ideas of political education of the public. For the former institutions (which are of greater interest to Cannon-Brookes) the collections are their *raison d'etre* and deaccessioning is liable to compromise their integrity and falsify the record.

On the other hand, in the same book American economist William Grampp makes a "colloquy" about art museums: an imaginary discussion between an economist and museologist. The first one (whom Grampp names as the impartial spectator) firstly accuses museologists of believing that the size of the collection should never be reduced and should if possible be increased continually. He characterises them of being always opposed to deaccessioning. He compares them with a business firm which would regard such practice as unusual to say the least.

In the answer, the "partial spectator" (museologist) defends his view by noting that in some civil law countries (among them countries with important art) the collections of museums and the museums themselves are state property and, therefore, inalienable. The museum, therefore, could not sell anything even if the wished to. He also attributes the existing museum policies on deaccessioning to cultural policy regulations, as well as to aesthetic, historical and scholarly reasons.

In his final answer, the impartial spectator asks the museologist if the museums ever consider the opportunity costs of not repairing (and conserving) the damaged works. A commercial gallery would do that, he says. Furthermore, the arguments about deaccessioning being prohibited by law and cultural policy is not valid, as museums argue in the same manner even in the U.S. (where no such law exists) as well as U.K. (where prohibition is not complete). Finally, the work of art donated to the museum can carry restrictions but they are difficult to enforce.

Grampp ends with reconciliation through the lens of political economy. He finds the main reason for deaccession policies of museum curators in deaccessioning reducing the size of the collection as measured in money while the acquisition is raising such value. One should therefore not be surprised to find those museum professionals are

opposed to net deaccessioning and that they believe the collection should grow (cf. Grampp, 1996).

Some basic reasons for debate on deaccessioning in cultural economics have been summarized in a 1998 article in Journal of Cultural Economics by the Irish economist John W. O'Hagan:

1) Many art museums have trustee status, which protects art works given in trust from being sold to satisfy creditors; however, by preventing the most beneficial allocation and use of available resources, restrictions of the donors can seriously impede attempts of the museum trustees of keeping the museum solvent;

2) Because collections demand space, protection, and maintenance, it seems sensible for the museum with precarious finances to deaccession artworks that are unexhibitable and unwanted;

3) Once allowing deaccessioning the politicians might insist on the sale of further works of art as the quid pro quo of further subsidy (although the opposite is more likely to apply, namely a large public outcry against the use of the money from the sale for anything other than the purchase of more art);

4) The issues concerning the process of deaccessioning: what conditions apply, who decides how it is to be disposed of, and how the proceeds are to be allocated.

An important article has been provided in 2012 by Italian economists Di Gaetano and Mazza (Di Gaetano and Mazza, 2012). The article is probably the first formally modelling the problem of deaccessioning (in the same year an article with formal modelling of deaccessioning by the author of this thesis also appeared and was presented at the ACEI conference in Kyoto, see Srakar, 2012; the articles differ in approach and main research questions: while Di Gaetano and Mazza use game theory modelling to address the problem of lowered donations of private donors in case of deaccessioning, the author of this thesis uses principal agent modeling framework to address the problem of museum management in the presence of deaccessioning).

Di Gaetano and Mazza analyse deaccessioning in a context of uncertainty. In their view, uncertainty about the museum's choice of deaccessioning generates a moral hazard problem that can have relevant effects on the contributions received by the museum, independently from the use of sales' revenue. Firstly, a museum that sells artworks can make private and public funders think that their support is less needed. In this case, the option for a museum to deaccess part of its collection may have a negative impact on public and private funding. Secondly, active deaccessioning also gives a signal that may discourage future bequests from donors who expect their work to stay in the museum's collection. Donations are expected to be motivated by the possibility that they will be enjoyed by the public, eventually in connection to the

identity of the donors. When donors contribute in kind rather than cash, it is expected that they have a special attachment to a specific work or collection that they do not want in the hands of other private collectors (ibid.: 2).

The main results of Di Gaetano and Mazza are (ibid.: 13):
1) When deaccessioning is allowed, this causes a moral hazard problem that may reduce private donations also to those museums which do not sale portion of their collections;
2) Reduction in public grants may benefit museums committed not to deaccess, which contrasts with the common wisdom that budget cuts hurt especially museums that choose to discard the option of selling their collections.

3 MICROECONOMICS OF THE PRINCIPAL-AGENT PROBLEM

3.1 Principal-Agent Problem and Contract Theory – Literature Review

In many situations in economics, one individual may hire a second individual to make some tasks for him. In economics, this is often called a relationship of "principal and agent." Commonly, agent has better information about the exact activities she would prefer to take and/or the characteristics of the environment she works in. For example, a manager in a private company, who works for the owner, frequently knows better than the owner about the amount of effort invested in his work and what are the conditions and changes in the market. The first case, where there are actions of an agent that the principal can not observe, will be referred to as hidden action or moral hazard problem. The second case, where there is information that the agent (or principal) has about the environment are superior to the information of the principal (or agent), will be referred to as hidden information or adverse selection problem. The study of such problems of principal-agent relationships has been an active area of research in microeconomics and industrial organisation theory in recent years (cf. Chen, 2011).

In his analysis of the wages' determination, Adam Smith (1776) recognized the contractual nature of the masters and workers' relationship. He noted the conflicting interests of the players and asserted that the bargaining power was unevenly distributed between them; in general the masters had most of the bargaining power. In the modern language of the theory of incentives, the masters are principals and the workers their agents. Smith as well stressed one of the most basic constraints, namely the participation constraint of the agent that bounds the principal's demands of effort from the agent. Smith didn't have an image of economic actors as necessarily

maximizing their long-run utility; he worried about the consequences of high-power incentives for short-run maximizers. He also criticised sharecropping as an agricultural practice which brings serious problems for incentives in the lack of investments of tenants in the land and the misusage of proprietor's instruments of husbandry. The analysis of sharecropping has been the departure point of a main part of agricultural economics' literature and economic theory which tried to understand the main features of contracts in sharecropping. Referring to Smith and Johnson, economists considered sharecropping as a hurtful practice to the whole society, an apparent failure of the invisible hand that should be discouraged by taxation or improved by adequate sharing of variable factors. A better understanding of the problem was finally achieved when the economists reconsidered and located the problem in the principal-agent theory' context (see e.g. Stiglitz, 1974).

Chester Barnard, an American business executive, can be credited as the figure who attempted to define a general theory of incentives in the theory of management for the first time, in his notable book The Functions of the Executive (Barnard, 1938). He had a broad view of incentives, including what we would now call nonmonetary and monetary incentives. He particularly stressed the ineffective material incentives, which were at his time almost exclusively considered and analysed by economic theory. Barnard also pointed out the fragile balance of the different types of incentives for success. He was saying that the incomplete contracts and the bounded rationality in the organization require that some managers be given authority for decisions in circumstances not addressed specifically by the contracts. A few decades later, Arrow (1963) introduced into the management literature the idea of moral hazard, which was originally based on insurance theory. This work was further extended by Wilson (1968) and Ross (1973), who redefined and explicitly named it as an agency problem. Williamson (1975) followed Barnard to develop his transaction costs theory for the case of symmetric and non-verifiable information between two players. Finally, Grossman and Hart (1986) presented the mathematical modelling of this paradigm, which led to the large body of literature on incomplete contracts in recent years.

Economics of contracts was born in the 1970s from a two-fold movement of dissatisfaction with Walrasian market theory (Brousseau and Glachant, 2002):
   1) Firstly, on the level of theory, the authors sought for new analytical tools to explain how the agents in economics determine the prices, properties and quantities of the resources they are trading. If these agents are subject to significant transaction costs, if they can make use of informational advantages, or if investments of an irreversible nature must be made, then one would expect the deviations from Walrasian equilibrium, i.e. not to see the same goods traded for the same price and under the same regulations as on a Walrasian market. Price theory as well as the analysis of the formation of

economic aggregates was significantly affected by the work of Akerlof, Arrow, Stiglitz and others.

2) Secondly, on the level of empirics, problems related to the competition regulation on the markets brought a significant change in economic thinking. The analysis of specific types of inter-firm contracts (long-term cooperation agreements, selective distributorship agreements, etc.), was rethought. Previously taken into account as acting against competition the welfare benefits of such arrangements have been ignored. Demsetz, Williamson, Baron, Laffont and others refocused the approach to such "regulation" issues.

Contracts allow us to study and give an new perspective to several economic problems (ibid.: 5):

1) The contract theory allows re-examining the precise nature of problems related to economic coordination, while, on the other hand, broadening our understanding of the basis of the functioning of coordination mechanisms.

2) It reveals the specifics of coordination provisions: incentives, routines, means of coercion, conflict resolution, the authority principle, etc.

3) It sheds light on the means of the agents to conceptualize the decision-making structures and rules that frame their behavior.

4) Study of the evolution of the mechanism of contracts helps to understand changes in the structures that shape the economic activity.

According to Brousseau and Glachant, the development of contract theory can be broadly classified in four main strands: 1) the origins; 2) incentive theory; 3) incomplete contract theory; and 4) transaction costs theory. We will firstly present the origins of the contract theory and then shortly each one of the main strands.

Part of the origins of contract theory were provided by the work of Nobel laureate Kenneth Arrow on the functioning of insurance markets (Arrow, 1971) and another Nobel Laureate George Akerlof (1970) on the famous "lemons" market, i.e. market for used automobiles. This work has led to the so-called theory of incomplete information. Questioning the assumption that all players on the market have equal access to (symmetrical) information, the authors have drawn focus on the consequences of one individual player having an informational advantage. They also emphasized the importance of implementing mechanisms of disclosure to limit the ability of the informed players to take advantage of the under-informed ones.

In the 1930s, other foundations of modern theory of contracts were laid. Chicago economist Ronald Coase was the first to stress the idea that the existence of costs of coordination on the market justifies resorting to various mechanisms of coordination in a decentralized economy, particularly the hierarchical coordination within firms (Coase, 1937). Forty years later, this analysis was expanded by Oliver Williamson.

But Coase was not the only one having influence on Williamson. The latter's early work in the 1960s represented the behaviourist school, along with March and Cyert (Cyert and March, 1963). Here the descendants of theories of the firm can be found, whose formulation began in the 1930s, but their full development occurred primarily in the 1950s. Behaviourist and managerial approaches to the firm (from Berle and Means, 1932 to Simon, 1947) and the problems related to their development (Machlup, 1967), allowed significant advances in the understanding of non-price coordination. Starting in the 1970s, most of these advances were reconsidered by economists interested in the features of institutional, organizational and contractual mechanisms of coordination.

There was another school having an influence on contemporary theory of contracts: property rights theory (Alchian, 1961; Demsetz, 1967; Furubotn and Pejovich, 1974). To a certain extent, Coase laid also the foundations for this approach with his analysis of the externalities' problem (Coase, 1960), bringing to light the implications of definitions of property-rights for efficiency issues. His contribution then merged with developments from other economist of the Chicago school. For example, analysis of alternate property-rights systems demonstrated that the assignment of residual rights (i.e. the right to determine the use of resources and to appropriate the resulting income) may motivate an efficient use of resources. This approach provided essential elements of contract theory and the theory of the firm (Alchian and Demsetz, 1972; Klein, Crawford and Alchian, 1978). With certain types of relational arrangements, only proper allocation of property rights can resolve the propensity of economic agents to be opportunistic. Finally, we can not ignore the contributions of other disciplines. Economic analysis of the law has been focused on specific aspects of relationships of contracts. Also, economic theories of non-market coordination were significantly influenced by developments in management, social psychology and sociology, history of organisations and administrative sciences as demonstrated by the numerous references to Simon, Chandler and Barnard (Barnard, 1938; Simon, 1947; Chandler, 1962). As for the institutional economics that develops an analysis of the role of the institutional environment on the performance and the design of contracts, its roots can be traced in the political science, history and ethnology (North, 1990; Eggertsson, 1990).

Arising from these predecessors, three schools are predominant in the field of economics of contracts today: incentive theory, incomplete-contract theory, and transaction-costs theory. They can be separated by differences in their underlying assumptions and emphasis on different problems.

The first one, incentive theory, draws from several of the traditional hypotheses of Walrasian microeconomic theory. It assumes: a) that economic actors are endowed with so-called Savage rationality (Savage, 1954); b) that they have complete

information regarding the structure of issues they confront along with their unlimited computational abilities; and c) that they possess an ordered and complete preference set.

Incentive theory begins with a stereotyped situation of an under-informed player (principal) putting into place an incentive scheme to motivate the informed player (agent) to either reveal the hidden information ("adverse selection" model) or to accept a behaviour conformable with the principal's interests ("moral hazard" model). The key element of the scheme of incentives is remuneration, which is conditional on signals, resulting from the behaviour of the agent such as the choice of an option from a "menu" of contracts or as the observed result of the effort supplied (when the actual effort is not observable).

The solution to problems of adverse selection relies on the "menu of contracts" that are meant to motivate the self-revelation of private information by the agent. The principal designs a set of possible contracts (i.e. a set of payment schemes linked to various responses by the agent). When the agent is faced with the set of possible options, she decides on the contract maximising her utility function while, on the other hand, allowing the principal to gather her private information. It is, of course, in the principal's interest to obtain agent's revelation in exchange for the minimal possible payment.

The classical problem of moral hazard occurs when at least one significant dimension of the agent's input is unobservable by the principal. Principal can not deduce the actually provided effort of the agent merely from the observed productivity as the productivity of agent depends on numerous different variables which are not under principal's control and are also unobservable to the principal (e.g. co-workers' efforts, the productivity of capital, randomness in the production process, etc.). Optimal payment scheme that solves this dilemma should combine a fixed base pay with a variable bonus conditioned on the observed result. This frequently results in a non-linear payment scheme while on the other hand the solution can be linear, as shown by Hölmstrom and Milgrom (1991).

Many new findings were subsequently included in this analytical framework that significantly extended its reach (see e.g. Salanié, 1997). At the start, the refinements focused on combining the theories of adverse selection and moral hazard. Subsequent extensions consisted of letting informational asymmetry apply to several variables repeating interactions over time, teaming several agents with one principal, etc.
The most recent among the significant developments is probably the theory of incomplete contracts. Its starting purpose was modelling several of Oliver Williamson's original propositions yet subsequent developments significantly broadened its extent and led it in various different directions. It, therefore, examined

the impacts of the institutional framework on the design of contracts, although its roots are somewhere else, namely in the analysis of the effects of allocations of property-rights on the surplus distribution between agents and on the agents' incentives to invest.

The solution of this dilemma of coordination consists of a commitment constraining the range of the negotiations ex-post with the purpose of providing incentives to each party to optimally invest ex-ante. This design assigns an (unilateral) decision right to one of the players to determine the efficient level of ex-post trade, while a (default) option protects the second player by establishing a minimal required level of trade.

Two main families of models were created deriving from this framework. Firstly, represented by the work of Hart and Moore (1988), it was theorized that an efficient investment level is not obtained from the beneficiary of the initial option since this option is insufficiently complex to motivate him to invest at the optimal level. The ex-ante inefficiency, therefore, occurs as the default option is contingent on the state of nature that takes place. The second family is an extension to the work of Aghion, Dewatripont and Rey (1994), who found out that the initial option may provide an incentive for the beneficiary of optimal investment. They also speculate that the judge will be capable of verifying default options of great complexity and that he will oppose any ex-post renegotiation of these provisions.

The theory of transaction costs enables an analysis of how economic agents combine commitment constraints (designed to secure the realization of individual investments) with flexibility constraints (needed due to the impossibility of perfectly forecasting the ex-post optimal modes of coordination).

The theory of transaction costs, therefore, simultaneously deals with the efficiency of adjustments ex-post and is limited to the performance of contracts. Its main features are:

1) It insists on the safeguards, needed to secure each party from the potentially opportunistic behavior on behalf of the other player and provide incentives for the commitment to the transaction. It pronounces the manipulation of the costs of breaking the agreement, using security deposits or irreversible investments, and pronounces also the importance of the length of the commitment;

2) The longer the length of the commitment, the more difficult it becomes to forecast effective future adjustments. It, therefore, becomes important to redefine the obligations of the players over the timing of the performance of the contract. There is here a paradoxical aspect to incompleteness of contracts with respect to the credibility of the commitment, namely since the parties know that ex-post revisions and renegotiations are possible, they feel less

motivated to shirk on their commitments when the contract does not provide them with a satisfactory outcome;

3) Finally, the theory of transaction costs insists on the mechanisms of private conflict resolution. Since the commitments are specific and open-ended, the resolution of conflicts can not be effectively secured by outside authorities. The contracting parties must, therefore, agree beforehand on bilateral procedures of resolving such disagreements.

The findings of the theory of transaction costs have numerous consequences for the theory of contracts. The nature of contractual arrangements is shown to be strongly dependent on the characteristics of the institutional framework. On the other hand, the institutional framework itself cannot be constrained to its public components, e.g. the judiciary and the legal environment. Finally, formal collective institutions are combined with their informal analogs to embody the full complement of significant properties of the institutional framework (North, 1990).

3.2 The Principal-Agent Problem – Relevant concepts

3.2.1 Optimal Employment Contracts without Uncertainty, Hidden Information, or Hidden Actions

Assume the following standard two-sided contracting problem between an employer and his employee:

1) Employee has some initial amount/endowment of time, which he can either keep for himself or sell as labour services to the employer.

2) We can therefore assume that the players' utility functions depend both on the purchasing power of the employee as well as on the allocation of employee time. Let's denote the employer's utility function as $U(l, t)$ with l denoting the quantity of employee time that the employer has acquired and t denoting the quantity of money (or output this money can buy) that the employer has at his disposal. By analogy , employee utility function is $u(l, t)$ where l denotes the time the employee has kept for himself and t denotes the money that he has at his disposal.

3) Assume that the initial endowment of the individuals is $(\hat{l}_1, \hat{t}_1) = (0,1)$ for the employer and $(\hat{l}_2, \hat{t}_2) = (1,0)$ for the employee. This simply means that without any trade, the employer gets no employee time but is assumed to have all the money, while the employee has all of her time for herself but has no money.

Both individuals could decide not to trade, in which case they would each achieve a utility level of $\overline{U} = U(0,1)$ and $\overline{u} = u(1,0)$, respectively. If, on the other hand, both

utility functions are strictly increasing (in both arguments) and concave, then both individuals are able to raise their joint payoff by exchanging labour services l for money (or output).

If we write by l_i the level of employee's time that is actually consumed and by t_i the level of output consumed by each party $i = 1,2$ after the trade takes place, the joint maximization problem for both individuals can be written in the following manner:

$$\max_{l_i, t_i} U(l_1, t_1) + \mu u(l_2, t_2) \qquad (8)$$

subject to aggregate resource constraints:

$$l_1 + l_2 = \hat{l}_1 + \hat{l}_2 = 1 \qquad (9)$$
$$t_1 + t_2 = \hat{t}_1 + \hat{t}_2 = 1 \qquad (10)$$

Here, μ is a multiplier that reflects both the individuals' respective reservation utility levels as well as their relative bargaining strengths.

The first order conditions imply:

$$\frac{U_l}{U_t} = \frac{u_l}{u_t} \qquad (11)$$

We, therefore, achieve joint surplus maximisation when the marginal rates of substitution between money and spare time for both individuals are equal.

From the viewpoint of employee (the agent), the maximisation problem can be expressed as:

$$\max_{l_2, t_2} u(l_2, t_2) \text{ subject to } U(1 - l_2, 1 - t_2) \geq \overline{U} \qquad (12)$$

while the same problem from the viewpoint of the employer (the principal) can be expressed as:

$$\max_{l_1, t_1} U(l_1, t_1) \text{ subject to } u(1 - l_1, 1 - t_1) \geq \overline{u} \qquad (13)$$

3.2.2 Optimal Contracts under Uncertainty

There is one important dimension that is not addressed in the classification of the previous section: uncertainty i.e. (Bolton and Dewatripont, 2006: 7) "the extent, to which employees are insured against economic downturns." The crucial economic

question related to insurance schemes is how much of risks, specific to the firm should be assigned to employers and how much to employees. To be able to analyze this question formally, we must append the framework of the previous section by including uncertainty in the model.0

We will firstly consider the first, most simple setting with uncertainty. Assume that there are only two possible future states of nature, θ_L and θ_H. To be concrete, let θ_L represent an adverse output shock ("recession") and θ_H a good output ("boom"). Presuppose the following endowments for each player in each state of nature:

$$(\hat{t}_{1H}, \hat{t}_{1L}) = (2,1), \quad for\ individual\ 1$$
$$(\hat{t}_{2H}, \hat{t}_{2L}) = (2,1) \quad for\ individual\ 2$$

The variable $\hat{t}_{ij}$, therefore, denotes the endowment of individual i in state of nature θ_j. The aggregate output is greater in boom as compared to the recession, 4 as compared to 2.

Before the realization of the state of nature, each individual has his idiosyncratic preferences over consumption bundles (t_L, t_H) as provided by the utility functions $V(t_L, t_H)$ for the employer and $v(t_L, t_H)$ for the employee.

The individuals are able to raise their ex-ante utility in the manner of coinsuring against economic risk. Nevertheless, some aggregate risk cannot be made insurable: the two players can't do anything to smooth the difference in aggregate endowments between the two states of nature. Still, they can increase their ex-ante utility in the manner of pooling their risks.

Again one obtains the "efficiency coinsurance" formula (11):

$$\frac{V_{tL}}{V_{tH}} = \frac{v_{tL}}{v_{tH}} \qquad (14)$$

To obtain a full characterization of the optimal contracting problem under uncertainty we need to put more structure on this framework and include two further elements in the characterisation of the optimal contract: firstly, a description of ex post utility once the state of nature has been realized, and secondly, the probability of each state occurring. First such framework were provided by von Neumann and Morgenstern in 1944 (von Neumann and Morgenstern, 1944), and this framework is still mostly used for proper specification of the problem.

In their framework the ex-post utility function for the employer and employee and denoted respectively by $U(t)$ and $u(t)$, where both functions are increasing in t.

Furthermore, $p_j \in (0,1)$ denotes the probability of any particular state of nature θ_j taking place.

We can therefore write the two ex-ante utility functions as:

$$V(t_{1L}, t_{1H}) = p_L U(t_{1L}) + p_H U(t_{1H}) \qquad (15)$$
$$v(t_{2L}, t_{2H}) = p_L u(t_{2L}) + p_H u(t_{2H}) \qquad (16)$$

The probability distribution $\{p_j\}$ can be seen as an objective distribution, assumed by both players or as a subjective belief, common to both players. In most economic contracting situations, it is presupposed that all players share common prior beliefs and that the differences in ex-post probability beliefs among the players reflect only the differences in information (Bolton and Dewatripont, 2006: 11).

The "optimal coinsurance" first order conditions can be stated in this case as:

$$\frac{V_{tL}}{V_{tH}} = \frac{p_L}{p_H} \frac{U'(t_{1L})}{U'(t_{1H})} \qquad (17)$$

The marginal rate of substitution between the two commodities, therefore, changes with the probability distribution and is constant along the 45° line, where $t_{1L} = t_{1H}$.

Now phrase this in the framework of two commodities (leisure l and consumption good t) used in the previous section. Let (l_{1L}, t_{1L}) and (l_{1H}, t_{1H}) represent the two different time/output composites of the employer, and (l_{2L}, t_{2L}) and (l_{2H}, t_{2H}) the respective bundles of the employee. Let also $(\hat{l}_{ij}, \hat{t}_{ij})$ denote their respective initial endowments where $i = 1,2; j = L, H$.

The optimal insurance contract agreed by the two individuals can be written in this framework as the solution to the problem of optimal contracts:

$$\max_{l_{ij}, t_{ij}} [p_L U(l_{1L}, t_{1L}) + p_H U(l_{1H}, t_{1H})] \qquad (18)$$

subject to

$$p_L u(l_{2L}, t_{2L}) + p_H u(l_{2H}, t_{2H}) \geq \bar{u} \qquad (19)$$
$$l_{1j} + l_{2j} \leq \hat{l}_{1j} + \hat{l}_{2j} \; for \; j = L, H \qquad (20)$$
$$t_{1j} + t_{2j} \leq \hat{t}_{1j} + \hat{t}_{2j} \; for \; j = L, H \qquad (21)$$

where:

$$\bar{u} = p_L u\left(\hat{l}_{2L}, \hat{t}_{2L}\right) + p_H u\left(\hat{l}_{2H}, \hat{t}_{2H}\right) \qquad (22)$$

If both $U(\cdot)$ and $u(\cdot)$ are strictly concave, then both individuals are risk averse and want to share risk. On the other hand, if both $U(\cdot)$ and $u(\cdot)$ are strictly convex, then both individuals are risk loving and desire to trade risks with each other.

The usual first order conditions are in this case:

$$\frac{U_l(l_{1j}, t_{1j})}{U_t(l_{1j}, t_{1j})} = \frac{u_l(l_{2j}, t_{2j})}{u_t(l_{2j}, t_{2j})} \qquad (23)$$

$$\frac{U_l(l_{1j}, t_{1j})}{u_l(l_{2j}, t_{2j})} \ constant \ across \ \theta_j's \qquad (24)$$

$$\frac{U_t(l_{1j}, t_{1j})}{u_t(l_{2j}, t_{2j})} \ constant \ across \ \theta_j's \qquad (25)$$

While condition (23) is a commonly known condition for the ex-post efficient trade (denoting that efficiency ex-ante is attained if and only if the contract is ex-post efficient as well), conditions (24) and (25) are again connected with optimal coinsurance. Condition (25) is sometimes named as the "Borch rule," denoting that optimal coinsurance demands the equalization of the ratio of marginal utilities of money across all states.

Optimal contracts under uncertainty, therefore, result in perfect insurance for the employee against risk only if the employer is risk-neutral. On the other hand, in general, when both employer and employee are risk-averse they will optimally divide the shares of business risk.

3.2.3 Asymmetric information – adverse selection

The discussion in previous section implies that even in the optimal environments for contracting it is improbable that all employees will be completely insured for business risks, which is simply a consequence of the equilibrium price of such insurance being too high if the employers would also be to risk.

A second important cause that employees are probable to get only bounded insurance is that they also need to have sufficient incentives for working (relationship between incentives and risk is an open question in contract theory, being perhaps explained in a most sufficient manner by Prendergast (2002)). There are two general types of incentive problems related to this question. First is called "the hidden-information problem" while the second is called "the hidden-action problem".

The first problem is associated with a situation where the agent (employee) can have private information about her unwillingness or inability of performing certain activities. Therefore, information about some crucial characteristics of the agent/employee (her unwillingness to perform certain tasks, her amount of competence) is hidden from the principal/ employer. On the other hand, the second problem is associated with situations where the principal/employer cann't see what the agent/employee is doing – whether he is working or not, how hard is he working, and so on. In such situations the agent's/employee's actions are hidden from the principal/employer. First problem is commonly called the *adverse selection problem* and second one the *moral hazard problem*. In the case of adverse selection we speak about "screening problems" where the player offering the contract is the uninformed player, and therefore must try to screen all different pieces of information the informed player has; and about "signalling problems", where the informed player offers the contract and may also try to signal to the other player his information through the type of contract it offers (or other activities).

To illustrate the contracting problem with hidden information we will use the previous problem of optimal contracts with uncertainty, with private information known only to an employee. Define the utility functions for employer and employee as follows (the employee time and output enter additively in both functions): $U[\alpha\theta(1-l)-t]$ is the utility function for the employer and $u(\theta l + t)$ is the utility function for the employee, where:

$(1-l)$ is employee's time provided to the employer, and l is the time employee maintains for herself;

t is the transfer of output from the employer to the employee;

α is a positive constant;

θ measures the unit value of time or the skill level of the employee.

The variable θ describes the given state of nature and is taken into account privately by the agent/employee before signing and confiring a contract. The agent/employee therefore knows whether she is skilled, with a provided value of time θ_H, or unskilled, with a provided value of time $\theta_L < \theta_H$. The principal/employer on the other hand is familiar only with the probability of facing a skilled agent/employee, amounting to p_H.

We assume that the relevant reservation utilities of an employee when the employer faces a skilled vs. an unskilled employee are $\bar{u}_H = u(\theta_H)$ and $\bar{u}_L = u(\theta_L)$. We also assume $\alpha > 1$ which means that the employee's time is more efficient when sold to the employer.

If the employer would therefore be able to get familiar with the agent's/employee's type, he would merely offer in state of nature θ_j a contract with a transfer $t_j = \theta_j$ in exchange for all the employee's working time (meaning that $1 - l_j = 1$). Such an offered contract would maximize the efficiency of production, and because the agent's/employee's individual rationality constraint would be binding in this contract, it would also maximize the principal's/employer's payoff.

On the other hand, when the information about agent's/employee's productivity is private, the principal/employer wouldn't be able to achieve the same payoff, because when the employer offers a contract $t_j = \theta_j$ in exchange for one unit of working time, all employee types would respond by pretending to be skilled to get the higher wage θ_H. Note that the assumption on the employee type being truly private information is the same as assuming that the employee's output is unobservable. Assumptions connected with the nonobservability of output are therefore needed in the problems of contracting with hidden information.

A further characteristic of optimal contracting problems in presence of asymmetric information is the condition of incentive compatibility. When having multiple types of agents (or principals), the revelation principle tells us that each contract has to be incentive compatible i.e. of the form that agent of a specific type has to prefer that type of contract to any other contract. That is, type θ_H must prefer contract (t_H, l_H) over (t_L, l_L), and type θ_L contract (t_L, l_L) over (t_H, l_H).

The optimal menu of employment contract can therefore be best represented by solution to the following optimisation problem:

$$\max_{(l_j, t_j)} \{ p_L U[\alpha\theta_L(1 - l_L) - t_L] + p_H U[\alpha\theta_H(1 - l_H) - t_H] \qquad (26)$$

subject to two individual rationality constraints:

$$u(l_L\theta_L + t_L) \geq u(\theta_L) \qquad (27)$$
$$u(l_H\theta_H + t_H) \geq u(\theta_H) \qquad (28)$$

and two incentive compatibility constraints:

$$u(l_H\theta_H + t_H) \geq u(l_L\theta_H + t_L) \qquad (29)$$
$$u(l_L\theta_L + t_L) \geq u(l_H\theta_L + t_H) \qquad (30)$$

The solution to above constrained optimization problem will result in the optimal (most efficient) contracts under hidden information. It can be seen from the problem that inclusion of incentive constraints will generally result in worse (less efficient)

allocations than under full information. We usually denote such solutions as second-best as compared to first-best solution of the complete-information optimisation problem.

3.2.4   Asymmetric information – moral hazard

Contrary to most hidden information (adverse selection) problems, situations of contracting with hidden actions include informational asymmetries that arise only after signing of the contract. In such problems, the agent/employee is not requested to decide for an option from a menu of contracts, but from a menu of action-reward pairs.

Problems of contracting with hidden actions include an incentive problem, long known as moral hazard: when an agent (e.g. an insuree) receives financial (or some other) coverage against a negative event from a principal (e.g. an insurer) she will be likely less careful to avoid the negative outcome against which she is insured. This response to improved insurance comes out in almost any insurance situation, whether in fire, flood, theft, health, or automobile insurance. The insurers commonly deal with moral hazard by charging proportionally greater amount for greater coverage and in this way inducing the insuree to exchange the benefits of improved insurance against the incentive cost of a greater occurrence of negative outcomes. Similar problems commonly come about in relationships of employment: if a given employee's job tenure and payment are protected against the risk of bad salary, she will invest less effort to avoid such outcomes. Employers frequently respond to moral hazard on the job by rewarding (through piece rates, efficiency wages, bonus payments, stock options, etc.) work done well and/or punishing work not done well (through layoffs).

To include hidden actions into the previous contracting problem with uncertainty, presuppose that the amount of time $1 - l$ worked by the agent/employee is private information (i.e. hidden action). In addition, suppose that the employee chooses action $(1 - l)$ before the state of nature θ_j is realized and that such action influences the probability of the state of nature: when the agent/employee chooses action $(1 - l)$, output for the principal/employer is simply θ_H with a probability function $p_H[1 - l]$, increasing in $(1 - l)$ (and θ_L with a probability function $p_L[1 - l] = 1 - p_H[1 - l]$).

It is not guaranteed that more effort will bring higher output since a bad state of nature θ_L may still occur. If the output would increase deterministically with effort then unobservability of effort would not be important because the supply of agent's (hidden) effort could then be perfectly inferred from the observed output.

Since effort $(1 - l)$ is not observable, agent can only be compensated on the basis of realized output θ_j. Principal/employer is, therefore, restricted to offering a compensation contract $t(\theta_j)$ to the agent/employee. Therefore he can now make only a guess that the level of effort chosen by the agent/employee is the outcome of the agent's own optimization problem:

$$(1 - l) \in \underset{l}{\text{argmax}}\{p_L[1 - l]u[t(\theta_L) + l] + p_H u[1 - l]u[t(\theta_H) + l]\} \qquad (31)$$

Therefore, when the principal/employer chooses his optimal compensation contract $\{t(\theta_j)\}$ to maximize the expected utility function, he must verify that it is in the agent's/employee's interest to supply the optimal level of effort $(1 - l)$. The employer therefore solves the following optimisation problem:

$$\underset{t(\theta_j)}{\max}\{p_L[1 - l]U[\theta_L - t(\theta_L)] + p_H[1 - l]U[\theta_H - t(\theta_H)]\} \qquad (32)$$

subject to:

$$p_L[1 - l]u[t(\theta_L) + l] + p_H[1 - l]u[t(\theta_H) + l] \geq \bar{u} = u(1) \qquad (33)$$

and

$$(1 - l) \in \underset{l}{\text{argmax}}\{p_L[1 - l]u[t(\theta_L) + l] + p_H[1 - l]u[t(\theta_H) + l]\} \qquad (34)$$

It is not a trivial matter in general to determine a solution to the employer's problem with both constraints. Efficient trade-off between insurance and incentives includes rewarding the agent greatly for the outcomes that are most probable to arise when he invests the required level of effort and punishing him greatly for outcomes that are most probable to occur when he shirks. This can give rise to rather complex compensation contracts in general (often more complex than what we see in reality). However, there exists one situation where the solution to this problem is trivial: when the agent is risk neutral. In this case, it is optimal to have the agent bear all the output risk to maximize her incentives for the provision of optimal effort. When an employee is, therefore, risk neutral, she should fully insure the employer.

3.2.5 Optimal contracting with multilateral asymmetric information

In practice, there are many situations where several contracting parties may possess relevant private information or be called to take hidden actions. A basic question of interest, therefore, is whether and how the theory of contracting with one-sided private information extends to multilateral settings if we, therefore, have presence of

multiple agents or multiple principals. There is one fundamental difference in this case. While in the case of single-sided private information the design of contracts problem reduces to the problem of control of the informed player's response, in the case of multilateral, private information the design of contracts problem becomes one of control of the strategic behavior of multiple players interacting among each other. The contract design problem, therefore, becomes a problem of game theory, namely of designing a game with incomplete information.

Probably the most widely studied and important problem of contracting with multilateral hidden information is design of the auctions with multiple bidders, where each bidder has his/her own private information on the value of objects that are provided for auction.

Often encountered contracting situations in firms and organisations are when several parties take hidden actions (e.g. rank-order tournaments). This problem has been so important that some prominent economic theorists of the firm like Alchian and Demsetz (1972) or Jensen and Meckling (1976) were arguing that the resolution of moral-hazard-in-teams problems (characterized by several agents taking complementary hidden actions) is the firm's raison d'etre. In our previously analysed employment problem with two employees and individual outputs able to be observed, the principal/employer may be able to improve on the incentives with a smaller exposure to risk to both employees by founding the compensation on how well they perform compared to each other. Such possibility can be one reason managers in firms like to provide incentives to their employees through schemes of promotion, hiring only better employees to better paying and rewarding jobs. The cause why the evaluation of relative performance can improve incentives lies in the employees when being exposed to the same exogenous shocks, it is possible to protect them from these risks by separating the common shock from their measure of performance.

When we need to monitor a large number of employees, it is not credible to think that single employer can effectively monitor all employees. In such case, we require multiple supervisors, and someone will have to supervise the supervisors. By, therefore, specifying the span of control of any supervisor and the loss of control when adding more tiers of supervisors, we can simultaneously develop a simple theory of the optimal size of the firm and the optimal firm's internal hierarchical organisation.

3.2.6 The dynamics of incentive contracting

Many if not most relations of contracting are in practice long term or repeated. There is methodologically no significant change when analyzing optimal multiperiod contracts so long as the parties in contracting parties are able to commit to a single

long-term contract at the initial stage of negotiations. On the other hand, when the parties in contracts are permitted to renegotiate the initial contract as new information in available and time is passing the basic methodology of optimal static contracting needs to be adapted. Incentive constraints have to be replaced by tighter renegotiation-proof constraints in this case.

Considering problems of hidden information (adverse selection), there exist two basic long-term contracting problems: the first, when the informed player's type doesn't change over time and the second one when a new type is drawn in each period. In the first problem, the main new conceptual issue that has to be addressed is related to adapting and learning and gradually reducing the informed party's informational advantage over time. The second problem is conceptually closer to the static contracting problem, as information asymmetries between the two players in contracting remain stationary. The main economic question in such class of problems relates to the trade-off among within-period and intertemporal allocative efficiency or insurance.

There can be no improvements from contracting in a single contracting relation because the informed player will always claim to have a low realization of income with the aim to receive insurance compensation. In a twice-repeated contracting, there can be substantial gains from contracting because, in a relation that is repeated, greater insurance against shocks in income within the first period can be exchanged against better intertemporal consumption' allocation. A key result in the literature is that lending and borrowing in a competitive debt market will provide inefficiently low amount of insurance. Optimal long-term incentive-compatible contracts would therefore provide more within-period insurance from low-income shocks (see e.g. Townsend, 1982).

3.2.7   Incomplete contracts theory

In practice most long-term contracts are incomplete as they are unable to deal explicitly with all possible contingencies and, therefore, leave many transactions and decisions for later determination. When we are dealing with incomplete contracts, many transactions and decisions have to be determined by the contracting parties only at a later stage. There, therefore, naturally arises a question on who makes these decisions. First formal mathematical model of the problem of incomplete contracts done by Simon (1951) analyses a fundamental aspect of the employment relation so far not considered: the relation of authority between the principal/employer and agent/employee. In practice, most employment contracts are able to define the duties of the employee only in very broad terms and leave the future determination of specific activities and tasks of the employee to the discretion of the employer. Simon views the decision among two transaction models as a comparison between two long-

term contracts: a "sales contract" where the provided service is specified precisely in a contract and "employment contract" where the provided service is assigned to the discretion of the employer with some specific contractually written limits. The employment contract is the preferred one when the principal/employer is very uncertain about which service he prefers at the contracting time and when the agent/employee is indifferent or almost indifferent to the different tasks the principal/employer can choose from.

That the presence of relation-specific investments makes the need for exchange modes other than trade in spot markets has been emphasized in works of Oliver Williamson (1975; 1979; 1985). In a key article that builds on his work, Sanford Grossman and Oliver Hart (1986) developed a theory and model of ownership rights based on the residual rights of control. The firm according to their definition is an assets' collection owned by a common owner having residual rights of control over the assets' usage. A key novelty of their article is that assets' ownership serves as an insurance against future holdups by other contracting partners and may therefore provide stronger incentives for relation-specific investments made ex-ante. Grossman and Hart are in this manner able to provide a formal theory of benefits and costs of integration and the boundaries of the firm.

3.3 Agency costs of free cash flow – literature review

While the literature in economics before 1970's was full of references to the theory of the firm, there was virtually no real *theory* of the firm, as stated in a landmark article by Jensen and Meckling (1976). The firm was viewed (ibid.: 3)"as a "black box" operated so as to meet the relevant marginal conditions with respect to inputs and outputs, thereby maximizing profits, or more accurately, the present value." There was however no theory taking into account the conflicting objectives of the individual participants brought into equilibrium so as to yield the maximisation objective.

In the mentioned article, Jensen and Meckling introduced an important concept of agency costs, a sort of "friction" in the abstract world of markets. Agency relationship was defined by Jensen and Meckling as (ibid.) "a contract, under which one or more persons (the principal/s) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to an agent". If both parties to the relationship are utility maximisers, there is according to Jensen and Meckling a good reason to believe that the agent will not always act in the best interests of the principal (ibid.: 5). On one hand, the principal can limit distortions from his interest by establishing appropriate incentives for the agent and by accepting the monitoring costs to limit the distortive activities of the agent. The agent, on the other hand, may find it worthwhile to expend resources (so-called bonding costs) to guarantee that he will not take certain actions that would harm the

principal or to ensure that the principal will be compensated if he does take such actions. In both cases, it can be impossible for both parties to ensure that the agent with make optimal decisions from the principal's viewpoint at zero costs.

Jensen and Meckling therefore define agency costs as the sum of three components (ibid.: 6):

1) The monitoring expenditures by the principal;
2) The bonding expenditures by the agent;
3) The residual loss.

Jensen and Meckling (ibid.: 6-7) also point to generality of the concept of agency costs: "It exists in all organizations and all cooperative efforts – at every level of management in firms, in universities, in mutual companies, in cooperatives, in governmental authorities and bureaus, in unions, and in relationships normally classified as agency relationships such as those common in the performing arts and the market for real estate." Agency costs can also be viewed as a special case of transaction costs concept as defined in works by Oliver Williamson (1964; 1970; 1975).

While Jensen and Meckling pointed to concrete cases of agency costs (agency costs of outside equity, agency costs of debt), in another landmark article from 1986, Michael Jensen went further and introduced a discussion about the agency costs of free cash flow in manager's hands, which is a concept extremely relevant for our discussion.

The debate was started by another author, Frank H. Easterbrook, in 1984, discussing agency costs explanation of dividends (Easterbrook, 1984). According to Easterbrook, dividends can be useful in narrowing discretion possibilities of managers (i.e. the agents) in spending free cash resources of the firm. According to him (ibid.: 658), "such an explanation offers a hope of understanding why firms simultaneously pay out dividends and raise new funds in the capital market."

A bit more general discussion has been introduced in the mentioned landmark article by Jensen (Jensen, 1986). According to him (ibid.: 323), "The payout of cash to shareholders creates major conflicts that have received little attention. Payouts to shareholders reduce the resources under managers' control, thereby reducing managers' power, and making it more likely they will incur the monitoring of the capital markets which occurs when the firm must obtain new capital."

Free cash flow is defined by Jensen (ibid.) as: "…cash flow in excess of that required to fund all projects that have positive net present values when discounted at the relevant cost of capital. Conflicts of interest between shareholders and managers over

payout policies are especially severe when the organization generates substantial free cash flow. The problem is how to motivate managers to disgorge the cash rather than investing it at below the cost of capital or wasting it on organization inefficiencies."

According to Jensen, managers have incentives to cause their firms to grow beyond the optimal size. Growth increases managers' power by increasing the resources under their control. It is also associated with increases in managers' compensation, because changes in compensation are positively related to the growth in sales. There are, therefore, two main reasons for costs of agency in the presence of excess free cash flow: 1) the managers may use free cash flow to raise the level of their perquisites; 2) the managers may use free cash flow to invest in projects with negative net present value.

A surprising mechanism to lower the agency costs of free cash flow can be either debt, according to Jensen, or dividends, according to Easterbrook. As noted by Easterbrook (Easterbrook, 1984), "managers with substantial free cash flow can increase dividends or repurchase stock and thereby pay out current cash that would otherwise be invested in low-return projects or wasted. This leaves managers with control over the use of future free cash flows, but they can promise to pay out future cash flows by announcing a "permanent" increase in the dividend. Such promises are weak because dividends can be reduced in the future."

On the other hand, debt creation enables managers effectively to bond their promise to pay out future cash flows. By exchanging debt in exchange for stock, managers of the firms are constraining their commitment to pay out the cash flows in future, in a way that cannot be made by simple increases of dividends. By doing so, they provide to the shareholder recipients of the debt the right to take the firm into court if they don't hold on to their promise to make the interest payments. Therefore, the debt can reduce the agency costs of free cash flow by constraining the cash flow available for spending at the managers'discretion.

Jensen also gave a number of examples to demonstrate his conjecture, among them petroleum companies in the early 1980s which experienced large cash flows which dissipated incentives for optimal monitoring. This dissipation of incentives led to excessive drilling and wasteful investments in other areas. Corporate debt, whether the result of the purchase of another firm or stock repurchase plans, served as the device limiting the discretionary power of managers (Jensen, 1986).

Jensen's and Easterbrook's conjecture has given rise to numerous research studies. Already in 1982, Rozeff analysed dividend policies of companies and found rationalisation for optimal dividend payout by appealing to two market imperfections, the agency costs of external financing and the transaction cost associated with issuing

external finance. Rozeff argued that increased dividends relative to earnings lower agency costs but raise the transactions costs of external financing. The sum of these two opposing costs determines an optimal dividend payout. In an empirical test Rozeff showed that the dividend payout is a significantly negative function of the firm's past and expected future growth rate of sales, significantly negative function of its beta coefficient, significantly negative function of the percentage stock held by insiders, and significantly positive function of the firm's number of common stockholders (Rozeff, 1982).

In his article in 1988, Griffin explored the relationship between cash flow and the resulting level of exploration investment in the case of the petroleum industry. His findings indicated considerable support for the free cash flow model. As stated by Griffin (1988), "exploration expenditures appear guided by neoclassical future profitability considerations, but at the margin, cash flow affects the status of individual projects." While exploration expenditures with respect to cash flow were showed to be inelastic, agency costs alone appeared insufficient to explain the increase in market values for several analysed mergers. Griffin was, therefore, not able to rule out the possibility that other explanations such as the traditional finance explanation based on the lower cost of debt capital were also playing a strong independent role (ibid.).

Crutchley and Hansen presented an empirical test of agency costs of free cash flow conjecture in 1989 (Crutchley and Hansen, 1989). Their study examined corporate leverage and dividend policies, and because the role of managers' common stock ownership was central to the Jensens and Meckling's agency theory, the study of Crutchley and Hansen also examined managers' common stock ownership behaviour. Their findings supported the agency theory explanation of how corporate managers determine their common-stock ownership, corporate-debt levels, and corporate dividends while furthermore showed that managerial common stock ownership is inversely related to the degree of common stock diversification. The results of their study also indicated that managers substitute between levels of the three policies, taking advantage of the benefit-cost tradeoffs between the policies, in a way that reduced agency costs. The findings were, therefore, generally consistent with the conclusion that ownership, leverage, and dividends are chosen in tandem by managers to control agency costs (Crutchley and Hansen, 1989).

Morck, Shleifer and Vishny in a 1990' article tried to answer to the question on whether the managerial objectives drive bad acquisitions (Morck, Shleifer and Vishny, 1990). They found on a sample of 326 US acquisitions between 1975 and 1987 that three types of acquisitions had systematically lower, and predominantly negative announcement period returns to bidding firms, namely 1) when the firm diversified; 2) when it bought a rapidly growing target; and 3) when its managers

performed badly before the acquisition. Results of their study, therefore, confirmed that managerial objectives drove acquisitions that reduced bidding firms' values.

Lang, Stulz and Walkling presented a test of free cash flow hypothesis in an article in 1991 (Lang, Stulz and Walkling, 1991). They developed a measure of free cash flow tat uses Tobin's q measure to distinguish between firms having good investment opportunities and others. In a sample of successful tenders, returns of the bidder were significantly and negatively related to cash flow for low q bidders while not for high q bidders and the relation between bidder returns and cash flow differed significantly for low q and high q bidders. This result held under significant number of robustness checks (ibid.).

Another test of free cash flow theory was presented by Mann and Sicherman in 1991 (Mann and Sicherman, 1991). They posited that shareholders do expect the misuse of free cash flow funds but condition their reactions to equity issue announcements on the basis of management's reputation for misusing free cash flow. They presented evidence that shareholders do condition their responses on prior acquisition activity, and furthermore, showed that shareholder reactions were consistent with the predictions of the theory of agency costs of free cash flow. Furthermore, they found that the bonding of cash flows through debt issues mitigates, at least partially, the concerns of shareholders about the misuse of funds (ibid.), which is perfectly in line with original Jensen's and Easterbrook's conjecture.

In another article, Opler and Titman analysed the free cash flow as a determinant of leveraged buyouts (Opler and Titman, 1993). Their paper investigated the determinants of leveraged buyout (LBO) by comparing organisations with the implemented LBOs to those without. Consistent with the free cash flow theory, they found that firms with LBOs are characterized by having a combination of unfavorable investment opportunities (low Tobin's q) and relatively high cash flow (ibid.). This is again consistent with Jensen's original article.

In the same year an article by Philip A. Gibbs sought to estimate the relative importance of free cash flow, takeover threat and corporate governance characteristics in determining portfolio and financial restructuring. His results supported the hypothesis that portfolio and financial restructuring were motivated, at least partly, by agency costs. Decomposition of variances demonstrated that restructuring can be equally explained by free cash flow and the interaction of governance and takeover threat with free cash flow (Gibbs, 1993).

Another article by Agrawal and Narayanan (Agrawal and Narayanan, 1994) found support for the hypothesis of Jensen that debt and dividends are substitutes for controlling the agency costs of free cash flow. The authors concluded that dividend

ratios of payout of a sample of all-equity firms were much higher than those of the control group of levered firms. Further, within the group of all-equity firms, firms with lower managerial holdings had higher ratios of payout. These results persisted even after controlling for the growth rates and free cash flow effects. The evidence by the authors, therefore, shows that managerial ownership and dividends are substitute mechanisms for reducing the agency costs in all-equity firms (ibid.).

The paper by Brush, Bromiley and Hendrickx (2000) investigated the hypothesis that sales growth in firms with free cash flow and with no strong governance was smaller than sales growth for firms with no free cash flow, and also tested whether strong governance conditions improved the performance of firms with free cash flow and limited the investments in unprofitable sales growth. Consistent with theories of Jensen, Easterbrook and Meckling, the article found support for the finding that firms with free cash flow gain less from sales growth than firms with no free cash flow. The effect of different governance conditions was not so uniform: firms that had substantial management stock ownership did not have a strong influence of free cash flow on the performance, even after allowing higher sales growth. On the other hand, outside blocks held by mutual funds reduced sales growth substantially but did not increase performance from sales growth (Brush, Bromiley and Hendrickx, 2000).

In the 2002 article, Kissan and Richardson (Kissan and Richardson, 2002) argue that positive relation between excess cash and expenditures for advertising is part of the commonly known affordability method of advertising budgeting. On the basis of theory, the authors conceptualized agency costs will first decrease, then increase, and then decrease again with the level of managerial ownership. The authors found that the fraction of surplus earnings reinvested in advertising follows the same pattern in managerial ownership. These findings supported the notion that the use of the affordability method is at least partly driven by agency costs (ibid.).

On a sample of 552 firms, Freund, Prezas and Vasudevan (Freund, Prezas and Vasudevan, 2003) show that the announcement period of assets purchases' returns was negatively correlated to the amount of free cash flow for buyers with fewer growth opportunities. Compared to the year prior to the purchase, the mean long-run operating performance of the buyers of assets was worse in each of the three years following the transaction. Changes in operating performance were negatively related to the amount of free cash flow, and the relationship was stronger for buyers with fewer growth opportunities, being consistent with Jensen's theory of free cash flow (ibid.).

Article by Mikkelson and Partch (Mikkelson and Partch, 2003) is the only article we found to present negative evidence on Jensen's and Easterbrook's conjecture. They tested the theory by examining the operating performance and other characteristics of

firms that for a five-year period held more than one-fourth of their assets in cash and cash equivalents. Following a five-year period, operating performance of high cash firms was comparable to (or greater) than the performance of firms matched by size and industry or a measure of proclivity to hold substantial cash. In addition, proxies for managerial incentive problems, such as ownership and board characteristics did not explain differences in operating performance among high cash firms. Mikkelson and Partch also found that greater investment accompanied high cash holdings, particularly R&D expenditures, and greater growth in assets. For firms that persistently held large cash reserves, the authors concluded that such policies supported investment without hindering corporate performance (ibid.), being in opposition to the Jensen's and Easterbrook's conjecture.

In another article, Richardson (Richardson, 2006) examined the extent of firm level over-investment of free cash flow. Using a framework based on accounting theory to measure overinvestment and free cash flow, he found evidence that, consistent with agency cost explanations, over-investment was concentrated in firms with the highest levels of free cash flow. His further tests suggested that certain governance structures, such as the presence of activist shareholders, appeared to mitigate over-investment (ibid.).

In more recent article, Byrd (2010) used data from 1979-1985 for a sample of U.S. oil and gas production and exploration companies to test Jensen's free cash flow theory. His findings indicated that the agency costs were inversely related to financial leverage, which appears to be consistent with the control effects of debt. These results persisted across a variety of model specifications and data aggregation methods, again showing the validity of Jensen's theory.

Finally, Indonesian researchers Utami and Inanga (Utami and Inanga, 2011) examined how firms in Indonesia, with substantial free cash flow, controlled agency costs of free cash flows, and tested the effect of agency costs on dividend and leverage. They also tested the difference in agency costs between firms that pay and firms that do not pay regular dividends to their shareholders. Their results over a large panel sample of Indonesian firms showed that there is a negative insignificant effect of free cash flow on dividends and, on the other hand, positive significant effect of free cash flow on leverage. Their results also showed that the effect of agency costs of free cash flow on leverage for both categories of firms was positive but not significant. Most of their results, therefore, confirmed (i.e. were not able to reject) the Jensen's theory.

3.1.1 Agency costs of free cash flow and deaccessioning

Agency costs of free cash flow' theory has been implemented in the economics of non-profit organisations via role of endowments. It can be said that endowments act in

a broadly similar manner as a debt in the theory of agency costs of free cash flow –
they act as buffers to remedy the possible negative effects on financial budgets of
non-profit firms. Papers by Hansmann (1980; 1990) and Fama and Jensen (1983a;
1983b) sketch some basic considerations regarding economics of non-profit
organisations and role of non-profit endowments. First (to our knowledge the only one
so far) attempt on modelling the financial structure of non-profit organisations and its
agency structure have been done by Wedig and colleagues (Wedig et al., 1988; Wedig
et al., 1996) on the case of non-profit hospitals. In their 1996' paper, they evaluate the
role of tax-exempt debt in non-profit hospitals and show some important results, e.g.
that non-profit firms behave as if they were following a target ratio of tax-exempt
debt.

Capital structure of non-profit organisations has been also analysed by Bowman
(2002), who tested whether capital structure of non-profit firms could be better
analysed by referring to pecking-order theory (that states that different forms of
capital always follow the same order of attractiveness and usage) or static trade-off
theory which is more in accordance with mentioned Jensen's findings. Bowman (and
several other authors, e.g. Fisman and Hubbard, 2003) founds evidence for the latter.

There are other contributions that have to be mentioned: studies on capital structure of
non-profit hospitals by Calem and Rizzo (1995) and Brickley and van Horn (2002);
econometric evaluation of agency costs of excess endowments by Core, Guay and
Verdi (2006); the economic model of non-profit entrepreneurs' behavior by Glaeser
and Shleifer (2001); and evaluation of the role of endowments in mitigating the
agency costs problems in non-profit firms by Fisman and Hubbard (2003).

To our task, especially important are articles by Core, Guay and Verdi and Fisman
and Hubbard. As stated by Fisman and Hubbard (2003: 217), "in a for-profit
organization, shareholders act as the residual bearers of risk, and because non-profits,
by definition, have no residual claimants, there must be some other means of
absorbing shocks that exist in the world of uncertain donations and uncertain needs
for program expenditures." As the authors (ibid.) explain further, "One possibility
would be simply to allow for shocks to revenue streams to be passed on to program
expenditures, thus effectively making the recipients of an organization's services bear
the burden. However, a desire for "production smoothing" naturally leads to a search
for an alternative buffer. Thus, non-profit organisations will hold precautionary
savings in the form of endowment fund balances, to protect against adverse revenue
shock." In the remaining part of the article, Fisman and Hubbard indeed find that the
precautionary-savings model of the endowment is supported by the data (ibid.: 231).

Core, Guay and Verdi go a step further and present a more complex econometric
analysis of the problem. They, therefore, provide evidence that excess holdings of

endowment assets cause agency problems in non-profit firms. They find that CEO pay and total officer and director pay are greater for firms with excess endowments. They also provide evidence that program expenditures on the non-profit goods are lower for firms with excess endowments. They find only modest evidence that managers use excess endowments to increase investment. Instead, excess endowments are highly persistent over time, suggesting that non-profit managers prefer the flexibility and discretion afforded them by excess endowment assets (Core, Guay and Verdi, 2006).

4) MODELS OF MANAGERIAL BEHAVIOR AND INCENTIVES IN THE PRACTICES OF DEACCESSIONING

4.1 The model of Grossman and Hart

To model the problem of deaccessioning using contract theory, we use two existing models. First one was presented by Fernandez-Blanco and Prieto-Rodriguez in Journal of Cultural Economics in 2006 (we already explained the logic and results of the model in chapter 2.2.3.), and the second one was presented by Sanford J. Grossman and Oliver D. Hart in 1982. The latter, which is key to our analysis and results was only briefly mentioned in previous chapters, therefore, we present it in more detail now.

The starting point of the analysis of Grossman and Hart (1982) was "the idea that in a corporation owned by many small shareholders there is an incentive problem; i.e., the managers (or directors) have goals of their own, such as the enjoyment of perquisites or the maximization of their own income, which are at variance with the goals of shareholders, which are assumed to be profit or market value maximization."

According to Grossman and Hart, there are several logical ways to overcome this incentive problem. First, managers can be given salary incentive schemes (e.g., profit sharing arrangements or stock options) to get their interests to move toward those of shareholders. Second, shareholders can write a corporate charter which permits and to some extent encourages takeover bids. The threat of such a takeover bid will in general lead current management to achieve higher profits.

But the Grossman and Hart's paper mainly studies the effects of a third factor which may be important in encouraging managers to pursue the profit motive: the possibility of bankruptcy. If managers do not seek high profits, the probability that the corporation will go bankrupt increases. If the benefits managers receive from the firm are lost in the event of bankruptcy, managers may prefer to maximize profits or come close to it rather than to risk sacrificing their perquisites.

It is apparent that the efficacy of bankruptcy as a source of discipline for management will depend on the firm's financial structure, especially its debt-equity ratio. It will generally be in the shareholders' interest for a firm to issue debt as well as equity since this raises profit. In a mature corporation, however, the power to determine the firm's financial structure usually rests in the hands of management, not the shareholders. Furthermore, since debt increases the probability of bankruptcy, it would seem never to be in management's interest for there to be debt (ibid.: 108). Nevertheless, the main purpose of the Grossman and Hart's article is to develop a model to explain the existence of the debt even under the assumption that management controls the firm's financial structure. As explained by the authors, the main logic lying behind this reasoning is in the raised value of the firm: if the firm doesn't issue debt, then among other things this means that it is in a relatively unconstrained position and, therefore, has less reason to profit maximize. As a result, the market will put a low valuation on the firm and its cost of capital will be high. Therefore, to the extent that management would like its firm to have a high market value, it may wish to issue debt as concluded by Grossman and Hart (ibid.).

Grossman and Hart also think of the issuing of debt as being an example of precommitment or bonding behaviour. Namely, by issuing debt, management (the agent) deliberately changes its incentives in such a way as to bring them in line with those of shareholders (the principal)—because of the resulting effect on market value. According to Grossman and Hart, this distinguishes this equilibrium from a more familiar signalling equilibrium, discussed in our previous chapters.

The model that Grossman and Hart use is, therefore, the following. They describe the investment opportunity by the stochastic production function:

$$q = g(I) + s \qquad (36)$$

where I is the level of investment undertaken by the firm, $g(I)$ is the expected profit from this investment and s is a random variable with mean zero.

The model is a two-period one. The level of investment is chosen today and profit is realised tomorrow. The market value of the firm, i.e. value of the firm's debt and equity is therefore given by:

$$V = \frac{g(I)}{R} \qquad (37)$$

where R is the expected return per dollar which can be obtained on investments elsewhere in the economy.

If the manager therefore chooses the level of investment I, then the net market value of the firm is:

$$V - I = \frac{g(I)}{R} - I \qquad (38)$$

If the manager's salary and perquisites are an increasing function of $V - I$, then I will be chosen to maximize this expression.

Suppose that the firm raises outside funds, equal to V dollars. Let this amount be divided between debt and equity in such a way that the total amount owing to the firm's creditors when tomorrow arrives is D dollars. We assume that the firm will go bankrupt if and only if the firm's profits are less than D, i.e., if and only if:

$$g(I) + s < D \qquad (39)$$

Grossman and Hart furthermore assume that the manager has a concave von Neumann – Morgenstern utility function $U(C)$ defined over nonnegative consumption C. We assume that, if V dollars are raised and I dollars are invested, the manager will have $V - I$ left for consumption and so his utility will be $U(V - I)$.

Grossman and Hart, therefore, firstly analyse the optimal choice of I for the manager, for given values of V and D. They assume that the manager chooses I before s is known.

Thus, given (V, D), he solves the following optimisation problem:

$$\max_{I} U(V - I) * prob[no\ bankruptcy]$$
$$= \max_{I} U(V - I) * prob[s \geq D - g(I)] \qquad (40)$$

If we furthermore assume that s is a random variable with distribution function F and density function f then we can rewrite the manager's optimisation problem as:

$$\max_{I} U(V - I)\left(1 - F\big(d - g(I)\big)\right) subject\ to\ 0 \leq I \leq V \qquad (41)$$

Grossman and Hart are able to show two important lemmas:

Lemma 1: If hazard rate $r(x) = \frac{f(x)}{1-F(x)}$ is an increasing function of x, then a necessary and sufficient condition for I to be an optimal choice for the manager given (V, D) is:

$$\frac{U'(V-I)}{U(V-I)} = \left(\frac{f\big(D-g(I)\big)}{1-F\big(D-g(I)\big)}\right) g'(I) \qquad (42)$$

Lemma 2: If $V > 0$, then $I_V \equiv \partial I/\partial V$ and $I_D \equiv \partial I/\partial D$ exist. Furthermore, $0 < I_V < 1$ and $0 < I_D < [g'(I(V,D)]^{-1}$.

In the second section, Grossman and Hart analyse how V depends on I, and also the optimal choice of D for the manager. Beside several lemmas they are also able to show three propositions:

Proposition 1: For each D, $V = 0$ is a solution of $g^{-1}(RV) = I(V,D)$ and there is at least one other solution $V > 0$.

We have to add here that the $V = 0$ equilibrium arises (ibid.: 115) "because if the market thinks the firm is worthless, then it will be worthless because it will be impossible to raise any capital."

Proposition 2: A necessary condition for I to be an optimal level of investment for the manager is that the following condition holds: $D'(I) = \frac{(g'I))^2}{R}$.

Proposition 3: If I is an optimal level of investment for the manager, then $I < I^*$, where I^* maximizes $[g(I)/R] - I$. In other words, there is underinvestment relative to the situation where I is observable.

In the final section Grossman and Hart are also able to show some important comparative static propositions:

Proposition 4: Suppose that at $t = t_0$, $I(t_0)$ is a unique optimal investment level for the manager. Suppose also that $I(t)$ is a regular maximum. Then a sufficient condition for $I(t)$ to be increasing (resp. decreasing) in t in the neighborhood of t_0 is that

$$\frac{\partial}{\partial t}\left(D'_t - \frac{g'^2}{R}\right) < 0 \; (resp. > 0) \qquad (43)$$

at $I = I(t)$.

Proposition 5: Suppose that at $t = t_0$, $I(t_0)$ is a unique optimal investment level for the manager. Suppose also that $I(t)$ is a regular maximum. Then if only the hazard rate $r_t(x) \equiv f_t(x)/(1 - F_t(x))$ depends on t, a sufficient condition for $I(t)$ to be increasing (resp. decreasing) in t in a neighborhood of t_0 is that $(d/dt)r'_t[D_t\big(I(t_0)\big) - g\big(I(t_0)\big)] > 0 \; (resp. < 0)$ at $t = t_0$.

Proposition 6: Suppose that the distribution function of s changes in such a way that (a) s becomes more risky (i.e., a mean-preserving spread occurs) and (b) $(dr_t'/dt)\left(D_t(I(t_0)) - g(I(t_0))\right) < 0$ and (c) the hazard rate increases: $\partial r_t/\partial t > 0$. Then this increases the value of equity and decreases the value of debt.

Proposition 7: If U is replaced by $V = U^\alpha$, where $\alpha < 1$, then I will decrease.

In the final section, Grossman and Hart conclude to explain the use of debt as a financial instrument. Their theory is based (ibid.: 130) "on the idea that the managers of debt a firm which is mainly equity-financed do not have a strong incentive to maximize profit—in particular, since, without debt, bankruptcy does not occur, bad managers are not penalized in the event of low profit. Thus, such a firm will have a low value on the stock market." It was, therefore, their finding that management can use debt to precommit itself in such a way that managers can avoid losing their positions only by being more productive. Thus, debt increases the firm's market value. The material in propositions also presented an analysis of the determinants of the optimal level of debt for management.

4.2   The model of deaccessioning

As explained, Grossman and Hart (Grossman and Hart, 1982) show that the debt can serve as a self-limitation device for a firm. Grossman and Hart analyze the model where there is no clearly defined principal and agent relationship - they are mainly interested in investment, its role in enhancing the market value of the firm and the impact on the expected utility function of the manager. On their account the manager optimizes the following function:

$$\max U(V - I)(1 - F(D - g(I)))   \quad (44)$$

where U is the manager's utility function, V is the expected value of the firm, I is the investment itself, $g(I)$ is the expected profit from the investment, D are current debt obligations and F is the cumulative density function. This formula, therefore, describes the manager's expected utility in the presence of the danger of bankruptcy due to debt obligations of the firm – the manager's expected utility depends upon the utility from current consumption $V - I$, that depends on the market value of the firm less the investment needed for changing the value of the firm. The manager's utility also depends upon the probability of solvency $1 - F(D - g(I))$ that is modeled as the probability that the current debt obligations D don't surpass in value the revenues of the firm $g(I)$. The latter formula, therefore, measures the probability that the random variable s is greater than $D - g(I)$ (total revenues are equal to $g(I)$ plus this random variable) which is equivalent to solvency condition of the firm.

We, therefore, propose to model the deaccessioning process in the following way. The budget function of the museum is:

$$Budg = R - w - FC \qquad (45)$$

where R are total revenues of the museum, consisting of fundraising (including donations), ticket sales and public grants, w is wage of the manager and FC are remaining costs of the museum (including both fixed costs as well as costs depending upon the level of service, e.g. cleaning costs, costs of collection maintenance).

We model possible role of deaccessioning as having a preventing function over the possible bankruptcy of the museum, following the model by Grossman and Hart. If the museum should remain solvent, the following inequality has to be satisfied:

$$-dE \leq R - w - FC + s \qquad (46)$$

where s is a random variable and dE is the amount of endowment allowed for deaccessioning. Deaccessioning in this equation serves the role of "reserve funds" available to prevent the possible bankruptcy of the museum (therefore if the budget is negative it has to be less in absolute value than the deaccessioning "reserve funds").

This therefore means that the following should be the specification of our principal-agent deaccessioning' problem (if we assume that the main objective of the principal is the maximization of the expected budget in line with considerations of e.g. Niskanen, 1968; 1971):

$$\max_{R,dE,w,e} [R - w - FC][1 - F(w + FC - dE - R)] \qquad (47)$$
$$s.t. \quad u(w)[1 - F(w + FC - dE - R)] - \psi(e) \geq \underline{u} \qquad (48)$$

where $R - w - FC$ is the net total budget, F is the cumulative distribution function, u is the manager's utility function, ψ is the manager's disutility from effort function and $\underline{u}$ is the minimal guaranteed level of manager's utility. The optimization problem is therefore to maximize the expected benefit of the principal (net revenues times the probability of no bankruptcy) such that the agent's expected utility is bigger than some guaranteed value. This problem doesn't include deaccessioning funds among revenues of the museum yet takes them into account in their role as a "buffer" against insolvency of the museum, in accordance with findings by Fisman and Hubbard (2003).

The above discussion also shows two important considerations:

1) From the inequality (46) and from the model (47)&(48) we see that deaccessioning acts in exactly the opposite manner as a debt in the model of Grossman and Hart. Is therefore serves as a sort of "negative debt": as reserves that are a "buffer" against possible insolvency of the museum.

2) From the above, it is also apparent that if we are able to prove that deaccessioning leads to non-optimal museum manager's/agent's decisions, this will be sufficient to show the Jensen's conjecture on agency costs of free cash flow in firms if the free cash flow behaves in a similar manner as deaccessioning funds: it is not included in the budget function of the firm, yet can serve to cover the possible firm's insolvency.

In the following we also make the following assumptions on marginal effects:

$$\frac{\partial R_T}{\partial e} > 0, \frac{\partial^2 R_T}{\partial e^2} \leq 0, \frac{\partial w}{\partial e} > 0, \frac{\partial^2 w}{\partial e^2} \leq 0, \frac{\partial u}{\partial w} > 0, \frac{\partial^2 u}{\partial w^2} \leq 0, \frac{\partial \psi}{\partial e} > 0, \frac{\partial^2 \psi}{\partial e^2} \geq 0 \quad (49)$$

where $R_T = R - FC$ are the net revenues excluding expenses for manager's wage (it will be sometimes written shortly as net revenues).

We, therefore, assume that additional effort raises net non-labor revenues and that the net non-labor revenue function is concave in effort; that additional effort raises manager's wage and that the wage function is concave in effort; that the utility function of the manager is concave in wage; and that the manager's disutility function of effort is convex. All of the assumptions are common in principal-agent problems.

4.3 Equlibrium determination and comparative static analysis

Solving the model leads to the following first order conditions and Lagrangian function:

$$\mathcal{L} = [R_T - w][1 - F] + \lambda u[1 - F] - \lambda \psi(e) - \lambda \underline{u} \quad (50)$$

where we write F and u as short terms for $F(w + FC - dE - R)$ and $u(w)$.

First order condition (F.O.C.) over wage is:

$$\frac{\partial \mathcal{L}}{\partial w} = -(1 - F) - (R_T - w)f + \lambda u'[1 - F] - \lambda uf = 0 \quad (51)$$

where f is the probability density function of the distribution with cumulative distribution function $F(w + FC - dE - R)$.

We can express the value of λ from this as:

$$\lambda = \frac{(1 - F) + (R_T - w)f}{u'(1 - F) - uf} \geq 0 \qquad (52)$$

where the last inequality, of course, holds because λ is the Lagrange multiplier and, therefore, non-negative.

There are two possibilities: either $\lambda = 0$ or $\lambda > 0$.

In the first case, it should hold that:

$$(1 - F) + (R_T - w)f = 0 \qquad (53)$$

and therefore

$$-\frac{f}{1 - F} = \frac{1}{R_T - w} \qquad (54)$$

Note that this condition is equivalent to $\lambda = 0$, it, therefore, also holds in the opposite direction. Because $0 \leq f, F \leq 1$, this would mean that the optimal value of the net revenues is negative which means that in this case relying on deaccessioning is optimal for the manager.

The F.O.C. over effort states that:

$$\frac{\partial \mathcal{L}}{\partial e} = \left(\frac{\partial R_T}{\partial e} - \frac{\partial w}{\partial e}\right)(1 - F) + (R_T - w)\left(\frac{\partial R_T}{\partial e} - \frac{\partial w}{\partial e}\right)f + \lambda u' \frac{\partial w}{\partial e}(1 - F)$$
$$+ \lambda u\left(\frac{\partial R_T}{\partial e} - \frac{\partial w}{\partial e}\right)f - \lambda \psi'(e) = 0 \qquad (55)$$

In the following, we prove three main propositions describing the equilibrium of the model and showing the negative effects of deaccessioning.

Proposition 1: If $\lambda > 0$ and the manager is risk averse ($u'' < 0$) then the principal's marginal benefit of additional effort is strictly greater than the agent's marginal benefit from the effort in the equilibrium. Principal is, therefore, better interested in incentives for greater effort than the agent.

Proof.
By inserting the value of λ from (52) into (55) we get to the equation:

$$\left(\frac{\partial R_T}{\partial e} - \frac{\partial w}{\partial e}\right)(1 - F) + (R_T - w)\left(\frac{\partial R_T}{\partial e} - \frac{\partial w}{\partial e}\right)f$$

$$+ \frac{(1 - F) + (R_T - w)f}{u'(w)(1 - F) - u(w)f} u' \frac{\partial w}{\partial e}(1 - F)$$

$$+ \frac{(1 - F) + (R_T - w)f}{u'(w)(1 - F) - u(w)f} u\left(\frac{\partial R_T}{\partial e} - \frac{\partial w}{\partial e}\right)f$$

$$- \frac{(1 - F) + (R_T - w)f}{u'(w)(1 - F) - u(w)f} \psi'(e) = 0 \quad (56)$$

which can be rewritten as:

$$[(1 - F) + (R_T - w)f]$$

$$* \left[\left(\frac{\partial R_T}{\partial e} - \frac{\partial w}{\partial e}\right) + \left(\frac{\frac{\partial w}{\partial e}(u'(1 - F) - uf) + \frac{\partial R_T}{\partial e}uf}{u'(1 - F) - uf}\right)\right.$$

$$\left. - \left(\frac{1}{u'(1 - F) - uf}\right)\psi'(e)\right] = 0 \quad (57)$$

If $\lambda = 0$ then this conditions holds trivially. If, on the other hand, $\lambda > 0$, the first term in the brackets is non-zero by previous consideration, therefore, the second term in the brackets has to be equal to zero. Therefore:

$$\left(\frac{\partial R_T}{\partial e} - \frac{\partial w}{\partial e}\right) + \left(\frac{\partial w}{\partial e} + \frac{\partial R_T}{\partial e}\frac{uf}{u'(1 - F) - uf}\right) - \left(\frac{1}{u'(1 - F) - uf}\right)\psi'(e)$$

$$= 0 \quad (58)$$

After canceling the term with w we get:

$$\frac{\partial R_T}{\partial e} + \frac{\partial R_T}{\partial e}\frac{uf}{u'(1 - F) - uf} = \left(\frac{1}{u'(1 - F) - uf}\right)\psi'(e) \quad (59)$$

Which can be finally simplified (after multiplying with denominator of the RHS and canceling the same term afterwards) into:

$$u'(1 - F)\frac{\partial R_T}{\partial e} = \psi'(e) \quad (60)$$

If we differentiate this equation once more over the effort we get:

$$u''\frac{\partial w}{\partial e}(1 - F)\frac{\partial R_T}{\partial e} - u'f\left(\frac{\partial w}{\partial e} - \frac{\partial R_T}{\partial e}\right)\frac{\partial R_T}{\partial e} + u'(1 - F)\frac{\partial^2 R_T}{\partial e^2} = \psi''(e) \quad (61)$$

and therefore:

$$u'f(\frac{\partial R_T}{\partial e})^2 \geq u'f\frac{\partial w}{\partial e}\frac{\partial R_T}{\partial e} - u''(1-F)\frac{\partial w}{\partial e}\frac{\partial R_T}{\partial e} - u'(1-F)\frac{\partial^2 R_T}{\partial e^2}$$
$$\geq u'f\frac{\partial w}{\partial e}\frac{\partial R_T}{\partial e} - u''(1-F)\frac{\partial w}{\partial e}\frac{\partial R_T}{\partial e} \qquad (62)$$

where the first inequality holds because the agent's disutility function ψ is convex (and therefore its second derivative is greater or equal than zero) and the second inequality holds because it is assumed that effort has a diminishing marginal effect to net revenues less wage (and, therefore, $\frac{\partial^2 R_T}{\partial e^2}$ is non-positive).

After dividing by $\frac{\partial R_T}{\partial e}$ on both sides (which is possible because this term is positive by assumption (48)) we get:

$$u'f\frac{\partial R_T}{\partial e} \geq u'f\frac{\partial w}{\partial e} - u''(1-F)\frac{\partial w}{\partial e} \qquad (63)$$

and further:

$$\frac{\frac{\partial R_T}{\partial e}}{\frac{\partial w}{\partial e}} \geq 1 - \frac{u''(1-F)}{u'f} = 1 + \frac{ARA}{r} > 1 \qquad (64)$$

where ARA stands for Arrow-Pratt absolute risk aversion coefficient and r for the hazard rate. The last inequality of right follows by positive sign of both coefficients (due to concavity of the agent's utility function and her being risk averse).

This therefore means:

$$\frac{\partial R_T}{\partial e} > \frac{\partial w}{\partial e} \qquad (65)$$

which proves the proposition. Note that the condition of risk-averse agent is not necessary, the final strict inequality holds as well if either $\psi''(e)$ or $\frac{\partial^2 R_T}{\partial e^2}$ are strictly lower than zero which is satisfied almost everywhere. If these conditions are not satisfied one would be able to get only "greater than or equal" condition.

<div align="right">Q.E.D.</div>

First-order conditions over R_T and dE are not feasible because the Lagrangian is monotonously rising with both R_T and dE, meaning that the optimal value of both is not defined (the problem is not convex).

If we want to calculate the marginal effect of deaccessioning over wage, we can use the second derivatives of the Lagrangian (using the implicit function theorem):

$$\frac{\partial w}{\partial dE} = -\frac{\frac{\partial^2 \mathcal{L}}{\partial w \partial dE}}{\frac{\partial^2 \mathcal{L}}{\partial w^2}} \qquad (66)$$

Similarly we can calculate:

$$\frac{\partial w}{\partial R_T} = -\frac{\frac{\partial^2 \mathcal{L}}{\partial w \partial R_T}}{\frac{\partial^2 \mathcal{L}}{\partial w^2}} \qquad (67)$$

$$\frac{\partial R_T}{\partial dE} = -\frac{\frac{\partial^2 \mathcal{L}}{\partial w \partial dE}}{\frac{\partial^2 \mathcal{L}}{\partial w \partial R_T}} \qquad (68)$$

The second order derivatives are:

$$\frac{\partial^2 \mathcal{L}}{\partial w^2} = 2f + wf' + \lambda u''(1 - F) - 2\lambda u'f - \lambda u f' < 0 \qquad (69)$$

where the inequality holds because the Lagrangian is maximized at w,

$$\frac{\partial^2 \mathcal{L}}{\partial w \partial dE} = -f + (R_T - w)f' + \lambda u'f + \lambda u f' \qquad (70)$$

$$\frac{\partial^2 \mathcal{L}}{\partial w \partial R_T} = -2f + (R_T - w)f' + \lambda u'f + \lambda u f' \qquad (71)$$

Proposition 2: In the equilibrium the marginal effect of deaccessioning to wage is greater than the marginal effect of additional net revenues to wage. Using deaccessioning funds is, therefore, more tempting for the manager than raising net revenues. Also, the marginal effect of deaccessioning to net revenues in the equilibrium is negative and greater than minus one.

Proof.

From equations (67), (69) and (70) we have:

$$\frac{\partial w}{\partial R_T} = -\frac{\frac{\partial^2 \mathcal{L}}{\partial w \partial R_T}}{\frac{\partial^2 \mathcal{L}}{\partial w^2}} = \frac{2f - (R_T - w)f' - \lambda u'f - \lambda uf'}{2f + wf' + \lambda u''(1 - F) - 2\lambda u'f - \lambda uf'} \qquad (72)$$

and from equations (66), (69) and (70) we have similarly:

$$\frac{\partial w}{\partial dE} = -\frac{\frac{\partial^2 \mathcal{L}}{\partial w \partial dE}}{\frac{\partial^2 \mathcal{L}}{\partial w^2}} = \frac{f - (R_T - w)f' - \lambda u'f - \lambda uf'}{2f + wf' + \lambda u''(1 - F) - 2\lambda u'f - \lambda uf'} \qquad (73)$$

Therefore:

$$\frac{\partial w}{\partial R_T} = \frac{\partial w}{\partial dE} + \frac{f}{2f + wf' + \lambda u''(1 - F) - 2\lambda u'f - \lambda uf'} \qquad (74)$$

Because of the inequality (69) the denominator in both (72) and (73) is negative. This means that the last term on the right-hand side of (74) is negative (f – the probability density function – is of course positive by assumption), which shows:

$$\frac{\partial w}{\partial R_T} < \frac{\partial w}{\partial dE} \qquad (75)$$

This proves the first part of the proposition. The second part is shown similarly using (68), (70) and (71):

$$\frac{\partial R_T}{\partial dE} = -\frac{\frac{\partial^2 \mathcal{L}}{\partial w \partial dE}}{\frac{\partial^2 \mathcal{L}}{\partial w \partial R_T}} = -\frac{f - (R_T - w)f' - \lambda u'f - \lambda uf'}{2f - (R_T - w)f' - \lambda u'f - \lambda uf'} > -1 \qquad (76)$$

Now let's observe the signs of $\frac{\partial w}{\partial dE}$, $\frac{\partial w}{\partial R_T}$ and $\frac{\partial R_T}{\partial dE}$. It is natural to assume that the marginal effect of additional net revenues less wage to wage is positive otherwise the manager wouldn't be motivated for the benefit of the firm at all. Therefore it is natural to assume:

$$\frac{\partial w}{\partial R_T} > 0 \qquad (77)$$

From (75) we also gain:

$$\frac{\partial w}{\partial dE} > \frac{\partial w}{\partial R_T} > 0 \qquad (78)$$

which means that the signs of both $\frac{\partial w}{\partial dE}$ and $\frac{\partial w}{\partial R_T}$ are positive. From equations (66) and (67) and the fact that $\frac{\partial^2 \mathcal{L}}{\partial w^2}$ is negative (as explained before) we gain:

$$sgn\left(\frac{\partial^2 \mathcal{L}}{\partial w \partial R_T}\right) = sgn\left(\frac{\partial^2 \mathcal{L}}{\partial w \partial dE}\right) = +1 \qquad (79)$$

and therefore:

$$sgn\left(\frac{\partial R_T}{\partial dE}\right) = -1 \qquad (80)$$

But this means that deaccessioning funds have negative marginal effect on the total revenues, therefore on the success of the firm. This proves that allowing deaccessioning leads to non-optimal management decisions of the firm, i.e. decisions leading to lower revenues than optimal. This also proves our proposition.

Q.E.D.

Proposition 3: Deaccessioning has negative marginal effect on the effort in the equilibrium. Allowing deaccessioning, therefore, leads to negative incentives for effort provision on the side of managers.

Proof.

From our assumptions, we know that $\frac{\partial w}{\partial e} > 0$. But this means (again using implicit function theorem) that:

$$\frac{\partial w}{\partial e} = -\frac{\frac{\partial^2 \mathcal{L}}{\partial w \partial e}}{\frac{\partial^2 \mathcal{L}}{\partial w^2}} > 0 \qquad (81)$$

This shows that $\frac{\partial^2 \mathcal{L}}{\partial w \partial e}$ and $\frac{\partial^2 \mathcal{L}}{\partial w^2}$ have to be of the opposite sign. But $\frac{\partial^2 \mathcal{L}}{\partial w^2}$ is strictly negative because w maximizes the Lagrangian. This shows that $\frac{\partial^2 \mathcal{L}}{\partial w \partial e}$ has to be strictly positive.

Using implicit function theorem again yields:

$$\frac{\partial e}{\partial dE} = -\frac{\frac{\partial^2 \mathcal{L}}{\partial w \partial dE}}{\frac{\partial^2 \mathcal{L}}{\partial w \partial e}} < 0 \qquad (82)$$

where the inequality holds because the term in the numerator is positive by (79), and the denominator is positive by previous consideration. This shows the proposition.

<div align="right">Q.E.D.</div>

4.4 The "risk-averse principal" case

In the next part, we consider the proof of our three propositions in the case of risk-averse principal. In this case the model in (47) & (48) becomes:

$$\max \; B(R - w - FC)[1 - F(w + FC - dE - R)] \qquad (83)$$
$$s.t. \quad u(w)[1 - F(w + FC - dE - R)] - \psi(e) \geq \underline{u} \qquad (84)$$

where $B(R - w - FC)$ (we will write it shortly as B) is the benefit function of the principal, and we assume $B' > 0, B'' < 0$.

The Lagrangian in this case is:

$$\mathcal{L} = B[1 - F] + \lambda u[1 - F] - \lambda \psi(e) - \lambda \underline{u} \qquad (85)$$

The first order conditions over wage and effort are:

$$\frac{\partial \mathcal{L}}{\partial w} = -B'(1 - F) - Bf + \lambda u'[1 - F] - \lambda uf = 0 \qquad (86)$$

$$\frac{\partial \mathcal{L}}{\partial e} = B'\left(\frac{\partial R_T}{\partial e} - \frac{\partial w}{\partial e}\right)(1 - F) + B\left(\frac{\partial R_T}{\partial e} - \frac{\partial w}{\partial e}\right)f + \lambda u' \frac{\partial w}{\partial e}(1 - F)$$
$$+ \lambda u\left(\frac{\partial R_T}{\partial e} - \frac{\partial w}{\partial e}\right)f - \lambda \psi'(e) = 0 \qquad (87)$$

From (86) we get:

$$\lambda = \frac{B'(1 - F) + Bf}{u'(1 - F) - uf} \geq 0 \qquad (88)$$

Again there are two possibilities: $\lambda = 0$ and $\lambda > 0$. The first one leads of course to negative expected benefit function (B) of the principal in the equilibrium that would again mean that relying on deaccessioning and having negative revenues is optimal. We will therefore again assume $\lambda > 0$.

If we insert the value of λ from (88) into (87) we get:

$$[B'(1-F) + Bf]$$

$$* \left[\left(\frac{\partial R_T}{\partial e} - \frac{\partial w}{\partial e} \right) + \left(\frac{\frac{\partial w}{\partial e}(u'(1-F) - uf) + \frac{\partial R_T}{\partial e} uf}{u'(1-F) - uf} \right) \right.$$

$$\left. - \left(\frac{1}{u'(1-F) - uf} \right) \psi'(e) \right] = 0 \qquad (89)$$

But this is precisely equivalent to (57) and the rest of the proof is precisely the same as before leading to the proof of the risk-averse principal equivalent of proposition 1.

For the proof of the equivalents of propositions 2 and 3 we have to presuppose the following inequality:

$$\frac{f}{1-F} = r > -\frac{B''}{B'} = ARA \qquad (90)$$

This inequality can be interpreted in the following way. As commonly interpreted (e.g. Pratt, 1964) the Arrow-Pratt coefficient of absolute risk aversion (ARA) can be interpreted as willingness-to-pay the insurance (risk premium), i.e. willingness-to-pay to avoid risk. On the other hand as interpreted by Grossman and Hart (1982) the hazard rate (r) in the model described by equation (1) can be interpreted as the marginal cost of avoiding bankruptcy, therefore, marginal cost of avoiding risk in our model. Inequality (90) therefore only means that the principal's willingness to pay a risk premium to avoid risk is smaller than the cost of avoiding risk, which is a necessary condition for the principal to be willing to take the risk of bankruptcy and therefore to participate in the contract described by the model (83) & (84). Inequality (89) is therefore nothing else than the participation condition for the principal.

Calculating the second order derivatives and implicit function quotients in this case gives:

$$\frac{\partial^2 \mathcal{L}}{\partial w^2} = B''(1-F) + 2B'f - Bf' + \lambda u''(1-F) - 2\lambda u'f - \lambda uf' < 0 \qquad (91)$$

$$\frac{\partial^2 \mathcal{L}}{\partial w \partial dE} = -B'f + Bf' + \lambda u'f + \lambda uf' \qquad (92)$$

$$\frac{\partial^2 \mathcal{L}}{\partial w \partial R_T} = -B''(1-F) - 2B'f + Bf' + \lambda u'f + \lambda uf' \qquad (93)$$

$$\frac{\partial w}{\partial R_T} = -\frac{\frac{\partial^2 \mathcal{L}}{\partial w \partial R_T}}{\frac{\partial^2 \mathcal{L}}{\partial w^2}}$$

$$= \frac{B''(1-F) + 2B'f - Bf' - \lambda u'f - \lambda uf'}{B''(1-F) + 2B'f - Bf' + \lambda u''(1-F) - 2\lambda u'f - \lambda uf'} \qquad (94)$$

$$\frac{\partial w}{\partial dE} = -\frac{\frac{\partial^2 \mathcal{L}}{\partial w \partial dE}}{\frac{\partial^2 \mathcal{L}}{\partial w^2}}$$

$$= \frac{B'f - Bf' - \lambda u'f - \lambda uf'}{B''(1-F) + 2B'f - Bf' + \lambda u''(1-F) - 2\lambda u'f - \lambda uf'} \qquad (95)$$

$$\frac{\partial w}{\partial R_T} = \frac{\partial w}{\partial dE} + \frac{B''(1-F) + B'f}{B''(1-F) + 2B'f - Bf' + \lambda u''(1-F) - 2\lambda u'f - \lambda uf'} \qquad (96)$$

Because of inequality (90) it holds:

$$B''(1-F) + B'f > 0 \qquad (97)$$

And therefore again (as in the risk-neutral principal case) it holds:

$$\frac{\partial w}{\partial R_T} < \frac{\partial w}{\partial dE} \qquad (98)$$

All the other steps in proving propositions 2 and 3 for the risk averse case are the same.

4.5 Extensions of the model and Jensen's conjecture in general

It is apparent that we just showed numerous negative effects of allowing deaccessioning funds. Let's try firstly to summarize the findings, starting in reverse order of proof. Firstly, deaccessioning has negative effects on effort of the managers – managers will tend to work less in the presence of deaccessioning funds, being able to cover for the possible deficit of the museum. With this in mind also the Proposition 1 immediately becomes logical: this proposition simply states that their effort benefits the principal more than them, so indeed they hardly have any motivation to work more (due to the negative sign of the marginal effect they actually have an incentive to work less) in the presence of deaccessioning funds. Thirdly, using deaccessioning funds is more tempting for the manager than raising revenues. This again only shows that in the presence of deaccessioning the manager has less motivation to work for the benefit of the museum, but will be more tempted to rely on deaccessioning funds, leaving the work for the benefit of the museum to "somebody else". This is finally and once more confirmed by the negative sign of the marginal effect of

deaccessioning to the revenues – the more we allow deaccessioning possibilities to cover the possible deficit of the museum, the lower will be the expected revenues.

One would be tempted of course to generalize this finding to behavior of managers in non-profit, as well as for-profit firms. For the non-profit firms, the result is immediate: allowing firms to rely on endowment funds for covering their possible deficit is economically detrimental to the incentives of a non-profit firm. This goes in line with the econometric findings in the literature (e.g. Fisman and Hubbard, 2003; Core, Guay and Verdi, 2006) yet goes, of course, a step further by formally proving the detrimental effects of large endowment funds for the incentives in non-profit firms.

So how about the for-profit firms? In the literature review, we presented the conjecture by Jensen that says that excess free cash flow in hands of the managers entails agency costs in the form of excessive perquisites and investments in negative net present value projects. We are, unfortunately, at this point not able to say that free cash flow acts exactly like deaccessioning (and/or endowment) funds in non-profit firms. We hadn't addressed all the different forms of negative effects of deaccessioning: do they lead to more perquisites on the side of managers (which appear to be the case) or do they lead to investments in negative net-present value projects, or perhaps even both. To account for this one would need to have a more specified basic model, including separate measures for all these effects. We are able to say that if the free cash flow in for-profit firms acts in a manner as deaccessioning funds in our case, therefore if it is not included among the firm-value raising funds, yet could be spent to finance the possible deficit of the firm, then we are able to formally show (and have shown in this article) that this leads to significant agency costs.

The model describes a situation in which there is a clearly specified relationship between principal and agent. In this way, it improves on the model of Grossman and Hart who only use the optimization for the agent. We specify manager's utility only in terms of his expected benefits from wage and disutility from effort. One could of course follow Grossman and Hart's logic further in specifying that the manager's utility also depends on bonding actions and value of the museum. In this way, one would have to include in the manager's utility function also the utility from the value of museum (its revenues and most of all its endowment). As Grossman and Hart clearly state, the firm's market value is in the manager's own interest and, therefore, his utility function could (or should) be made dependent on the value of the museum. This would complicate the model further, yet would be more in line with original model and findings by Grossman and Hart.

There are many speculations one could made on the specification of the principal-agent problem in our model. One could firstly argue about the choice of principal and agent. In one of the rare existing articles on principal-agent modeling in cultural economics Prieto-Rodriguez and Fernandez-Blanco (2006) consider the public agency (providing subsidies) to be the principal and the museum (or its board) to be an agent in museum financing decisions. One could also argue that museum has multiple principals: both the board of trustees as well as the donors can serve the role of principals. It would be interesting to include multiple principals (or even multiple agents) in our principal-agent problem following work of e.g. Bernheim and Whinston, 1986; Li, 1993; Martimort, 1996; Waterman and Meier, 1998; Gailmard, 2002; taking into account the externalities of one principal-agent relation for another principal-agent relation. One could furthermore argue that museums follow versatile objectives besides revenue maximization and are motivated by educational, aesthetic and other purposes as well. To this task, the extensions following Holmström and Milgrom's 1991 multitasking model would be most appropriate. One could also speculate that principal can follow a more general utility function and not risk neutral as presupposed in our article. We consider this observation would change nothing in the results of this paper that is demonstrated in the appendix.

Finally, one could also again speculate whether the proof in our article is sufficient to prove the Jensen's agency costs of free cash flow conjecture which so far remains to be formally shown. There is at least one big difference of our situation and model to the Jensen's case, namely, free cash flow in general is an endogenous variable in the model, it can be influenced by the revenues of the firm while deaccessioning does not behave in the same manner as explained. The endogenous nature of this variable has significant influence over our calculations, and we are, therefore, not permitted to generalise the propositions also for the general, endogenous case. Jensen's conjecture, therefore, remains to be conclusively solved in our future work.

In the following, we try to verify our three main propositions also in the empirical study on the data of nonprofit American museums. We mainly try to show that endowments in nonprofit museums tend to lead to lower revenues than optimal and higher perquisites on museum managers as desired by the principal.

We, therefore, use our basic mathematical structure of the model which implies a positive relationship between excess endowments in museums and manager's perquisites to verify that, indeed, the higher the first variable in empirical sense causes the higher level of manager's perquisites, as showed in the level of managerial compensation. Secondly, we demonstrate that the higher level of excess endowments also leads to lower performanc of the museum, being demonstrated by lower total revenues and lower ratio of program to total expenses. All those findings are summarized particularly in our Proposition 2, while Propositions 1 and 3 serve to

further enhance the adverse effects of deaccessioning and excess endowments in general.

5) EMPIRICAL STUDY

In the empirical part of the study, we, therefore, verify conclusions from our theoretical part, and mathematical model in an econometric exercise using data provided by National Center for Charitable Statistics. We were able to extract data for 500 US museums coming from 48 states (Alaska, Arkansas and South Dakota are not represented in the study). In our dataset, we included museums only from the category A51 (Art Museums). We included only those museums which had data for all ten years under study (2002-2011) or missing in only one year, to construct a mildly unbalanced panel (see Deb and Trivedi, 2011).

One important caveat of the empirical study has to be mentioned at the start. Deaccessioning relates to collections of art museums. Unfortunately, the value of collections is not included in the yearly reports of museums as there is so far no feasible way to quantify its value. When analysing our data, we therefore don't analyse the deaccessioning practice but only the effect of large (excess) endowment on performance of the non-profit firm. Nevertheless, we should be able to find confirming evidence for the thesis that excess endowment (in the form of cash, savings and securities, therefore in the form of a "money buffer" against adverse situations for a museum) has an adverse effect on the management of a museum which is of course strongly related to our initial hypothesis on deaccessioning

Our empirical strategy closely follows the strategy used by Core, Guay and Verdi (2006) and Fisman and Hubbard (2003) to estimate the adverse effects of persistently large endowments in the US non-profit organisations. The main difference is in the dataset we use that includes only art museums. We are, therefore, not able to estimate the industry effects estimated in both mentioned articles.

The empirical strategy, therefore, consists of two parts. We, firstly, estimate the regression equation with proxy for endowment (endowment divided by total expenses of the museum; or logarithm of endowment of the museum) as dependent variable and several controls (proxy for regulation; logarithm of total revenues of the museum; coefficient of variation of revenues of the museum; loan dummy; interaction variable of coefficient of variation of revenues and loan dummy) as independent variables including time, state and unit dummies. The first stage regression allows us to get a measure of excess endowment.

The residuals from this first stage equation, therefore, serve as a proxy for excess endowment. We insert them in the second stage regression with performance

measures of the museum (compensation of CEO's; program to total expenses ratio; total revenues of the museum) as dependent variables and abnormal/excess endowment (in several different variable forms) and several controls (logarithm of total expenses; public support) as independent variables including time, state and unit dummies. The second stage regression allows us to finally estimate the effects of abnormal endowments on performance of the museum.

5.1   Data and methodology

The data are provided on a sample of 283 U.S. museums chosen among the 500 museums which have data on their financial performance available on NCCS webpages. The museums have been chosen on the basis of criteria that they have missing data for at most one year in the period 2002-2011, and to have no missing data due to filling out a shorter version of 990' form (the EZ or EO form).

The museums in our sample are listed in detail in appendix 1.

For all the listed museums the data have been gathered for years 2002-2011 with some museums having missing data for one year (leading to the so-called unbalanced panel, see e.g. Baltagi, 2005; Cameron and Trivedi, 2009). Among the 283 selected museums, we also eliminated those museums that had zero compensation of the officers and CEO's (no evidence on manager's perquisites). We were, therefore, left with data for 239 museums in total.

We gathered data for several groups of variables:

- ‣ *Cash, non-interest bearing* (end of year); *Savings and temporary cash investments*; *Investments – publicly traded securities*; *Investments – other securities*; – Variables to proxy for the Endowment
- ‣ *Total expenses*; *Total revenue*
- ‣ *Tax-exempt bond liabilities*; *Secured mortgages and notes payable to unrelated third parties*; *Unsecured notes and loans payable to unrelated third parties*; - Variables to proxy for the Loan Status of the Museum
- ‣ *Salaries, other compensation, employee benefits*; *Total Compensation of Officers, Directors, Trustees, Key Employees, and Highest Compensated Employees* – Variables to proxy for the Manager Perquisites
- ‣ *Total Program Service Revenue*; *Total Program Service Expenses* – Variables to proxy for the Museum Effectiveness
- ‣ *Land, buildings, and equipment cost or other basis*; *Depreciation, depletion, etc.* – Variables to proxy for the Investment
- ‣ *Total public support* – Variable to proxy for Outside fundraised sources

5.2 Summary statistics of the variables

The basic descriptive statistics for the variables used are provided in the table below. All variables have been winsorized of 1% of the values above and below the distribution.

Table 1. Summary statistics for the variables in the model

variable	N	min	max	mean	stand.dev	median	skewness	kurtosis	cv
cash	1409	-141	1.10E+07	528939.3	1556220	59038	4.994917	30.30195	2.942152
savings	1409	0	4.85E+07	2601206	7259425	230699	4.521827	25.1894	2.790792
investpublictra	1409	0	5.72E+08	2.74E+07	8.28E+07	1239015	4.744945	27.61694	3.02572
investother	1409	0	2.64E+08	1.01E+07	3.70E+07	0	5.115479	31.16387	3.681162
inventories	1409	0	2.61E+06	205881.4	411631.5	54007	3.693102	18.77672	1.999363
totalexpenses	1413	26249	1.57E+08	9.14E+06	2.18E+07	2267049	4.755633	28.76976	2.381879
totalrevenues	1413	-1.39E+04	2.06E+08	1.18E+07	2.93E+07	2345092	4.709519	27.81066	2.495664
taxexempt	1409	0	1.85E+08	5845889	2.69E+07	0	5.692834	35.74364	4.602558
securedmort	1409	0	3.30E+07	1152851	4331165	0	5.578143	36.93865	3.756918
unsecuredmort	1408	0	3.00E+06	48326.91	348680.2	0	7.947345	65.87243	7.215031
salaries	1411	0	6.75E+07	3458968	8535164	947773	5.387803	37.11842	2.467547
compofficdir	1411	0	4208954	321924.8	587122.5	126100	4.317602	25.74214	1.823788
progrevenues	1413	0	2.97E+07	1217854	4013650	169177	5.836051	38.62637	3.295674
progexpenses	1413	0	1.17E+08	6766626	1.70E+07	1387148	4.628927	26.65196	2.508591
landbuild	1407	0	4.12E+08	2.63E+07	6.22E+07	5195842	4.203629	22.61901	2.36552
accumdeprec	1407	0	1.37E+08	7444769	1.84E+07	1476181	4.996576	31.96403	2.476914
publicsupport	1412	0	1.31E+08	7516925	1.87E+07	1625347	4.674401	27.49474	2.494144

Source: own calculations

- Variable "Cash" measures the headline *Cash, non-interest bearing (end of the year)* which relates to IRS form 990 - line 45, column (b). The average value of this variable in 239 museums is slightly above $500,000.00 and is skewed to the right that means that most of the mass of observations is located to the left of the mean and the median is located to the far left of the mean (it amounts to only $59,038.00). Also, the coefficient of variation equals 2.94 which denotes a relatively large dispersion of the data around the mean.
- Variable "Savings" measures the headline *Savings and temporary cash investments* which relates to IRS form 990 - line 46, column (b). The average value of this variable is $2,601,206.00 and is again skewed to the right. The median value is $230,699.00 which is less than 10% of the mean value. Also, the coefficient of variation is high (although slightly less than for the "cash" variable) and amounts to 2.79.
- Variable "Investpublictra" measures the headline *Investments – publicly traded securities* which relates to IRS form 990 - line 54, column (b). The average value of this variable is $27,400,000.00 with again the same characteristics regarding skewness (and kurtosis) as for previous two variables. The coefficient of variation is slightly above 3, which is higher than for previous two variables and again a sign of high dispersion of the data that

can be explained by the commonly observed characteristic of investments as a highly volatile variable.

- Variable "Investother" measures the headline *Investments – other securities*, which is present in IRS form 990 Part X Line 12. The mean value of this variable is $1,010,000.00 with median value being zero. As expected from this also the skewness, kurtosis as well as the coefficient of variation shows strong average dispersion around the mean and high skewness to the right.

- Variable "Total_expenses" measures the headline *Total expenses* which is present in IRS form 990 - line 17. This variable has a mean value of $9,140,000.00 with the median again being significantly lower. Variable also shows high skewness to the right and coefficient of variation of 2.38 yet no so large as in the analysis of previous variables.

- Variable "Total_revenue" measures the headline *Total revenues* which is present in IRS form 990 - line 12. The variable has a mean value of $11,800,000.00 and a median significantly lower. In general it and shows similar characteristics as the total expenses variable.

- Variable "Taxexbondliab" measures the headline *Tax-exempt bond liabilities* which is present in IRS form 990 - line 64a, column (b). The variable has a mean value of $5,845,889.00 and a median of zero. The variable has a high positive skewness, kurtosis as well as coefficient of variation of over 4.5. All three variables, denoting the loan status ("Taxexbondliab", "Securmortg", "Unsecurnotes") have by far the highest skewness, kurtosis as well as coefficients of variation among all the analyzed variables.

- Variable "Securmortg" measures the headline *Secured mortgages and notes payable to unrelated third parties* which is present in IRS form 990 Part X Line 23. The variable has a mean value of $1,152,851.00, a zero median and similar characteristics as the previous variable.

- Variable "Unsecurnotes" measures the headline *Unsecured notes and loans payable to unrelated third parties* which is present in IRS form 990 Part X Line 24. The variable has a mean value of only $48,326.91 and again a zero median. It has even much higher dispersion (measured by coefficient of variation, which is the largest among all the analyzed variables), right-skewness and peakedness (positive excess kurtosis) as previous two variables.

- Variable "Salaries" measures the headline *Salaries, other compensation, employee benefits* that is present in IRS form 990 Part I Line 15. The variable has a mean value of $3,458,968.00 and a median of $947,773.00 and suffers from rather high skewness and kurtosis while having smaller variation in values than previous variables.

- Variable "Compens_OfficDi" measures the headline *Total Compensation of Officers, Directors, Trustees, Key Employees, and Highest Compensated Employees* which is present in IRS form 990 - line 25, column (a). The variable has a mean value of $321,924.80 and a median of $126,100.00 and

has similar, although slightly less deviant characteristics as the previous variable of salaries.

- Variable "Program_Revenue" measures the headline *Total Program Service Revenue* which is present in IRS form 990 - line 9. The variable has a mean value of $1,271,854.00 and a median of $169,177.00 and is again slightly more dispersed, right-skewed and leptokurtic as previous two variables.
- Variable "Program_Expense" measures the headline *Total Program Service Expenses* which is present in IRS form 990 - line 13. The variable has a mean value of $6,766,626 and a median of $1,387,148.00 (indicating that the program expenses are much higher on average and in median value than program revenues in the US museums) and has similar although slightly less deviant characteristics in skewness, kurtosis and variation as program revenues.
- Variable "Landbuildequipc" is the difference between two IRS categories: *Land, buildings, and equipment cost or other basi*s (IRS form 990 - line 57a, column (b)) and *Depreciation, depletion, etc.* (IRS form 990 – line 42, column (a)). The variable has a mean value of $26,300,000.00 and a median of $5,195,842.00. Its distributional characteristics are again similar to previous variable (program expenses) while being even slightly less deviant.
- Variable "Publicsupport" measure the headline *Total public support* which is present in IRS form 990 - line 1d. The variable has mean value of $7,516,925.00 and a median of $1,625,347.00 and has almost the same distributional characteristics as the program expenses' variable.

Below table also shows the correlations among the included variables.

Table 2. Correlation table for variables in the model

	cash	savings	investpublictra	investother	inventories	totalexpenses	totalrevenues	taxexempt	securedmort	unsecuredmort	salaries	compofficdir	progrevenues	progexpenses	landbuild	accumdeprec	publicsupport
cash	1																
savings	0.1225***	1															
investpublictra	0.2304***	0.3336***	1														
investother	0.2802***	0.2238***	0.4581***	1													
inventories	0.1272***	0.3091***	0.7355***	0.6414***	1												
totalexpenses	0.3628***	0.4255***	0.8045***	0.6988***	0.8947***	1											
totalrevenues	0.3864***	0.4227***	0.8304***	0.5358***	0.8096***	0.909***	1										
taxexempt	0.0782	0.4584***	0.4347***	0.4164***	0.5444***	0.5976***	0.4845***	1									
securedmort	0.0078	0.1014**	0.2605***	0.2452***	0.3374***	0.3025***	0.2995***	0.1053**	1								
unsecuredmort	0.0065	0.1981***	0.1051**	0.1931***	0.3802***	0.3091***	0.1663***	0.3379***	0.1273***	1							
salaries	0.4065***	0.3217***	0.7999***	0.7225***	0.8854***	0.968***	0.8949***	0.4807***	0.3086***	0.2353***	1						
compofficdir	0.4049***	0.3393***	0.7185***	0.6416***	0.8398***	0.9181***	0.8413***	0.5221***	0.2707***	0.3217***	0.9106***	1					
progrevenues	0.1316***	0.4864***	0.5232***	0.2697***	0.614***	0.7058***	0.6644***	0.6118***	0.1851***	0.2789***	0.6281***	0.6916***	1				
progexpenses	0.3387***	0.4074***	0.8226***	0.6936***	0.8922***	0.9944***	0.9095***	0.593***	0.3023***	0.2808***	0.9642***	0.9062***	0.6902***	1			
landbuild	0.3256***	0.4753***	0.7671***	0.6882***	0.8572***	0.9293***	0.8318***	0.7276***	0.2351***	0.3557***	0.9011***	0.8603***	0.6835***	0.9209***	1		
accumdeprec	0.3255***	0.2431***	0.8147***	0.7332***	0.8952***	0.928***	0.8542***	0.4686***	0.2936***	0.2277***	0.966***	0.8556***	0.565***	0.9346***	0.8973***	1	
publicsupport	0.5297***	0.4781***	0.6788***	0.5452***	0.6418***	0.8116***	0.9108***	0.4441***	0.2375***	0.1446***	0.7851***	0.7524***	0.5228***	0.8001***	0.7447***	0.7131***	1

Source: own calculations (*** - significance at 1%; ** - significance at 5%; * - significance at 10%)

Several observations from the table are evident:
- Firstly, all correlations are positive, showing that all the variables tend to move in the same direction which is not particularly surprising.

- Due to a large sample and multiple comparisons problem the significance values are adjusted with a Bonferroni correction.
- The only variables which have correlations with other variables largely on the border (or below) the critical value are loan status variables. All three loan variables are not correlated to the value of cash holdings that could perhaps be attributed to the different liquidity status between those variables.
- Apart from this, all correlations among the variables are positive and relatively strong.

Our empirical strategy will therefore proceed in the same direction as the analysis of Core, Guay and Verdi. We will firstly perform an OLS regression (adjusted for possible heteroskedasticity and other violations of OLS assumptions) of the endowment of museums on a set of commonly used explanatory variables. We will then use the residuals from this regression as an explanatory variable of different performance measures of museums, particularly compensation of management crew and total revenues of the museum. The latter regression will allow us to test the main hypotheses of the empirical part:

▶ Hypothesis 1: Excess managerial compensation and perquisite consumption are greater for museums with excess endowment assets, ceteris paribus.
▶ Hypothesis 2: Expenditures on production of the not-for-profit good are lower for museums with excess endowment assets, ceteris paribus.
▶ Hypothesis 3: Total revenues and other performance measures are lower for museums with excess endowment assets, ceteris paribus.

5.3 First-stage econometric specification and results

In the first stage econometric specification we will use few newly constructed variables:
- "End/Exp" (endowment ratio) which simply denotes the ratio of total endowment (being composed of sum of "Cash", "Savings", "Investpublictra" and "Investother") to total expenses ("Total_expenses");
- "LogEnd" which denotes the logarithm of total endowment;
- "LogRev" which denotes the logarithm of "Total_revenue";
- "CVREV" which denotes the coefficient of variation (CV) of the variable "Total_revenue", on the basis of observations of the past five years. This therefore means that we have to reduce the time series of our panel dataset to only six years (2006-2011);
- "Loan_dummy" which is a dummy variable coded "1" if the firm has obtained a loan in any of the years ending at year t and "0" otherwise; we categorize a firm as having a loan if the firm reports tax-exempt bond liabilities (variable

"Taxexbondliab" having non-zero value) or mortgages and other notes payable (variables "Securmortg" or "Unsecurnotes" having non-zero value);

- "CVREV*Loandum" which is an interaction variable of the "CVREV" and "Loan_dummy" variables;
- "Regulation" that denotes a discrete variable taking value from zero to eight; it measures a count of the number of powers of the state's Attorney General, reported by the Office of the Ohio Attorney General report in 1974 and used and also reported in the article of Fisman and Hubbard (2003).

We also include in the regression time dummies, state dummies and unit dummies, capturing the individual effects of museums, states and years.

Because of the results of the White's test of heteroskedasticity, we also include results of another model, namely weighted least squares regression using the inverse of squared values of residuals of individual observations as weights. The results of both models are provided in below table.

We therefore estimate the following first-stage regression model:

$$
\begin{aligned}
LogEnd_{it} = \beta_0 &+ \beta_1 * Regulation + \beta_2 * CVREV_{it} + \beta_3 * Log\_Rev_{it} + \beta_4 \\
&* Loan\ dummy_{it} + \beta_5 * CVREV\_Loandum_{it} + \sum \beta_t * Year_t \\
&+ \sum \beta_j * State_j + \sum \beta_m * Museum_m + \varepsilon_{it} \qquad (99)
\end{aligned}
$$

Predicted signs of the coefficients in accordance with analyses of Core, Guay and Verdi and Fisman and Hubbard are:

- "Log Rev": in accordance with expectations, firms with higher revenues would be in less need of higher endowments, the coefficient for this variables would therefore be predicted to have a negative sign; yet it is of course also possible that firms with higher revenues (and larger size) in general have larger endowments, the sign of this coefficient is therefore ambiguous;
- "CVREV": this coefficient should be positive, as we would expect that firms with higher variation in the revenues would have a need for higher endowments;
- "Loan_dummy": this coefficient should be negative, as we would expect that firms with alternative financing sources are less likely to require precautionary funds in the form of endowments;
- "CVREV*Loandum": cash flow uncertainty requires a smaller buffer of funds when firms have access to alternative financing sources, we would therefore expect this coefficient to have a negative value as well;

- "Regulation": in states with greater regulatory oversight, donors are expected to allow firms to hold greater endowments, we would therefore expect that the coefficient for this variable has a positive sign. In accordance with findings in Core, Guay and Verdi this coefficient can be insignificant as well.

Table 3. Results of first stage regression

	OLS		WLS	
	Coef.	Signif.	Coef.	Signif.
Const	6.899522		-0.816509	
	[0.1734549]	***	[0.8155059]	
regulation	-0.3488857		-0.2009635	
	[0.0241224]	***	[0.1292802]	
logrev	0.0770538		1.148615	
	[0.0141621]	***	[0.0141406]	***
loandummy	0.050004		0.0947966	
	[0.0496023]		[0.084597]	
cvrev	0.2087582		1.069389	
	[0.0467892]	***	[0.0744691]	***
cvrevloandum	-0.0424252		-1.873266	
	[0.0974715]		[0.1917352]	***
time dummies	Yes		Yes	
state dummies	Yes		Yes	
unit dummies	Yes		No	
Observations	1390		1390	
Adj. R squared	0.9192		0.99916	
F test	65.74	***	2985.03	***
Breusch Pagan statistic	45.08	***		

Source: own calculations (in parentheses are the standard errors; *** - significance at 1%; ** - significance at 5%; * - significance at 10%)

The first model (the OLS) shows that there are two coefficients with expected signs, namely "CVREV" and the interaction term on CVREV and Loandummy.The coefficient on Loan Dummy is positive but insignificant. Coefficient on Regulation is negative and significant, which has to be interpreted in lines of warnings by Core, Guay and Verdi mentioned previously. Coefficient on LogRev is positive and significant, a finding that is robust through any model specification and shows that in general the firms with higher revenues tend to have higher endowments.

The model is clearly heteroskedastic which is shown by the Breusch-Pagan statistic. We, therefore, remedy for this by using weighted least squares (WLS) specification as explained previously.

In the WLS model, two main things are changed: the coefficient of the interaction term on CVREV and Loandummy, which is again correctly signed, is now strongly significant. Also, the coefficient of Regulation is while still being negative now insignificant. This shows that the model is now almost fully in accordance with our expectations. We will therefore in the following use the results (residuals) of this model to explore the relationships among the variables further. In the robustness tests, we will also present the results using another dependent variable (End/Exp i.e. ratio of endowment to expenses) to account for the endowment effects in our model. We will show that the results are robust to the specification of endowment variable.

5.4   Second-stage econometric specification and results

We save the residuals from our first stage model (the heteroskedasticity corrected version) and use the residuals as proxies for abnormal endowment. Each museum is, therefore, assigned a value of the residual denoting the individual museum's value of abnormal (i.e. non-predicted, non-explained by first-stage regression) endowment in the previous year (AbEndt-1). We also construct a second measure of abnormal endowment, the "NegAbEnd" (i.e. negative abnormal endowment), which is a dummy variable having value of "1" if the value of abnormal endowment is negative and "0" otherwise. We interact both variables to get a variable with the coefficient different for firms with positive and negative endowments (AbEnd_NegAbEndt-1) which is consistent with Opler et al.'s (1999) capital expenditure regressions allowing different coefficients on positive and negative excess cash holdings.

We therefore estimate the following two regression models:

$$Dependent\ variable_{it}$$
$$= \beta_0 + \beta_1 * Controls + \beta_2 * AbEndow_{i,t-1} + \sum \beta_t * Year_t + \sum \beta_j$$
$$* State_j + \sum \beta_m * Museum_m + \varepsilon_{it} \qquad (100)$$
$$Dependent\ variable_{it}$$
$$= \beta_0 + \beta_1 * Controls + \beta_2 * AbEndow_{i,t-1} + \beta_3$$
$$* AbEnd\_NegAbEnd_{i,t-1} + \sum \beta_t * Year_t + \sum \beta_j * State_j$$
$$+ \sum \beta_m * Museum_m + \varepsilon_{it} \qquad (101)$$

For the dependent variable we choose three variables, slightly different from what was selected by Core, Guay and Verdi. We choose firstly, the logarithm of "Compens_OfficDi" as a measure of manager's perquisites; secondly, the logarithm of "Total_revenue" as a measure of performance of the firm; and thirdly, the ratio of

program expenses to total expenses ("Progrtotexp") as a measure of expenditures on the production of the not-for-profit good.

For controls, we choose three additional variables. Firstly, we choose the logarithm of "Total_expenses" in year t-1 to control for the firm size. Taking into account findings by Hallock (2005), who finds that outside fund-raising is the performance measure that best explains CEO compensation in not-for-profits (see also Core, Guay and Verdi, 2006), we also include two variables controlling for outside fund-raising, namely public support to the museums. Total contributions are the sum of direct and indirect public support and government grants ("Publicsupport"). To avoid losing additional observations due to taking the logarithm of zero, we include a dummy variable, "Zero_Contrib", equal to "1" if outside fund-raising is zero, and "0" otherwise. We then measure "Log_Contrib" as the log of total contributions if positive, and 0 otherwise. We also again include in all regressions dummies for state and year fixed effects.

The results of modeling the first dependent variable, logarithm of manager's compensation are shown below. They are shown for four specifications: firstly, two models (OLS and heteroskedasticity corrected regression, the second one is included as in all models we find the presence of heteroskedasticity) accounting for only one abnormal endowment variable, and secondly the same two model specifications, including our both variables measuring effects of abnormal endowments. We expect the coefficient on first, "normal" abnormal endowment variable to be positive and significant while we expect the coefficient on the interaction variable to be of the opposite sign, therefore, to be negative.

Table 4. Results of second-stage regression[1], dependent variable: manager's compensation

dep: logcompceo	OLS_1		WLS_1		OLS_2		WLS_2	
	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.
Const	2.445597		2.403493		2.356081		2.346985	
	[0.3994127]	***	[0.0758971]	***	[0.3964548]	***	[0.0779898]	***
abend(n-1)	0.0395037		0.042307		0.0199534		0.0228786	
	[0.0128817]	***	[0.0015033]	***	[0.0225974]		[0.0031016]	***
abend*negabend (n-1)					-0.037618		-0.0303367	
					[0.0357254]		[0.0049206]	***
logexp(n-1)	0.5339537		0.5320147		0.5347964		0.5321951	
	[0.0258895]	***	[0.0030481]	***	[0.0259004]	***	[0.0038532]	***
logpublicsupport	0.1077454		0.1101701		0.1086278		0.1119799	
	[0.022999]	***	[0.0024814]	***	[0.023013]	***	[0.0036881]	***
zeropublicsupport	0.533355		0.5939166		0.5711576		0.6241399	
	[0.2824552]	*	[0.0351764]	***	[0.2847117]	**	[0.0472859]	
time dummies	Yes		Yes		Yes		Yes	
state dummies	Yes		Yes		Yes		Yes	
Observations	1010		1010		1010		1010	
Adj. R squared	0.8378		1		0.8378		0.9992	
F test / Wald chi2	97.52	***	inf	***	95.77	***	22218.13	***
Breusch Pagan statistic	29.27	***			28.89	***		

Source: own calculations (in parentheses are the standard errors; *** - significance at 1%; ** - significance at 5%; * - significance at 10%)

The results are confirmed by the model. In three specifications, the coefficient on abnormal endowment is positive and significant; in both heteroskedasticity-robust models it is positive and strongly statistically significant. The coefficient on interactive abnormal endowment variable is negative and significant again confirming our previous reasoning (for firms with negative abnormal endowment the effect of abnormal endowment on manager's compensation is negative). The signs and significance of control variables is in accordance with expectations. We, therefore, find positive evidence on the presence of the positive relationship between excess endowments and manager's compensation which confirms the first hypothesis.

The results of modeling the second dependent variable, logarithm of total revenues are shown below. They are again shown for four specifications: firstly, the OLS and heteroskedasticity corrected regression (the reasons for including the latter are again the same as before) accounting for only one abnormal endowment variable, and secondly the same two model specifications including our both variables of abnormal endowments. We expect the coefficient on first, "normal" abnormal endowment variable to be negative and significant while we expect the coefficient on the interaction variable to be positive.

---

[1] The subscripts _1 and _2 refer to the number of variables refererring to abnormal endowment included in the model (_1: only "abend"; _2: both "abend" and the interaction variable)

Table 5. Results of second-stage regression, dependent variable: log revenues

dep: logrev	OLS_1		WLS_1		OLS_2		WLS_2	
	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.
Const	0.5745866		0.0883481		0.5711896		0.1097247	
	[0.4351009]		[0.0586208]		[0.4353812]		[0.0772408]	
abend(n-1)	-0.0177862		-0.0154289		-0.0255038		-0.0232462	
	[0.0154533]		[0.0008756]	***	[0.026628]		[0.0008235]	***
abend*negabend (n-1)					0.0151223		0.0139457	
					[0.0424823]		[0.0011307]	***
logexp(n-1)	0.0925365		0.093705		0.092848		0.0927549	
	[0.0314046]	***	[0.0011437]	***	[0.0314295]	***	[0.0010147]	***
logpublicsupport	0.3185621		0.3182546		0.3188801		0.3199932	
	[0.0280273]	***	[0.0009416]	***	[0.0280528]	***	[0.0009188]	***
zeropublicsupport	2.400131		2.392656		2.413624		2.420169	
	[0.3408273]	***	[0.0140577]	***	[0.3430653]	***	[0.013359]	***
time dummies	Yes		Yes		Yes		Yes	
state dummies	Yes		Yes		Yes		Yes	
Observations	1137		1137		1137		1137	
Adj. R squared	0.6251		0.9998		0.6248		0.9999	
F test / Wald chi2	36.07	***	inf	***	35.39	***	inf	***
Breusch Pagan statistic	748.52	***			750.7	***		

Source: own calculations (in parentheses are the robust standard errors; *** - significance at 1%; ** - significance at 5%; * - significance at 10%)

The results are once more confirmed by the model. In all four specifications the coefficient on abnormal endowment is negative, and it is strongly significant in both heteroskedasticity-robust models. The coefficient on interactive abnormal endowment variable is positive and strongly significant (in the final WLS model) again confirming our previous reasoning (for firms with negative abnormal endowments the effect of abnormal endowment on total revenues is positive as compared to firms with positive abnormal endowments). The signs and significance of control variables are again in accordance with expectations.

The results of modeling the third dependent variable, ratio of program expenses to total expenses are shown below. They are once more shown for four specifications: firstly, the OLS and heteroskedasticity corrected regression (the reasons for including the latter are again the same as before) accounting for only one abnormal endowment variable, and secondly the same two model specifications including our both variables of abnormal endowments. We once more expect the coefficient on first, "normal" abnormal endowment variable to be negative and significant, while we expect the coefficient on the interaction variable to be positive.

Table 6. Results of second-stage regression, dependent variable: ratio of program expenses to total expenses

dep: progrtotexp	OLS_1		WLS_1		OLS_2		WLS_2	
	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.
Const	0.3073079		0.1124364		0.2991586		0.0825846	
	[0.1275659]	**	[0.0303797]	***	[0.1271537]	**	[0.0334469]	**
abend(n-1)	-0.0009861		-0.0011083		-0.0195004		-0.0184604	
	[0.0045307]		[0.0005867]	*	[0.0077767]	**	[0.0012145]	***
abend*negabend (n-1)					0.0362779		0.0340426	
					[0.012407]	***	[0.0015641]	***
logexp(n-1)	0.0244635		0.0271488		0.0252108		0.0268482	
	[0.0092074]	***	[0.0011418]	***	[0.009179]	***	[0.0014631]	***
logpublicsupport	0.003105		0.0006952		0.0038679		0.0035174	
	[0.0082172]		[0.0010324]		[0.0081929]		[0.0013104]	***
zeropublicsupport	-0.1961218		-0.3665576		-0.1637532		-0.2868382	
	[0.0999261]	**	[0.0386002]	***	[0.1001927]		[0.0348128]	***
time dummies	Yes		Yes		Yes		Yes	
state dummies	Yes		Yes		Yes		Yes	
Observations	1137		1137		1137		1137	
Adj. R squared	0.2408		0.9973		0.2461		0.9946	
F test / Wald chi2	7.67	***	7732.9	***	7.74	***	3808.02	***
Breusch Pagan statistic	264.63	***			273.3	***		

Source: own calculations (in parentheses are the standard errors; *** - significance at 1%; ** - significance at 5%; * - significance at 10%)

The results are fully confirmed by the model. In all four specifications the coefficient on abnormal endowment is negative, and it is significant in both heteroskedasticity-robust models (when also including the interaction term it becomes strongly significant). The coefficient on interactive abnormal endowment variable is positive and strongly significant in both models in which it is included again confirming our previous reasoning. The signs and significance of control variables are in accordance with expectations.

The results of our regression analysis, therefore, strongly confirm results from theoretical and mathematical part. Large endowments in nonprofit museums are correlated to stronger payment of manager's perquisites on one side and to lower revenues and smaller program-to-total-expenses ratio on the other side. Both results seem to be in accordance with our propositions from the mathematical part of the thesis. We empirically demonstrated that firstly, large endowments are related to benefits for the manager (Jensen's basic conjecture) and secondly, that large endowments are related to losses in revenues and worse performance of the firm (our Proposition 2). On the basis of this, we are, therefore, able to confirm our main hypothesis (allowing deaccessioning leads to nonoptimal museum management) in empirical terms as well.

5.5 Robustness tests

We will also perform two robustness tests. Firstly, we will explore whether the selection of the first-stage dependent variable in any manner effects the final results. Secondly, we will try to take into account the peculiar construction of our excess endowment measure, namely residuals from the first-stage regression which leads to a classical measurement error problem in econometrics.

We firstly present the results when including a different first-stage dependent variable, namely ratio of endowment to expenses ("End/Exp"). Below are firstly shown the results of the first stage regression models.

Table 7. Results of first stage regression, endowment/expenses as dependent variable

dep: End/Exp	OLS		WLS	
	Coef.	Signif.	Coef.	Signif.
Const	-2.039584		-0.3405482	
	[0.9176721]	**	[11.78089]	
regulation	-0.1284767		-0.4293891	
	[0.1298271]		[1.484998]	
logrev	0.4488547		0.6791248	
	[0.0783733]	***	[0.0906042]	***
loandummy	0.1756408		-2.230205	
	[0.2704866]		[0.1519434]	***
cvrev	0.9658332		0.6263718	
	[0.2554087]	***	[0.2121158]	***
cvrevloandum	-0.7960041		6.944693	
	[0.5315376]		[0.3259865]	***
time dummies	Yes		Yes	
state dummies	Yes		Yes	
unit dummies	Yes		No	
Observations	1388		1388	
Adj. R squared	0.8078		0.9617	
F test	24.89	***	684.45	***
Breusch Pagan statistic	1148.34	***		

Source: own calculations (in parentheses are the standard errors; *** - significance at 1%; ** - significance at 5%; * - significance at 10%)

The above results are not fully in accordance with results from table 3. There are two main differences: firstly, the coefficient on Loan Dummy in the heteroskedasticity-corrected model is negative and significant, which is fully in accordance with theoretical expectations and shows that firms with alternative financing possibilities have less need of larger endowments. On the other hand, the coefficient on the interaction term is positive and significant (in the heteroskedasticity-corrected model) which can be explained by reasoning that when taking into account the effects of alternative financing possibilities (LoanDummy) and variation in the revenues (CVREV), the remaining effect of cash flow uncertainty is still strong even when firms have access to alternative financing sources.

The results of the second-stage regressions for all three dependent variables but now using residuals from the model in Table 7 as measures of excess endowment are presented below.

Table 8. Results of second-stage regression, dependent variable: manager's compensation, excess endowments based on End/Exp regression

dep: logcompceo	OLS_1		WLS_1		OLS_2		WLS_2	
	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.
Const	2.447264		2.276734		2.397619		2.710258	
	[0.4002399]	***	[0.0767841]	***	[0.3997588]	***	[0.1234162]	***
abend(n-1)	0.0294706		0.0291416		-0.0114545		-0.0143705	
	[0.0121682]	**	[0.0015642]	***	[0.0208394]		[0.0039308]	***
abend*negabend (n-1)					0.0877071		0.0913165	
					[0.0363042]	**	[0.0052084]	***
logexp(n-1)	0.5319485		0.5285988		0.5352732		0.5375174	
	[0.0259484]	***	[0.0042254]	***	[0.0259195]	***	[0.0020535]	***
logpublicsupport	0.1097216		0.1137758		0.1104597		0.1108267	
	[0.0230343]	***	[0.0041915]	***	[0.0229782]	***	[0.0020366]	***
zeropublicsupport	0.5440094		0.6508904		0.6454766		0.6949909	
	[0.2836093]	*	[0.0595016]	***	[0.2859946]	**	[0.045113]	***
time dummies	Yes		Yes		Yes		Yes	
state dummies	Yes		Yes		Yes		Yes	
Observations	1010		1010		1010		1010	
Adj. R squared	0.8372		1		0.838		0.9999	
F test / Wald chi2	97.09	***	inf	***	95.92	***	inf	***
Breusch Pagan statistic	30.33	***			27.73	***		

Source: own calculations (in parentheses are the standard errors; *** - significance at 1%; ** - significance at 5%; * - significance at 10%)

The above results only partly confirm our hypotheses. When including only AbEnd$_{t-1}$ as a measure of excess endowment in the model, the results of the previous section are fully confirmed: the coefficient is positive and strongly significant in the heteroskedasticity-robust model. On the other hand, in the models with included the variable controlling for negative endowments, the results are pointed in the opposite direction. For the time of writing the thesis we were not able to fully explain this result, it has to be noted though that this result is not supported by results of all previous seven models measuring the effects of abnormal endowments on manager's compensation.

The results with the dependent variable of log revenues are shown below and fortunately full confirm the results of the previous section based on LogEnd first-stage regression.

Table 9. Results of second-stage regression, dependent variable: log revenues, excess endowments based on End/Exp regression

dep: logrev	OLS_1		WLS_1		OLS_2		WLS_2	
	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.
Const	0.587997		0.6003933		0.5719099		0.1670094	
	[0.4343754]		[0.0848813]	***	[0.4341748]		[0.0786899]	**
abend(n-1)	-0.0318903		-0.0302495		-0.0637613		-0.05408	
	[0.0146196]	**	[0.0008998]	***	[0.0246489]	**	[0.001727]	***
abend*negabend (n-1)					0.0691073		0.0576607	
					[0.0430485]	*	[0.0024725]	***
logexp(n-1)	0.0880512		0.0885108		0.090811		0.0929267	
	[0.0313388]	***	[0.0013438]	***	[0.0313632]	***	[0.0012305]	***
logpublicsupport	0.3218806		0.3231524		0.3221199		0.3214521	
	[0.0279571]	***	[0.0013429]	***	[0.0279371]	***	[0.0010323]	***
zeropublicsupport	2.453851		2.47121		2.522389		2.544352	
	[0.340659]	***	[0.0314746]	***	[0.3430778]	***	[0.0293815]	***
time dummies	Yes		Yes		Yes		Yes	
state dummies	Yes		Yes		Yes		Yes	
Observations	1137		1137		1137		1137	
Adj. R squared	0.6263		0.9999		0.6268		0.9998	
F test / Wald chi2	36.25	***	inf	***	35.69	***	inf	***
Breusch Pagan statistic	757.17	***			765.34	***		

Source: own calculations (in parentheses are the standard errors; *** - significance at 1%; ** - significance at 5%; * - significance at 10%)

The results, therefore, show that excess endowment is negatively and statistically significantly related to revenues of the non-profit firm. All of the variables in the model behave in accordance with theoretical predictions and confirm results from Table 5.

Final table in our first robustness verification shows the relationships when taking as the dependent variable also the ratio of program expenses to total expenses. Thr results are shown below.

Table 10. Results of second-stage regression, dependent variable: ratio of program to total expenses, excess endowments based on End/Exp regression

dep: progrtotexp	OLS_1		WLS_1		OLS_2		WLS_2	
	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.
Const	0.30572		0.1050421		0.2991804		0.2463492	
	[0.1275564]	**	[0.030411]	***	[0.1273582]	**	[0.0342046]	***
abend(n-1)	0.00062		0.0007023		-0.0123359		-0.0104178	
	[0.0042931]		[0.0007067]		[0.0072304]	*	[0.0012128]	***
abend*negabend (n-1)					0.0280928		0.0261282	
					[0.0126276]	**	[0.0018324]	***
logexp(n-1)	0.0249475		0.027901		0.0260693		0.0290482	
	[0.0092028]	***	[0.0010289]	***	[0.0091999]	***	[0.0015333]	***
logpublicsupport	0.0027246		0.0001034		0.0028219		0.0011024	
	[0.0082097]		[0.0009752]		[0.0081949]		[0.0012241]	
zeropublicsupport	-0.2011933		-0.3763894		-0.1733322		-0.2957947	
	[0.1000361]	**	[0.0391779]	***	[0.1006363]	*	[0.0312305]	***
time dummies	Yes		Yes		Yes		Yes	
state dummies	Yes		Yes		Yes		Yes	
Observations	1137		1137		1137		1137	
Adj. R squared	0.2408		0.9975		0.2435		0.996	
F test / Wald chi2	7.67	***	8402.67	***	7.65	***	5160	***
Breusch Pagan statistic	264.66	***			272.63	***		

Source: own calculations (in parentheses are the standard errors; *** - significance at 1%; ** - significance at 5%; * - significance at 10%)

Results are again in accordance with theoretical expectations as well as with results in Table 6. In the first two specifications, when the effect of negative endowments is not controlled for, the variable for abnormal endowment is incorrectly signed but not statistically significant. On the other hand, when we include the negative endowments control variable, the results show that abnormal endowments are negatively related to the ratio of program expenses to total expenses and, therefore, confirm our previous findings.

The second robustness test takes into account the peculiar construction of our measure for abnormal endowments which is based on residuals from first-stage regression and is, therefore, measured with measurement error, which causes the coefficients in the regression equations to be biased downwards (see e.g. Verbeek, 2004). This is, therefore, one of three classical cases for usage of instrumental variables as noted by e.g. Verbeek (2004: 125): the presence of a lagged dependent variable and autocorrelation in the error term; measurement errors in the regressors; and simultaneity or endogeneity of regressors.

Usage of instrumental variables (IV) needs two additional assumptions on the variable to be included as instrumental in the model: 1) correlation with the variable that we instrument for (in our case the excess endowments, i.e. residuals for first stage regression); and 2) independence from the residuals of the regression model in which we perform the IV regression (this is sometimes also called the "exclusion restriction," see e.g. Verbeek, 2004).

To instrument for the excess endowments we will use the second lag of residuals from the first-stage regression. Firstly we have to demonstrate that such variable satisfies restrictions 1 and 2 from the previous paragraph which is shown in below pairwise correlation tables which are done for regressions in Tables 4, 5 and 6.

Table 11. Satisfying the IV assumptions – pairwise correlations, Models in Table 4

	res1	lagabend	laglagabend
res1	1		
lagabend	0	1	
laglagabend	0.0492	0.2729***	1

	res2	lagabend	laglagabend
res2	1		
lagabend	0	1	
laglagabend	0.0488	0.2729***	1

Source: own calculations (*** -significance at 1%; ** - significance at 5%; * - significance at 10%)

Table 12. Satisfying the IV assumptions – pairwise correlations, Models in Table 5

	res3	lagabend	laglagabend
res3	1		
lagabend	0	1	
laglagabend	-0.0277	0.2729***	1

	res4	lagabend	laglagabend
res4	1		
lagabend	0	1	
laglagabend	-0.028	0.2729***	1

Source: own calculations (*** -significance at 1%; ** - significance at 5%; * - significance at 10%)

Table 13. Satisfying the IV assumptions – pairwise correlations, Models in Table 6

	res5	lagabend	laglagabend
res5	1		
lagabend	0	1	
laglagabend	-0.0493	0.2729***	1

	res6	lagabend	laglagabend
res6	1		
lagabend	0	1	
laglagabend	-0.0527	0.2729***	1

Source: own calculations (*** -significance at 1%; ** - significance at 5%; * - significance at 10%)

From all of the above three tables we can verify that both IV assumptions are satisfied: the residuals from all six models are uncorrelated to either of the lagged endowment variables ("lagabend" is the same as our "AbEnd$_{t-1}$" variable, while "laglagabend" denotes the lagged AbEnd$_{t-1}$ variable, therefore, our instrument), while, on the other hand, both lagged variables are strongly correlated to each other.

In the below table we firstly present the results of IV model specifications, which are related to regressions in Table 4, modelling the effect of abnormal endowment on log managers compensation. We present results for both models in Table 4, namely the one when only the abnormal endowment variable is included and a second one when also the control for negative abnormal endowment is included. We also present the results for two IV estimators: the 2SLS and the GMM.

Table 14. Results of second-stage regression, instrumental variables, dependent variable: manager's compensation

dep: logcompceo	IV-2SLS_1		IV-GMM_1		IV-2SLS_2		IV-GMM_2	
	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.
Const	2.349507		0.1491703		2.603234		1.277347	
	[0.5445982]	***	[0.0235466]	***	[0.6026794]	***	[0.6079183]	**
abend(n-1)	0.1348076		0.1396486		0.3729416		0.38061	
	[0.0701067]	*	[0.0867149]	*	[0.2347293]	*	[0.3750473]	
abend*negabend (n-1)					-0.4328882		-0.4441058	
					[0.3468194]		[0.4856351]	
logexp(n-1)	0.5408095		0.545469		0.5187389		0.5202304	
	[0.0337616]	***	[0.0382901]	***	[0.0321218]	***	[0.0381586]	***
logpublicsupport	0.1059301		0.1033794		0.1105684		0.1095682	
	[0.0294632]	***	[0.0340569]	***	[0.0305207]	***	[0.0382278]	***
zeropublicsupport	0.5194283		0.4980506		0.2791374		0.263631	
	[0.356892]		[0.4219224]		[0.4952819]		[0.6719695]	
time dummies	Yes		Yes		Yes		Yes	
state dummies	Yes		Yes		Yes		Yes	
Observations	787		787		787		787	
R squared	0.8368		0.815		0.8085		0.8007	
Wald chi2	4080.26	***	6.40E+05	***	3480.69	***	5.47E+03	***

Source: own calculations (in parentheses are the standard errors; *** - significance at 1%; ** - significance at 5%; * - significance at 10%)

The above results show that the positive effects of abnormal endowments on manager's compensation remain although the effects are much less statistically significant. It is also notable that the effects are much more intensive, and the coefficient on abnormal endowment is significantly higher than the coefficient in e.g. Table 4. This is in accordance with expectations and confirms that the measurement error problem was causing the estimates to be biased downwards. On the other hand although the effects in the last column are the highest they are the only ones that have been found insignificant.

Table 15. Results of second-stage regression, instrumental variables, dependent variable: log total revenues

dep: logrev	IV-2SLS_1		IV-GMM_1		IV-2SLS_2		IV-GMM_2	
	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.
Const	0.6962		0.6813843		0.6074436		0.595544	
	[0.4180805]	*	[0.2632617]	**	[0.4355967]		[0.2691426]	**
abend(n-1)	-0.0588807		-0.0588336		-0.1902059		-0.1901324	
	[0.0722285]		[0.1311736]		[0.2761366]		[0.4848552]	
abend*negabend (n-1)					0.2301536		0.2300913	
					[0.3620369]		[0.6233839]	
logexp(n-1)	0.0457015		0.0457204		0.0561047		0.0561171	
	[0.0417015]		[0.0745806]		[0.0386729]		[0.0630437]	
logpublicsupport	0.3556806		0.3556308		0.3529661		0.3529268	
	[0.0366183]	***	[0.0612747]	***	[0.0356956]	***	[0.0582965]	***
zeropublicsupport	2.450053		2.449391		2.554099		2.553538	
	[0.445989]	***	[0.7436381]	***	[0.5247691]	***	[0.9476059]	***
time dummies	Yes		Yes		Yes		Yes	
state dummies	Yes		Yes		Yes		Yes	
Observations	893		893		893		893	
R squared	0.6186		0.6186		0.6138		0.6138	
Wald chi2	1448.47	***	5254.38	***	1430.77	***	4260.76	***

Source: own calculations (in parentheses are the standard errors; *** - significance at 1%; ** - significance at 5%; * - significance at 10%)

The results in the above table confirm the negatively signed coefficient of the effect of abnormal endowment on total revenues. Again the effects appear to be stronger in level than in Table 5, yet the effect is insignificant in all four IV regressions.

Table 16. Results of second-stage regression, instrumental variables, dependent variable: ratio of program expenses to total expenses

dep: progrtotexp	IV-2SLS_1		IV-GMM_1		IV-2SLS_2		IV-GMM_2	
	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.	Coef.	Signif.
Const	0.2454369		0.2788767		0.1792971		0.2148233	
	[0.1147531]	**	[0.0790952]	***	[0.1229671]		[0.0862803]	**
abend(n-1)	-0.0248979		-0.0250043		-0.1227591		-0.1229786	
	[0.0143619]	*	[0.0255498]		[0.0679522]	*	[0.1025513]	
abend*negabend (n-1)					0.1715064		0.1716925	
					[0.1022015]	*	[0.1322731]	
logexp(n-1)	0.0100214		0.0099788		0.0177737		0.0177367	
	[0.0111787]		[0.0168172]		[0.0109172]	*	[0.014567]	
logpublicsupport	0.0148897		0.015002		0.0128669		0.0129843	
	[0.0078161]	*	[0.015263]		[0.0100767]		[0.0135437]	
zeropublicsupport	-0.119108		-0.117615		-0.0415747		-0.0399012	
	[0.1195537]		[0.190912]		[0.1481401]		[0.2039686]	
time dummies	Yes		Yes		Yes		Yes	
state dummies	Yes		Yes		Yes		Yes	
Observations	893		893		893		893	
R squared	0.3074		0.3067		0.2223		0.2212	
Wald chi2	419.63	***	1225.9	***	376.28	***	5.46E+02	***

Source: own calculations (in parentheses are the standard errors; *** - significance at 1%; ** - significance at 5%; * - significance at 10%)

The effects in our final IV regression models in the above table are in accordance with previous findings. The effects are correctly signed, stronger in level than in our original specifications in Table 6, but of lower statistical significance (although still significant in both 2SLS IV models).

We can therefore conclude that we have found evidence on adverse effects of abnormal (excess) endowments on performance of the firm and production of the non-profit good while, on the other hand, having another adverse (excessively positive) effect on manager's compensation as predicted by Jensen (1986). Our robustness tests have confirmed that the effects are robust in most specifications, although can be lower in statistical significance than in the original models. We can therefore conclude that we managed to find evidence confirming all three initial hypotheses and, therefore, also evidence to confirm our main hypothesis that deaccessioning and excess endowments lead to non-optimal museum management.

CONCLUSION

In our thesis, we tried to provide a broad and comprehensive view on the phenomena of deaccessioning in economic perspective. Although the problem is well known in the literature (in cultural economics the debate started with article by Michael Montias in 1973 if not before, while in museum management the problem was present much before) there have been until 2012 no attempts of economic modelling. Two articles by Di Gaetano and Mazza (2012) and Srakar (2012) have broken this. The first demonstrated (unsurprisingly) that allowing deaccessioning will have negative effects on private donations, and the second one (which was the basis for our chapter 4) demonstrated that allowing deaccessioning will lead to nonoptimal museum management.

In our thesis, we, therefore, tried to provide a step forward in the analysis of this phenomenon. We firstly presented an overview of cultural economics as this field is almost unrepresented in Slovenian' (and Eastern European' in general) economic debates. We presented an overview of a number of different subfields of cultural economics, classifying them on the basis of the general topic and artistic field covered. We showed that cultural economics is much more varied than commonly perceived and that it studies number of economic problems, relevant also for the economics and society in general. We also presented the main findings of the field in all covered subjects and pointed to main references studies existing in the field, including some of the recent studies.

In the second part of this chapter, we presented an overview of the problem of deaccessioning viewed in light of its managerial, ethical, moral, legal and finally economic problems. Although our general thesis brings light into the understanding of effects of deaccessioning, we expect the debate to be more fierce in the following years, as the effects of the financial crisis are still very much present in daily life of museums and financial issues in museums will come to the forefront of attention not just in the U.S. museums but also in many European and other world countries as well. We pointed to the main controversies not just in legal and moral, but also in the economic aspects, presented the main results of existing studies (including also the recent study of Di Gaetano and Mazza 2012) and demonstrated the problems of deaccessioning practices on four case studies of American museums announcing the decisions on deaccessioning and, mostly, latter dropping them or implementing deaccessioning in a much reduced extent.

In our third chapter, we presented an overview of contract theory as a subfield of microeconomics that served us to get insights into effects of deaccessioning on the management in museums. We presented the debates on principal agent theory which lies at the core of contract theory. The conflicts between principal and agent are

present in almost any relationship in daily life and while the conflicting nature of the theory can be debated (e.g. via prospect theory) the way forward is probably not in the dismissal of the theory but the refinement of its rich mathematical perspective. We presented also some recent theoretical findings, related to incomplete contract theory and diversity of possible problems arising in principal agent analysis. We, then, presented the debates about agency costs of free cash flow which are the core for our mathematical and empirical analysis, presenting a thorough literature review of all research findings in the area, including also some empirical findings on agency costs of excess endowments in non-profit organisations and findings on the economics of non-profit organisations in general.

In the fourth chapter, we performed a mathematical analysis, following the model by Grossman and Hart established for the analysis of effects of debt on private firm's market value. We managed to get a rich set of results confirming three main observations: 1) allowing deaccessioning has a negative effect on incentives in the nonprofit firm (principal benefits more from additional effort of the manager than the manager himself); 2) allowing deaccessioning is related to lower revenues as optimal; 3) allowing deaccessioning is related to lower effort by the manager as optimal. We managed to prove the results in case of both risk-neutral and risk-averse principal (the manager was expected to be risk-averse in both cases). In the latter case we used an additional assumption which was shown to be merely a necessary condition to participate in the principal agent "game". The results strongly point to the confirmation of our main hypothesis and therefore to the finding that deaccessioning has adverse effects for the management of the museum. Its presence therefore has adverse effects (viewed from principal's perspective) on both the effort of the museum manager; his/her perquisites; as well as on the performance criteria of the museum (mainly its revenues). We therefore demonstrated that deaccessioning leads to risky and costly situations which are surely not in the interest of the museum as a nonprofit firm. The results can easily be generalised for any nonprofit firm: higher endowment will almost surely lead to agency problems in a nonprofit firm. The task lying ahead is to formally prove the Jensen's conjecture of agency costs of free cash flow also for the private for-profit firms. We also noted some difference between our analysis and the analysis in the case of for-profit firms and possible paths for the solution also in this case. We believe our mathematical analysis is the first step in formally showing the Jensen's conjecture also in the general case.

In the final, fifth chapter we also conducted an empirical study on the effects of abnormal endowments in the U.S. museums. We conducted a study on a rather large sample of museums, covering almost all (48 out of 51 – including Washington D.C.) of the U.S. states. We included data on over 20 different variables in our analysis. We again note the caveat that deaccessioning and museum collections in general are not included in the museum's yearly reports due to problems in quantifying the value of

museum collections, our results are, therefore, valid for endowment as consisting of cash, savings and securities, a sort of "money buffer" against adverse situations for a museum.

We strictly followed an econometric design by Fisman and Hubbard (2003) and Core, Guay and Verdi (2006), which proceeds in two steps: firstly, with regression estimation of endowment as explained by its most common determinants; and secondly, estimating the effects of "abnormal," i.e. non-explained endowment on the performance of the nonprofit firm. We were able relatively strongly to confirm the results of Core, Guay and Verdi (valid for NGO's in general) also for the U.S. museum sector: the abnormal endowment leads to higher perquisites of the managers and to lower revenues and performance of the non-profit firm as optimal. This is strongly related to our mathematical analysis of the previous chapter and empirically verifies our three propositions from the mathematical part of the thesis. We were also able to control for the effect of measurement error including an instrumental variable (first lag of the abnormal endowment), which was not addressed or remedied in previous analyses. We were able to perform also some other robustness tests confirming and strengthening while also relativising our results.

Main scientific contributions of the thesis are apparent and are listed below:
1) Probably the first Slovenian PhD thesis in cultural economics with an extensive presentation of the field itself in the first chapter;
2) One of the first mathematical modelling analyses of deaccessioning problem in general (to our best knowledge the only other existing articles are Di Gaetano and Mazza (2012) and Srakar (2012));
3) The first mathematical modelling analysis of economic effects of deaccessioning on *management* in museums;
4) Probably the first mathematical model of agency costs of free cash flow, proving the Jensen's conjecture for the case of nonprofit firms;
5) One of rare econometric analyses of financial management of museums with a focus on U.S. nonprofit museums;
6) Confirmation of main existing econometric evidence on nonprofit firms in general (Fisman and Hubbard, 2003; Core, Guay and Verdi, 2006) also for museum sector;
7) Extension of results of Fisman and Hubbard and Core, Guay and Verdi by also taking into account the measurement error problems in their regressions.

We are, therefore, able strongly to claim that deaccessioning, i.e. selling of museum artworks for the purpose of covering operation costs of the museum leads to important and widespread agency costs for the museum and is, therefore, undesirable also from an economic viewpoint. An important addition to our work would also be in searching for possible remedies to the problem, either in economic mechanisms (e.g. certain

types of auctions as proposed by Montias), legal regulations (e.g. Brodsky Bill) or higher transparency (e.g. database of Indianapolis Museum of Art). In any case we believe we have provided sufficient arguments to enhance the debate about economic effects of deaccessioning in cultural economics, museum management, general economics and society in general. We hope that this is only the start of a new debate on economics of museums and cultural economics in Slovenia, the U.S. and other countries. We provide sufficient reasons to be careful about deaccessioning practices with the purpose of covering the revenues slack. New solutions for covering the museums financial problems have to be searched for in future, enabling the sound incentives for museum managers to provide the best possible effort for museum's benefit. Deaccessioning is surely not an answer in such situation.

As the scientific debate on deaccessioning gained ground in past few years, it will be interesting to see where the debate and future scientific findings will lead us. Furthermore, it will be interesting to see if the mathematical analysis of microeconomic problems such as deaccessioning situations, which is common for the economic area of industrial organization will be enhanced in cultural economics in future years. Additionally one has to note that macroeconomic issues in cultural economics (i.e. economics and econometrics of cultural policy), which would also demand a formal mathematical analysis are not covered well (if at all) at present. Cultural economics is therefore a promising and not well research subject in general and we expect its rise in future years to come. We hope the analysis in our thesis will, on one side, provide ground for research in this area in general, while also stirring the development of cultural economics in Slovenia and Eastern Europe in general, where the subject of cultural economics is rarely represented. If it manages to provide at least some ground to this, it will fulfill one of the author's main intentions.

REFERENCES

1. Abbé-Decarroux, F., & Grin, F. (1992). Risk, Risk Aversion and the Demand for the Performing Arts. In: R. Towse and A. Khakee, eds., *Cultural Economics*, Berlin: Springer, pp. 125-140

2. Abbing. H. (2002). *Why Are Artists Poor? The Exceptional Economy of the Arts*. Amsterdam: Amsterdam University Press

3. Aghion, P., Dewatripont, M., & Rey, P. (1994). Renegotiation Design with Unverifiable Information. *Econometrica*, Vol. 62, No. 2, pp. 257-282

4. Agrawal, A., & Narayanan, J. (1994). The Dividend Policies of All-Equity Firms: A Direct Test of the Free Cash Flow Theory. *Managerial and Decision Economics* 15: 2, pp. 139-148

5. Akerlof, G. A. (1970). The Market for "Lemons": Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics*, Vol. 84, No. 3., pp. 488-500

6. Alchian, A. A. (1961). *Some Economics of Property*. Santa Monica: Rand Corporation

7. Alchian A.A., & Demsetz, H. (1972). Production, Information Costs and Economic Organization. *American Economic Review*, 62, pp. 777-795

8. Anderson, C. (2004). The Long Tail. *Wired*, Issue 12. 10 Oct., 2004

9. Arrow, K.J. (1963) Uncertainty and the Welfare Economics of Medical Care. *The American Economic Review*, Vol. 53, No. 5, pp. 941-973

10. Arrow, K.J. *(*1971*)*. *The Theory of Discrimination*. Working Papers 403, Princeton University, Department of Economics, Industrial Relations Section

11. Arrow, K.J., Solow, R., Portney, P.R., Leamer, E.E., Radner, R., & Schuman, H. (1993): *Report on the NOAA Panel on Contingent Valuation*, (Access: 22.09.2013)

12. Association of Art Museum Directors (2009). *AAMD College and University Guidelines for Art on Campus*. New York: Association of Art Museum Directors

13. Babb, E. (2007). *The Public Value and Legal Battles of a Single Donor Museum*. Harvard Law School Student Scholarship Series. Paper 18

14. Barnard, C.I. (1938). *The Functions of the Executive*. Cambridge, MA: Harvard University Press

15. Baró, E., & Bonet, L. (1997). Els problemes d'avaluació de l'impacte economic de la despesa cultural. *Revista Econòmica de Catalunya* 31, pp. 76-83

16. Bedate, A.M., Herrero, L.C., & Sanz, J.A. (2009). Economic valuation of a contemporary art museum: correction of hypothetical bias using a certainty question. *Journal of Cultural Economics* 33(3), pp. 185-199

17. Basso, A., & Funari, S. (2004). A quantitative approach to evaluate the relative efficiency of museums. *Journal of Cultural Economics*, Kluwer, vol. 28, 195-216

18. Baumol, W.J. (1971). Economics of Athenian Drama. *Quarterly Journal of Economics*, LXXXV, No. 3, pp. 365-76.

19. Baumol W.J. (1986). Unnatural value: or art investment as a floating crap game. *American Economic Review*, Vol. 76, pp. 10–14

20. Baumol, W.J.,& Bowen, W.G. (1966). *Performing Arts: The Economic Dilemma*. New York: Twentieth Century Fund

21. Baumol, W.J., & Baumol, H. (1994). On the economics of musical composition in Mozart's Vienna. *Journal of Cultural Economics*, Vol. 18, pp. 171–198

22. Benhamou, F. (1997). Conserving Historic Monuments in France: A Critique of Official Polices. in: M. Hutter and I. Rizzo (eds.), *Economic Perspectives on Cultural Heritage*. St. Martin's Press, Inc., New York.

23. Benhamou, F. (2003). Heritage. In: R. Towse: *A Handbook of Cultural Economics*. Cheltenham, UK & Northampton, USA: Edward Elgar

24. Berle, A.A., & Means, G.C. (1932). *The Modern Corporation and Private Property*. New York: The Macmillan Company

25. Bernheim, B.D., & Whinston, M.D. (1986). Common Agency. *Econometrica*, Vol. 54, No. 4, pp. 923-942

26. Besterman, T. (1991). The Ethics of Emasculation. *Museums Journal*, 91, pp. 25–28

27. Bille, T. (2008). *The creative class and preferences for culture*. Boston: 15th Conference of ACEI, Mimeo

28. Bishop, P., & Brand, S. (2003). The efficiency of museums: a stochastic frontier production function approach. *Applied Economics*, Taylor and Francis Journals, vol. 35(17), pp. 1853-1858

29. Blaug, M. (ed., 1976). *The Economics of the Arts*. London: Martin Robertson and Company, reprinted in 1992, by Gregg Revivals

30. Blaug, M. (2001). Where are We Now on Cultural Economics? *Journal of Economic Surveys*, Vol. 15, No. 2, pp. 123–143

31. State of the New York Board of Regents (2009). *An Act to Amend the Education Law, in Relation to the Deaccessioning of Property by Museums; And to Repeal Certain Provisions of Such Law Relating Thereto*. New York: State of the New York Board of Regents

32. Bolton, P., & Dewatripont, M. (2006). *Contract Theory*. Cambridge, Massachussets, London, England: MIT Press

33. Borg, A. (1991). Confronting Disposal. *Museums Journal* 91, pp. 29-31

34. Borowiecki, K.J., & O'Hagan, J. (2013). Impact of war on individual life-cycle creativity: tentative evidence in relation to composers. *Journal of Cultural Economics*, Springer, vol. 37(3), pp. 347-358

35. Bowman, W. (2002). The Uniqueness of Nonprofit Finance and the Decision to Borrow. *Nonprofit Management & Leadership*, Vol. 12, No. 3, pp. 293-311

36. Brickley, J.A., & van Horn, R.L. (2002). Managerial Incentives in Nonprofit Organizations: Evidence from Hospitals. *Journal of Law and Economics*, vol. XLV, pp. 227-249

37. Brooks, A.C. (2000). Genetic Algorithms and Public Economics. Journal of Public Economic Theory, Association for Public Economic Theory, vol. 2(4), pp. 493-513

38. Brousseau, E., & Glachant, J.M. (2002). Contract Economics and the Renewal of Economics. In: *The Economics of Contracts. Theories and Applications*, Cambridge: Cambridge University Press

39. Brush, T. H., Bromiley, P., & Hendrickx, M. (2000). The Free Cash Flow Hypothesis for Sales Growth and Firm Performance. *Strategic Management Journal*, Vol. 21, No. 4, pp. 455-472

40. Burke, E. (1995). Employment Prospects in the Irish Popular Music Industry. *Journal of the Statistical and Social Inquiry Society of Ireland*, Vol. XXVII, No. 2

41. Burke, E. (1997). Small Firm Start-Up by Composers in the Recording Industry. *Small Business Economics*, Vol. 9, pp. 463–471

42. Byrd, J. (2010). Financial Policies and the Agency Costs of Free Cash Flow: Evidence from the Oil Industry. *International Review of Accounting, Banking and Finance*, 2(2), pp. 23-50

43. Calem, P.S., & Rizzo, J.A. (1995). Financing Constraints and Investment: New Evidence from Hospital Industry Data. *Journal of Money, Credit and Banking*, Vol. 27, No. 4, Part 1, pp. 1002-1014

44. Cameron, S. (1990). The demand for cinema in the United Kingdom. *Journal of Cultural Economics*, Vol. 14, No. 1, pp. 35–47

45. Cameron, S. (1999). Rational Addiction and the Demand for Cinema. *Applied Economics Letters*, Vol. 6, No. 9, pp. 617–620

46. Cannon-Brookes, P. (1996). Cultural-Economics Analyses of Art Museums: a British Curator's Viewpoint. In: V.A. Ginsburgh, P.-M. Menger (eds.): *Economics of the Arts – Selected Essays*, Amsterdam: Elsevier

47. Canoy, M., van Ours, J. C., & van der Ploeg, F. (2006). The Economics of Books. In. Ginsburgh, V.A, Throsby, C.D. (eds.). *Handbook of the Economics of Art and Culture*, Elsevier

48. Castañer, X., & Campos, L. (2010). The Determinants of Artistic Innovation: Bringing in the Role of Organizations. *Journal of Cultural Economics*, Vol. 26, No. 1, pp. 29-52

49. Castañer, X., & Cavotta, V. (2010). *Creativity and innovation in cultural organizations*. Copenhagen: 16th Conference of ACEI, Mimeo

50. Caves, R. (2000): *Creative Industries. Contracts between Art and Commerce*. Cambridge & London: Harvard University Press

51. Chandler, A.D. Jr. (1962). *Strategy and Structure: Chapters in the History of the American Industrial Enterprise*. Cambridge, MA: MIT Press

52. Chen Y.-J. (2011). Optimal selling scheme for heterogeneous consumers with uncertain valuations. *Mathematics of Operations Research* 36, pp. 659 - 720

53. Clark, D.E., & Kahn, J.R. (1988). The Social Benefits of Urban Cultural Amenities. *Journal of Regional Science* 28 (3), pp. 363–377

54. Coase, R.H. (1937). The Nature of the Firm. *Economica*, New Series, Vol. 4, No. 16, pp. 386-405

55. Coase, R.H. (1960). The Problem of Social Cost. *Journal of Law and Economics*, Vol. 3, pp. 1-44

56. Colbert, F. (2003). Management in the Arts. In: R. Towse: *A Handbook of Cultural Economics*. Cheltenham, UK & Northampton, USA: Edward Elgar

57. Core, J.E., Guay, W.R., & Verdi, R.S. (2006). Agency Problems of Excess Endowment Holdings in Not-for-Profit Firms, *Journal of Accounting and Economics*, 41, pp. 307 - 333.

58. Cowen, T. (1996). Why I do not believe in the cost-disease. A comment on Baumol. *Journal of Cultural Economics* 1996, Volume 20, Issue 3, pp. 207-214

59. Cowen, T. (1998). *In Praise of Commercial Culture*. Boston: Harvard University Press

60. Cowen, T. (2008). Why everything has changed: the recent revolution in cultural economics. *Journal of Cultural Economics*, Vol. 32, No. 4, pp. 261–273

61. Cox, R.A., & Felton, J.M. (1995). The Concentration of Commercial Success in Popular Music: An Analysis of the Distribution of Gold Records. *Journal of Cultural Economics*, Vol. 19, pp. 333–340

62. Crutchly, C., & Hansen, R. (1989). A test of the agency theory of managerial ownership, corporate leverage and corporate dividends. *Financial Management*, Vol 18, pp. 36-76

63. Cyert, R. M., & March, J.G. (1963). *A Behavioral Theory of the Firm*. Prentice Hall, Englewood Cliffs, NJ

64. Čopič, V., & Srakar, A. (2010). *Vlaganja v kulturo in NVO* [Investments in culture and NGO's]. Ljubljana: Asociacija

65. Čopič, V., Uzelac, A., Primorac, J., Jelinčić, D.A., Srakar, A., & Žuvela, A. (2011). *Encouraging Private Investment in the Cultural Sector*. Brussels: European Parliament

66. Darnell, A.C., & Johnson, P.S. (2001). Repeat visits to attractions: a preliminary economic analysis. *Tourism Management*, 22: 119-126

67. De Vany, A. (2006). The movies. In: Victor Ginsburgh and David Throsby, eds., *Handbook of the Economics of Arts and Culture*, Amsterdam : Elsevier

68. Deb, P., & Trivedi, P.K. (2011) *Finite Mixture for Panels with Fixed Effects*. Hunter College Working Paper.

69. Demsetz, H. (1967). Toward a theory of property rights. *American Economic Review* 57 (May), pp. 347-359

70. Di Gaetano, L., & Mazza, I. (2012). *Better an egg today than a hen tomorrow? On the implications of deaccess policies on donations to museums*. MPRA Paper 39611, University Library of Munich, Germany

71. Dickenson, V. (1992) Museum Visitor Surveys: An Overview, 1930-1990. In: Towse, R.; Khakee, A. (eds.). *Cultural Economics* (pp. 272-281). Berlin: Springer

72. Easterbrook, F. (1984). Two Agency Cost Explanations of Dividends. *American Economic Review* Vol. 74, pp. 650-659

73. Eggertsson, T. (1990). *Economic institutions and behavior*. Cambridge: Cambridge University Press

74. Fama, E.F., & Jensen, M.C. (1983a). Separation of Ownership and Control. *Journal of Law and Economics*, Vol. 26, No. 2, Corporations and Private Property: A Conference Sponsored by the Hoover Institution (Jun., 1983), pp. 301-325

75. Fama, E.F., & Jensen, M.C. (1983b). Agency Problems and Residual Claims. *Journal of Law and Economics*, Vol. 26, No. 2, Corporations and Private Property: AConference Sponsored by the Hoover Institution (Jun., 1983), pp. 327-349

76. Feld, A.L., O'Hare, M., & Schuster, J.M.D. (1983). *Patrons despite themselves: taxpayers and arts policy*. New York : New York University Press

77. Feldstein, M. (1991). Introduction. In: Feldstein M. (ed.). *The Economics of Art Museums*, Chicago: University of Chicago Press

78. Fernández-Blanco, V., & Banos Pino, J.F. (1997). Cinema Demand in Spain: A Cointegration Analysis. *Journal of Cultural Economics*, Vol. 21, No. 1, pp. 57–75

79. Fernández-Blanco, V., & Prieto-Rodríguez, J. (2011). Museums. In: Towse, R. (ed.) *Handbook of Cultural Economics*. Second Edition, Cheltenham, Northampton: Edward Elgar Publishing

80. Fisman, R., & Hubbard, R.G. (2003). The Role of Nonprofit Endowments. In: Edward L. Glaeser (ed.): *The Governance of Not-for-Profit Organizations*. Chicago: University of Chicago Press, pp. 217-233

81. Florida, R.L. (2004). *The rise of the creative class : and how it's transforming work, leisure, community and everyday life*. New York : Basic Books, Cambridge (Mass.): Perseus Books

82. Florida, R.L. (2005). *The flight of the creative class : the new global competition for talent*. New York : HarperCollins

83. Freund, S., Prezas, A. P., & Vasudevan, G. K. (2003). Operating Performance and Free Cash Flow of Asset Buyers. *Financial Management*, 32(4), 87-106

84. Frey, B.S. (1994). Cultural Economics and Museum Behaviour. *Scottish Journal of Political Economy* 41:3, pp. 325-335

85. Frey, B.S. (2000). *Arts&Economics. Analysis&Cultural Policy*. Berlin, Heidelberg, New York: Springer-Verlag

86. Frey, B.S. (2003). Festivals. In: R. Towse: *A Handbook of Cultural Economics*. Cheltenham, UK & Northampton, USA: Edward Elgar

87. Frey, B.S. (2005). *What Values Should Count in the Arts? The Tension between Economic Effects and Cultural Value*. Working Paper No. 253, Zurich: Institute for Empirical Research in Economics, University of Zürich

88. Frey, B.S. (2009). *A multiplicity of approaches to institutional analysis. Applications to the government and the arts*. IEW - Working Papers 420, Institute for Empirical Research in Economics - University of Zurich

89. Frey, B.S., & Pommerehne, W.W. (1989). *Muses and Markets: Explorations in the Economics of the Arts*. Basil Blackwell, Oxford

90. Frey, B.S., & Pommerehne, W.W. (1990). Public promotion of the arts: a survey of means. *Journal of Cultural Economics*, Vol. 14, No. 4, pp. 73–95

91. Frey, B.S., & Meier, S. (2006). The Economics of Museums. In: V.A. Ginsburgh, C.D. Throsby (eds.): *Handbook of the Economics of Art and Culture*, Amsterdam: Elsevier

92. Frey, B.S., & Steiner, L. (2010). *Pay as you go: A new proposal for museum pricing*. Copenhagen: 16th Conference of Association for Cultural Economics International, Mimeo

93. Furubotn, E., & Pejovich, S. (ed., 1974). *The Economics of Property Rights*. Cambridge, MA: Ballinger

94. Gailmard, S. (2002). *Multiple Principals and Outside Information in Bureaucratic Policy Making*. Mimeo

95. Gapinski, J. (1984). The Economics of Performing Shakespeare. *American Economic Review*, 74, pp. 458-466

96. Gapinski, J. (1986). The Lively Arts as Substitutes for the Lively Arts. *American Economic Review*, Vol. 76, No. 2, pp. 20–25

97. Gerstenblith, P. (2008). *Art, Cultural Heritage, and the Law: Cases and Materials*. 2nd ed. Carolina Academic Press

98. Gibbs, P.A. (1993). Determinants of Corporate Restructuring: The Relative Importance of Corporate Governance, Takeover Threat, and Free Cash Flow. *Strategic Management Journal*, Summer, Special Issue, pp. 51-68.

99. Ginsburgh, V.A., & Menger, P.-M. (1996). *Economics of the Arts. Selected Essays*. Amsterdam, Lausanne, New York, Oxford, Shannon, Tokyo: Elsevier

100. Glaeser, E.L. (2004). *The Political Economy of Hatred*. Harvard University, Mimeo

101. Glaeser, E.L., & Shleifer, A. (2001). Not-for-profit entrepreneurs. *Journal of Public Economics* 81 (2001), pp. 99–115

102. Goetzmann, W.N. (1993). Accounting for taste: art and financial markets over three centuries. *American Economic Review*, Vol. 83, pp. 1370–1376

103. Grampp, W. (1996). A Colloquy about Art Museums: Economics engages Museology. In: V.A. Ginsburgh, P.-M. Menger: *Economics of the Arts – Selected Essays*. Amsterdam: Elsevier

104. Gray, C.M. (2003). Participation. In: R. Towse: *A Handbook of Cultural Economics*. Cheltenham, UK & Northampton, USA: Edward Elgar

105. Griffin, J. M. (1988). A test of the free cash flow hypothesis: Results from the petroleum industry. *The Review of Economics and Statistics* 70, 76–82

106. Grossman, S.J., & Hart, O.D. (1982). Corporate Financial Structure and Managerial Incentives. In: McCall, J.J. (ed.). *The Economics of Information and Uncertainty*. Chicago: University of Chicago Press, pp. 107-140

107. Grossman, S.J., & Hart, O.D. (1986). The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration. *Journal of Political Economy*, 94, pp. 691-719

108. Hallock, K. F. (2005). Managerial pay and governance in American nonprofits. *Industrial Relations* 41(3), 377-406

109. Handke, C.W. (2012). A Taxonomy of Empirical Research on Copyright – How Do We Inform Policy? *Review of Economic Research on Copyright Issues* 9(1), 2012, pp. 47-92

110. Hansmann, H.B. (1980). The Role of Nonprofit Enterprise. *The Yale Law Journal*, Vol. 89, No. 5 (Apr., 1980), pp. 835-901

111. Hansmann, H.B. (1990). Why Do Universities Have Endowments?. *The Journal of Legal Studies*, Vol. 19, No. 1 (Jan., 1990), pp. 3-42

112. Harris, M., & Raviv, A. (1990). Capital Structure and the Informational Role of Debt. *The Journal of Finance*, Vol. XLV, No. 2, June 1990

113. Hart O., & Moore, J. (1988). Incomplete Contracts and Renegotiation. *Econometrica*, 56, pp. 755-786

114. Heilbrun, J., & Gray, C.M. (2001). *The Economics of Art and Culture*. Cambridge: Cambridge University Press

115. Hjorth-Andersen, C. (2000). A Model of the Danish Book Market. *Journal of Cultural Economics,* Vol. 24, No. 1, pp. 27–43

116. Holmström B., & Milgrom, P. (1991). Multitask Principal-Agent Analyses : Incentive Contracts, Asset Ownership and Job Design. *Journal of Law, Economics and Organization*, Vol. 7, pp. 24-51

117. Hoyman, M., & Faricy, C. (2009). It Takes a Village: A test of the Creative Class, Social Capital and Human Capital Theories. *Urban Affairs Review* (44): 311-333

118. Hutter, M., & Throsby, C.D. (2008). *Beyond price: value in culture, economics and the arts*. Cambridge: Cambridge University Press

119. Hutter, M., Frey, B.S. (2010). On the Influence of Cultural Value on Economic Value. *Revue d' économie politique* 120(2), pp. 35-46

120. Jackson, R. (1988). A Museum Cost Function. *Journal of Cultural Economics* 12. 41-50

121. Jensen, M.C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, Vol. 76, No. 2, Papers and Proceedings of the Ninety-Eighth Annual Meeting of the American Economic Association (May, 1986), pp. 323-329

122. Jensen, M.C., & Meckling, W.H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics*, October, 1976, V. 3, No. 4, pp. 305-360

123. Kawasaki, K. (2010). *Two Creative Cities and Cultural Policies in Comparison: a new identity?* Copenhagen: 16th Conference of ACEI, Mimeo

124. KEA European Affairs (2006). *Economy of Culture in Europe*. Report, Brussels: European Commision

125. KEA European Affairs (2009). *The Impact of Culture on Creativity*. Report, Brussels: European Commision

126. Kennedy, R., & Vogel, C. (2009). Outcry Over a Plan to Sell Museum's Holdings. *The New York Times*, p. C1, NY edition, January 28, 2009

127. Kissan, J., & Richardson, V.J. (2002). Free Cash Flow, Agency Costs, and the Affordability Method of Advertising Budgeting. *Journal of Marketing*, January 2002, Vol. 66, No. 1, pp. 94-107

128. Klamer, A. (1996). *The value of culture: on the relationship between economics and arts*. Amsterdam: Amsterdam University Press

129. Klamer, A. (2002). Accounting for Social and Cultural Values. *De Economist*, Vol. 150, pp. 453–473

130. Klamer, A., Petrova, L., & Mignosa, A. (2006): *Financing the arts and culture in the European Union*. Brussels: European Parliament

131. Klamer, A., Kombrink, D., & Smith, S. (2008). *Cultural Monitor. A Measure of Cultural Capital*. Boston: 15th Conference of ACEI, Mimeo

132. Klein, B., Crawford, R., & Alchian, A. (1978). Vertical Integration, Appropriable Rents, and the Competitive Contracting Process. *Journal of Law and Economics* 21: 297-326

133. Kovač, B. (2001). Pozabljiva ekonomika umetniških muz [Forgetful economics of art' muses]. In: B. S. Frey, W. W. Pommerehne: *Muze na trgu. Odkrivanje ekonomike umetnosti* [Muses and Markets. Exploring the economics of the arts]. Murska Sobota: PAC, Pomurski akademski center; Kranj: Ustanova za podjetništvo

134. Krebs, S., & Pommerehne, W. (1995). Politico-Economic Interactions of German Public Performing Arts Institutions. *Journal of Cultural Economics*, Vol. 19, pp. 17-32

135. Landes, W.M. (2003). Copyright. In: R. Towse: *A Handbook of Cultural Economics*, Cheltenham, UK & Northampton, USA: Edward Elgar

136. Lang, L.H.P., Stulz, R.M., & Walkling, R.A. (1991). A test of the free cash flow hypothesis. The case of bidder returns. *Journal of Financial Economics*, 29 (1991), 315-335

137. Lévy-Garboua, L., & Montmarquette, C. (1996). A Microeconometric Study of Theater Demand. *Journal of Cultural Economics*, Vol. 20, pp. 25–50

138. Li, S. (1993). *Competitive Matching Equlibrium and Multiple Principal-Agent Models*. Center for Economic Research, Department of Economics, University of Minnesota: Discussion Paper No. 267, January 1993

139. Liebowitz, S.J. (2006). File Sharing: Creative Destruction or Just Plain Destruction? *Journal of Law and Economics*, University of Chicago Press, vol. 49(1), pages 1-28

140. Luksetich, W.A., & Partridge, M.D. (1997). Demand Functions for Museum Services. *Applied Economics* 29, pp. 1553-59

141. Machlup, F. (1967). Theories of the Firm: Marginalist, Behavioral. Managerial. *American Economic Review*, 1967. 57, pp. 1-33

142. Madden, C. (2001). Using 'Economic' Impact Studies in Arts and Cultural Advocacy: A Cautionary Note. *Media International Australia incorporating Culture and Policy*, No. 98, pp. 161–178

143. Maddison, D. (2002). *Causality and Museum Subsidies*. Working Paper Series

144. Maddison, D., & Foster, T. (2001). *Valuing congestion costs in the British Museum*. Working Paper Series

145. Mairesse, F., & Vanden Eeckaut, P. (2002). Museum Assessment and Fdh Technology: Towards a Global Approach. *Journal of Cultural Economics*, 26 (4), pp. 261-286

146. Malaro, M.C. (1991). Deaccessioning: The American Perspective. *Management and Curatorship*, Vol. 10, No. 3, 1991, pp. 273—279

147. Malaro, M.C. (1995). *A Legal Primer on Managing Museum Collections*. 1st Ed., Smithsonian Institution Press

148. Mann, S. V., & Sicherman, N.W. (1991). The Agency Costs of Free Cash Flow: Acquisition Activity and Equity Issues. *The Journal of Business*, 64 (2), pp. 213-227

149. Markusen, A. (2006). Urban Development and the Politics of a Creative Class: Evidence from the Study of Artists. *Environment and Planning*, Vol. 38, No. 10, pp. 1921-1940

150. Martimort, D. (1996). Exclusive Dealing, Common Agency, and Multiprincipals Incentive Theory. *RAND Journal of Economics*, 27, pp. 1-3l

151. Matsushima, T.S. (2010). *Issues Related to Entertainment Business Funding Case Study: Entertainment Trust Fund in Japan*. Copenhagen: 16th Conference of ACEI, Mimeo

152. McCain, R.A. (1979). Reflections on the Cultivation of Taste. *Journal of Cultural Economics,* Vol. 3, No.1, pp. 30–52

153. McCain, R.A. (1981). Cultivation of Taste, Catastrophe Theory, and the Demand for Works of Art. *American Economic Review*, Vol. 71, No. 2, pp. 332–334

154. McCain, R.A. (1995). Cultivation of taste and bounded rationality: Some computer simulations. *Journal of Cultural Economics*, Vo. 19, No. 1, pp. 1–15

155. McCarthy, K.F., & Jinnett, K. (2001). *A New Framework for Building Participation in the Arts*. Santa Monica, CA: Rand

156. McCarthy, K.F., Brooks, A., Lowell, J., & Zakaras, L. (2001). *The Performing Arts in a New Era*. Santa Monica, CA: Rand

157. McKenzie, J. (2009). *The Economics of Movies*. The European Science Days 2009 – "The Economics of Art and Culture", Steyr, Austria, 16th July 2009, Mimeo

158. Mei, J., & Moses, M. (2002). Art as an investment and the underperformance of masterpieces. *American Economic Review*, Vol. 92, pp. 1656–1668

159. Meier, S., & Frey, B.S. (2002). *Private Faces in Public Places: The Case of a Private Art Museum in Europe*. Working Paper Series

160. Mikkelson, W., & Partch, M. (2003). Do persistent large cash reserves hinder performance? *Journal of Financial and Quantitative Analysis* 38, 275-294

161. Miller, S.H. (1997). "Guilt-Free" Deaccessioning. In: *A Deaccession Reader 94, 96* (Stephen E. Weil ed., 1997)

162. Montias, J.M. (1973, reprinted 1995). Are Museums Betraying the Public's Trust. *Journal of Cultural Economics*, 19, pp. 71-80

163. Montias, J.M. (1979). Statistical Evidence on the economic status of artists and artisans in Delft in the 17th Century. *Journal of Cultural Economics*, Vol. 3, pp. 69–97

164. Montias, J.M. (1982). *Artists and Artisans in Delft: A Socio.-Economic Study of the Seventeenth Century*. Princeton: Princeton University Press

165. Moore, T.G. (1966). The Demand for Broadway Theatre Tickets. *Review of Economics and Statistics*, 48, pp. 79–87

166. Morck, R., Shleifer, A., & Vishny, R.W. (1990). Do Managerial Objectives Drive Bad Acquisitions? *Journal of Finance*, American Finance Association, vol. 45(1), pp. 31-48

167. Murovec, N., Kavaš, D., Prodan, I., Drnovšek, M. (2012). *Stanje oblikovanja, s poudarkom na industrijskem oblikovanju, kot dela kreativnih industrij in primeri dobre prakse v svetu kot podlaga za krepitev te dejavnosti v Sloveniji*, Ljubljana: Inštitut za ekonomska raziskovanja

168. Navrud, S., Ready, R.C. (ed., 2002). *Valuing Cultural Heritage. Applying Environmental Valuation Techniques to Historic Buildings, Monuments and Artifacts*. Cheltenham, UK & Northampton, USA: Edward Elgar

169. Netzer, D. (1978). *The subsidized muse: Public support for the arts in the United States*. Cambridge&New York: Cambridge University Press

170. North, D. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge: Cambridge University. Press.

171. O'Hagan, J. W. (1995). National Museums: To Charge or Not to Charge?. *Journal of Cultural Economics* 19. 33-47

172. O'Hagan, J.W. (1998). Art Museums: Collections, Deaccessioning and Donations. *Journal of Cultural Economics*, 22, pp. 197-207

173. O'Hagan, J.W., & Hellmanzik, C. (2008). Clustering and Migration of Important Visual Artist: Broad Historical Evidence. *Historical Methods*, 40(3), pp. 121-136

174. Oh Lim, S. (2010). *The Boom of the Creative City in Recent Korea: Fashion or Alternative*. Copenhagen: 16th Conference of ACEI, Mimeo

175. Opler, T.C., & Titman, S. (1993). The determinants of leveraged buyout activity: Free cash flow vs. financial distress costs. *Journal of Finance* 48, pp. 1985-1999

176. Peacock, A.T. (1969). Welfare Economics and Public Subsidies to the Arts. *Manchester School of Economics and Social Studies* 37(December), pp. 323-35

177. Peacock, A.T., & Godfrey, C. (1974). The economics of museums and galleries. *Lloyds Bank Review* 111: pp. 17-28

178. Peck, J. (2005). Struggling with the creative class. *International Journal of Urban and Regional Research* 29, pp. 740-

179. Peltier, S., & Moreau, F. (2010). *Looking for the Long Tail: Evidence from the French Book Markets*. Copenhagen: 16th Conference of ACEI, Mimeo

180. Peterson, R.A., Hull, P., & Kern, R. (2000). *The Aging of Arts Audiences*. National Endowment for the Arts, Seven Locks Press

181. Plaza, B. (2010). Valuing Museums as Economic Engines: Willingness to Pay or Discounting of Cash Flows? *Journal of Cultural Heritage*, 11(2), pp. 155-162

182. Pratt, J.W. (1964). Risk Aversion in the Small and in the Large. *Econometrica*, 32 (1/2), pp. 122-136

183. Prendergast, C. (2002). The Tenuous Trade-Off between Risk and Incentives. *The Journal of Political Economy*, Vol. 110, No. 5, pp. 1071-1102

184. Prieto-Rodriguez, J., Romero-Jordan, D., & Sanz-Sanz, J.F. (2005). Is a tax cut on cultural goods consumption actually desirable? A microsimulation analysis applied to Spain. *Fiscal Studies*, 26(4): pp. 549-575

185. Prieto-Rodríguez, J., & Fernández-Blanco, V. (2006). Optimal pricing and grant policies for museums. *Journal of Cultural Economics*, 30, 169–181

186. Richards, G. (1996). Production and Consumption of European Cultural Tourism. *Annals of Tourism Research*, 23, pp. 261–283

187. Richardson, S. (2006). Over-Investment of Free Cash Flow. *Review of Accounting Studies*, 11, pp. 159–189

188. Robbins, L.C. (1963). Art and the State. In: Robbins, Lionel C. (Ed.). *Politics and Economics: Essays in Political Economy*. London: Macmillan. pp. 53-72

189. Robbins, L.C. (1971). Unsettled Questions in the Political Economy of the Arts. *Three Banks Review* 91. pp. 3-19

190. Rochelandet, F. (2003). Internet: economics. In: R. Towse: *A Handbook of Cultural Economics*. Cheltenham, UK & Northampton, USA: Edward Elgar

191. Rohner, J.L. (2010). *Profiting from paintings and paying the price: the implications of increased deaccessioning for general operating expenses in U.S. art museums*. Master of Arts Thesis, Faculty of Teachers College, Columbia University

192. Roselli, J. (1984). *The Opera Industry in Italy from Cimarosa to Verdi*. Cambridge: Cambridge University Press

193. Rosen, S. (1981). The Economics of Superstars. *American Economic Review* 71(Dec.), pp. 845-58

194. Ross, S. (1973). The Economic Theory of Agency: The Principal's Problem. *American Economic Review*, 63, pp. 134-139

195. Rozeff, M. (1982). Growth, Beta and Agency Costs as Determinants of Dividend Payout Ratios. *Journal of Financial Research* 5, pp. 249-259

196. Rushton, M. (2008). Who pays? Who benefits? Who decides? *Journal of Cultural Economics*, Vol. 32, No. 4, pp. 293–300

197. Salanié, B. (1997). *The Economics of Contracts: A Primer*. MIT Press, Cambridge, Mass.

198. Sasaki, M. (2010). *Urban Regeneration through Culture Creativity and Social Inclusion -- Re-thinking Creative City Theory through Japanese Case Study*. Copenhagen: 16th Conference of ACEI, Mimeo

199. Savage, L.J. (1954). *The Foundations of Statistics*. New York: John Wiley

200. Schimmelpfenig, J. (1995). Remember Gorsky. *The Dancing Times*, 1019, pp. 1045

201. Schimmelpfenig, J. (1997). Demand for Ballet: a non-parametric analysis of the 1995 Royal Ballet Summer Season. *Journal of Cultural Economics*, Vol. 21, pp. 119–27

202. Schimmelpfenig, J. (2003). Ballet. In: R. Towse: *A Handbook of Cultural Economics*. Cheltenham, UK & Northampton, USA: Edward Elgar

203. Schulze, G.G., & Ursprung, H.W. (2000). La Donna e Mobile - or is She?: Voter Preferences and Public Support of the Performing Arts. *Public Choice* 102, pp. 131-49

204. Schuster, J.M.D. (1998). Neither Public Nor Private: The Hybridization of Museums. *Journal of Cultural Economics* 22. pp. 127-50

205. Schwarz, S., & Peters, M.G. (1983). *Growth of Arts and Cultural Organisations in the Decade of the 1970s*. National Endowment for the Arts, Rockville, MD, Informatics General Corporation

206. Seaman, B.A. (1987). Arts Impact Studies: A Fashionable Excess. In: A.J. Radich (ed.). *The Economic Impact of the Arts: A Sourcebook*. Denver, Colorado: National Conference of State Legislatures

207. Seaman, B.A. (2003). Economic Impact of the Arts. In: R. Towse: *A Handbook of Cultural Economics*, Cheltenham, UK & Northampton, USA: Edward Elgar

208. Seaman, B.A. (2006). *The Relationship Among Regional Economic Impact Models: Contingent Valuation Versus Economic Impact in the Case of Cultural Assets*. Working Paper, Atlanta: Georgia State University

209. Simon, H.A. (1947). *Administrative Behavior*. New York, NY: Macmillan

210. Simon, H.A. (1951). A Formal Theory of the Employment Relationship. *Econometrica*, Vol. 19, No. 3 (Jul., 1951), pp. 293-305

211. Smith, A. (1776). *An Inquiry into the Nature and Causes of the Wealth of Nations, Volumes I and II*. Liberty Fund: Indianopolis.

212. Snowball, J.D. (2008). *Measuring the value of culture: methods and examples in cultural economic*s. Berlin, Heidelberg: Springer Verlag

213. Snowball, J.D., & Antrobus, G.G. (2006). Valuing the Arts: Pitfalls of Economic Impact Studies of Arts Festivals. *South African Journal of Economics*, Vol. 70, No. 8, pp. 1297–1319

214. Srakar, A. (2010). *Ekonomsko vrednotenje umetniških dogodkov: umetnost med trgom in državo* [Economic valorization of art events: art between market and the state]. Ljubljana: Založba FDV

215. Srakar, A. (2012). *Economic Analysis of Deaccessioning in American Museums*. Kyoto: 17th Conference of ACEI, Mimeo

216. Steiner, F. (1997). Optimal Pricing of Museum Admission. *Journal of Cultural Economics* 21, pp 307-333

217. Sterngold, A.H. (2004). Do Economic Impact Studies Misrepresent the Benefits of Arts and Cultural Organisations? *Journal of Arts Management, Law and Society*, Vol. 34, No. 3, pp. 166–187

218. Stigler, G.J., & Becker, G.S. (1977). De Gustibus Non Est Disputandum. *The American Economic Review*, Vol. 67, No. 2, pp. 76–90

219. Stiglitz, J. E. (1974). On the Irrelevance of Corporate Financial Policy. *The American Economic Review*, December 1974, 64, pp. 851-866

220. Throsby, D. (1990). Perception of quality in demand for the theatre. *Journal of Cultural Economics*, Vol. 14, No. 1, pp. 65–82

221. Throsby, D. (1994). The Production and Consumption of the Arts: A View of Cultural Economics. *Journal of Economic Literature*, Vol. XXXII, pp. 1–29

222. Throsby, D. (2001). *Economics and Culture*. Cambridge: Cambridge University Press

223. Throsby, D. (2010). *The Economics of Cultural Policy*. Cambridge: Cambridge University Press

224. Towse, R. (1997). *Cultural economics: the arts, the heritage, and the media industries*. Cheltenham, UK: Edward Elgar

225. Towse, R. (2003). *A Handbook of Cultural Economics*. Cheltenham, UK & Northampton, USA: Edward Elgar

226. Towse, R. (2010). *A Textbook of Cultural Economics*. New York: Cambridge University Press

227. Urrutiaguer, D. (2002). Quality Judgements and Demand for French Public Theatre. *Journal of Cultural Economics*, Vol. 26, pp. 185–202

228. Utami, S.R., & Inanga, E.L. (2011). Agency Costs of Free Cash Flow, Dividend Policy, and Leverage of Firms in Indonesia. *European Journal of Economics*, Finance and Administrative Sciences, 33 (2011), pp. 7-24

229. Velthuis, O. (2003). Visual Arts. In: R. Towse: *A Handbook of Cultural Economics*. Cheltenham, UK & Northampton, USA: Edward Elgar

230. Verbeek, M. (2004). *A Guide to Modern Econometrics*. Chicester: John Wiley & Sons Ltd

231. Volpe, J. (1991). *The Income Gap and Symphony Orchestra*. unpublished Master's Thesis, Department of Economics, University of Nevada, Las Vegas

232. von Neumann, J., & Morgenstern, O. (1944). *Theory of Games and Economic Behavior*. Second edition, 1947; third edition, 1953. Princeton, New Jersey: Princeton University Press

233. Waterman, R.W., & Meier, K. (1998). Principal-Agent Models: An Expansion? *Journal of Public Administration Research and Theory*, 8, pp. 173–202

234. Wedig, G., Sloan, F.A., Hassan, M., & Morrissey, M.A. (1988). Capital Structure, Ownership, and Capital Payment Policy: The Case of Hospitals. *The Journal of Finance*, 43 (1), pp. 21-40

235. Wedig, G., Hassan, M., & Morrissey, M.A. (1996). Tax-Exempt Debt and the Capital Structure of Nonprofit Organizations: An Application to Hospitals. *The Journal of Finance*, 51 (4), pp. 1247-1283

236. Weil, S. (1990). *Rethinking the Museum: And Other Meditations*. Washington, D.C.: Smithsonian Institution Press

237. Whitting-Looze, B.M. (2010). *Collections as communication: deaccessioning policies and public trust*. Masters of Science Thesis, University of Oregon

238. Wilson, R. (1968). On the Theory of Syndicates. *Econometrica,* Jan. 1968, 36, pp. 119-132

239. Withers, G.A. (1980). Unbalanced Growth and the Demand for Performing Arts: An Econometric Analysis. *Southern Economic Journal*, Vol. 46, No. 3, pp. 735-742

240. Withers, G.A. (2003). Broadcasting. In: R. Towse: *A Handbook of Cultural Economics*. Cheltenham, UK & Northampton, USA: Edward Elgar

241. Worthington, A.C., & Higgs, H. (2007). Art as an investment: Risk, return and comovments in major painting markets. In: A. Chakraborty. *Investment in Art an Introduction*. Icfai University Press, India

242. Zieba, M. (2008). *Demand for German Public Theatre: The Importance of Allocation of Time and Quality Factors for the Consumption of Performing Arts*. Boston: 15th Conference of ACEI, Mimeo

APPENDICES

LIST OF APPENDICES

Appendix A: List of included museums

Alabama:
- Huntsville Museum Association Inc;
- Isabel Anderson Comer Museum & Arts Center;
- Montgomery Museum of Fine Arts Association;
- The Art Fund of Birmingham Inc;
- The Mobile Museum of Art Inc.;
- The Wiregrass Museum of Art Inc;

Arizona:
- George Phippen Memorial Foundation;
- Phoenix Art Museum;
- Skystone Foundation Inc;

California:
- A Window Between Worlds;
- Armand Hammer Museum of Art and Cultural Center Inc;
- Asian Art Museum Foundation of San Francisco;
- Bakersfield Art Foundation Inc;
- Cartoon Art Museum of California;
- Corporation of the Fine Arts Museums;
- Craft and Folk Art Museum Incorporating the Egg and the Eye;
- Crocker Art Museum Association;
- Falkenstein Foundation;
- Fresno Art Museum;
- Henry E Huntington Library & Art Gallery;
- Laguna Art Museum;
- Latino Museum History Art & Culture;
- Long Beach Museum of Art Foundation;
- Monterey Museum of Art;
- Museum Associates;
- Museum of Contemporary Art;
- Museum of Contemporary Art San Diego;
- Museum of Fashion Designers and Creators;
- Norton Simon Museum of Art at Pasadena;
- Oceanside Museum of Art;
- Orange County Museum of Art;
- Putnam Foundation;
- Riverside Art Museum;
- Rosita C Victoria Foundation;
- Sam and Alfreda Maloof Foundation for Arts and Crafts;

- San Diego Museum of Art;
- San Francisco Museum of Modern Art;
- San Jose Museum of Art Association;
- Santa Barbara Museum of Art;
- Santa Barbara Museum of Art Group Return;
- Santa Monica Museum of Art;
- The Constance Corcoran Miller Foundation;
- The Museum of Art and History at the Mcpherson Center;

Colorado:
- Arthur Roy Mitchell Memorial Inc;
- Aspen Art Museum;
- Boulder Museum of Contemporary Art;
- Denver Art Museum Inc;
- Mca Denver;

Connecticut:
- Sarah G Austin Foundation Inc;
- The Aldrich Contemporary Art Museum Inc;
- Wadsworth Atheneum Museum of Art;

Delaware:
- Delaware Art Museum;
- Henry Francis Du Pont Winterthur Museum Inc;

District of Columbia:
- National Museum of Women in the Arts Inc;
- Phillips Collection;
- Trustees of the Corcoran Gallery of Art;

Florida:
- A D Williams 6 Tr Uw 302857 FBO Medical College of VA Tr Div;
- Boca Raton Museum of Art Inc;
- Deette Holden Cummer Museum Foundation Inc;
- Miami Art Museum of Dade County Association Inc;
- Museum of Contemporary Art Inc;
- Museum of Contemporary Art Jacksonville Inc;
- Museum of Fine Arts of St Petersburg Fla Inc;
- Orlando Museum of Art Inc;
- Pensacola Museum of Art;
- Polk Museum of Art Inc;
- Salvador Dali Museum Inc;

- Schacknow Museum of Fine Arts Inc;
- Tampa Museum of Art Inc;
- The Museum of Florida Art Inc.;

Georgia:
- Albany Museum of Art Incorporated;
- Decorative Arts Collection Inc;
- Museum of Contemporary Art of Georgia Inc;
- Museum of Design Atlanta Inc;
- Telfair Museum of Art Inc;
- The Columbus Museum Inc;

Hawaii:
- Honolulu Academy of Arts, dba Honolulu Museum of Art;
- Masayuki and Harue Tokioka Foundation Inc;

Idaho:
- Boise Art Museum Incorporated;

Illinois:
- Museum of Contemporary Art;
- Quincy Art Center;
- Rockford Art Museum;

Indiana:
- Art Museum of Greater Lafayette Inc;
- Fort Wayne Museum of Art Inc;
- Indianapolis Museum of Art Inc;
- Midwest Museum of American Art Foundation;
- South Bend Museum of Art Inc;

Iowa:
- Cedar Rapids Museum of Art;
- Dubuque Museum of Art;
- Edmundson Art Foundation Inc;

Kansas:
- Albert Bloch Foundation;
- Coutts Memorial Museum of Art;
- John K and Jane M Garvey Foundation;

Kentucky:

- Headley-Whitney Museum Inc;
- J B Speed Art Museum;
- Owensboro Museum of Fine Art Inc;

Louisiana:
- New Orleans Museum of Art;
- Twin City Art Foundation;

Maine:
- Museum of Art of Ogunquit;
- Wendell Gilley Museum of Bird Carving;
- William A Farnsworth Library and Art Museum Inc;

Maryland:
- Havre de Grace Decoy Museum Inc;
- National Gallery of Art;
- The American Visionary Art Museum Inc;
- Washington County Museum of Fine Arts;

Massachussetts:
- Cape Cod Museum of Art Inc;
- De Cordova and Dana Museum and Park de Cordova Museum & Sculpture Park;
- Eric Carle Museum of Picture Book Art Inc;
- Fitchburg Art Museum;
- Institute of Contemporary Art;
- Isabella Stewart Gardner Museum Inc;
- Museum of Fine Arts;
- Norman Rockwell Museum at Stockbridge Inc;
- Ossorio Foundation;
- Provincetown Art Association and Museum Inc;
- Sterling & Francine Clark Art Institution;
- Worcester Art Museum;

Michigan:
- Grand Rapids Art Museum;
- Kalamazoo Institute of Arts;
- Krasl Art Center Inc;
- Sagiw Museum Sagiw Art Museum;
- The Detroit Institute of Arts;

Minnesota:

- American Museum of Wildlife Art;
- Minneapolis Society of Fine Arts;

Mississippi:
- Mississippi Museum of Art Inc;
- Ohr-Okeefe Museum of Art Inc;
- Walter Anderson Museum of Art Incorporated;

Missouri:
- Albrecht-Kemper Museum of Art;
- Charlotte Street Foundation;
- Nelson Gallery Foundation;

Montana:
- Trigg-C M Russell Foundation Inc;

Nebraska:
- Joslyn Art Museum;
- Museum of Nebraska Art;

Nevada:
- Nevada Museum of Art Inc;
- Triple Aught Foundation;

New Hampshire:
- Currier Museum of Art;

New Jersey:
- Aljira Inc;
- Montclair Art Museum;

New Mexico:
- Georgia Okeeffe Museum;
- Mandelman-Ribak Foundation;
- Site Santa Fe;
- The Allan Houser Foundation;

New York:
- Arnot Art Museum;
- Art Studio of Western New York Inc Buffalo Arts Studio;
- Bronx Museum of the Arts;
- Brooklyn Institute of Arts and Sciences Brooklyn Museum;

- Canajoharie Library and Art Gallery;
- Childrens Museum of the Arts Inc;
- Coby Foundation Ltd;
- Everson Museum of Art of Syracuse and Onandaga County;
- Exploring the Arts Inc;
- Fisher Landau Center for Art Landau Emily Fisher Ttee;
- Foundation for the Chapel of Sacred Mirrors Ltd;
- Frederic Remington Art Museum;
- Frick Collection;
- Handweaving Museum and Arts Center;
- Heckscher Museum;
- Hudson River Museum of Westchester;
- International Center of Medieval Art Inc;
- International Council of the Museum of Modern Art;
- Katonah Museum of Art Inc;
- Leon Polk Smith Foundation Tr Marsh Gordon Et AL Ttee;
- Metropolitan Museum of Art;
- Museum of Arts and Design;
- Museum of Modern Art;
- Nassau County Museum of Art;
- Neue Galerie New York;
- New Museum of Contemporary Art;
- Parrish Art Museum Inc;
- Ps1 Contemporary Art Center Inc;
- Queens Museum of Art;
- Sasson Soffer Foundation Inc;
- Shepards Cornerstone Foundation Inc;
- Slobodki Foundation;
- Solomon R Guggenheim Foundation;
- Storefront for Art and Architecture Inc;
- Storm King Art Center;
- The InternationalFriends of the Montreal Museum of Fine Arts Inc Cai Advisors & Co;
- Traveling Wilderness Experience Inc;
- V I A Art Inc;
- Whitney Museum of American Art;

North Carolina:
- Asheville Art Museum Association Inc;
- Black Mountain College Museums & Arts Center;
- Contemporary Art Foundation Inc;
- Hickory Museum of Art Inc;

- Louise Wells Cameron Art Museum;
- Mint Museum of Art Inc;
- Smith C K Woodmere Art Museum Tw 1513031291;

North Dakota:
- North Dakota Museum of Art;

Ohio:
- Akron Art Museum;
- Butler Institute of American Art;
- Canton Museum of Art;
- Cincinnati Museum Association;
- Cleveland Museum of Art;
- Cleveland Museum of Art 2 General Endowment Fund Trust;
- Columbus Museum of Art;
- Contemporary Arts Center;
- Dayton Art Institute;
- International Center for Environmental Arts;
- Southern Ohio Museum Corporation;
- Springfield Museum of Art;
- Toledo Museum of Art;
- Zanesville Museum of Art;

Oklahoma:
- Artists Incubation Inc.;
- Oklahoma City Museum of Art;
- Philbrook Museum of Art Inc;
- Price Tower Arts Center Inc;
- Sherwin Miller Museum of Jewish Art Inc Fenster General Fund;

Oregon:
- Portland Art Museum;

Pennsylvania:
- Allentown Art Museum;
- Allentown Art Museum Trust Fund;
- Barnes Foundation;
- Erie Art Museum;
- Frick Art & Historical Center Inc;
- James A Michener Art Museum;
- Kemerer Museum of Decorative Arts;
- Lancaster Museum of Art;

- Lynch Trust;
- Philadelphia Museum of Art;
- Philadelphia Museum of Art Womens Committee;
- Rosenbach Museum and Library;
- Southern Alleghenies Museum of Art;
- The Crary Art Gallery Inc;
- Westmoreland Museum of Art;
- William W Jamison II Purchase Trust For The Westmoreland Museum;
- Woodmere Art Museum Inc;

Rhode Island:
- Horace A Moses Tr FBO Smith Art Museum;
- Museum of Art of Ogunquit Trust;
- Newport Art Museum and Art Association;
- Warwick Museum Inc;

South Carolina:
- Beaufort Art Association;
- Bob Jones University Museum and Gallery Inc;
- Franklin G Burroughs Simeon B Chapin Art Museum;
- Spartanburg Art Museum;

Tennessee:
- Cheekwood Botanical Garden and Museum of Art;
- Dixon Gallery and Gardens;
- Hunter Museum of Art;
- Knoxville Museum of Art;
- Memphis Brooks Museum of Art Inc;
- National Ornamental Metal Museum Foundation Inc;

Texas:
- Amon Carter Museum of Western Art;
- Art Museum of South Texas Endowment Trust Fund;
- Art Museum of Southeast Texas;
- Austin Museum of Art Inc;
- Chinati Foundation;
- Contemporary Art for San Antonio;
- Contemporary Arts Museum Houston;
- Dallas Museum Art;
- Ellen Noel Art Museum of the Permian Basin;
- Mcnay Art Museum;
- Museum of East Texas;

- Museum of Fine Arts Houston;
- Nasher Foundation 101796;
- San Angelo Museum of Fine Arts;
- San Antonio Museum of Art;
- The Museum of Western Art Foundation;
- Tyler Museum of Art;

Utah:
- Central Utah Art Center;
- Springville Museum of Art;

Vermont:
- Harold Weston Foundation;
- Shelburne Museum Incorporated;
- St Johnsbury Atheeum Inc;

Virginia:
- The Chrysler Museum Inc;
- The Taubman Museum of Art;
- Virginia Museum of Fine Arts Foundation;
- Virginia Quilt Museum Inc;

Washington:
- Edmonds Arts Festival Foundation;
- Maryhill Museum of Art;
- Museum and Arts Center in the Sequim-Dungeness Valley;
- Museum of Glass;
- Seattle Art Museum;
- Tacoma Art Museum Tacoma WA;
- The Bellevue Art Museum;
- Washington Art Consortium;

West Virginia:
- Huntington Museum of Art Inc;

Wisconsin:
- Bergstrom-Mahler Museum Inc;
- Madison Museum of Contemporary Art Foundation;
- Madison Museum of Contemporary Art Inc;
- Milwaukee Art Museum Inc;
- New Visions Gallery Inc;
- Racine Art Museum Association Inc;

Wyoming:
- Museum of Western Art;
- Nicolaysen Art Museum.

Appendix B: Summary in Slovenian language / Daljši povzetek disertacije v slovenskem jeziku

Muzeji igrajo v tem trenutku morda pomembnejšo vlogo, kot kadarkoli poprej v naši družbi (Frey in Meier, 2006). Deaccessioning oz. odsvojitev muzejskih del, opredeljena kot (McKinney, 2000) "trajna odstranitev ali odtujitev predmetov iz zbirke muzeja na podlagi njihove prodaje, izmenjave, donacije ali prenosa s kakršnimi koli sredstvi" je kot praksa prinesla s seboj številne polemike. V enem izmed prvih kulturnoekonomskih prispevkov o tej temi, ameriški ekonomist John Michael Montias (1973) zagovarja njeno uporabo, medtem ko je bila (in je še vedno) s strani muzejskega sveta deležna precejšnjega nasprotovanja (glej npr. Besterman, 1991; Cannon-Brookes, 1996). Praksa je postala vprašljiva zaradi številnih pravnih in moralnih vprašanj, ki jih je odprla (glej npr. Rohner, 2010), medtem ko so njeni ekonomski vidiki ostali neraziskani in s formalnega modelskega (pa tudi empiričnega) vidika neobravnavani. Odsvojitev muzejskih del je postala posebej zanimiva in aktualna v zadnjih letih v ZDA, ko so jo številni muzeji poskušali uporabiti kot rešitev za svoje finančne težave v času velike gospodarske krize.

Problem odsvojitve muzejskih del zadeva z vidika ekonomske teorije predvsem vprašanja učinkovitosti upravljanja muzeja in primernih spodbud za upravljavce muzejev. V disertaciji trdimo, da so upravljavci muzejev pri sprejemanju odločitev o odsvojitvi muzejskih del v položaju asimetričnih informacij do njihovih principalov (nadzornih organov muzeja), kar ima za posledico t.i. moralni hazard ter nevarnosti in spodbude za ne-optimalno (s strani principala in družbe) delovanje in neučinkovitost.

To hipotezo v nalogi ocenjujemo s pomočjo mikroekonomskih teoretičnih modelov v okviru teorije pogodb in analize problema principala in agenta. Teorija pogodb nam daje vpogled v analizo spodbud upravljavcev v luči asimetričnih informacij in prisotnosti moralnega hazarda, teorija agentskih stroškov prostega denarnega toka v podjetjih, ki so jo razvili Jensen in Meckling (1976), Easterbrook (1984) in Jensen (1986) pa tvori osnovni fokus našega raziskovanja. Našo hipotezo preverjamo na osnovi klasične situacije principala in agenta, ki se pojavi pri odsvojitvi muzejskih del: nadzorni odbor muzeja (kot principal), zanima predvsem uspešnost muzeja, medtem ko menedžerja (kot agenta) vodijo predvsem lastni interesi (plača, različni dodatki in ugodnosti, itd.) S tem sledimo institucionalni razlagi obnašanja menedžerjev muzeja, razviti v delu Freya in Meierja (2006). Večinoma torej analiziramo situacijo, ko sredstva iz naslova odsvojitve muzejskih del delujejo kot "blažilec" za odpravo likvidnostnih težav muzeja (glej npr Fisman in Hubbard, 2003).

Disertacija torej najprej predstavlja celovit pregled področja kulturne ekonomike, saj je slednje le zelo slabo prisotno v slovenskem prostoru. Tako predstavljamo obsežen pregled različnih podpodročij v kulturni ekonomiki, ne toliko glede na razvrstitve v

drugi referenčni literaturi (npr. Throsby, 1994; Blaug, 2001), pač pa predvsem glede na smernice številnih konferenc zadnjega desetletja. Zato najprej predstavljamo podpodročja kulturne ekonomike glede na ekonomske teme, ki jih ta obdelujejo, kasneje pa še podpodročja po zastopanosti različnih sektorjev kulture in umetnosti (ekonomika glasbe, plesa, gledališča, likovnih umetnosti, itd.).

V nadaljevanju istega poglavja predstavljamo problem odsvojitve muzejskih del v njegovem najširšem vidiku, vključujoč vse probleme pravnih, moralnih, umetniških, muzejsko-upravljavskih in ekonomskih vidikov, kakor tudi nekaj ameriških študij primerov: The National Academy Museum, The Barnes Foundation, The Rose Art Museum ter Indianapolis Museum of Art.

V tretjem poglavju predstavljamo naš glavni pojmovni aparat za analizo s področja mikroekonomike problema principala in agenta in teorije pogodb. Študije problemov razmerja principala in agenta so bile dejavno področje raziskav v mikroekonomiji in organizaciji in strukturi trga (angl. industrial organization) v zadnjih desetletjih (glej npr. Chen, 2011). Na kratko predstavljamo dve glavni sodobni smeri razvoja v teoriji pogodb: teorijo nepopolnih pogodb ter teorijo transakcijskih stroškov. Nato v splošnem predstavljamo glavne ugotovitve raziskav teorije pogodb pri analizi problema principala in agenta. V zadnjem delu tretjega poglavja pa se osredotočimo na predstavitev in kratko analizo jedrnega problema naše naloge, agentskih stroškov prostega denarnega toka v podjetjih, kot so jo v svojih delih razvili Jensen in Meckling (1976), Easterbrook (1984) in Jensen (1986).

V četrtem poglavju izvedemo obsežnejšo matematično analizo problema principala in agenta v situacijah odsvojitve muzejskih del in dokažemo, da problem več kot očitno vodi v tri temeljne vrste agentskih stroškov: principal ima močnejše spodbude za večje delo agenta kot agent (menedžer) sam; večja dovoljena sredstva iz naslova odsvojitve muzejskih del so povezana z nižjimi prihodki muzeja od optimalnih; večja dovoljena sredstva iz naslova odsvojitve muzejskih del vodijo k manjšim spodbudam za delo agenta od optimalnih. V izpeljavi dokažemo obstoj takšnih stroškov tako za do tveganje nevtralnega kot do tveganja nenaklonjenega principala. Posplošitev naših ugotovitev za primeru neprofitnih organizacij je takojšnja in kratka: presežno premoženje (angl. endowment), ki ga ima organizacija na voljo privede do ekonomskih, agentskih stroškov in ne-optimalnih spodbud v neprofitnih organizacijah.

Naš osrednji matematični model je preoblikovanje modela Grossmana in Harta (1982), ki sta ga avtorja razvila za preučevanje razmerja med dolgom in uspešnostjo podjetja. Osnovna formulacija našega modela principala in agenta je torej naslednja (sprva predpostavljamo, da je principal do tveganja nevtralen):

$$\max_{R,dE,w,e} [R - w - FC][1 - F(w + FC - dE - R)] \qquad (47)$$

$$s.t. \quad u(w)[1 - F(w + FC - dE - R)] - \psi(e) \geq \underline{u} \qquad (48)$$

kjer je $R - w - FC$ neto skupni proračun muzeja (R označuje skupne prihodke muzeja, w označuje menedžerjevo plačo, FC pa označujejo preostale stroške muzeja (brez menedžerjeve plače)), F je kumulativna porazdelitvena funkcija slučajne spremenljivke s (glej izpeljavo v nalogi), dE označuje sredstva, dovoljena za odsvojitev muzejskih del, u je menedžerjeva funkcija koristnosti, ψ je menedžerjeva funkcija izgube (angl. disutility) zaradi vloženega dela, e označuje menedžerjev vložek dela (angl. effort), $\underline{u}$ pa je minimalna zagotovljena raven menedžerjeve koristnosti.

V nalogi torej matematično dokažemo tri jasne izreke, ki veljajo tako v primeru do tveganja nevtralnega kot do tveganja nenaklonjenega principala:

Izrek 1: Če velja $\lambda > 0$ in je menedžer do tveganja nenaklonjen ($u'' < 0$) potem je principalova mejna korist od dodatnega delovnega vložka v ravnovesju striktno večja od agentove. Principal je torej bolj motiviran za spodbude za večje delo kot pa agent.

Izrek 2: V ravnovesju je mejni učinek sredstev od odsvojitve muzejskih del na plačo menedžerja večji od mejnega učinka dodatnih prihodkov na plačo. Uporaba sredstev iz naslova odsvojitve muzejskih del je torej za menedžerja bolj mamljiva kot pa večanje prihodkov muzeja. Prav tako je mejni učinek sredstev odsvojitve muzejskih del na prihodke v ravnovesju negativen in večji od -1.

Izrek 3: Sredstva od odsvojitve muzejskih del imajo v ravnovesju negativne mejne učinke na delovni vložek. Dovolitev uporabe sredstev iz naslova odsvojitve muzejskih del torej vodi v negativne spodbude za delovni vložek agenta/menedžerja.

Očitno je, da te ugotovitve potrjujejo obstoj številnih negativnih učinkov dovoljevanja uporabe sredstev iz naslova odsvojitve muzejskih del. Najprej, uporaba tovrstnih sredstev ima negativen učinek na delovni vložek menedžerjev – slednji bodo težili k temu, da delajo manj v prisotnosti sredstev odsvojitve muzejskih del, ki bi lahko krila morebiten primanjkljaj muzeja. S tem v mislih tudi prvi izrek takoj postane bolj razumljiv: ta izrek preprosto pomeni, da vložek menedžerjev bolj koristi principalu kot pa njim, torej slednji resnično nimajo velikih spodbud za večje delo (zaradi negativnega predznaka imajo celo spodbude za manjše delo) v prisotnosti sredstev od odsvojitve muzejskih del. Tretjič, uporaba sredstev odsvojitve muzejskih del je bolj mamljiva za menedžerje kot pa večanje prihodkov muzeja. To še enkrat več pokaže, da ima v prisotnosti možnosti uporabe sredstev iz naslova odsvojitve muzejskih del menedžer res precej manjšo motivacijo za delo v korist muzeja, pač pa toliko večjo

motivacijo za odsvojitev muzejskih del in uporabo teh sredstev za financiranje muzeja, in zato za prepustitev delovanja v korist muzeja "komu drugemu". To je naposled potrjeno tudi z negativnim predznakom mejnega učinka sredstev odsvojitve muzejskih del na prihodke muzeja – močneje kot dovolimo uporabo sredstev od odsvojitve muzejskih del za kritje primanjkljaja muzeja, manjši bodo pričakovani prihodki.

Mikavne so tudi generalizacije, ki jih te ugotovitve dopuščajo, tako za neprofitne kot profitne organizacije. Za neprofitne je rezultat nedvoumen in takojšen: dovolitev organizacijam, da se zanašajo na sredstva od premoženja (angl. endowment) organizacije za kritje lastnih primanjkljajev, ima ekonomsko škodljive učinke na spodbude za delo v organizaciji. To potrjuje empirične rezultate iz dostopne literature (npr. Fisman in Hubbard, 2003; Core, Guay in Verdi, 2006) vendar gre seveda še korak naprej s tem, da takšne negativne učinke dokaže tudi v formalni izpeljavi.

Model torej opisuje situacijo, v kateri je jasno določeno razmerje med principalom in agentom. Na tak način predstavlja pomemben korak naprej od modela Grossmana in Harta, kjer je razmerje vključeno le za enega igralca, t.j. agenta. Žal pa dokaz v naši nalogi ni dovolj za potrditev teh razmerij tudi v primeru zasebnih profitnih podjetij. V takšnem primeru je namreč prosti denarni tok endogena spremenljivka, medtem ko smo sami predpostavili, da so sredstva prostega denarnega toka določena eksogeno, torej neodvisno od proračuna muzeja. Takšna endogena narava razmerja ima pomemben vpliv na matematično izpeljavo, zato dokaz Jensenove teze v splošnejšem primeru ostaja odprt za nadaljnje izpeljave.

V zadnjem, petem poglavju izvedemo še ekonometrično analizo učinkov presežnih premoženj na uspešnost ameriških muzejev. Uporabimo panelno podatkovno bazo za 283 ameriških muzejev za leta 2002-2011, pri čemer sledimo metodologiji Corea, Guaya in Verdija (2006). V analizi pokažemo, da presežna premoženja resnično vodijo k nižjim prihodkom, nižjim kazalcem uspešnosti (manjšemu razmerju programskih v skupnih stroških muzeja), ter k večjim kompenzacijam menedžerjev, kar je povsem v skladu s trditvami Jensena (1986).

V empirični študiji preverjamo veljavnost naslednjih treh dodatnih hipotez:

- ▸ Hipoteza 1a: Menedžerske kompenzacije so višje za muzeje z večjimi presežnimi premoženji, ceteris paribus.
- ▸ Hipoteza 2a: Izdatki za izvedbo programa so manjši pri muzejih s presežnim premoženjem, ceteris paribus.
- ▸ Hipoteza 3a: Skupni prihodki in drugi kazalniki uspešnosti muzeja so manjši za muzeje s presežnim premoženjem, ceteris paribus.

14

Naša empirična strategija tesno sledi strategiji, ki so jo uporabili Core, Guay in Verdi (2006) ter Fisman in Hubbard (2003) za ovrednotenje negativnih učinkov presežnih premoženj na uspešnost ameriških neprofitnih organizacij. Temeljna razlika je v podatkovni bazi, ki v našem primeru vključuje le umetniške muzeje, zato v naši analizi ne moremo ovrednotiti stalnih učinkov po industrijskih panogah.

Naša empirična strategija je torej sestavljena iz dveh delov. Najprej, v prvi fazi, ocenjujemo regresijsko enačbo z odvisno spremenljivko premoženja organizacije (v dveh oblikah: skupno premoženje, deljeno s skupnimi stroški muzeja; ter logaritem skupnega premoženja muzeja) ter z več kontrolnimi spremenljivkami (regulacija; logaritem skupnih prihodkov muzeja; koeficient variacije prihodkov muzeja; neprava spremenljivka za dolžniški status muzeja; ter interakcijska spremenljivka koeficienta variacije in dolžniškega statusa muzeja). V regresijo vključimo tudi neprave spremenljivke za časovne učinke in individualne učinke posameznih muzejev in držav. Ostanki iz regresije v prvi fazi nam služijo kot mera za presežno, z običajnimi dejavniki "nepojasnjeno" premoženje muzeja.

Ostanke iz prve regresije torej uporabljamo kot neodvisno spremenljivko v naslednjem regresijskem modelu, ki poleg tega vključuje še nekaj kontrolnih spremenljivk (logaritem skupnih stroškov in skupna javna sredstva, namenjena muzeju). Odvisne spremenljivke v modelih druge regresije so treh vrst: kompenzacija menedžerjev, razmerje programskih do skupnih stroškov, ter skupni prihodki muzeja. V regresijo ponovno vključujemo tudi neprave spremenljivke za časovne učinke in individualne učinke posameznih muzejev in držav. Tako konstruirani regresijski modeli nam pomagajo, da lahko naposled ovrednotimo negativne učinke presežnih premoženj na uspešnost muzeja.

Rezultati naše regresijske analize močno potrjujejo rezultate četrtega poglavja. Presežna premoženja neprofitnih muzejev so vezana na večje kompenzacije menedžerjev na eni strani, ter na slabše kazalnike uspešnosti muzejev na drugi strani. Na tem temelju lahko torej tudi v empiričnem smislu potrdimo našo osnovno hipotezo naloge: uporaba sredstev od odsvojitve muzejskih del v namene financiranja dejavnosti muzeja vodi v ne-optimalno upravljanje muzeja.

Izvedemo tudi dva testa robustnosti. Najprej, raziščemo ali izbor odvisne spremenljivke iz prve regresije v kakršni koli meri vpliva na končne rezultate. Drugič, ker je zaradi specifične narave naše mere za presežno premoženje, ki je vezana na spremenljivko, merjeno z napako (angl. measurement error), so koeficienti v drugi regresiji nujno pristranski navzdol in potrebujejo uporabo instrumentalnih spremenljivk za bolj precizne in korektne izračune. Kot instrumentalno spremenljivko uporabljamo prve odloge ostankov v regresiji prve faze. Na tak način odpravljamo

pomanjkljivost, prisotno tudi v omenjenih izhodiščnih študijah (npr. Core, Guay in Verdi, 2006), kar je še en znanstveni prispevek naše naloge.

Rezultati testov robustnosti večinoma potrjujejo naše dodatne hipoteze, čeprav učinki niso več statistično značilni v vseh modelskih specifikacijah. Lahko torej zaključimo, da smo potrdili prisotnost negativnih učinkov presežnih premoženj na uspešnost muzejev ter po drugi strani pozitivne učinke na kompenzacije menedžerjev v skladu s predvidevanji Jensena (1986) in tudi v skladu z našo izhodiščno hipotezo, z ugotovitvami v matematični izpeljavi četrtega poglavja, pa tudi z dodatnimi hipotezami v petem poglavju.

V zadnjem poglavju opozorimo na dve glavni poti možnega prihodnjega raziskovanja: najprej, z nadaljnjo matematično analizo v okviru ogrodja analize problema principala in agenta bi bilo potrebno dokazati Jensenovo hipotezo tudi v splošnejšem primeru profitnih podjetij; drugič, v okviru ogrodja analize problema principala in agenta in mikroekonomske teorije oblikovanja mehanizmov (angl. mechanism design) bi bilo potrebno preučiti tudi možne rešitve problema odsvojitve muzejskih del, kot so bile ponujene v ameriški praksi (različne zakonske rešitve; postopki za večjo transparentnost poteka odsvojitve muzejskih del; nekatere posebne oblike dražb del, namenjenih za odsvojitev, itd.).

Glavni znanstveni prispevki disertacije so navedeni spodaj:
1) Verjetno prva slovenska doktorska teza na področju kulturne ekonomike z obširno predstavitvijo področja v drugem poglavju;
2) Ena prvih matematičnih analiz problemov odsvojitve muzejskih del (edina dosedanja prispevka sta verjetno Di Gaetano in Mazza (2012) ter Srakar (2012));
3) Prvo matematično modeliranje problemov, ki ga odsvojitev muzejskih del prinaša za upravljanje v muzejih;
4) Verjetno prvi matematični model agentskih stroškov prostega denarnega toka v podjetjih, z dokazom obstoječih postavk Jensena (1986) in Easterbrooka (1984), ki so bile doslej pokazane le v empirični analizi;
5) Ena redkih ekonometričnih analiz finančnega menedžmenta v muzejih s poudarkom na ameriških neprofitnih muzejih;
6) Potrditev glavnih ekonometričnih ugotovitev glede učinkov presežnih premoženj na uspešnost neprofitnih organizacij (Fisman in Hubbard, 2003; Core, Guay in Verdi, 2006) tudi za muzejski sektor;
7) Nadgradnja ekonometričnega modela Corea, Guaya in Verdija (2006) z upoštevanjem napak pri merjenju z uporabo instrumentalnih spremenljivk.

Disertacija je po našem vedenju prva formalna analiza problemov odsvojitve muzejskih del in presežnih premoženj za upravljanje v muzejih in neprofitnih

organizacijah. S tem prinaša številna odprta vprašanja kot tudi rešitve na področje, ki je bilo doslej raziskano le v empiričnem smislu. Prav tako gre za eno prvih doktorskih tez s področja kulturne ekonomike v Sloveniji, zato upamo, da bo spodbudila raziskovanja tudi na tem področju.