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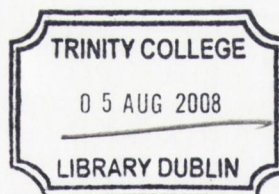
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THESIS
8484

**The State, the Performing Arts and the
Taxpayer: Applied Econometric Essays
on the German Cultural Sector**

Ph.D.

2007

António Pedro Crespo Martins

Declaration

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Dublin, 23rd September 2007

António Pedro César Martins

Summary

This research work investigates the relation between the State, the performing arts organisations and the taxpayer. The overall area of interest is taxation and public policy, in the form of public support for the arts. The empirical research is applied to Germany, using German datasets.

Chapter 1 describes cultural policy and the performing arts sector in Germany. This sets the framework for the empirical studies.

Chapter 2 studies the cost factors of German performing arts, by focusing on public theatres and orchestras. The main goal is to understand the cost structure of arts organisations, and about ways in which the performing arts firms may be able to rearrange their resources to lower their costs and improve their profitability.

Differences in the availability of data require different empirical models to be considered for public theatres and for Orchestras. The models were estimated using OLS.

The results obtained are in line with previous findings in the literature, confirming that total costs depend to a large extent on the outputs (performances and productions) and quality. Economies of scale were found both in the production of orchestras and of public theatres.

For theatres, the results confirm the basic statements made by Muehlenkamp (1998) and Robledo (2002) that total costs depend largely on the outputs, with the number of productions and the number of opera performances as the most significant cost factors. For orchestras, size and quality have positive effects on total costs.

Chapter 3 follows Chapter 2 in the investigation of German performing arts organisations. However, while Chapter 2 uses a cross section of circa 150 theatres and 50 orchestras for a season, 1998/99, Chapter 3 considers German public theatres, using time series data from 1965 to 2004. This is a new dataset that is employed to study the demand for German public theatre.

The aim of Chapter 3 is to provide estimates of the price and income elasticities¹ of demand, and to assess if the use of reduced rates of VAT for live arts admissions helps promote theatre attendance.

Two alternate methodologies are contrasted: OLS, as used in the previous studies in the literature, and the cointegrated VAR model, which is required because the data are not stationary. The results obtained from OLS are consistent with previous findings,

¹ Elasticities are defined as the ratio of one percentage of change to another.

with the main result being that demand is found to be price inelastic, which suggests that theatres could raise price and increase revenue. The cointegration results find demand to be price elastic. A one percent increase in price leads to a 1.2 percent fall in attendance. Demand was expected to be elastic, due to the availability and the increased range of substitutes produced by technological progress.

The estimation results find no evidence to support the hypothesis that the reduced rate of VAT² has a positive effect on theatre attendance.

Chapter 4 investigates gifts by living individuals to philanthropy. Empirical studies on philanthropic giving estimate demand functions for contributions, to obtain price and income elasticities. The main question of interest is whether contributions are treasury efficient³, i.e. if because of the tax incentive the increase in giving exceeds the amount of Treasury revenue losses.

Another objective of Chapter 4 is to investigate giving to different types of organisations. It is also relevant to perceive how giving varies with income, how much taxpayers give as a share of their income, and how this share changes with income.

The results are in line with recent research findings that giving is tax price inelastic, suggesting that the itemized deductions for contributions lose more tax revenue than the increase in giving, and are therefore not treasury efficient. The price and income elasticities also vary by income decile.

In line with other findings in the literature on charitable giving, age is associated with higher levels of giving. Other factors that impact giving positively are being an independent worker, employing a tax consultant, and being religious. In contrast to results from other countries, females and married taxpayers donate less. The number of dependents (number of children) also reduces both the probability of being a giver and the amount given to philanthropy.

² Measured by the spread between the standard and the reduced rates.

³ A price elasticity of giving greater than one, in absolute value, indicates treasury efficiency.

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To my friends, who now firmly believe that there is something happening between the State, the performing arts and themselves, as taxpayers.

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INTRODUCTION

This research work investigates the relation between the State, the performing arts organisations and the taxpayer. The overall area of interest is taxation and public policy, in the form of public support for the arts. The research is applied to Germany, and German datasets are employed in the empirical analysis.

Public support for the arts is funded out of general taxation. Taxpayers contribute without a real understanding of what is being funded and why. This occurs because spending on all arts represents a tiny fraction of the national budget, around one percent. Furthermore, in times of shortage of funds, spending on the arts is a prime candidate for budget cuts.

Governments support the arts as an important public good and because of market failure, using both direct and indirect funding. The arts improve society as a whole, but benefits are not equally shared, as members with higher consumption benefit more. Hence, it is important to consider who decides the allocation of funds, who enjoys the benefits from supported activities and who bears the cost of funding. Since attendance to the live arts is highly skewed towards older and higher income taxpayers, a minority of the population, the costs of public support for the arts and the benefits accrued from arts consumption are not equally shared among taxpayers, raising equity⁴ considerations.

Research on the public support for the arts is therefore required, to provide the taxpayer with information regarding her/his relation to the State and the arts.

The investigations in this research work are applied to Germany, a benchmark of cultural policy in Europe. Chapter 1 describes German cultural policy and the performing arts sector in Germany. This provides the framework for the empirical studies in subsequent chapters.

Cultural policy in Germany is governed by the principles of decentralization, subsidiarity, plurality, competition, and government non-interference. A strong sense of

⁴ The concept of vertical equity implies that a tax system should distribute burdens fairly across people with different abilities to pay (usually achieved through progressive tax rates). The concept of horizontal equity, formulated by Musgrave, states that people in equal positions should be treated equally.

public-sector responsibility ensures the existence and funding of cultural institutions and programmes, at both the regional and local levels. This state support coupled with respect for artistic autonomy and a primarily supply-oriented approach to cultural policy have led to a situation where the bulk of the cultural infrastructure is under the public law sponsorship of the cities and the Länder.

Of particular interest is the German theatre system, as the empirical studies on Chapters 2 and 3 will study the cost factors and the demand for live performing arts. The German *theatre* has taken shape over the past 200 to 250 years. Its system is characterized by extensive public support of numerous and geographically dispersed theatres. Private funding and commercial structures are rare, and public support sustains about 150 publicly funded theatres and 280 private houses⁵. There are also many independent theatre groups, and many private theatres are also subsidized. As a result, almost every town has its own stage.

The public theatre in Germany, generically described as the ‘city theatre’, has been predominantly financed by city budgets and is thus also subject to municipal cultural policies. There is no assessment of subsidized companies by their funding authority as the Deutscher Bühnenverein (representing theatres and cities as theatre-owners) and the funding bodies themselves do not consider the funding bodies to be suited to make such assessments and have voiced their objection to them. As a result, performance indicators have not been an issue in Germany.

The most common theatre structure in Germany is the three category house (Drei Sparten Theater) offering a broad spectrum of performing arts including drama, opera, musical theatre and dance.

Chapter 2 studies the cost factors of German performing arts, by focusing on public theatres and orchestras. It applies and updates previous research in the literature, employs a new dataset containing data from the 1998/99 theatre season, to validate previous results, test new hypothesis, and serve as a preparatory work for a panel data time series study, to extend the analysis to the period 1965/66 to 2004/05.

The main goal of Chapter 2 is to understand the cost structure of arts organisations, what they are likely to be in the future, and about ways in which the performing arts firms may be able to rearrange their resources to lower their costs and improve their profitability. As noted by Globerman and Book (1974), the design of cost control policies requires some understanding of the cost determination process.

⁵ http://www.germany-info.org/relaunch/culture/performing_arts/p_arts.html

Performing arts cost studies are most concerned with the behaviour of the cost function with respect to the output variable. The main interest of all applications of cost functions for cultural industries has been in finding evidence of economies of scale. Scale economies⁶ indicate monopolistic markets and suggest cost savings from large scale production. Chapter 2 includes a study of economies of scale for German public theatres and orchestras.

There are two main reasons for studying cost functions in performing arts organisations: first, cost reductions enable lower prices and allow for people with lower valuations of live performing arts experiences to participate. Performing arts firms are reluctant to pass on cost increases in the form of higher ticket prices, which may be attributable to political biases and/or fear of significant resulting decreases in audience sizes, and this makes the implementation of policies to control costs important and desirable. Chapter 3 will empirically estimate demand to test the hypothesis that demand is sensitive to the price of tickets.

Second, cost functions are approached from the income gap that requires increased government subsidies to the arts, in order to maintain output and quality. The performing arts are subsidised using public monies, with subsidies financed out of general taxation. Cost reductions mean less support is required, and that taxpayers are left with more disposable income.

The goals of the performing arts organisation (PAO) and the preferences of its patrons influence the programme choice, but the performances these institutions decide to present has a direct impact on the cost structure. In the case of German PAOs, public ownership often means that cost minimization, a necessary condition for profit maximization, is not the sole objective, with issues of access to the arts playing an important role in the definition of the PAO objectives.

A further issue of interest is the impact of quality on total costs. Recent papers in the literature have approached quality in the arts, namely Ginsburgh (2003), Traub (2004), and Tobias (2005). Although most studies on the performing arts include a proxy for quality, there is no homogeneous definition as how to evaluate the dimensions of quality. Chapter 2 considers the different measures used in the literature and contrasts them. It suggests and tests proxies for the different dimensions of quality.

Chapter 3 follows Chapter 2 in the investigation of German performing arts organisations. However, while Chapter 2 uses a cross section of circa 150 theatres and 50 orchestras for a season, 1998/99, Chapter 3 considers all public theatres in a time

⁶ When costs increase less than proportionately with output.

series running from the 1965/66 season to the 2004/05 season. This is a new dataset that is employed to study the demand for German public theatre.

The aims of Chapter 3 are to provide estimates of the price and income elasticities⁷ of demand, and to introduce the issue of the use of reduced rates of VAT in promoting theatre attendance. Empirical studies on the demand for the live performing arts generally focus on providing estimates of price and income elasticities. The two fundamental questions are whether an increase in price will increase revenue or reduce it, due to a corresponding fall in attendance (law of demand); and if increases in income will result in higher levels of attendance.

Performing arts tend to be either state owned/run or organized as non-profit institutions. Quality aspirations and social goals often cause operating revenue to be lower than would be the case if services were priced to satisfy a simple profit-maximization goal. As high prices serve as a deterrent to consumption, a low price for the product of a non-profit is normally an inevitable consequence of its objectives. Lower prices can be achieved with cost savings, as addressed in Chapter 2, or can be the result of government intervention, such as the use of lower rates of VAT.

Chapter 3 addresses this important policy issue, the use of the reduced rate of VAT for admissions to cultural performances, according to Annex H.

VAT is a tax, and as such, it introduces distortions and causes excess burden. VAT is a regressive tax and performing arts attendance is skewed towards a minority of high income individuals. Revenue loss due to the VAT tax expenditures has to be raised by general taxation, leading to a higher level of taxes for all taxpayers. Tax expenditures⁸ also introduce important distortions in the way institutions and donors behave, changing the visitors or the arts experience.

Furthermore, in Europe, the application of the reduced rate of VAT is subject to rules that increase the complexity of the VAT system and generate inconsistent application of VAT rates.

As noted previously, Chapter 2 investigates the cost structure of the performing arts organisations. Public owned theatres need to present a zero profit and loss at the end of the fiscal year, and thus require additional funding in the event of operating at a loss. This additional funding will either translate into debt or into higher taxes, current or in the future, for the taxpayer. Chapter 3 studies public theatre demand over a 40 year period. It attempts to measure the effect of the use of reduced rates of VAT on theatre

⁷ Elasticities are defined as the ratio of one percentage of change to another.

⁸ Tax expenditures are not specifically targeted at the arts, except for the exemption of works of art from import duties.

attendance, by considering the evolution of the spread between the standard and the reduced rates. The cost of the VAT exemption depends on the number of ticket sold, on the demand for live performances. Thus, the tax cost to the taxpayer is neither known nor approved in advance.

Chapter 4 approaches the relation between the taxpayer and the State sponsoring of the arts from a different viewpoint. It considers the income tax deductions that exist in the tax code for taxpayers who decide to contribute to philanthropy. These tax breaks mean that the State allows the taxpayer some discretionary power in the allocation of his taxes, while acting as a co contributor.

The majority of studies on philanthropic giving refer to the U.S. experience and Chapter 4 contributes to the literature by applying the same techniques to a dataset of German taxpayers, containing a random sample of 10 percent of taxpayers. The dataset makes it possible to split philanthropic giving as religious and secular, and further distinguishes secular giving as gifts to charity, to education, to political parties, to association of voters, to heritage, and to other types of organisations.

Empirical studies on philanthropic giving estimate demand functions for contributions, to obtain price and income elasticities. The main question of interest is whether contributions are treasury efficient, i.e. if because of the tax incentive the increase in giving exceeds the amount of Treasury revenue losses. A price elasticity of giving greater than one, in absolute value, indicates treasury efficiency.

Another objective of Chapter 4 is to investigate giving to different types of organisations, as described above. It is also relevant to perceive how giving varies with income, how much taxpayers give as a share of their income, and how this share changes with income.

In Germany, the eligibility to receive tax deductible donations is dependent on the organization being public benefit (*gemeinnutzig*). Chapter 1 shows that the non-profit sector is not entirely distinct from government and the for profit sector, with significant overlaps between all sectors. The revenue structure of German civil society organizations is dominated by Government, with philanthropy accounting for only three percent of total revenues⁹. The non-profit sector is supported directly (subsidies and grants) and indirectly (tax exemption and provisions for the deduction of philanthropic gifts) through the tax system.

The relevance of this study is enhanced by the financial strains of unification, the stability pact, and an ageing population that burdens the welfare State. The increased

⁹ Salamon (1995)

pressure on federal spending and shortage of funds mean that nonprofits are faced with an increased demand for many of their services, as philanthropy is expected to fill the gaps in State provision.

Overall, this research work employs new datasets to study research questions that remain unsettled in the literature. The standard economic theory is applied to supply and demand of live performing arts, and to the demand of philanthropic contributions. Empirical models derived from the previous literature are estimated and extended, with new hypothesis being tested, new research questions being asked, and the methodology from previous studies updated.

CHAPTER 1

GERMAN CULTURAL POLICY AND GERMAN PERFORMING ARTS SECTOR

This chapter describes the German cultural policy and cultural sector, as Chapters 2, 3, and 4 will present empirical investigations relating to Germany and the arts.

1.1 Overall German Cultural Policy and Cultural Sector¹⁰

Subsection 1.1.1 describes the German cultural system; subsection 1.1.2 details the cultural policy model. Subsection 1.1.3 presents the main legal provisions in the cultural field, and subsection 1.1.4 discusses sector specific legislation. Subsection 1.1.5 describes the financing of culture and cultural expenditures. This is required as it provides the institutional framework for the performing arts organizations that are studied in Chapters 3 and 4. Subsection 1.1.6 discusses cultural institutions and new partnerships, and subsection 1.1.7 provides an overview of support to creativity, concluding this section.

1.1.1 Overall Framework

Article 5 (Freedom of expression)

[3] Art and science, research and teaching are free. Freedom of teaching does not absolve from loyalty to the constitution.

Article 28 (Federal guarantee concerning Länder constitutions, guarantee of self-government for local authorities)

[2] The communities must be guaranteed the right to regulate on their own responsibility all the affairs of the local community within the limits set by law. The

¹⁰ This section follows the Cultural Policy in Germany (2005) report (www.culturalpolicies.net). It also draws from Cummings and Katz (1987), Krebs and Pommerehne (1995), Krebs (1996), Schulze and Rose (1998), Schulze and Perino (2003) and Ahearne (2003).

associations of communities also have the right of self- government in accordance with the law within the limits of the functions given them by law.

Article 30 (Distribution of competence between the Federation and the Länder)

The exercise of governmental powers and the discharge of governmental functions is incumbent on the Länder insofar as this Basic Law does not otherwise prescribe or permit.

Article 32 (Foreign Relations)

[1] The conduct of relations with foreign States is the concern of the Federation.

Basic Law for the Federal Republic of Germany¹¹

The German constitution guarantees freedom of the arts, in Article 5[3]. In 1974, the court decided that this should be interpreted as the role of the modern State, which defined itself as a Kulturstaat, to maintain and to promote a liberal artistic life. It is therefore understood that the State is responsible to actively encourage, support and uphold this artistic freedom. The duty of the State to promote culture and the arts was reaffirmed as a responsibility of the new Länder in the 1990 Unification Treaty.

There are three levels of cultural policy in terms of structures and competences: Federal level (Federal Government, Bundestag, Bundesrat), Land (regional) level (16 Land governments and Land parliaments), and Municipal (local) level (municipal administrations and council assemblies/county councils).

German cultural policy is federally organized and decentralised, and it has been almost exclusively a matter for regional States and municipal councils, but this “cultural sovereignty of the Länder” is formed on the significance of omission: in so far as the Basic Law does not ascribe responsibility for cultural matters to the federal government, authority for cultural policy remains within the Länder (Article 30). Under the Basic Law, the municipalities are part of the Länder. They are furthermore guaranteed the right (Article 28[2]) to regulate all local affairs on their own responsibility (voluntarily and autonomously take decisions concerning the cultural affairs of the local community).

The Federation is responsible for cultural policies in relation to third countries and federal legislation pertaining to cultural affairs (Article 32[1]), the Länder are responsible for funding cultural institutions and projects of regional importance, and the Municipalities (towns, cities and counties) are responsible for the promotion of culture at local level. The Länder also have the competence for schools and higher education,

¹¹ <http://www.lib.byu.edu/~rdh/eurodocs/germ/ggeng.html>

and all Federation, Länder and Municipalities are free to determine the form, extent and priorities of their cultural programmes.

There is no official body in charge of coordinating cultural policy initiatives and given the autonomy of the Länder and municipalities, cultural policy and cultural activity may vary greatly. At the Land level, inter-ministerial level voluntary self-coordination takes place through the KMK¹², and at the municipal level a similar structure exists through the local authority associations.

In a broad sense, cultural policy includes education and media regulation, but the definition of cultural policy is far from being consensual. German cultural policy is decentralised, and the French centralised model is the polar example. Ahearne (2003) notes that although the contrast between Germany and France retains its structural significance, it has become more complex as a result of what is called a chiasmic convergence (the most centralised pole admitting elements of decentralisation, and the most decentralised pole admitting elements of centralisation), of which the federal Ministry of Culture set up in Germany in 1998 is an example.

As a result of the prominence of the Länder in the administration of culture, there was no federal Ministry of Culture until 1998, when the Federal Commissioner for Cultural and Media Affairs was created. This is still not a Ministry, but more of an Authority, which is part of the Chancellor's office and headed by a Staatsminister, a junior minister, rather than by a Bundesminister.

1.1.2 Cultural Policy Model

Cultural policy in Germany is governed by the principles of decentralization, subsidiarity, plurality, competition, and government non-interference. A strong sense of public-sector responsibility ensures the existence and funding of cultural institutions and programmes, at both the regional and local levels.

This State support coupled with respect for artistic autonomy and a primarily supply-oriented approach to cultural policy have led to a situation where the bulk of the cultural infrastructure is under the public law sponsorship of the cities and the Länder. The problematic financial situation of many Länder has prompted a desire for more substantial involvement of the Federation as co-financer of "cultural landmark institutions", and with the move to Berlin of the German Bundestag, the Bundesrat, and the Federal Government, the capital has grown in cultural significance and the

¹² Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany (www.kmk.org)

Federation has assumed sole responsibility for funding some institutions in Berlin. The consequences of the German unification and greater federal competence for cultural affairs are examples of current cultural policy issues. As a legislator, the Federation has launched reforms in the area of foundation law (including taxation), copyright, social insurance for artists, and the legislation of fixed prices for books, among others. The federation also plays a role in restitution claims for cultural objects unlawfully seized during World War II.

Other current cultural policy issues are civic commitment, individualisation and differentiation of the public, migrants and cultural diversity, and administrative reform. As public cultural life in some cities is marked by civic initiatives, the policy maker is required no longer to think solely in terms of State financing. State and municipal cultural policy have been unable to react to an environment of multiple and diversified urban cultural institutions, which reflect the interests of the public. This means that State and local cultural funding should be more oriented towards demand, satisfying unmet demands and discontinuing unutilised services.

Greater financial constraints have forced the policy administration systems and the structure of cultural institutions to modernize, increase efficiency and proximity to the citizen. To this end, some public institutions have been privatised and private commercial and voluntary non-profit organizations become partners of the public sector in private-public arrangements.

In relation to minorities, the autochthonous minorities and ethnic groups of German nationality (Danes, North Frisians, Sater Frisians, Sorbs, German Sinti and Roma) are protected, with the Federation and the Länder providing substantial funding. Other ethnic groups often act on their own initiative, and although there may be local support, at the Land and Federal levels such support is nonexistent.

In terms of gender equality, women are underrepresented in leadership positions in the cultural policy sector, artistic professions and cultural institutions, and support exists to foster a greater involvement.

As for media pluralism and content diversity, broadcasting operates under a dual system of public corporations and private firms producing and broadcasting programmes. The privilege of fee-based revenue coupled with differential restrictions on advertising has led to a market share of public stations of around 40 percent.

Public TV stations affect revenues of private stations indirectly through reducing the viewer numbers available to private stations and thus the willingness of companies to pay for TV advertisement. Likewise, public stations are additional demanders for TV

content and therefore increase the private stations' costs. In addition, the existence of public stations may also reduce the import of foreign films due to their different program structure. This is relevant, as Chapter 3 estimates cost functions for public theatres in Germany, and public theatres may affect private theatres in a similar way.

There are no official quotas to which broadcasters must adhere, reflecting the view that the imposition of quotas is an unsuitable instrument for the promotion of European film and television production. The interest in the media is fairly recent, and previous measures to promote the film sector were adopted by the Federation and the Land to support the national culture industry and the development of film as an element of the country's national heritage.

As part of cultural life, cultural industries have been increasingly supported through direct and indirect (like tax exemptions) measures: real subsidies to public theatres have increased from 1965 to 2004 and the difference between the VAT standard rate and the reduced rate applied to cultural products such as theatre attendance has also increased. Private cultural enterprises, State or municipal publicly funded institutions or activities, and not-for-profit intermediary organizations coexist and public-private partnerships are increasingly being formed to fund cultural projects and institutions. In terms of importance, the real value created by the cultural sector and the publishing sector is estimated to equal that of the food industry and four fifths of the value created by the chemical industry.

In terms of labour, Germany has 1.5 percent of the employed population in cultural occupations (commercial and subsidized cultural employment). In terms of labour market policy, no national cultural policy strategy has become discernible, but some indirect support for employment measures in the Bundesländer can be found via the Social Funds and Structural Funds of the EU.

In relation to new technologies and cultural policies, the development of broadband and platform-independent access allows for "electronic integration", social cohesion and cultural diversity. Thus the positive effects associated with digitalisation outweigh the negative, with the internet breaking down high brow hegemonic market power structures. The new media are of special importance to migrants, children and young people.

Art, literature and music education fall within the purview of the Länder. As in the subjects of music and the fine arts, lack of instruction is a widespread problem. Out-of-school private or mixed funded institutions for cultural and arts education (such as

music schools, art schools for young people, cultural workshops and media centres) are taking on ever greater importance, exhibiting higher quality and broader scope.

Heritage is a cultural priority at all levels of government and there is an ongoing public debate on the importance of immaterial and material cultural heritage, which comprises museums, historic monuments and cultural traditions. Financial reasons are one part of the problem (what to protect, reconstruct and maintain and by which measures), but another reason lies in the widened concept of culture developed in the 1970s and 1980s which included objects of everyday life as well as industrial culture. The reunification of Germany increased the number of objects worth protecting and reconstructing to an extent that new criteria are indispensable. High maintenance costs and finding appropriate and economically sound concept for the use of reconstructed buildings further upset the balance between protection of heritage and support to contemporary creativity, with demands to reconsider the criteria used to determine public support for culture and that of expensive institutions such as theatre and music be modernised and economically streamlined.

1.1.3 Main legal provisions in the cultural field

Cultural policy is not codified in a single text but consists of a host of constitutional and statutory provisions. The Basic law and the constitutions of the Länder encompass statements concerning basic rights, aims of the State, and the division of competences. In fact, 14 of the 16 Land constitutions contain provisions dealing specifically with art and culture. There are no special statutory bases for the competence of the municipalities in the cultural field, and their competence is enshrined in the Basic law and various Land constitutions and county and municipal codes.

Regarding the social security framework, artists and journalists/authors enjoy comprehensive social security coverage. If they are employed, they are covered under the general social security scheme, and if they are unemployed, special protection exists.

In relation to tax laws, indirect State support in the form of tax breaks is not laid down in a separate piece of legislation but instead consists of a multitude of regulations contained in various specialized acts. In the case of VAT, some cultural products such as theatre performances are subject to the reduced rate of VAT of seven percent instead of the standard rate of 16 percent, and Chapter 3 deals with the effectiveness of such measures. Under certain conditions public cultural operations and non-profit theatre performances are exempt from VAT and corporate tax altogether. Since 2000 a new Act on the taxation of foundations has been in force, containing tax incentives for the

establishment of and donations to foundations, and in the past few years additional tax breaks have been incorporated into the law governing donations. Tax incentives for individual charitable giving are the object of the investigation in Chapter 4.

As for copyright provisions, the copyright law codifies the right of creative and performing artists to their intellectual property. Its provisions regulate the protection of works, remuneration rights and exploitation rights. Collecting societies are responsible for the collection of royalties on behalf of the authors.

There is a standard levy on audio equipment which was introduced in 1965 and a levy on audio and video recording equipment which was added in 1985. There are also levies on digital reproductions that benefit authors and performing artists. There are no regulations governing the representation of languages in the media.

1.1.4 *Sector specific legislation*

Cultural policy aims to preserve and protect the built heritage. At the Land level, monument protection legislation has been passed, and monument conservation is also a task of municipalities. At the Federal level, since 1950, there has been a programme to promote monument conservation measures, co-financed by the Land involved. But not only immovable cultural assets are preserved, as movable cultural treasures are safeguarded, especially through State protection against the export of such objects. In line with the law of the European Union, trade and movement of cultural objects classified as national cultural treasures is restricted. The vast majority of these objects (paintings, medieval books, musical instruments, archaeological objects or archives) are privately owned and are registered and compiled from the Land registers and published at the Federal level in the Federal Gazette. The Federation also helps the Länder and the municipalities purchase such objects when it is feared they may be sold abroad.

Regarding cultural industries, the German cultural sector can be subdivided into three areas: publicly funded and maintained cultural institutions, voluntary non-profit organizations, and private commercial culture industry.

In general there is no special statutory provisions or forms of State support for the culture industry, aside from lower rates of VAT for some products (e.g. film production) and the areas in which both public and private providers are active (radio, television, and computer-based communication media). Public radio and television corporations are financed mainly by compulsory licence fees (that have to be paid by all people owning a TV set), while private commercial television broadcasters (except for the single pay-TV station) are financed exclusively through selling air time for

advertisement. The national system of fixed prices for books was safeguarded through the adoption of an act in 2002.

Below the statutory level there are numerous forms of public support for the culture industry, such as special breaks for the music industry and support for business start-ups in individual Länder. Both the Federal and Land governments support film.

1.1.5 *Financing of Culture and Cultural Expenditures*

In keeping with the subsidiarity principle, the financing of culture is first and foremost the responsibility of the citizens and their local communities. The State steps in as a sponsor once the scope or nature of a cultural policy task is beyond the community's resources. The Federal government has limited competence in the field of cultural policy and provides only a small share of total support for culture, with the municipalities and the Länder bearing the lion's share of the cost of financing public cultural activities and institutions. Funds stemming from other policy fields, especially job promotion are also important in both Western and Eastern Länder. In addition, cultural institutions, events and projects are also privately funded to a considerable extent.

Public cultural expenditures differ considerably because municipalities, Länder and the Federation operate on the basis of rather different definitions of the term "culture". There are also different standards to collect cultural statistics, which further complicates this issue. However, cultural expenditures increased disproportionately in comparison to other areas of public expenditure in the 1970s and 1980s, and in the 1990s total public expenditure increased nominally but decreased in real terms.

Direct public cultural expenditures by sector have changed little between 1995 and 2000. In 2000, 44.6 percent of funds were allocated to the Performing Arts (music and theatre), 16 percent to Museums/Archives, and 11 percent to Libraries/Literature.

Total public cultural expenditure broken down by level of government, in 2000, indicated that Regional/Provincial governments (Länder) accounted for 47.5 percent of expenditures, followed by Local/Municipal governments with 43.7 percent, and the Central Government (Federal) accounted only for 8.7 percent of expenditures.

1.1.6 *Cultural institutions and new partnerships*

Over the past few years there has been an organizational restructuring of the cultural sector, reflecting a growing preference for new sponsorship models. This institutional reform still demands that the public sector maintains its responsibility to

ensure funding. However, most municipal institutions are still integrated into and bound by the structures and hierarchies of public administration. Two strategies can be distinguished: one that opts for a choice of another legal form such as limited liability company or a foundation (which so far has not resulted in a reduction of public funding), and another strategy that focuses on cooperation with intermediary organizations (transfer of tasks), which is prevalent at the federal and Land levels.

Vibrant cultural institutions in all of Germany are an outgrowth of German history, especially the emergence and flourishing of many small territorial States. After each profound societal change (1918, 1945 and 1990) the Länder and the municipalities reaffirmed their responsibility for theatres, orchestras and museums. Severe financial problems in recent years at both municipalities and Land levels have called for a reform of State-run cultural institutions, such as theatres and museums, especially in regards to wage and salary scales at theatres. Chapter 2 contributes to this debate. While most cultural institutions, including the largest ones are still exclusively State-run, for smaller institutions at local level permanent co-operation and co-financing arrangements have been reached. And there are also more examples of larger institutions collaboration between the Länder, the municipalities and private firms/patrons as permanent sponsors.

Cultural associations in Germany are very diverse and play a large role. They range from small local or neighbourhood sponsors of cultural activities to museum associations that run their own institutions. They are an example of civic commitment and involvement, and form an indispensable structural framework for the sponsorship of cultural activities. In some areas (sociocultural centres, local heritage societies and choirs) they are even the dominant organizational form and the public sector has long supported them in line with the subsidiarity principle. Cultural associations are also the primary sponsors of the amateur arts.

Another type of cultural association is the “friend’s society”, composed of volunteers who procure funds for individual institutions, especially museums, art galleries and theatres.

1.1.7 *Support to creativity*

Direct and indirect support to artists is provided on one hand through the funding of arts institutions and on the other hand through the creation of general conditions conducive to the flourishing of the arts.

At the federal level, support to artists is provided through the institutions for the self-organization of artists and culture-sector actors. It includes exhibitions of

contemporary art, competitions, scholarships and prizes, and since the 1970s there has been a budget for art purchase and a collection of contemporary art, as well as funding for German artists' stays abroad. However, most of the support for artists is provided by the municipalities and the Länder through a variety of instruments, with individual Land foundations for the arts and culture playing an important role. Widespread forms of support include financial assistance for art projects, purchase and commissioning of works of art, scholarships awards, provision of facilities, prize awards and publication subsidies. Additional support exists for the Eastern Länder.

Of particular importance are awards and art prizes which have increased in both number and importance in recent years. The 2000 Handbook of Cultural Awards lists 2.400 prizes and 3.100 individual awards, from 776 prizes and scholarships listed in 1978. Recent years have also seen an increase in scholarships and prizes endowed by private individuals and firms.

1.2 German Performing Arts Sector

This section looks at the performing arts in Germany, in particular the theatre system. This is required as Chapter 2 studies cost functions for German public theatres and orchestras (*Selbstsändige Kulturorchester*), and Chapter 3 investigates the use of reduced rates of VAT as a means of promoting German public theatre attendance.

Performing Arts data for the period 1965-2005 are presented and discussed. A description, explanation, and details about the data are given in Annex 1.2.B.

1.2.1 Characteristics of the performing arts as creative industries

The performing arts (theatre, opera, concerts, dance) can be considered creative industries and some of their main characteristics such as live production and contemporaneous consumption have important implications for their cost structures.

According to Caves (2000), the creative industries comprise 'industries supplying goods and services that are broadly associated with the cultural, artistic, or simply entertainment value'.

Haunschild (2003) illustrates some particularities of theatre, by following the seven 'basic economic properties of creative industries' given by Caves (2000). There is uncertainty as to how patrons will react to new plays (nobody knows property), and there is a large variety of productions being offered (infinite variety property). Plays

need to be performed at specific schedules (time flies property) with production and consumption normally occurring at the same time, and only in exceptional cases are the performances recorded as durable goods (ars longa property). Furthermore, theatre plays, opera, ballet and concerts are normally complex creative goods, requiring complex teams of creative and 'humdrum' inputs (motley crew property). In Germany, this property together with historical circumstances has led to the emergence of numerous resident ensembles. Actors care about their products (art for art's sake property) and the inputs provided by theatre artists differ with respect to 'technical' skills, talent and originality, and are ranked from and within the occupational community (A list/B list property).

1.2.2 *The performing arts in Germany*¹³

The German *theatre*, in its present form, has taken shape over the past 200 to 250 years. Its system is characterized by extensive public support of numerous and geographically dispersed theatres. Private funding and commercial structures are rare, and public support sustains about 150 publicly funded theatres and 280 private houses¹⁴. There are also many independent theatre groups, and many private theatres are also subsidized. As a result, almost every town has its own stage.

The public theatre in Germany, generically described as the 'city theatre', has been predominantly financed by city budgets since 1918 and is thus also subject to municipal cultural policies. There is no assessment of subsidized companies by their funding authority as the Deutscher Bühnenverein (representing theatre and cities as theatre-owners) and the funding bodies themselves do not consider the funding bodies to be suited to make such assessments and have voiced their objection to them. As a result, performance indicators have not been an issue in Germany.

The most common theatre structure in Germany is the three category house (Drei Sparten Theater) offering a broad spectrum of performing arts including drama, opera, musical theatre and dance.

Most of the popular plays performed are classics, and the most frequently performed plays include works by Goethe (Faust I), Brecht (The Threepenny Oper), and Shakespeare (Romeo and Juliet, Hamlet, A Midsummer Night's Dream).

German theatre is regarded as a "moral institution", and plays should be both political and socio-critical, mirroring the times and problems of the society out of which

¹³ This subsection draws from www.germany-info.org/relaunch/culture/performing_arts/p_arts.html

¹⁴ http://www.germany-info.org/relaunch/culture/performing_arts/p_arts.html

they have grown. Berthold Brecht further developed this idea, in what he called epic theatre: “give topical subjects a theatrical form and force audiences to reflect on today’s reality”.

The German theatre scene is considered one of the most progressive in the world¹⁵. In recent years the number of young playwrights has grown steadily, and this has led to a shift in the typical audience from loyal season ticket holders to a young, choosy and more unpredictable public.

Opera has been part of the publicly funded system for hundreds of years, since the days of court operas maintained by the different princes and dukes. Consequently, there are approximately 80 opera houses in Germany, now funded by State or local authorities. The most popular operas include works by Mozart (The Magic Flute, The Marriage of Figaro), Verdi (La Traviata), and Humperdinck (Hansel and Gretel).

German theatres and opera houses engage *ballet* companies and nearly 1.500 dancers, not including freelancers. The dance scene is much more international as many of the coreographers working in Germany are not German. The most popular ballets are classical ballets by Tchaikovsky (The Nutcracker, Swan Lake) and Prokofiev (Cinderella).

The German tradition of *classical music* has produced an impressive legacy of composers. To this one has to add active public interest and participations, complemented by robust government funding for musical activities.

Germany has 141 professional orchestras¹⁶, some located in the public radio stations. The radio networks commission new works, contributing to a thriving classical music and classic avant-garde markets.

Music education plays a major role and starts early for German students, as music is a compulsory subject and participation in a ensemble music is encouraged.

Music *festivals* also increase the supply of performing arts, are open to new musical influences and try to stimulate public discourse. They attract broader audiences to the arts, in particular new and occasional visitors, cultural minorities and youth.

1.2.3 *The German Theatre System: from the viewpoint of Supply*

Empirical research in Chapters 2 and 3 investigates German public theatres, and a review of the theatre system is required.

¹⁵ http://www.germany-info.org/relaunch/culture/performing_arts/theater.html

¹⁶ http://www.germany-info.org/relaunch/culture/performing_arts/music.html

The German theatre system can be expressed as decentralised or polycentral. It emerged from a network of court theatres that appeared during the 19th century, when Germany was not yet a nation State, which only occurred in 1871. As a result, there was not a single cultural capital, and cities like Berlin, Munich, Hamburg, Frankfurt, Leipzig, Dresden, or Cologne play a role of equal status in the history of German culture or theatre.

German reunification in 1990 merged the numbers of performing arts organisations operating in the country. The number of theatres, operas, orchestras, dance companies, and festivals increased as the East German institutions were added to the performing arts sector of West Germany. The series are thus influenced by the German reunification in 1990 and show large increases (or decreases) just because of that. This increased the demand for performing arts funding, in a time of public money shortage for statutory commitments, when taxes were being increased to account for the underestimated costs of reunification.

Hofmann (1988) noted that under communal administration law, the German local authorities make a distinction between their required tasks and the voluntary activities (which include in particular institutions of art and culture). This allows the so called 'city fathers' to halt the voluntary activity of theatre in order to fulfil a required task.

Schulze and Rose (1998) noted that, in Germany, cultural affairs are decentralised and the performing arts are predominantly supported by local governments (more than 75 percent of total subsidies for theatres and music came from local communities or municipalities, only 0.6 percent was provided by the federal government). The commitment to cultural affairs is not a result of federal or State legislation, and local arts support is not statutory, but depends decisively on local politicians' calculus.

Figure 1.2.1 shows the evolution of the number of performing arts organizations, in Germany, in the period 1965-2005. The number of public theatres is fairly stable, with German re-unification corresponding to a level shift and to a small decreasing trend. The number of private theatres has been increasing and this increase was stronger after 1990, with a correction in the last years. Festivals and orchestras have increased slowly over the period, with level shifts in 1990.

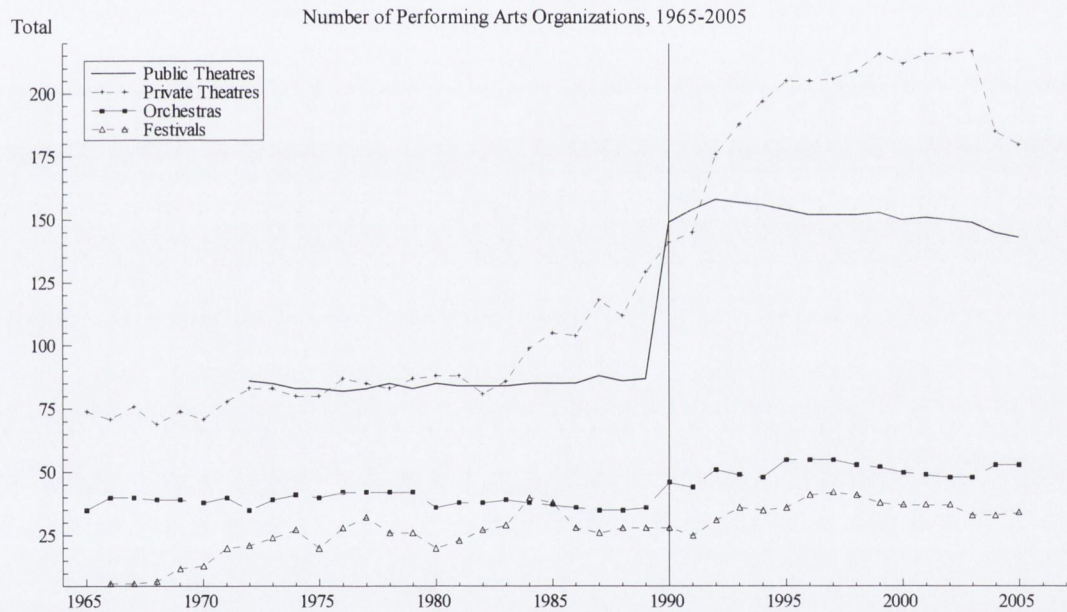
In the old Federal Republic of Germany there existed until 1989 a relatively stable total of about 80-90 public theatres (including a bare 20 regional theatres) and roughly the same number of larger private theatres. To this total can be added about two

dozen touring theatres, about 40-50 regularly used theatres without their own ensemble and a series of open air festival theatres, some of these with seasons lasting several months.

In Eastern Germany there were up to 1998 about 70 theatres, completely controlled and financed by the State. Private theatres were only tolerated in the last years of the system. Since reunification a few of these have been closed, the rest have been handed over to municipalities and regions as licence holders.

In the same dataset, and in the period 1965-2005, the number of private theatres increased from 74 to 180, the number of orchestras increased from 35 to 53, and the number of festivals increased from six to 34.

Figure 1.2.1: Number of Performing Arts Organizations, 1965-2005

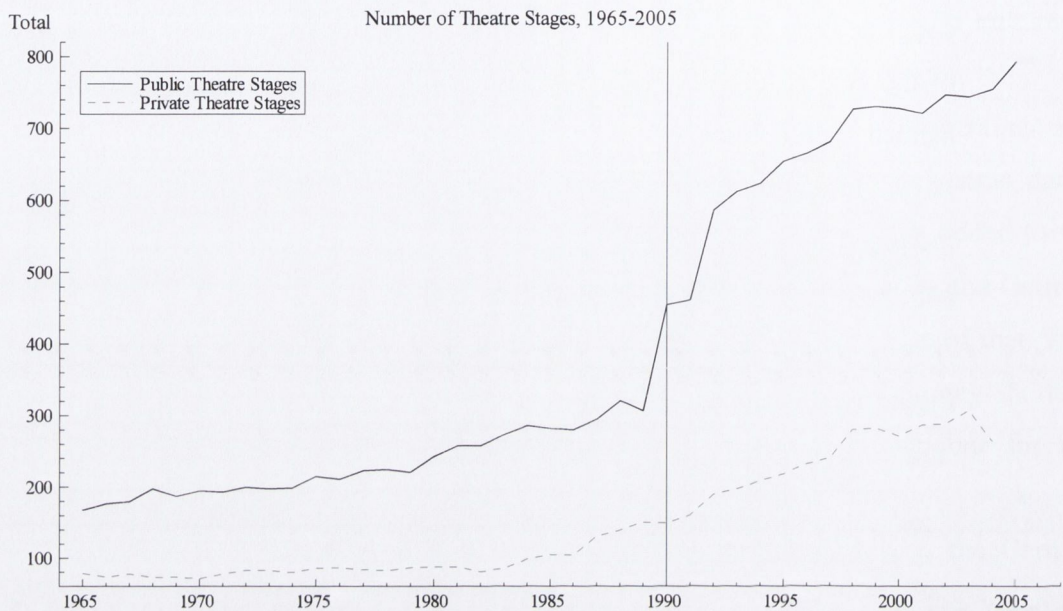


Source: own calculations, using data from the Theaterstatistik reports

In 1972, the Stage Association Theatre Report listed 72 public theatres; in 2005 this number had increased to 143. This is mainly the effect of German re-unification. A theatre may use different rooms for its performances, and public theatre stages increased from 168 in 1965 to 793 in 2005. The numbers of public and private theatre stages are displayed in Figure 1.2.2, illustrating the “multiplex” effect (multi-stage theatres). Theatre stages grew at a fairly constant rate until 1980. In the 1980s their growth rate increased, and in the first years of reunification they almost doubled. Between 1989 and 1992, public theatre stages increased 91 percent, while the number of public theatres increased 82 percent. After 1992, the growth rate of theatre stages was reduced, but

remained at levels above those experienced in the 1980s. In the more recent years, this rate has declined.

Figure 1.2.2: Number of Theatre Stages, 1965-2005



Source: own calculations, using data from the Theaterstatistik reports

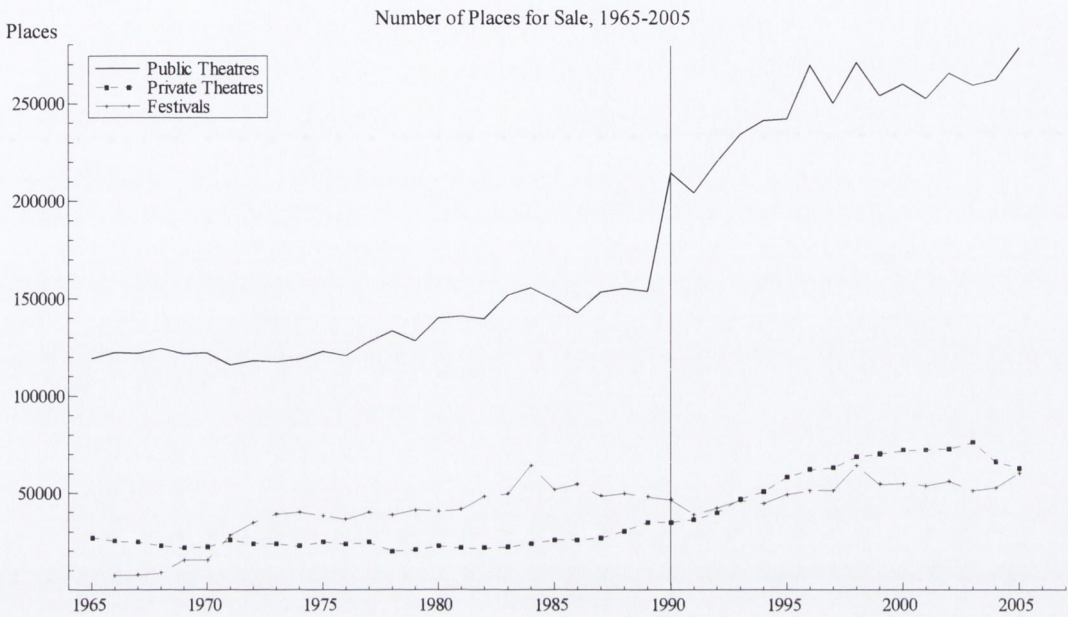
This growth in supply is reflected in the number of places for sale. Figure 1.2.3 details places for sale in public theatres, private theatres and festivals. For both public and private theatres this figure increased slowly until 1990 having increased rapidly in the period after German re-unification. For festivals, there has been a slow increase, with a period of rapid increase until 1973. Between 1965 and 2005, places for sale per 1.000 inhabitants increased much faster for public theatres (by a factor of 73 percent) than for private theatres (59 percent), as depicted in Figure 1.A.1.

The number and type of performances also impacts costs very significantly, as will be shown in Chapter 2. Figure 1.2.4 depicts the evolution of the number of performances at public theatres, private theatres, orchestras and festivals. In public theatres, total events (performances) grew slowly until reunification, when they doubled and stabilised at a new level. However, the type of events being produced changed significantly, as seen in Figure 1.2.5.

The number of events offered by private theatres grew slowly until 1985, rapidly in the following decade, and has since then grown at a slower rate, having decreased in the last years. For orchestras, the number of performances remained stable around 2,500 until 1990, having risen after re-unification. Festivals seem not to have been affected by

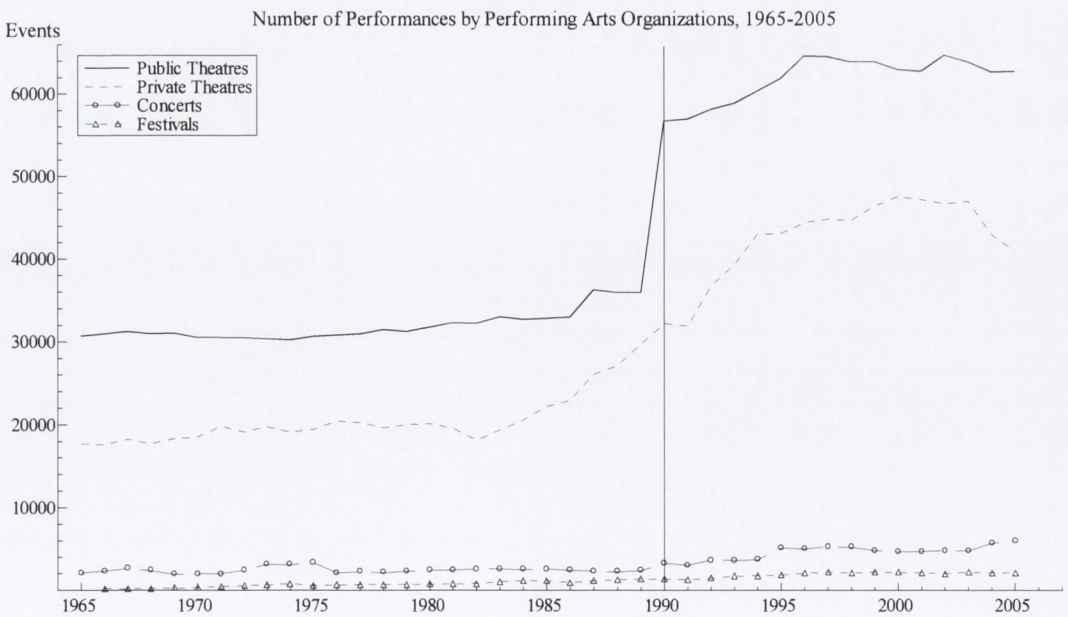
re-unification, and the number of performances has been rising continuously since 1965, from 255 to 2,108 in 2005.

Figure 1.2.3: Number of Places for sale, 1965-2005



Source: same as Figure 1.2.1

Figure 1.2.4: Number of Performances by Performing Arts institutions, 1965-2005



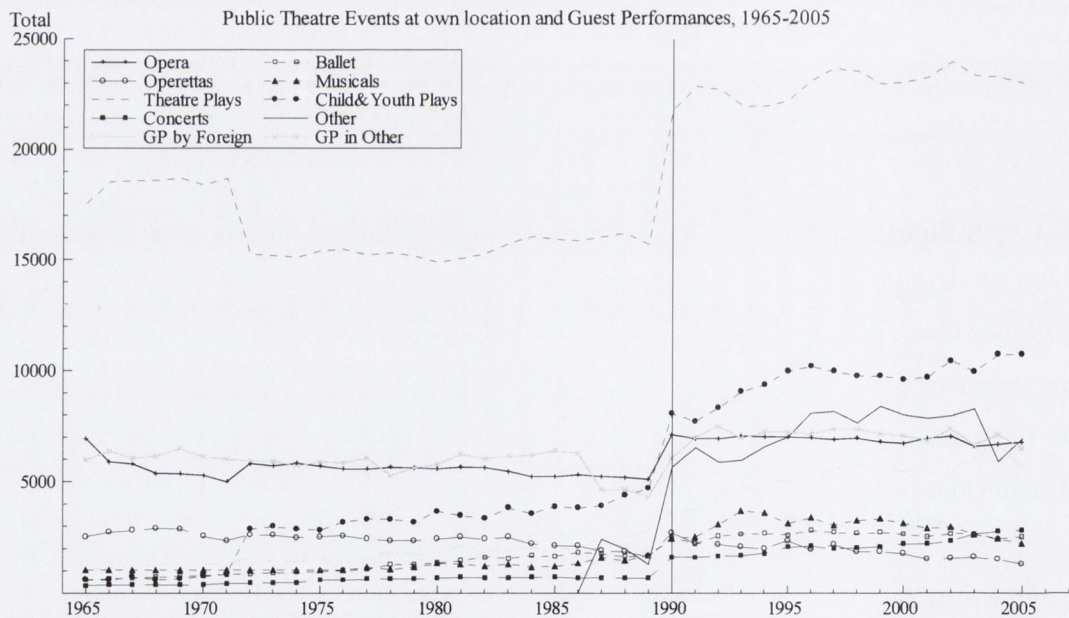
Source: same as Figure 1.2.1

Figure 1.2.5 illustrates the changes in the composition of performances in public theatres. Theatre plays are the most important type of performance, but their relative

weight fell from 57 percent of total performances in 1965 to 37 percent in 2005. After re-unification the number of theatre plays has been growing slowly. The cultural movement of the 1970s called for culture to everyone, and placed emphasis on child and youth plays and other type of performances, as a means of improving access to the arts. From 1972 until reunification, theatre plays stabilised at a lower level, opera, ballet and concerts remained stable, the number of operettas fell; child and youth plays and other types of performances increased. In 2005, theatre plays remained the most important category of performances, but child and youth plays came second, followed by other types of performances.

Guest performances in other municipalities remained stable over the period, but the number of guest performances by other ensembles has been rising. Chapter 2 will argue that this has a significant impact on the cost structure of public theatres.

Figure 1.2.5: Public Theatre Total Events (Performances), 1965-2005



Source: same as Figure 1.2.1

The number of productions on a programme attempts to balance different interests and demands, by supplying different groups of patrons with their desired performances. This figure has been steadily declining for years, as seen in Figure 1.2.6. Chapter 2 will make the point that the number of productions has a significant impact on the costs of public theatres.

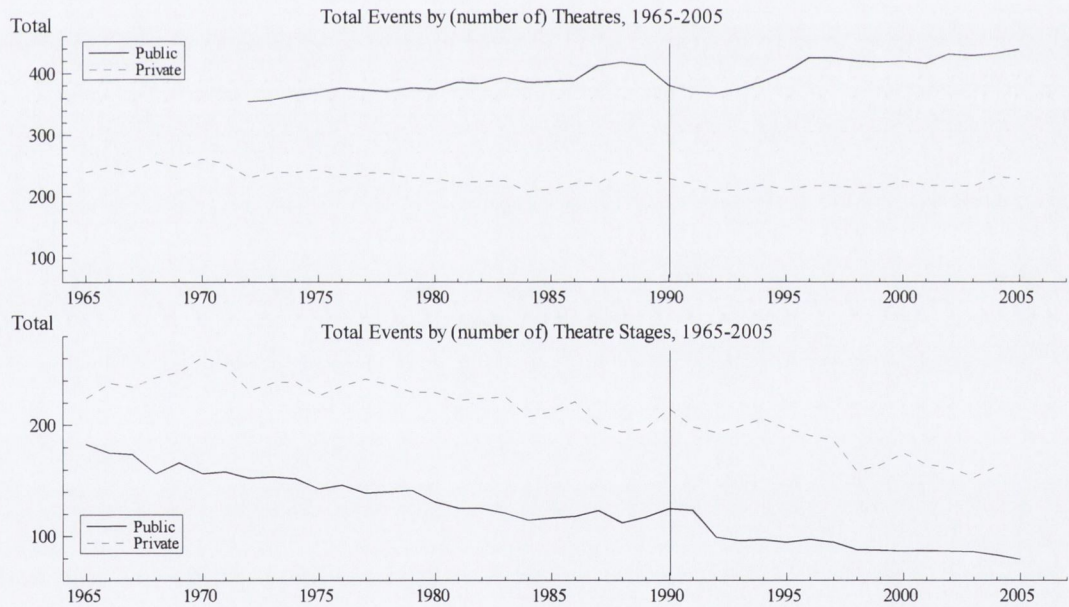
Hoffman (1998) reports that since the post war period the rehearsal times have doubled from about three to six weeks on average (in drama) and that with larger, rather

than smaller ensembles. The number of performances per season is decreasing and when city theatres could previously offer season ticket holders about 15 performances per season, they can today only manage half that number. Since the size of the potential audience has remained more or less the same, the total number of visits is declining.

Figure 1.2.6 illustrates that total events per number of theatres have increased for public theatres while remaining fairly constant for private theatres. This suggests that total events have increased at a greater rate than the increase in the number of public theatres. However, total events per theatre stage have been falling, for both public and private, indicating that the growth in the number of theatre stages has been faster than the growth in the number of performances.

Figure 1.2.6 is better understood in the context of Figures 1.2.2 and 1.2.4, as both public and private theatre stages and events have risen significantly.

Figure 1.2.6: Total Events (Performances) by Stages and by Theatres, 1965-2005



Source: same as Figure 1.2.1

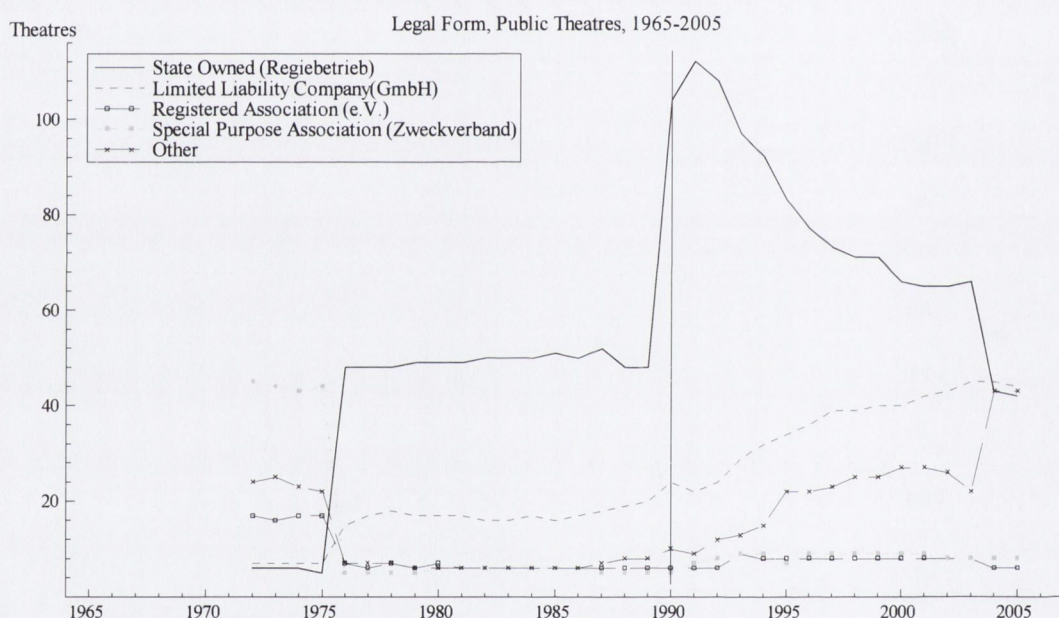
Performing arts literature has discussed how performing arts supply should be measured, whether as a stock or a flow variable. Supply as a flow variable is presented as the product between places for sale and number of performances, divided by population. Figure 1.A.2 illustrates supply as a flow variable for public and private theatres, and festivals. It corroborates the previous description of performing arts supply in Germany.

1.2.4 German Public and Private Theatres: Legal Entity and Legal Form

Public and private theatres are organized differently according to legal entity (ownership) and legal form (management). Public theatres are owned by the city or federal region or a combination of both, while private theatres can be run as limited companies. Figure 1.A.3 depicts the legal entity of public theatres, from 1965 to 2005.

An analysis of legal entity and legal form is required as Chapters 2 and 3 investigate public theatre in Germany, using German theatre data, which is far more detailed for public theatres than for private theatres, orchestras, and festivals. Figure 1.2.7 illustrates legal form of public theatres, from 1965 to 2005.

Figure 1.2.7: Legal Form, Public Theatres, 1965-2005



Source: same as Figure 1.2.1

Most public performing arts institutions in Germany are run as Regietriebe (administrative firms), and 'cities' or 'States' theatres are administered like other public institutions. The German Regiebetrieb theatres are headed by a director (theatre manager), appointed by the city council or the State parliament, who is responsible for the financial management. An Intendant (general manager) is responsible for artistic policy as well as for the general management of the theatre company.

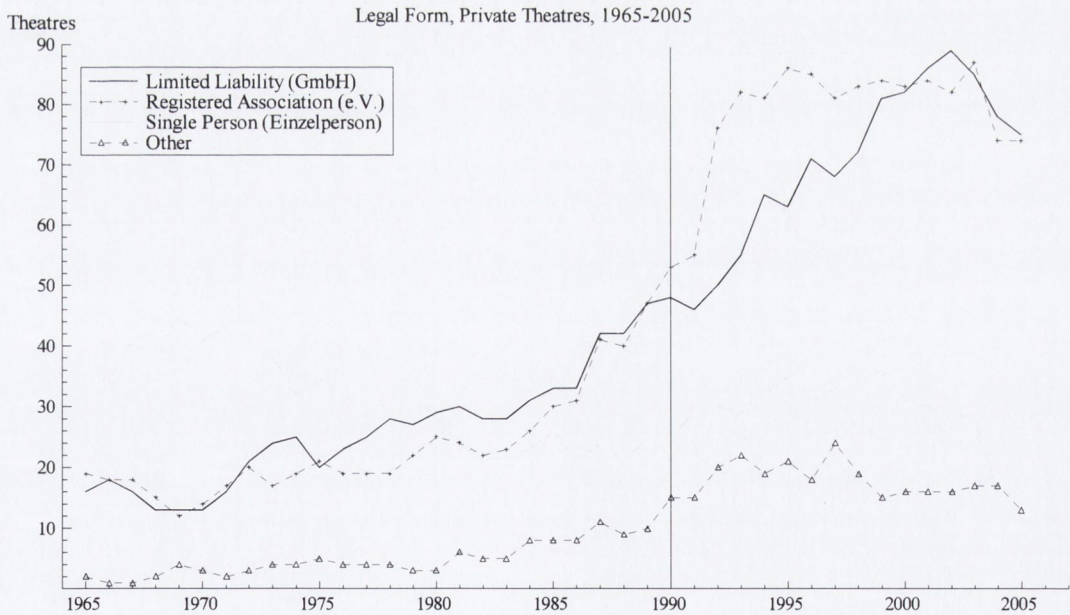
Krebs and Pommerehne (1995), using data for Germany, noted that the ownership structure had hardly changed in the period 1961-1991. They reported that 73 percent of public performing arts institutions were Regietriebe, the remaining had some economical or juridical independence and were thus controlled with more difficulty.

About 18 percent were owned by the State, the remaining belonged to one or more municipalities.

In 2005, 31 percent of public theatres were GmbH and 29 percent Regiebetrieb. 50 percent were owned by cities and 20 percent were owned by federal regions. Figure 1.2.7 also shows that, in terms of management, after 1991, there has been a change from the traditional Regiebetrieb to other forms of management; while the ownership structure has not changed much (see Figure 1.A.3).

Figure 1.2.8 illustrates the legal form of private theatres in Germany, in the period 1965-2005. It can be seen that until 1980 the most common form of management was Einzelperson (single person) and that legal forms other than e.V. and GmbH were not significant. The 1980s appear to have been a transition period in what regards legal form and in the 1990s the current pattern emerged, with anonymous societies (GmbH) and registered associations (e.V.) as the predominant forms. Einzelperson have decreased in number and other legal forms have gained relevance.

Figure 1.2.8: Legal Form of Private theatres, 1965-2005



Source: same as Figure 1.2.1

It is necessary to recall that the total number of private theatres rose significantly in the period from the mid 1980s to the mid 1990s. It is likely that the new theatres being created in this period chose either the anonymous society form (GmbH) or the registered association (e.V.) forms for practical reasons. Overall, the limited liability company is the form of choice for the great majority of for-profit corporations in

Germany. Under the GmbH form, shareholders are only liable for the value of their shares, unlike the single person (Eizelperson) form. Registered associations were the dominant legal form of private theatres during the 1990s and this is an important feature that will appear later in the discussion of charitable giving, in Chapter 4.

Anheimer and Seibel (1997) indicated that a registered association could be recognized by the acronym “e.V.” (eigentrager verein). It becomes a legal personality endowed with its own legal rights, and associations are the most important organizational type in the German nonprofit sector. They were also the predominant form of private for-profit theatres during the 1990s.

1.2.5 *Public Theatres: accounting principles and employment in German repertory theatres*¹⁷

Directly related to the cost structure of public theatres is the three branch concern (drama, music theatre and ballet) feature, widely associated with the concept of the German ‘city theatre’, the most numerous type of institution in the German public theatres. In contrast, private theatres need to be financially viable restricts their artistic policies, and they normally produce only one branch of theatre.

Hofmann (1988) noted that in the organisational and programming aspects of production and distribution a practically institutionally embedded difference between repertoire and serial theatres existed. As a rule of thumb, the public theatres play repertoires, the private en suite or in series. The organization of a theatre on the basis of the one or other form of programming is a decisive and comprehensive determinant of its conditions of production.

Two other features of public theatres are particularly important to understand their cost structure: the ‘cameral’ accounting principle and the forms of employment.

Hofmann (1998) noted that the organisational structure of German public theatre generally placed them under public authority, in most cases that of a municipality or a federal region, normally described as a Regibetrieb. Officialdom cannot be removed from theatre.

The accounting principles of public authorities are legally required to be ‘cameral’ in form, this means that all items must be clearly separated, as if in chambers. This is unlike the ‘mercantile’ principle, where cost-benefit calculations or those of expenditure and payments or return are placed at the top of the page. However, in public authorities, for example, surplus returns may not be calculated against lesser returns in

¹⁷ This subsection draws from Hofmann(1988) and Haunschild (2003)

other areas, nor may personnel and material costs be related to each other. Cameral theatre is opposed by its principle to mercantile commercial theatre. As the cameral accounting procedures mean that a success is not financially worthwhile for the city theatre, there is no financial incentive or pressure to react to such a 'box-office vote'.

Hofmann (1988) reported that the percentage of its budget that a public theatre brings in through ticket sales (box-office target) is, in general, between 12 and 15 percent. Figure 1.A.4 illustrates that box office results, as a percentage, declined until 1990, having increased since re-unification, to the current level of 17.3, which is roughly the same as that of 1975.

Haunschild (2003) noted that in comparison with business organizations, it was striking that there were no explicit performance appraisals in theatres. Caves (2000) observation that profits and revenues do not exclusively control rankings of artists holds especially true for German repertory theatres. In the theatre, the way reputation is gained is self-enforcing, dependent on networking activities within the community. Box office revenues are seen as a less important indicator of project success, and the economic success of productions has little direct influence on the reputation of the actors.

Haunschild (2003) also noted that there are community wide rules of organizing work and managing employment relationships that lead to organizational isomorphism among German repertory theatres.

With very few exceptions, (German) actors and other theatre artists work under temporary contracts (one to three years) as ensemble members or under contracts for certain plays or periods. In addition to contracts for ensemble members, there are other work arrangements in use for theatre artists. Overall, the employees of a public theatre are employed under seven different contract models.

The 150 State-supported theatres (Stadttheater, Staatstheater, Landestheater) produce and provide ensembles for drama, opera, and ballet. In contrast to State owned theatres in many other countries, and in contrast to commercial theatres, these theatres are repertoire theatres (which means they play one play today, another tomorrow and the day after a different one).

Hofmann (1988) pointed that, in general, the programming of contemporary drama is insignificant. Of the 10 plays in repertoire only one on average will be by a living German speaking author. In music theatre, the focus of the repertoire is almost entirely on the 18th and 19th century while operetta clings rigidly to some 10 works of fin de siècle. While musicals consist almost exclusively of repeating Anglo-American hits,

ballet has nevertheless undergone a revitalising modernisation to dance theatre in some theatres.

Hofmann (1988) noted that the sets of drama, opera or ballet, depending on the programme, must be built up or taken down every day, especially what are normally the more extensive sets of opera. Stage technicians (including stage hands) become particularly important under these conditions. In the repertoire theatre one production will generally be rehearsed during the day and another one performed in the evening.

Technical activities in the theatre have proved difficult to rationalise. With the exception of some programming of lighting, computers have passed by the remainder of theatre work, leaving barely a trace. The stage technicians, highly unionised, are well covered in their pay contracts. The development of the star cult of artistic directors which is also related to the production theatre, acts against any readiness for cooperation between technicians and artists. This is also true in respect of members of (opera) choirs and ballet corps, who are not well paid.

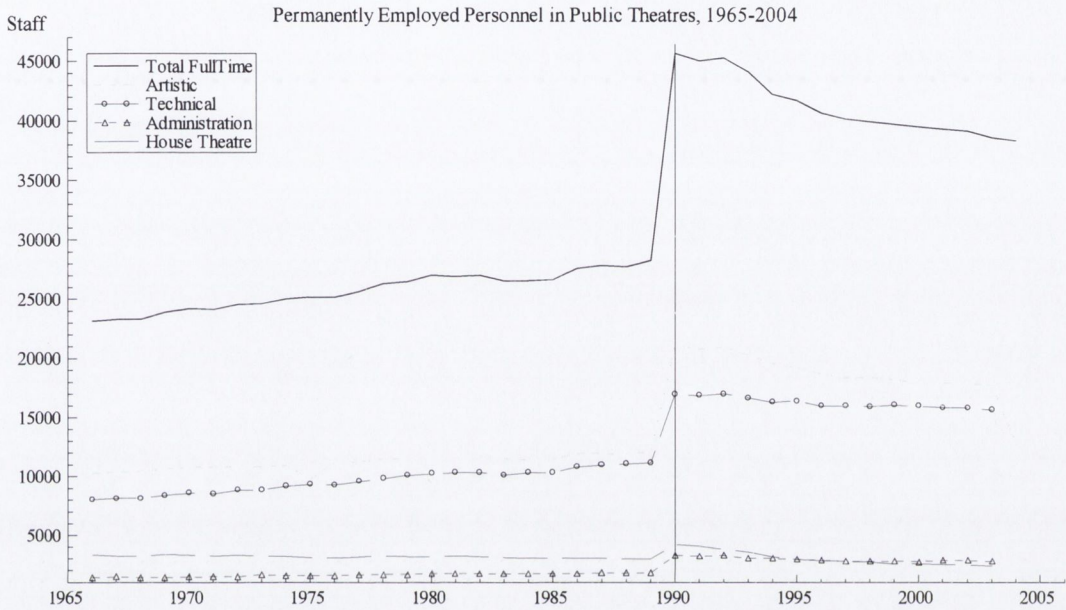
Another important feature of the labour market for theatrical artists is interorganizational mobility. As a rule of thumb, when the theatre manager changes, he usually takes one third of the ensemble members with him/her, one third of the actors stay in the ensemble, and one third is given notice that their contract will not be renewed. As most German cities have just one larger State theatre, changing the ensemble usually involves spatial mobility.

The legal and formal structure of the performing art institutions in Germany, where virtually everybody on the payroll is a civil servant, prevents the companies from dismissing members and employees. In practical terms, this means that if a city needs to close a theatre for financial reasons, all the theatre's employees have the right to alternative jobs in the city administration. They can only be fired if the city can prove to the court that there are no adequate jobs for the employees in question. This very structure is argued to play a similar role to that of the subsidies themselves in ensuring the continued existence of the theatres.

Figure 1.2.9 indicates the number of public theatre permanent personnel, by type, in the period 1965-2004. The number of full time workers employed by public theatres increased from 23.167 in 1965 to 38.342 in 2004, but the first trend to be noted is that total full time personnel increased until reunification and has been decreasing ever since. Artistic, technical and administration personnel were growing before reunification, and after 1990 the number of staff in these areas has been decreasing. Technical personnel grew faster than artistic and administration personnel before reunification and has fallen

less than the number of workers in artistic and administration positions. House theatre staff decreased over the period, with the interval of the reunification period, where it increased slightly.

Figure 1.2.9: Public Theatre Permanently Employed Personnel, by Type, 1965-2004



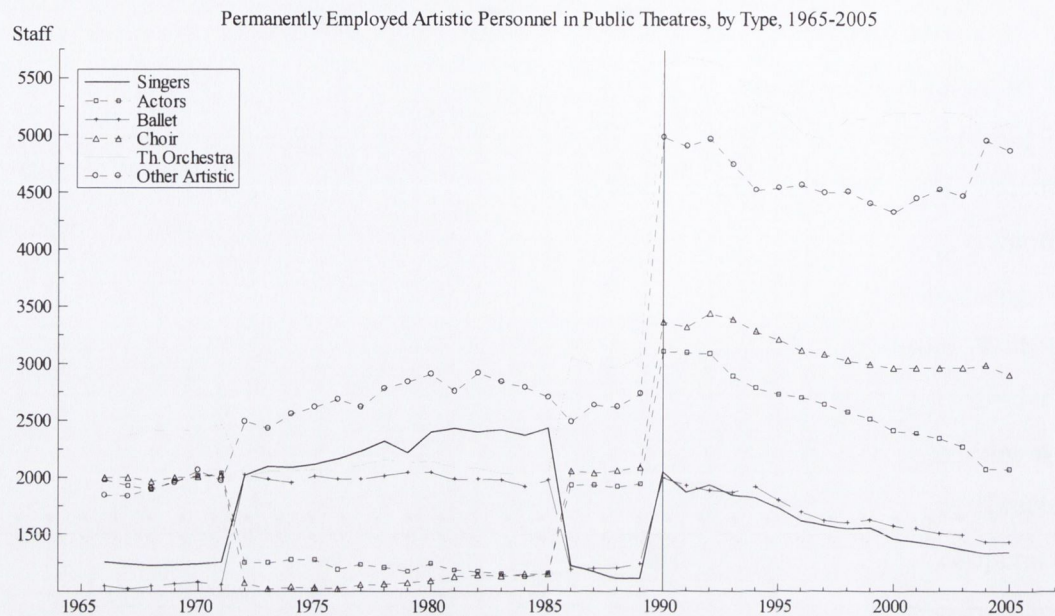
Source: same as Figure 1.2.1

From 1965 to 2003, public theatres work force consisted of a stable 45 percent of artistic staff, seven percent of administrative staff, while the share of technical workers increased from 35 percent to 41 percent.

Figure 1.2.10 describes the evolution of artistic personnel by type: singers, actors, ballet, choir, theatre orchestra, and other artistic. Theatre orchestra and other artistic personnel more than doubled from 1965 to 2005, while the numbers of singers, actors, ballet, and choir have all been falling since 1990.

The proportion of women employed increased from 34 percent to 40 percent, while the share of artistic personnel in guest performances rose from seven percent to 25 percent. Given that at drama school the proportion of women is larger, the likelihood that actresses leave the labour market or become unemployed is higher than for men. Hofmann (1998) also reports that of the 150 or so public theatres of the extended Federal Republic of Germany less than five were run by women.

Figure 1.2.10: Public Theatre Permanently Employed Artistic Personnel, 1965-2005



Source: same as Figure 1.2.1

1.2.6 The German Theatre System: from the viewpoint of Demand

Figure 1.2.11 indicates performing arts attendance in Germany, during the period 1965-2005. The number of visits to public theatres has been decreasing, from circa 23 million in 1965 to circa 17 million in 1990. Reunification shifted the number of visits upwards, but the decreasing trend appears to continue. This is confirmed in Figure 3.1, in Chapter 3, depicting total attendance per capita.

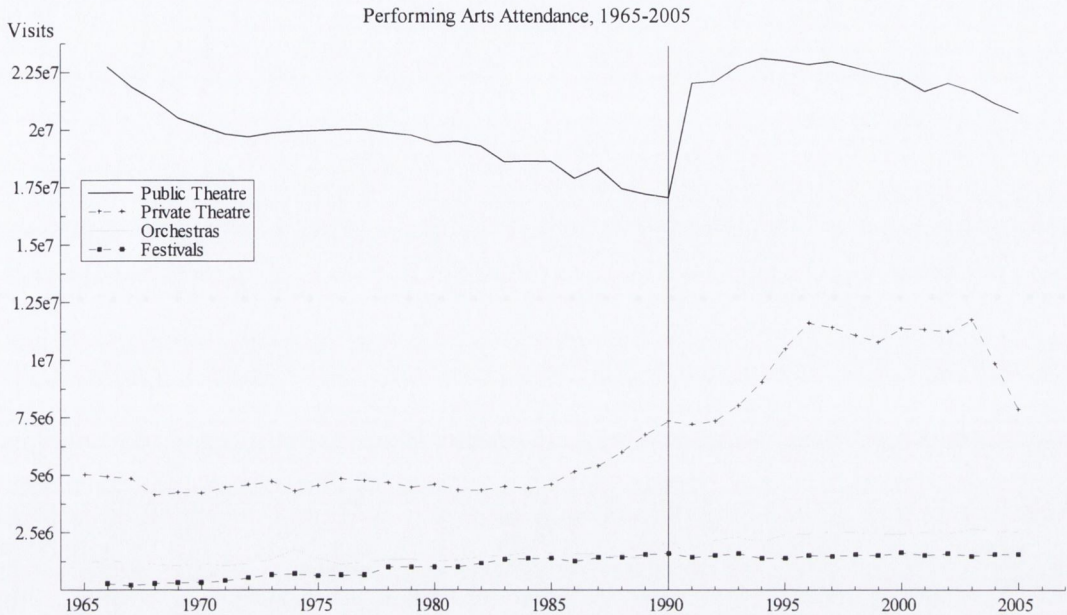
Private theatre attendance has been increasing, from circa five million visits in 1965 to circa eight million in 2005. It remained stable until 1985, more than doubled until 1996, but had fallen sharply in recent years.

Orchestra attendance remained stable until 1980, increased until 1990 and increased slightly in recent years. Orchestra attendance increased from circa one million visits in 1965 to circa two and a half million in 2005.

Attendance at festivals increased rapidly until 1978, and has since then been increasing at a slower rate. It increased from 285,000 visits in 1965 to one and a half million in 2005.

It is important to note that it is not possible to link the number of visits to the number of visitors, although the latter would be substantially smaller, as it is known that performing arts attendance is skewed towards a minority of high income and “highly” educated patrons, who visit frequently.

Figure 1.2.11: Performing Arts Attendance in Germany, 1965-2005



Source: same as Figure 1.2.1

Figure 1.2.12 breaks down public theatre attendance by type of performance, and is best understood in the context of Figure 1.2.4 that described public theatre total performances (events).

A breakdown of attendance by category of performance indicates that the number of visitors to theatre plays accounted for 44 percent of total visits in 1965, but represented only 26 percent in 2005. Attendance at operas remained stable, representing 22 percent of total visits; ballet increased from four percent to seven percent; operettas declined from nine percent to three percent; musicals grew in importance from three percent to six percent; concerts from two percent to seven percent, and child and youth plays from three percent to 12 percent.

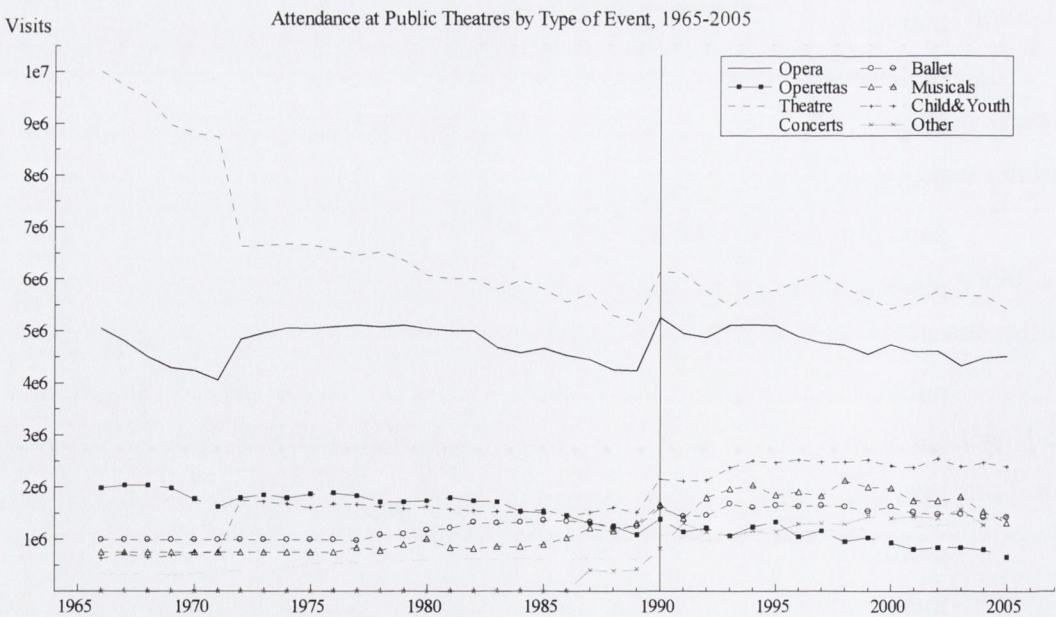
Although theatre plays are by large the most important type of performance in public theatres, attendance at theatre plays fell rapidly until 1980, having stabilized at six million visits per year. Theatre attendance fell rapidly following the cultural movement of the 1970s, when they followed the decrease in the number of theatre performances. Hofmann (1988) provides a comprehensive explanation for the fall in theatre attendance: the process of restoration and consolidation of public theatres was only completed in the middle of the 1960s, while private theatres had yet to recover from the economic, political and personnel losses during the Nazi period. At the same time, it was particularly hard hit by the competition from the mass media of film and television in the entertainment sector. Furthermore, the revolt of 1968 turned public

theatres in Western Germany into important meeting halls. In the tradition of bourgeois German theatre the plays of classical authors became the foil of contemporary attacks and many members of what was in any case a demographically top-heavy audience left never to return.

The increase in the number of performances after reunification failed to meet an increase in the number of visitors, in a context of rapid increase in the number of stages, as shown in Figures 1.2.1 and 1.2.2; and rapid decrease in the number of performances per stage, as made evident in Figure 1.2.6. Despite the increase in the number or performing arts organizations, places for sale, and total performances, visits to public theatres have been trending downwards since 1965, except for the period of reunification. This is in contrast with the experience of private theatres.

Opera attendance figures suggest a much more inelastic demand than that of theatre plays. The number of opera performances remained stable, with a slight increase after re-unification. Opera attendance also remained stable during this period at a level of circa six million visits, although the last decade exhibits a small decreasing trend. Operas provide the second largest source of visits to public theatres, despite the fact that it is the fourth in importance regarding the number of total events.

Figure 1.2.12: Attendance at German Public Theatres by Type of Event, 1965-2005



Source: same as Figure 1.2.1

Attendance at child and youth plays increased until reunification and stabilised in the last decade at a level of circa two and a half million visits. This occurred in the context of a continuous increase in the number of child and youth events.

Operettas remained the third most important source of visits and type of events until 1970, but are now the least significant in both attendance and event figures. Musicals, ballet, concerts, and other types of events have been stable in the last decade, both in terms of visitors and number of events.

The major difference between public and private theatres is in the respective availability of funding: the public theatre sector depends almost exclusively on public subsidy as ticket sales are falling steadily in accordance with audience numbers, as shown in Figure 1.2.11. The private theatre, as is the case almost everywhere, gets most of its audience from direct box-office sales.

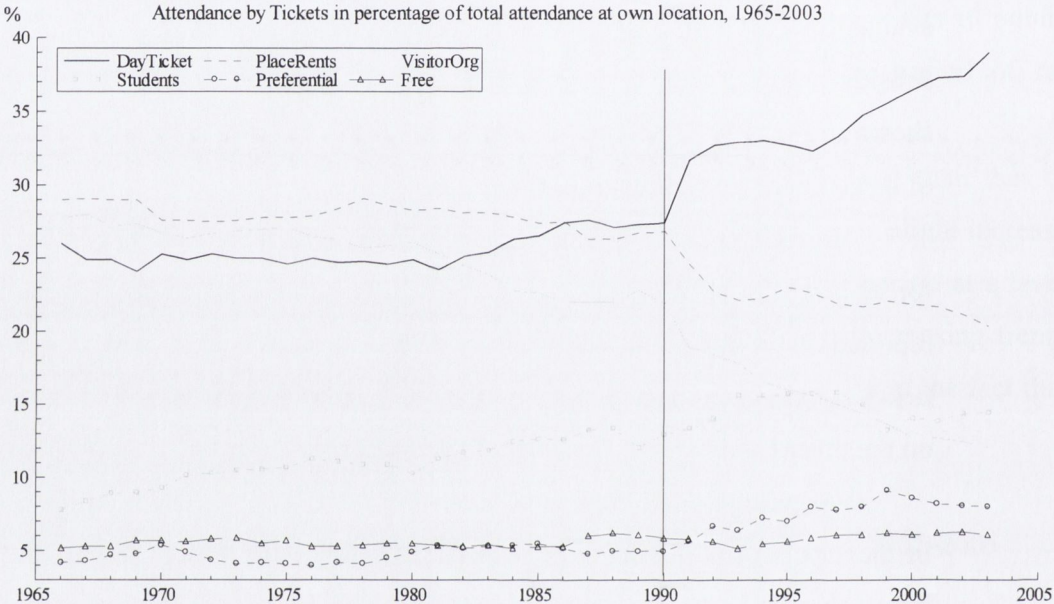
In the German city theatre a specific form of ticket-selling has developed, which for its part is to be understood as part of the conditions of production. Hofmann (1998) reported that in the public theatre the sale of individual tickets was superseded by group ticket sales. These are organised on the one hand through season ticket membership and on the other hand by organizations of theatre visitors.

According to Hofmann (1998) the proportions of the sales structure of the theatre in the old Federal Republic remained stable over the years: half of the tickets were issued through organised visits, while direct sales made up on average one quarter of the total. However, Figure 1.2.13 indicates that the sales structure has changed in the period 1965-2003, in particular after 1981. Regarding the type of tickets sold, in 1965, place rents (29 percent) and visitor organizations (28 percent) were the predominant forms, day tickets followed with 26 percent. In 2003, day tickets represented 39 percent, place rents 20 percent and visitor organisations 12 percent.

Until 1981, the sales structure of public theatres was stable, as noted by Hofmann (1988). Place rents and visitor organisations accounted for half of the tickets sold; day tickets, preferential, and free tickets represented stable shares and student tickets were increasing in importance. After 1981, day tickets increasingly became the most important type of tickets sold, as place rentals and visitor organisations gradually represented smaller shares of tickets sold. These trends were further reinforced after reunification, as the divergent trends became more evident. In particular, visitor organisations went from being the second most important type of tickets sold, in 1965, to being the fourth, in 2003.

As place rents and visitor organizations represent recurring visits, these trends could suggest that the number of patrons has increased over the period, likely as the results of efforts to target new audiences. However, it might be the case that individuals simply prefer to organize their visits to public theatres in a different way. Without further data it is not possible to determine which of these, or other, hypothesis better describe the behaviour of patrons.

Figure 1.2.13: Attendance by ticket category, in percentage of Attendance, 1965-2003



Source: same as Figure 1.2.1

Figure 1.2.14 illustrates the importance of ticket category in the operating revenues of public theatres, in the period 1965-2003. This is better understood in comparison to Figure 1.2.13, describing attendance by ticket category.

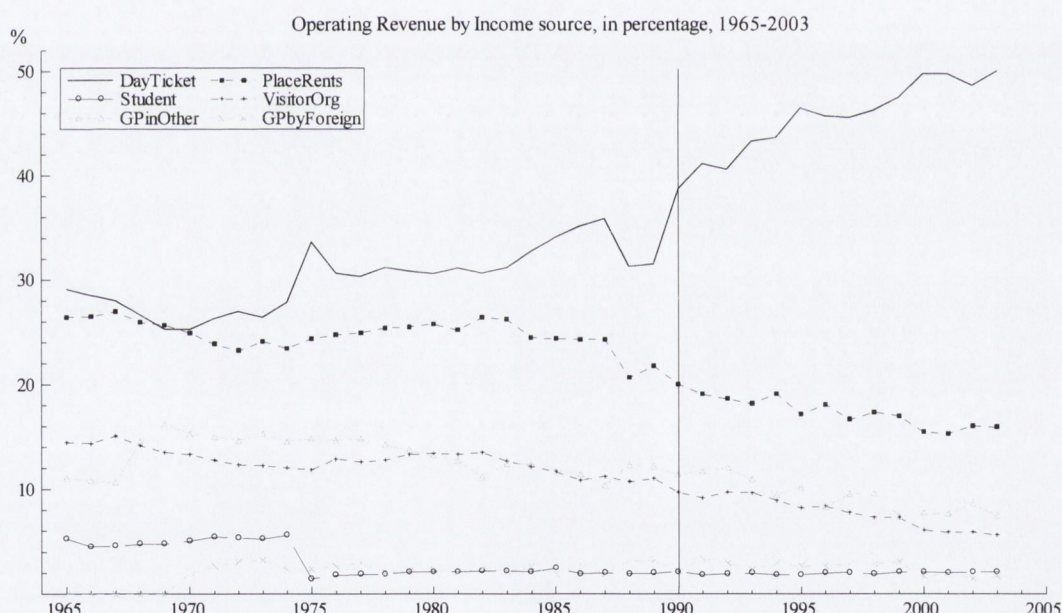
The first important feature in Figure 1.2.14 is that day tickets were always the most important type of tickets sold in terms of operating revenue. Day tickets increased from 29 percent of total operating revenue, in 1965, to 50 percent in 2003. Their importance decreased until 1970, having increased ever since, a trend reinforced after reunification.

Although attendance is dominated by place rents and visitor organisations until 1981, day tickets dominate operating revenue since 1965. This suggests that theatre prices for day tickets were higher than for place rents and visitor organizations. Changes in the pricing policies of public theatres might explain these trends, but such detailed data is not available in the Deutscher Bühnenverein reports.

The fact that attendance structure is substantially different between 1965 and the 1990s may introduce bias in the results, in particular in Chapter 4. When estimating demand functions to assess the impact of reduced rates of VAT on attendance, as detailed prices for the different ticket categories are not available, an average theatre price is calculated as an unweighted average price. Day ticket prices appear to be higher than the average price, but represent only a quarter of attendance in the first part of the sample. Therefore, the average ticket price might be higher than if it was calculated as a weighted average, according to the attendance share.

Given the methodology chosen and the number of observations available, it is not possible to divide the sample in two sub samples and compare the estimation results. However, this possible bias should be noted.

Figure 1.2.14: Public theatre operating income by income source, in percentage, 1965-2003



Source: same as Figure 1.2.1

Place rents declined from 26 percent of operating revenues in 1965, to 16 percent in 2003. Their importance remained stable until the late 1980s, when it started to decrease and the divergent trend with day tickets became evident. The share of visitor organizations in operating revenues fell from 14 percent in 1965, to six percent in 2003.

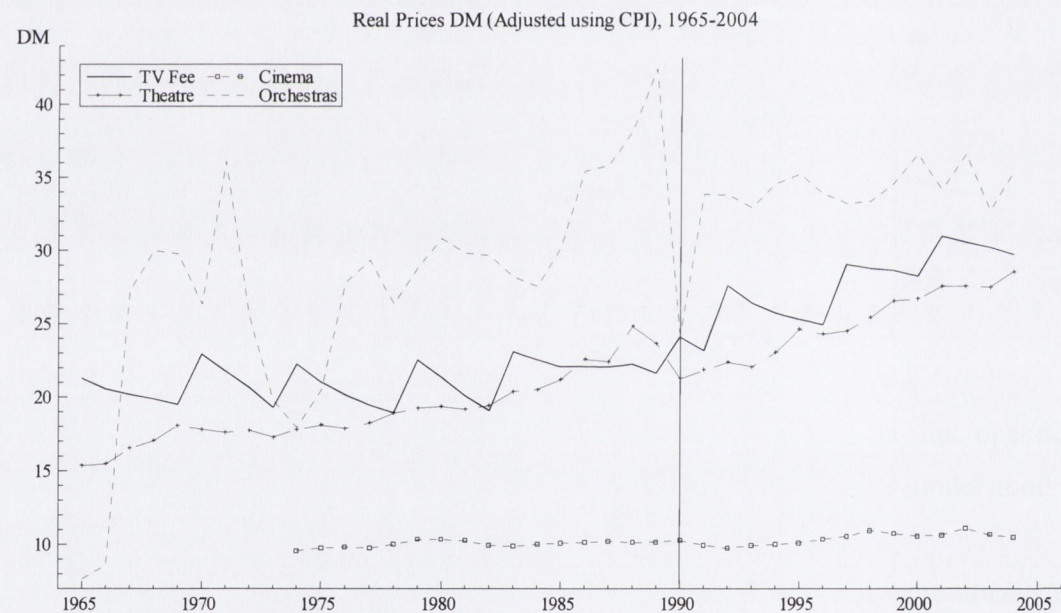
The relationship between attendance by ticket category and the share of ticket type in operating revenues is not immediate, suggesting a particular type of pricing policy in public theatres, with prices being determined exogenously to the theatre, by the

competent level of government, who provides the overwhelming majority of funds. This is in line with the accepted notion of German public theatre as a social institution, but has implications regarding the funding of public theatres.

Price is a major factor influencing demand and Figure 1.2.15 depicts the evolution of real prices (in DM) of broadcasting fees; cinema, public theatre and orchestra tickets. Real prices for all the cultural goods presented have risen in the period 1965-2004. Orchestra tickets exhibit the highest prices, followed by TV fees, theatre tickets, with cinema tickets having the lowest price.

Deflating the nominal prices using the consumer price index for services produces a slightly different picture, as shown in Figure 1.A.5, where it can be seen that the real price of theatre tickets has risen and the real price of cinema tickets has decreased, while the real price of TV fees remained fairly stable.

Figure 1.2.15: Real Price of Cultural Goods, 1965-2004



Source: same as Figure 1.2.1

Other determinants of theatre demand are income, demographic trends, quality measures, and other variables, but these will be discussed in Chapter 3.

Despite the continuous increase in the number and variety of cultural and leisure-time activities since the 1970s, especially those made available by cultural and media industries, attendance and participation figures for public cultural institutions have continued to rise over the long term, with wide fluctuations and declines in some areas, such as public theatres, as seen in Figure 1.2.11.

1.2.7 *State Funding of Public Theatres in Germany*

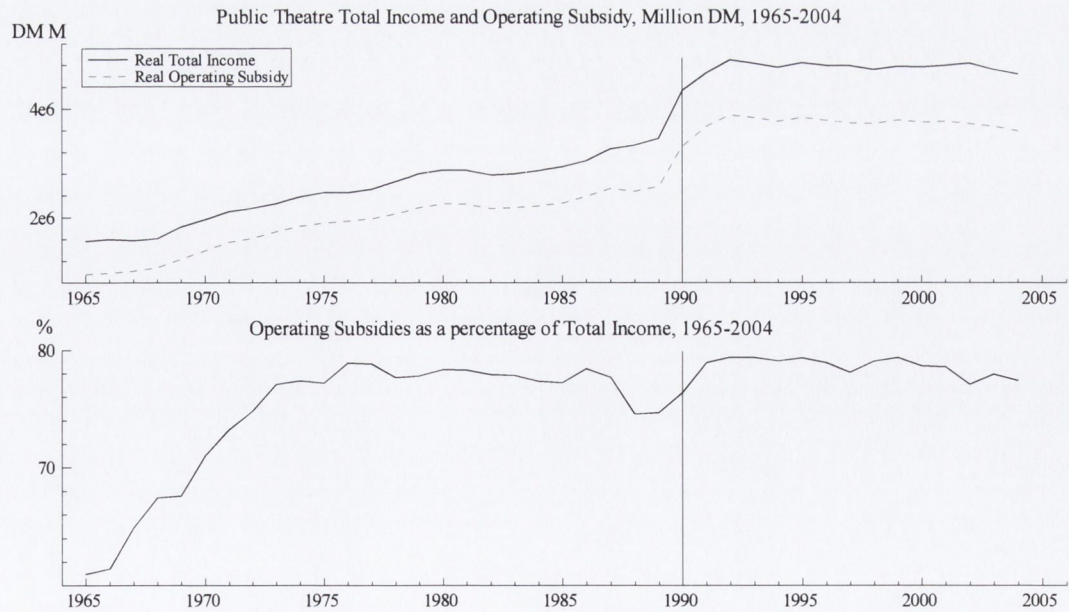
The basic principle governing cultural policy in Germany is to enable the greatest number of citizens to participate in the country’s cultural life. Appropriate cultural support therefore aims to reduce obstacles to access posed by educational deficiencies.

Hoffman (1988) reported that the public theatre in Germany, the epitome of the German theatre system, was subsidized to over 85 percent and spent about 85 percent of this money on staff costs – 85 percent of which was fixed by pay negotiations. Hofmann (1988) noted that since there is no rational or effective criterion for the financial expenditure of the public theatre, the level of subsidies depends in the long term on the budget appropriation of the previous year alone, it exists only as a self-created figure.

Public theatres receive the majority of their funding from the State, as seen in Figure 1.2.16. In contrast, apart from a few purely commercial theatres, larger theatres in the private sector receive a small level of funding.

For public theatres, the share of operating subsidies to total income increased from 61 percent in 1965, to 77 percent in 1973 and has since then remained stable.

Figure 1.2.16: Public Theatre Total Income and Operating Subsidy, 1965-2003



Source: same as Figure 1.2.1

Public support for the arts affects charitable giving, and in relation to Chapter 4, a characterisation of public funding of theatres is required.

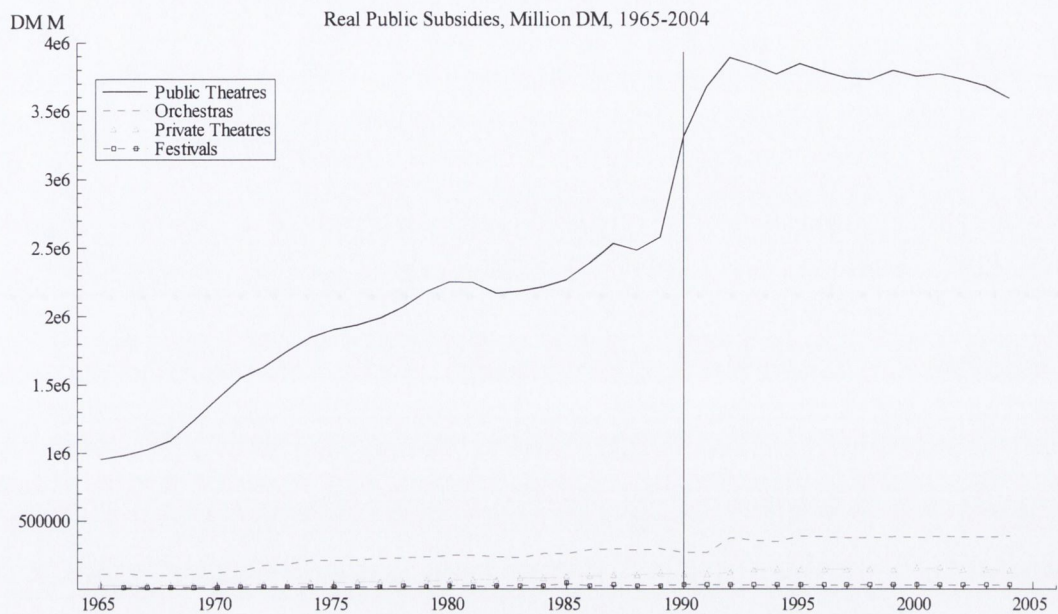
In relation to the impact of charitable giving and public subsidies to the arts, Brooks (2000) found evidence that crowding in occurs at low levels of subsidies, while high levels of subsidies crowd out charitable giving to the arts.

In contrast to the US, where the arts have always been almost wholly privately funded, in Germany, State support is extensive. As in other European countries, non-State funding to the arts is developing according to a recognisable pattern: State subsidies are cut back and are replaced by corporate sponsorship and private funding. Public subsidies are complemented with ticket sales, copyright fees and renting out halls, combined with sponsorship and private philanthropy.

In Germany, as depicted in Figure 1.A.6, the evidence from the Deutscher Bühnenverein institutions indicates that real operating subsidy per visitor to public theatres (in DM) increased continuously until re-unification, from below DM 50 to circa DM 185 in 2004. When taking into account different types of institutions, namely public theatres, private theatres, orchestras, and festivals, real public subsidies (in 1.000 DM) increased until re-unification, having stabilized, increased or decreased slightly in recent years, as shown in Figure 1.2.17.

For public theatres, they increased much more and much faster than for the other institutions. A first change in slope is noted in the late 1960s, corresponding to the new cultural movements that called for culture to be available to everyone; while reunification greatly increased the volume of funds being provided to the larger number of public theatres. For private theatres, orchestras, and festivals, slopes do not seem to change and a slight shift can be observed for orchestras, associated with the increase in the number of orchestras being supported.

Figure 1.2.17: Real Public Subsidies, Million DM, 1965-2004

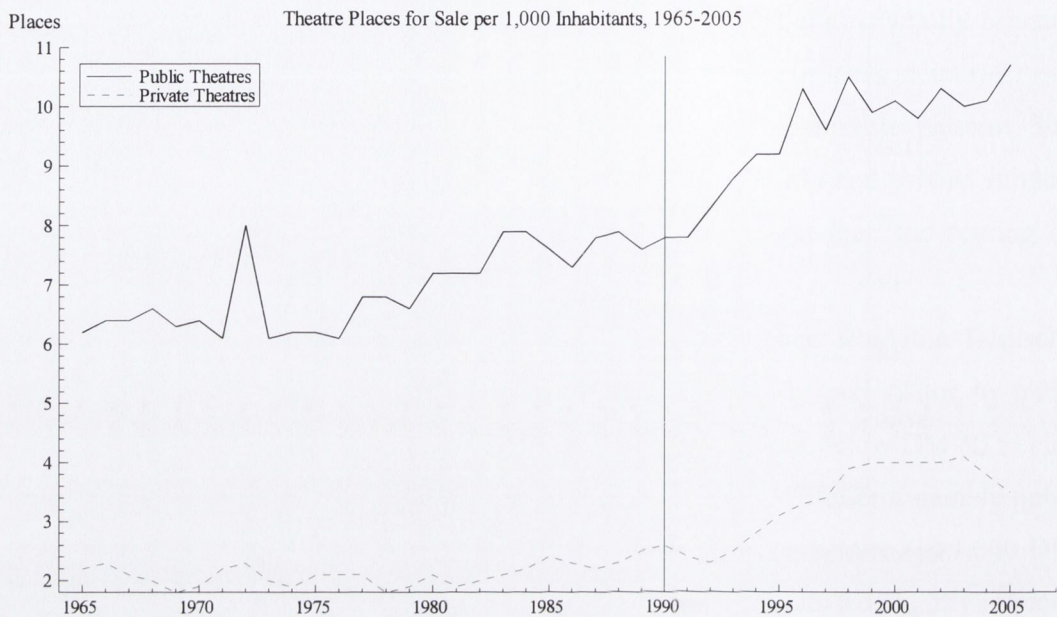


Source: same as Figure 1.2.1

These figures show that public theatre grows in prosperous times and declines in times of recession. After unification, pressure for funding increased, but despite the closing of some theatres, the German theatre system is fairly stable, not in crisis and in no way threatened.

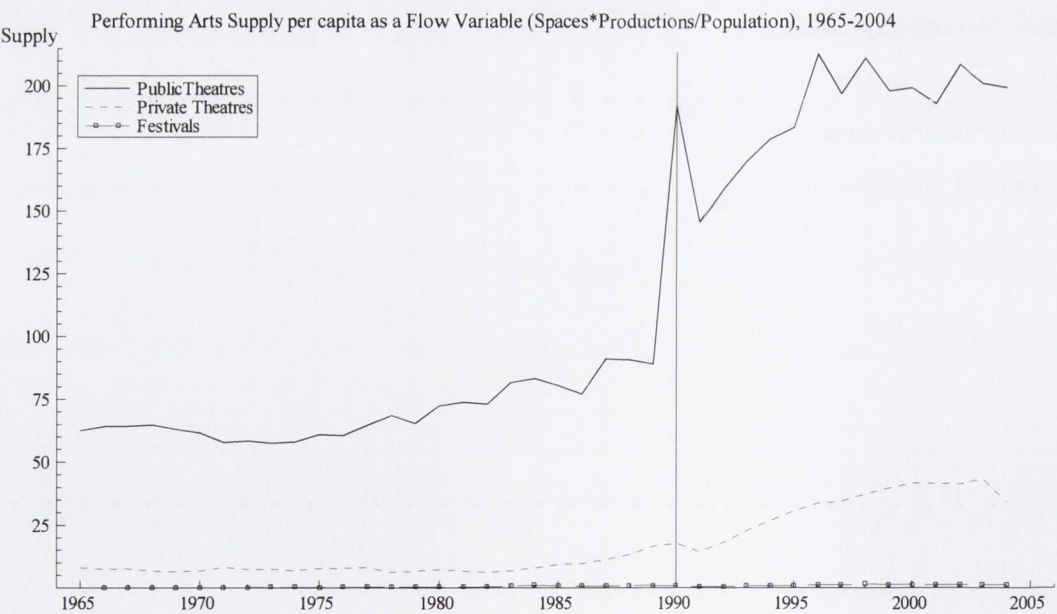
1A FIGURES

Figure 1.A.1: Public Theatre Places per 1.000 Inhabitants, 1965-2005



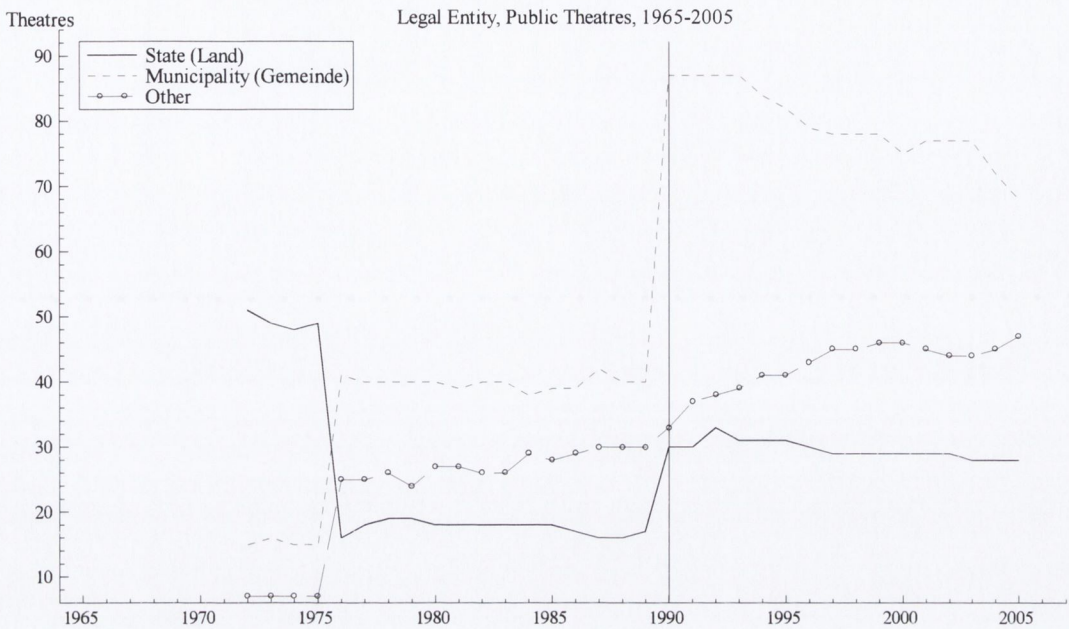
Source: same as Figure 1.2.1

Figure 1.A.2: Performing Arts Supply as a Flow variable, 1965-2004



Source: same as Figure 1.2.1

Figure 1.A.3: Legal Entity, Public Theatres, 1965-2005



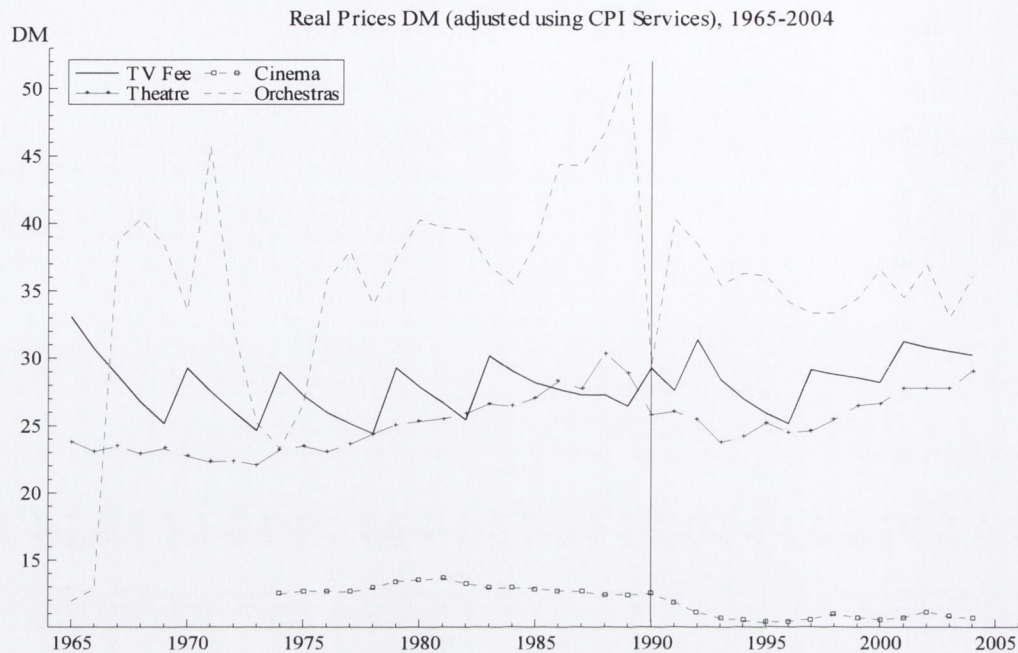
Source: same as Figure 1.2.1

Figure 1.A.4: Public theatre Box Office results, in percentage, 1965-2005



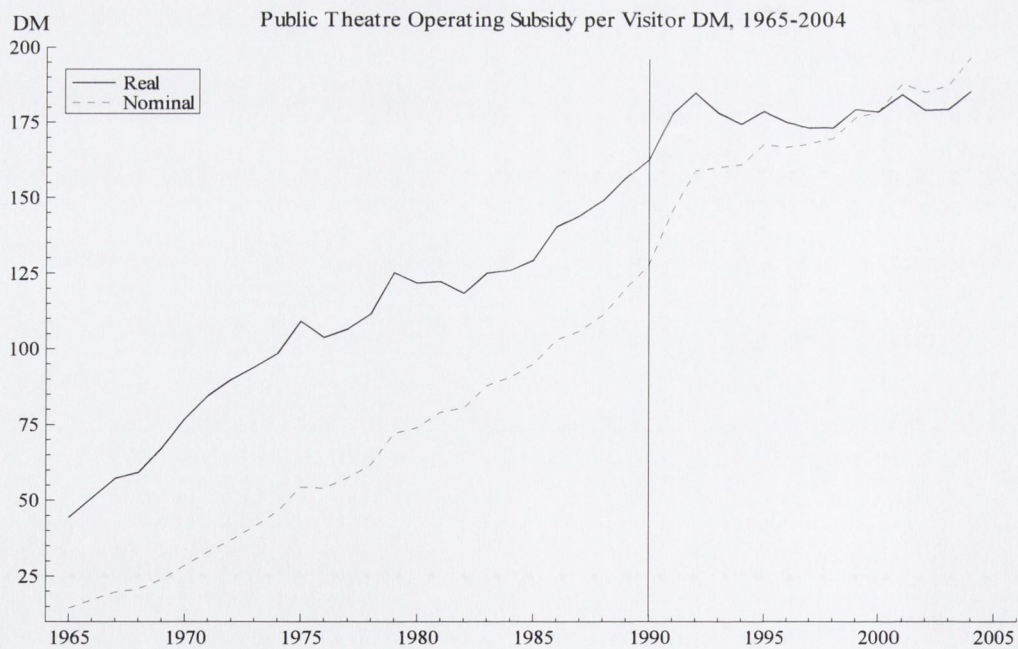
Source: same as Figure 1.2.1

Figure 1.A.5: Real Prices of Cultural Goods, using CPI Services, 1965-2004



Source: same as Figure 1.2.1

Figure 1.A.6: Public Theatre Operating Subsidy per visitor, in DM, 1965-2004



Source: same as Figure 1.2.1

This annex provides details on the construction of the database used in Chapters 1, section 1.2, and Chapter 4.

1.B.1 Report structure

The dataset was created from the “official” statistics of public theatres in Germany, published by the Deutscher Bühnenverein. It includes the information in the Summentabellen (sums tables) from the 1965 until 2004 reports.

The reports are organized as chapters, although the structure has changed over time, as will be described.

Chapter one collects information on number of municipalities, theatre companies, legal entity, legal form, and number of places.

The variable “usage index” is created as the percentage of places for sale in places available. The variable “load” is created as attendance at own location divided by places for sale.

Chapter two collects information on events in the season: own events at own location (opera, ballet, operettas, musicals, theatre plays, child and youth plays, concerts, other events) and guest performances. It also records new productions.

The variable “new stagings” is created as the percentage of new stagings in total stagings.

Chapter three collects information on attendance, by category (opera, ballet, operettas, musicals, theatre plays, child and youth plays, concerts, other events) and by tickets expressed in percentage of total attendance at own location (day tickets, place rents, visitor organisations, student tickets, preferential tickets, free tickets). It also provides attendance at own location and at guest performances in other municipalities, and the total attendance.

Chapter four collects information on personnel in the theatre season. It provides information on permanently employed personnel (artistic personnel by category – singers, actors, ballet members, choir members, theatre orchestra members and other artistic personnel; other personnel, total full time, female personnel) and artistic personnel in guest performances.

Chapter five collects information on income and allocation of funds. It provides operating revenue by category (day tickets, place rents, student tickets, visitor organisations, cloakroom fees, radio and television fees, foreign guest performances,

non-native German guest performances, sale of programmes, advertising revenue, remaining income, and total) and funds allocated from and subsidies information (Bund, Land, own municipality, other municipalities, municipalities associations, broadcast and lotto, public institutions, private institutions, and total). Also included are income from recording liabilities, total income and operating subsidies.

The variable “total box office revenue” is constructed as the sum of day tickets, place rents, student tickets, visitor organisations, foreign guest performances, and non-native German guest performances.

The variable “nominal theatre price” is calculated by dividing total box office revenue by total attendance at own location. The variable “real theatre price” is calculated as the log of nominal theatre price minus the log of CPI.

The variable “theatre supply flow” is calculated as the product of number of places and total events, divided by population.

The variable “percentage of subsidy in theatre income” is calculated as operating subsidies divided by total income.

Chapter six collects information on expenditures and their classification, separating between personnel expenditures (board of directors, opera and operetta, theatre plays, ballet members, choir members, theatre orchestra members, total artistic personnel, technical personnel, administration and house personnel, miscellaneous personnel expenditures, maintenance expenditures, total personnel expenditures); neutral operating expenditures (administrative, rents and leases, decor, publications, author rates, guest performances/excursions, foreign companies as guest performers, other expenditures, and total neutral expenditures). Also included are interest and repayment service, special expenditures for financing, building expenditures, and total expenditures.

The variable “quality_LL” (quality according to Luksetich and Lange, 1985) is constructed as the real value of the sum of total artistic expenditures with total events expenditures and radio and television recording expenditures. This is obtained by first adding artistic personnel expenditures with technical expenditures and author rates; and then multiplying this summation with the theatre orchestra members. A real value is obtained by deflating the nominal value using the Consumer Price Index (CPI). The CPI series was obtained from Ecwin and originated from OECD data.

Chapter seven collects information on prices for different art forms, but only registers the highest and lowest prices, and the highest premiere price.

Chapter eight presents ratios for visitors, box-office results and subsidies. It included the total number of presentations, total presentations per 1.000 inhabitants, and visitors to own and foreign events at location in percentage of all available spaces (for opera, ballet, operettas, musicals, theatre plays, child and youth plays, and concerts). It also presents box-office results in percentage, operating subsidy per visitor in DM, and total subsidy per inhabitant in DM.

Chapter nine collects information for orchestras (kulturorchester). It included information on the number of municipalities, members, concerts at own location and outside own location, attendance at own locations, attendance at own locations per 1.000 inhabitants, expenditures in 1.000 DM, and total earned income (operating revenues, refunding from theatre, and other revenues). The allocation of public funds (total 1.000 DM, per inhabitant DM) as well as origin (Land, municipality, other) is also recorded.

The variable “total events” is defined as the sum of concerts at own and outside own location. The variable “nominal orchestra price” is calculated as operating revenues divided by attendance. The variable “real price of orchestras” is calculated as the log of nominal orchestra price minus the log of CPI.

Chapter ten collects information on private theatres. It contains information on the number of municipalities, total theatres, legal form (GmbH, e.V., EP, other), places (total, and per 1.000 inhabitants), events (total, and per 1.000 inhabitants), attendance (total, and per 1.000 inhabitants), and allocation of public funds (in 1.000 DM, and per inhabitant in DM).

The variable “private theatre supply flow” is constructed as the product of the number of private theatres and the number of events, divided by the population.

Population series was obtained from Ecwin, from OECD data.

Chapter eleven collects information on festivals. It provides the number of municipalities, total festivals, legal form (municipalities and other), places, performances, attendance, and allocation of funds (total, Bund, Land, municipalities, other).

The variable “festivals supply flow” is constructed as the product of the number of spaces and the number of events, divided by population.

Data on cinema prices is collected from the German Federal Film Board¹⁸. Real prices are calculated as the log of nominal prices minus the log of CPI. Data on

¹⁸ www.ffa.de

television and broadcasting fees is collected from Gebuhreneinzugszentrale¹⁹ (GEZ). Real prices are calculated as the log of nominal prices minus the log of CPI.

1.B.2 Comparability between year reports

Since 1981 the reports are directly comparable in terms of chapters and variables included. To ensure comparability and that the database is consistent, the procedure is to start with the more detailed reports and go back to early reports to try and match the categories.

Between 1977 and 1980 the only difference in the structure of the reports is that chapter tree only includes 15 instead of the 17 detailed categories

The 1976 report only includes 14 categories in chapter three.

The 1974 and 1975 reports only include 13 categories in chapter two (instead of 15) and 12 in chapter three (instead of 17). Chapter eight only includes ten categories, instead of the 11 of the posterior reports.

The 1972 and 1973 reports include 24 categories in chapter five (instead of the 23 in the later reports) and chapter seven includes the information that in later reports is presented in chapter eight.

The reports from 1966 to 1971 do not include information on what is in later reports chapter one, and chapter one corresponds to what in later reports is chapter four. The information that in later reports appears as chapter six, appears in these reports as chapter four. Similarly, the information that in posterior reports appears in chapter nine, appears in these reports as chapter eight.

In the 1967 report chapter five only has 22 categories (instead of 23).

In the 1966 report chapter five only has 21 categories (instead of 23) and chapter eight only has 12 (instead of 13). Chapter nine has 13 categories (instead of 12).

In 1965 the structure of the report was similar, but the chapters were numbered differently. There is no chapter that corresponds to what in later reports will be chapter one, and chapter one corresponds to chapter two of the later reports. Chapter two corresponds to chapter three in subsequent reports, chapter four to chapter five and chapter three to chapter six. Chapter seven corresponds to chapter nine. There is chapter that corresponds to chapter four.

1.B.3 Data interpolation

¹⁹ www.gez.de

Schulze and Rose (1998) noted that the subsidization data in the Theaterstatistik report for 1995/95 was seriously flawed and incomplete. Values that are obvious misprints are corrected and regarding missing data, some values are interpolated reports to harmonize the categories in each chapter, due to the differences in the structure of the reports.

From 1965 to 1971 the only information comparable to chapter one in the later reports is the number of municipalities, number of existing places and places per 1.000 inhabitants. As described below, the number of places for sale is interpolated, but information about legal entity and legal form cannot be interpolated. Information on number of theatre stages is obtained by counting the number of stages in each year report.

In the 1965 to 1983 reports, the number of places for sale to the public is not recorded. Places for sale are normally inferior to the number of available places and these values are interpolate according to equation (1), starting in 1983 and moving backwards until 1965.

$$(1) \quad \text{Places for sale } i = \text{Existing places} - (\text{Existing places } i+1 - \text{Places for sale } i+1)$$

The following describes the principle used in data interpolation. In the reports from 1965 to 1976, events for opera include opera and ballets, and events for operettas include operettas and musicals.

Data is interpolated for opera and ballet attendance from opera attendance data, and data for operettas and musicals from operettas data.

In the first case, data exists for ballet attendance in 1965 and 1976. Ballet attendance in 1965 is subtracted from ballet attendance in 1976 and this value divided by the number of years for which data is missing. With a start and end point and as ballet attendance increases from 612 to 1021, missing data is interpolated as a regular increase per year. Once ballet attendance has been interpolated, opera attendance is simply the value in the report minus the interpolated value.

In the second case, the general trends in the 1978-2004 period are for attendance to operettas to be reduced and attendance at musicals to increase. There is no start point for 1965 and attendance for 1976 is used as a proxy for attendance in the previous years, given that attendance at musicals remained stable from 1978 to 1988. This assumption will eliminate variation in attendance to musicals but not to attendance to operettas.

Data interpolation for other values follows the same guidelines and it applies mainly to data that is reported as an aggregate value for two categories, in the 1965 to 1975 reports.

CHAPTER 2

THE COST FACTORS OF GERMAN PERFORMING ARTS ORGANIZATIONS

2.1 Introduction

This Chapter replicates and extends the investigation by Robledo (2002) for German Public Theatres. It also applies the study by Globerman and Book (1974) to German Kulturorchesters, which is done for the first time.

The primary objective of this Chapter is to identify cost-output relations for a sample of German performing arts organisations (PAO). A secondary objective is to analyse the relation between the scale of the firm's operation and the firm's costs.

Pindyck and Rubinfeld (2005) note that Economists are concerned with the allocation of scarce resources, they care about what cost is likely to be in the future and about ways in which the firm might be able to rearrange its resources to lower its costs and improve its profitability. This chapter investigates the cost factors (factors that determine the total cost) of German PAO, so that suggestions can be made as how costs can be reduced in the future.

There are two main reasons for studying cost functions in performing arts organisations: first, cost reductions enable lower prices and allow for people with lower valuations of live performing arts experiences to participate. PAO are reluctant to pass on cost increases in the form of higher ticket prices, which may be attributable to political biases and/or fear of significant resulting decreases in audience sizes, and this makes the implementation of policies to control costs important and desirable.

Second, cost functions are approached from the income gap that requires increased government subsidies to the arts, in order to maintain output and quality. The performing arts are subsidised using public monies, with subsidies financed out of general taxation. Cost reductions mean less support is required, and that taxpayers are left with more disposable income.

As noted by Globerman and Book (1974), the design of cost control policies requires some understanding of the cost determination process, and this Chapter contributes by providing empirical studies of the cost factors of German public theatres, and German Kulturorchester.

Robledo (2002) notes that even though a social consensus exists in Germany as to the important role of culture and cultural promotion, in times of scarce resources, such as the decade after German reunification, cultural budgets also face reductions, with expenditures being cut or completely cancelled in some cases.

The goals of the performing arts organisation and the preferences of its patrons influence the programme choice, but the performances these institutions decide to present has a direct impact on the cost structure. Mas-Collel et al. (1995) note that the objectives of the firm should emerge from the objective of those individuals who control it. In the case of German PAO, public ownership often means that cost minimization, a necessary condition for profit maximization, is not the sole objective, with issues of access to the arts playing an important role in the definition of the PAO objectives. Therefore, the focus of this study is not on efficiency, but rather the factors that determine total costs.

2.2 Economic Model and Theory

2.2.1 Theoretical Background

Pindyck and Rubinfeld (2005) note that the firm's cost of production is determined by the production function together with the prices of factor inputs. The characteristics of the firm's production technology affect costs, both in the short run (when the firm can do little to change its factor inputs) and in the long run (when the firm can change all its factor inputs).

This Chapter focuses on what cost is likely to be in the future for German PAO, and about ways these firms may rearrange their resources to lower their costs. The economic cost is being considered, the cost of utilizing resources in production, distinguishing between the costs that the firm can control and those it cannot. Of particular importance is the concept of opportunity cost, the cost associated with the opportunities that are foregone by not putting the firm's resources to their best alternative use.

As noted before, German PAO are not expected to act as profit maximizing firms, because of their objectives. However, all firms face the fundamental problem of how to select inputs to produce a given output at minimum cost, the cost-minimizing input choice. Following Mas-Colell et al. (1995) this can be formally presented as: let z be a nonnegative vector of inputs, $f(z)$ the production function, q the amount of output, and $w \gg 0$ the vector of input prices. The cost minimization problem can then be stated as:

$$\begin{aligned} (1) \quad & \text{Min } w \cdot z \\ & z \gg 0 \\ & \text{subject to } f(z) \geq q \end{aligned}$$

The optimal value of the cost minimization problem is given by the cost function: $c(w, q)$. Plotting all the combinations of inputs that have some given level of cost C produces an isocost line. If C varies, a set of isocost lines is obtained, with higher isocost lines associated with higher costs. Thus the cost minimization problem can be presented as finding the point on the isoquant²⁰ that has the lowest possible isocost line associated with it.

Instead of cost minimizing input choice, it is possible to use duality to look at production isoquants given isocost lines. As in consumer theory, the firm's input decision has a dual nature. The optimum choice of z can be analyzed not only as the problem of choosing the lowest isocost line tangent to the production isoquant, but also as the problem of choosing the highest production isoquant tangent to a given isocost line.

Pindyck and Rubinfeld (2005) remark that to analyze the relation between the scale of the firm's operation and the firm's costs, it is needed to recognize that when input proportions do change, the firm's expansion path²¹ is no longer a straight line, and the concept of returns to scale no longer applies. The term economies of scale reflects input proportions that change as the firm changes its level of production. In this more general setting, a U-shaped long run average cost curve characterizes the firm facing economies of scale for relatively low output levels and diseconomies of scale for higher levels.

²⁰ An isoquant is a curve that represents the set of all input combinations that give the firm the same level of output.

²¹ The expansion path describes the combinations of inputs that the firm will choose to minimize costs at each output level. It corresponds to the curve passing through the points of tangency between the firm's isocost lines and its isoquants.

Varian (1993) notes that returns to scale can be expressed in terms of the behaviour of the average cost (AC) function: the cost per unit to produce q units of output.

$$(2) \quad AC(q) = \frac{c(w, q)}{q}$$

If the technology exhibits increasing returns to scale, then the costs will increase less than linearly with respect to output, so the AC will be declining in output: as output increases, the average costs of production will tend to fall. A given technology can have regions of increasing, constant, or decreasing returns to scale.

The AC function is the sum of the average variable cost function and the average fixed cost function. Hence, the AC curve is the sum of two effects and is U-shaped: the average fixed costs decrease as output increases and the average variable costs eventually increase as output is increased.

Performing arts cost studies are most concerned with the behaviour of the cost function with respect to the output variable. They regard the factor prices as being fixed at some predetermined levels and only think of costs as depending on the output choice of the firm: $c(q)$.

2.2.2 *Previous Cost Estimation Studies*

Unlike the literature on demand for the performing arts, published research on total costs for the provision of performing activities is not extensive. The main interest of all applications of cost functions for cultural industries has been in finding evidence of economies of scale. Scale economies²² indicate monopolistic markets and suggest cost savings from large scale production.

Empirical studies normally refer to the experience of a single country, focus on the live performing arts (theatre, symphony, opera, and ballet) or museums, and use datasets with a small number of observations: Baumol and Bowen (1966), Globerman and Book (1974), Throsby (1977), Lange et al. (1985), Jackson (1988). Other recent studies that investigate diminishing average costs in the provision of seat capacity include Lange and Luksetich (1993), Gray (1992), Hjorth-Andersen (1992), Krebs (1996), Taalas (1997), Robledo (2002), Tobias (2003), and Traub (2005).

Total costs are defined as a function of inputs (capital and labour), output (quantity and type) and quality. Researchers have used different empirical models in the estimation of total costs for PAO, with all studies agreeing that quality and output are

²² When costs increase less than proportionately with output.

the most important factors in explaining costs. Increases in quantity or quality are expected to positively affect total costs.

Table 2.1 illustrates some features of selected published research. Different country experiences, different industries and data availability explain the different variables used to proxy output and quality. Output is normally understood as quantity, and usually measured by the number of performances. Jackson (1988) uses total attendance, and Traub (2005) employs a specification that does not include quantity, but considers total cost as a function of theatre capacity (size) and quality. Quality, being multi-dimensional is more difficult to measure and different proxies have been used in the literature, either linked to attendance, repertoire, productions, or accreditation to peer associations.

Searching for evidence of Economies of Scale in the cost structure of PAO

Globerman and Book (1974) note that costs of any live performance are predominantly variable; capital inputs (i.e. expenditures on stage props and sets) are significant only for large theatre groups²³. Similar results are observed in the data for German public theatres. In the period from 1965 to 2004, personnel expenditures²⁴ as a share of total costs ranged from 72 to 81 percent, and neutral expenditures from 14 to 20 percent. Décor expenditures represented on average three percent of total costs. A detailed breakdown of expenditures is not available for Kulturorchester.

Throsby (1977) notes that the traditional set-up costs involved in mounting a production (from factors such as sets, costumes, rehearsal labour and facilities, designs) are fixed in the short run in the sense that they have to be committed before any output takes place. Variable costs include materials and services used in the course of each performance, and they are variable in the sense that they are directly related to the number of performances given, which in turn may be able to be increased as a means of raising output. The number of performances of a particular production (i.e. the length of season) can be interpreted as directly measuring the input of variable factors. In some cases, the season length may be predetermined and all the resources required for the run may be contracted in advance, as for example, in the case of most musical programmes

²³ For their sample of symphony orchestras, salaries and fees combined made up 81 percent of total expenditures, and costs for renting the concert hall, selling tickets, and like activities accounted for 10 percent. For their sample of theatre groups, salaries and fees accounted for 65 percent, theatre rental and operating costs for 10 percent, and another 10 percent for expenditures on sets and props.

²⁴ Personnel expenditures include artistic expenses plus technical, administrative and house personnel, miscellaneous personnel, and maintenance personnel expenditures. Artistic expenses includes directors, representative personnel (operas, operettas, and theatre plays), ballet members, choir members, and theatre orchestra members.

involving only a small number of performances. In such a case all factors used by the firm may be regarded as fixed in the short run and the short run production function does not exist. The total costs function represents a long run cost function insofar as it is generated from simultaneous expansion in all factors of production.

If set up costs are high relative to operating costs, as is commonly the case, average total costs are likely to decline for a substantial range of output. Taalas (1997) concurs with Baumol and Bowen, noting that the likely reason for size economies is the relatively high costs of staging and rehearsing a play compared to the relatively low costs of keeping the play in a repertoire.

The different specifications considered in previous studies

The study by Globerman and Book (1974) is the benchmark reference. They model total costs as a function of a group of factors: quantity of basic service units (individual live performances), product mix (type of performances presented and location of individual performances), service quality, factor price levels (the higher cost of living in cities would lead to higher performer salaries in urban arts groups), and institutional preferences.

In relation to product mix, a relevant distinction is drawn between main performances and other. A main performance involves full utilization of the organizations complement of performing artists, while other includes presentations by a subset of the group's artists. Since labour costs constitute the bulk of all costs, the greater the percentage of main performances in the overall performance total, the greater should be overall production costs. In relation to institutional preferences, the argument is that slack can appear in the form of expenditures which do not contribute to improved performance levels, with the government granting agency acting as the only available policy mechanism. Institutional preferences will also differ with respect to the degree of performance diversity required. This will be manifested in a greater percentage of different productions for any given level of total performances. The greater the degree of product diversity, the smaller the opportunity to exploit economies in rehearsal time and the use of stage sets and props.

Globerman and Book (1974) further specify different models for theatres and for symphonies. For symphonies, total costs are affected by: the number of performances of all types, the percentage of all performances classed as main performances (product mix

variable), audience attendance per tour performance (quality proxy²⁵), length of performing season and age of the symphony (institutional preference proxies). For theatres, main performances are used as the output measure, and a diversity index calculated as the number of main performances minus the average length of run of all productions, divided by main performances, is considered.

²⁵ Different input requirements per performance will be transformed directly into expressions of audience preferences.

Table 2.1: Selected Literature Review for Performing Arts Cost Functions

Researcher(s)	Industry and Country	Estimated Model Specification	Definition of Output	Definition of Quality
Globerman and Book (1974)	Theatre, Symphony [Canada]	TC = f (Quantity, Product Mix, Service Quality, Factor Price Levels, Institutional Preferences) TC = f (Q, P, S, L, R)	N. Performances	Attendance per Tour performance
Throsby (1977)	Performing Arts Institutions [Australia]	TC = f (Quantity, Quality)	N. Performances	Cost of production=Total Revenue from grants/ Total Revenue from box office
Jackson (1988)	Museums [US]	TC = f (Total Attendance, Wage Rate, Cost of Capital, Activity expenses as a fraction of Total Cost, Quality) TC = f (Q, W, K, ASi, S)	Total Attendance	Accreditation to AAM (American Association of Museums)
Robledo (2002)	Public Theatres [Germany]	TC = f (Size, Quantity, Type of Performance, City, Quality, Legal Entity, Legal Form, East/West, Competition)	N. Performances	Percentage of New Productions
Traub (2005)	Theatres [Germany]	TC = f (Size, Quality)	(Total tickets sold)	Giftedness of actors, Lavishness of productions, Broadness of repertoire

Source: see References

2.2.3 *Empirical Models used, Methodology, and difficulties with measuring the variables*

Differences in the availability of data require different empirical models to be considered for public theatres and for Kulturorchester²⁶. The model specification for theatres follows Robledo (2002), while for orchestras it follows the Globerman-Book (1974) formulation.

The models were estimated using OLS.

Cost Function specification: Public Theatres

For theatres, the dependent variable is total costs (measured as total expenditures in 1.000 DM). The independent variables include the capacity of the theatre (measured by places for sale), the number of stagings (productions), the type of performance (opera, ballet, musical, theatre play, child and youth play, concerts, other, guest performances), the size of the city where the theatre is located (measured by population of the city), quality of the performances (measured by the percentage of new stagings, total attendance to guest performances in other locations, and box office as a percentage of results), size of theatre (measured by number of full-time employees), and market structure (measured as the number of private minus public stages in the city where the theatre is located). Dummies for legal entity (base category is Municipality - G), legal form (base category is State Owned - R), and East/West Germany location of the performing art institution are also included, as well as interaction terms between the dummies and total events and places for sale.

To admit the possibility of increasing, constant and/or decreasing returns to scale, it is appropriate to specify total costs as a cubic function of output. This is in line with the findings by Taalas (1997), who found that the underlying production technology of the Finnish theatres was non homothetic with respect to output. This finding contrasts with Lange et al. (1985) and Jackson (1988) who assume homothetic production technology, but it coincides with the analyses of Globerman and Book (1974) and Throsby (1977) who both take homogeneity into account²⁷.

Globerman and Book (1974) note that the basic output unit of a performing arts group is the individual live performance. Lange et al. (1985) remark that defining output is difficult because of the varied services provided by cultural institutions. However, the

²⁶ The data for orchestras is far more limited than that available for public theatres.

²⁷ They used in their estimations functional forms that include second and third powers of output.

number of performances is generally accepted to be the correct measure of output in the performing arts, with total attendance having been used only in the case of museums.

In Germany, in the 1998/1999 season, circa 64,000 performances attracted 22.7 million visits to public theatres. For orchestras, the circa 3,500 concerts at the own location attracted 2.54 million visits. However, the number of visitors (size of the arts audience) is likely to be a much lower figure, as most of the individuals who purchased these tickets are likely to have attended more than one performance.

In relation to quality there is no homogeneous definition and several proxies have been used to measure the impact of quality on total costs. Globerman and Book (1974) use audience attendance per tour performance (attendance at performances abroad would reflect prestige and recognition, thus quality), Throsby (1977) considers the cost of the production, employing the ratio between total revenue from grants and total revenue from the box office. Jackson (1988) uses a dummy variable to assess accreditation with the American Association of Museums. Robledo (2001) uses the percentage of new productions²⁸ (the assumption is that theatres that have more quality will innovate and expand the repertoire), and Traub (2005) considers three dimensions of quality: giftedness of actors, lavishness of stagings, and broadness of repertoire.

Higher total costs for theatres are expected to be positively associated with: output (measured by the number of productions), quality, the capacity of the theatre, size of city, and competitive pressure. Theatres with larger seating capacity would, all things equal, have higher costs. The size of the city (inhabitants) affects the general price level (rent, wages, other) and leads to higher costs of local theatres. The existence of private theatres leads to higher costs with the public theatres, because there is competition around renowned artists (driving up their fees), and competition around the spectators (requiring more complex and normally more expensive performances).

The empirical model for total costs of public theatres extends the Robledo formulation and is named Model 1:

$$(3) \quad \text{Model 1: } TC_i = \alpha_1 + \beta_1 \text{Productions}_i + \beta_2 \text{Productions}_i^2 + \beta_3 \text{Productions}_i^3 + \beta_4 \text{Opera}_i + \beta_5 \text{Ballet}_i + \beta_6 \text{Operettas}_i + \beta_7 \text{Musicals}_i + \beta_8 \text{Theatre Plays}_i + \beta_9 \text{Child and Youth Plays}_i + \beta_{10} \text{Concerts}_i + \beta_{11} \text{Other Performances}_i + \beta_{12} \text{Guest Performances by Foreign}_i + \beta_{13} \text{Guest Performances in other}_i + \beta_{14} \text{Population}_i + \beta_{15} \% \text{ of New Stagings}_i$$

²⁸ This variable is inaccurate as there are *repertoire* theatres, which produce different pieces next to each other and thus score high on this measure of quality; and *en suite* theatres, which play a piece up to the next premiere. In addition, a large portion of new productions is characteristic of the *en suite* theatre: perhaps this play enterprise is more economical than the *repertoire* theatre. Furthermore, in East Germany, the *en suite* theatre prevails. East German performances are cheaper than West German.

+ β_{13} Total Attendance GP in other_i+ β_{14} Theatre Employment Size_i + β_{15} Box Office as a % of Results_i + β_{16} (N°Private – N°Public Stages)_i + Legal Entity_i + Legal Form_i + ϵ_i

Model 2 is the same used by Robledo (2002) and considers interaction effects between East, Legal Form and Legal Entity, with places for sale and total performances. This model is included to ensure comparability of results.

Cost Function specification: Orchestras

The data for orchestras are limited and although some insight into the cost factors of Kulturorchester can be gained by exploring correlations, it is not feasible to exactly replicate the Globerman and Book (1974) study. Some of the variables are simply not available and it is not possible to solve this omitted variable problem with instrumental variables, as suitable instruments cannot be found²⁹.

For orchestras, total cost is the outcome variable (measured as total expenditures in 1.000 DM), and the predictors are quantity (measured by total concerts), quality (measured by attendance at own location performances), product mix (measured by the percentage of main performances³⁰), size of orchestra (measured by the number of members), size of the city where the orchestra is located (measured by city population), dummy variables for legal entity and East/West Germany location of orchestra. Finally, a dummy variable for refunding from theatre evaluates if Kulturorchester that operate with theatres face higher costs as a result of this association.

The empirical model to be estimated is therefore specified as Model 3:

$$(4) \quad \text{Model 3: } TC_i = \alpha_1 + \beta_1 \text{Concerts}_i + \beta_2 \text{Concerts}_i^2 + \beta_3 \text{Concerts}_i^3 + \beta_4 \text{Main}_i + \beta_5 \text{Members}_i + \beta_6 \text{Population}_i + \beta_7 \text{East}_i + \beta_8 \text{Refunding}_i + \beta_9 \text{Attendance}_i + \beta_{10} \text{Touring}_i + \beta_{11} \text{Quality}_i + \epsilon_i$$

Higher total costs are expected to be positively related to output (the number of concerts), quality, size of orchestra, and city size. Total costs are also expected to be positively related to the percentage of main performances, as a main performance involves the full utilization of artists instead of a small subset of musicians. Given the importance of labour costs, the more musicians participate in the production of concerts, the higher the costs³¹. Orchestras located in larger cities should be affected by higher general price levels (rents, wages, others) and thus face increased costs.

²⁹ For example, it was not possible to collect data for capacity of concert halls, attendance at tour concerts, length of the performing season, or age of the symphony.

³⁰ Calculated as the proportion of concerts at own location.

³¹ The underlying assumption in this formulation is that touring need not include all the orchestra members, whereas a concert in the own location would.

Total costs in a given year should be related to total costs in previous years, as costs are known to be incremental in nature. Costs should also be linked to the size of orchestras, and this should be modelled. Specific to Germany, the model for cost factors of Kulturorchester should consider the relation between orchestras and public theatres and examine the possibility of an East West cost downward gradient.

The Globerman-Book (1974) formulation was introduced in subsection 2.2.2. It defines total costs of orchestras as a function of the number of performances (Q), the proportion of main performances (M), quality (measured by attendance per tour performance, A), and institutional preferences (measured by length of the performing season, L), and the age of symphony, Y).

$$(5) \quad \text{Model 4: } TC_i = \alpha_1 + \beta_1 \text{Performances}_i + \beta_2 \text{Performances}_i^2 + \beta_3 \text{Performances}_i^3 + \beta_4 \text{Percentage of Main Performances}_i + \beta_5 \text{Quality}_i + \beta_6 \text{Season Length}_i + \beta_7 \text{Age}_i + \varepsilon_i$$

In the estimation of Model 3, log transformation of some variables was required, to improve normality of the residuals.

2.3 Data Sources and Description

The data are cross sectional, from the German Theatre Association report for the season 1998/1999. To the German Theatre Association belong nearly all public theatres, many private theatres and culture orchestras, and the public broadcasting corporations as well as the directions and personal members. Detailed data appear only for public theatres, but the data also include information on cultural orchestras, private theatres and festivals. All variables used in the models come from the report, or are constructed from variables in the report. As noted by Schulze and Rose (1998), the data present some problems and extensive checking and data cleaning were required.

2.3.1 Public Theatres

The descriptive statistics in Table 2.2 illustrate the large variance in the data, either in number of places for sale, total attendance, total events, total stagings, total new stagings and total expenditures, which range from 265,000 DM to circa 150 million DM.

The data refer to 122 municipalities, comprising 154 public theatres, of which 101 were located in West Germany and 53 in East Germany. These theatres offered 727 theatre stages where productions could be mounted and circa 271,000 places for sale to the public. In the 1998/1999 season, circa 20.5 million tickets were sold in the

approximately 64,000 theatre performances³². 4,600 stagings were offered, including 2,400 new stagings. Public subsidies amounted to 3.7 billion DM (circa 1.9 billion euros), with box office results covering only 15.3 percent of operating costs. Operating subsidy per visitor amounted to 170 DM (87 euros), while the average ticket price was 25 DM (13 euros).

Table 2.2: Theatre Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Places for Sale	148	1,852.26	1,687.12	69	13,231
Total Attendance at own	154	134,090.9	108,376.2	2,846	576,257
Total Events	154	421.77	210.9	29	1,309
Total Stagings	151	30.49	16.67	2	90
New Stagings	154	15.69	8.31	0	37
Total Expenditures	154	30,032.03	28,308.53	265	149,357

Source: own calculation after the Theaterstatistik Report 1998/99

Total attendance reached 20.5 million visits, out of 27.3 million places made available for sale³³. The largest cities of Berlin, Hamburg, and München host 18 public theatres and 78 private theatres. These 18 public theatres (11.7 percent of total public theatres in the sample) represent 12.7 percent of total places for sale in the public theatres, 18.2 percent of attendance, 13.4 percent of performances, 21.4 percent of expenditures and 19.4 percent of total subsidies.

Due to attendance frequency, the 20.5 million total visits correspond to a much lower number of visitors. In relation to total attendance by art form, theatre plays and opera dominate with 5.8 million and 4.7 million visits, child and youth theatre plays contribute with another 2.5 million visits, musicals with 2.1 million, ballet with 1.6 million, other performances with 1.3 million, concerts with 1.2 million, and operettas with one million visits.

In relation to attendance by type of tickets sold, 35 percent corresponded to day ticket sales, 22 percent to place rents, 15 percent to child and youth tickets, and 14 percent to visitor organizations.

Public theatres in this sample employed circa 40,000 full time workers, 16,000 of which were female. 18,500 corresponded to artistic personnel (5,100 theatre orchestra members, 4,500 other artistic, 3,000 choir members, 2,600 actors, 1,600 ballet members, 1,600 singers); 16,000 were technical workers, and 3,000 administration.

³² Performances is used as a synonym of events.

³³ Calculated as the sum of all performances per stage multiplied by places for sale per stage.

Personnel expenditures accounted for 77 percent of total expenditures. Artistic personnel accounted for 42 percent (12 percent theatre orchestra members, nine percent directors, five percent opera and operetta, five percent theatre, five percent choir members, three percent ballet members), technical personnel for 24 percent, administration for six percent. Neutral expenditures accounted for 16 percent of total expenditures, and include expenditures such as décor and setting (three percent) and publications (one percent). Building expenditures are reported as two percent of total expenditures and interest and repayment as 0.5 percent.

In relation to legal entity, half of the public theatres are owned by the municipalities (the form in which the influence of politics and administration is tendentious largest). Regarding legal form, 45 percent of public theatres were organized as Regiebetrieb and only 25 percent as GmbH³⁴. Table 2.3 indicates that the most common combinations of legal form and legal entity were Regiebetrieb/Gemeinde (47 theatres), Regiebetrieb/Land (21 theatres) and GmbH/other (20 theatres).

Table 2.3: Theatre Legal Entity and Legal Form

LE \ LF	Legal Entity (LE) and Legal Form (LF)							Total
	Owner Operator (Eigenbetrieb) E	Non-Trading Partnership (Gesellschaft bürgerlichen Rechts) GbR	Limited Liability Company (Gesellschaft mit beschränkter Haftung) GmbH	State Owned (Regiebetrieb) R	Special Purpose Association (Zweckverband) ZV	Registered Association (eingetragener Verein) e.V.	Public Law Institution (öffentlich-rechtliche Anstalt) öRA	
Municipality (Gemeinde) G	19	1	10	47	0	1	0	78
District (Kreis) K	1	0	1	1	2	0	0	5
State (Land) L	0	0	7	21	0	0	1	29
Other (Mehrträgerschaft) M	0	4	20	1	8	5	1	39
Registered Association (eingetragener Verein) e.V.	0	0	1	0	0	2	0	3
Total	20	5	39	39	10	8	2	154

Source: same as Table 2.2

The relative importance of capital and labour inputs appears to be fairly similar for all public theatres. Capital inputs are relatively unimportant in the production structure, representing less than half of inputs for all public theatres in the sample. For 85 percent of public theatres, capital inputs represent less than 20 percent of inputs, and only for three theatres (all in large cities) do they account for a share between 40 percent and 50 percent. There is no apparent relation between relative importance of capital

³⁴ See Chapter 1 for the discussion of different legal entities and legal forms.

inputs and the size of the city where the theatre is located, or the East/West Länder location.

Labour inputs dominate the inputs used in the production process. In the majority of theatres they represent more than 70 percent of inputs used. There appears to be no effect of size of the city where the theatre is located and the relative importance of labour inputs; and no difference in theatres located in East/West Länder.

Total expenditures are related to output (either measured by attendance or total performances), city size, total events, and theatre capacity. There is a strong linear relation between total costs and total attendance (measured by a correlation coefficient of 0.87), and weaker correlations with capacity (0.61) and the number of performances (0.40). In relation to total expenditure and size of city where the theatre is located, cities with more inhabitants have theatres with larger expenditures. Within each city size group there is variation, and this variation is greater the larger the city size.

Small theatres (less than 100 employees) have individual total expenditures below the 15 million DM threshold (circa 7.7 million euros), and total costs increase rapidly with the number of performances. There is variation within this group but all observations are quite near and it is fairly homogeneous. Middle sized theatres (employing between 100 and 500 people) present individual total expenditures that are always below the 65 million DM (circa 33 million euros) threshold. There is wide variation within this group, but the number of performances appears to be centred at 500 events per season. Large theatres have individual expenditures always above the 50 million DM (circa 26 million euros) threshold and tend to present between 500 and 1.000 events per season.

Although expenditures increase rapidly with capacity³⁵, the increase in total costs is slower as theatre size increases. The slope of a fitted line is higher for small theatres and dispersion also appears to increase with theatre size, but this may only reflect the number of observations in each category.

In relation to performances by location, home events (performances at own location) are the most important type of location for almost all theatres. Tour events are relatively more significant for smaller theatres, located in smaller cities.

Regarding city ratios (defined as the number of places per 1.000 inhabitants), as population increases (city size increases) city ratios become smaller, indicating that smaller cities offer more public theatre seats per inhabitant than larger cities. This may reflect the market structure, with public theatres in smaller cities acting as sole providers

³⁵ Measured as number of places for sale to the public.

of theatrical services (monopolists), or reflect the missing private theatre seats being offered, which is not in the data. Private theatres are commercially run and tend to be located in larger cities.

Cost per seat in public theatres indicates that for 96 percent of public theatres cost per seat is below the threshold of 40,000 DM (circa 20,000 euros). There appears to be no relation between cost per seat and the size of the city where the theatre is located. The two sample t-test³⁶ does not reject the null of no difference in cost per seat between public theatres located in East and West Germany.

The ratio of places for sale and existing places can be used to measure how well adapted theatre halls (buildings) are to what is being produced and offered for consumption. If a theatre hall is well adapted for theatrical performances, then the ratio should be close to one. Poorly adapted theatre rooms should negatively influence the quality of the theatrical experience, and this is why this ratio is relevant. The majority of public theatres score a ratio above 80 percent. When separating between different theatre sizes, it becomes clear that large theatres are fairly homogeneous and score ratios above 90 percent, with only one theatre scoring below 80 percent. Medium size theatres have scores fairly concentrated between 80 percent and 100 percent, with six theatres falling below the 80 percent threshold and one falling below 60 percent. Medium size theatres are by large the most numerous group of theatres in the data. Small theatres are the more disperse group, with seven theatres below 80 percent. This suggests that large theatres have halls that are well equipped to theatre performances, while small theatres are worse adapted and thus may provide lower quality theatrical experiences, all else equal. As theatre attendance is an experience good, this may be relevant in audience formation policies.

Average year wage per artistic personnel indicates that wages increase with city size. This is observed in both East and West German public theatres. Artistic wages have been used as proxies for artistic talent and quality in theatres. Another variable that has been used as a dimension of quality is the lavishness of productions. This can be measured by décor and settings expenditures, which increase with city size. For the majority of theatres, décor and setting expenditures represent less than five percent of total expenditures. Small and medium sized theatres have low décor costs and large theatres have high décor expenditures, but as a percentage of total expenditures, this ratio is unrelated to the size of the city where the theatre is located.

³⁶ Not shown here.

Another dimension of quality is related to new stagings, measuring the broadness of the repertoire. Larger cities present more conventional repertoires with smaller proportions of new stagings, while theatres located in smaller cities tend to present riskier performances, in the form of new stagings. This is evident for the Western theatres, but for Eastern theatres it is unclear, as theatres in Brandenburg and Mecklenburg-Vorpommern present the opposite relation.

The level of competition public theatres face is assessed by subtracting the number of private and public theatres, per city³⁷. A large value indicates public theatres face fierce competition, while a low value indicates public theatres can act as local monopolists in the provision of live theatrical performances. Only in large cities is it found that public theatres face significant competition, as the number of private theatres is larger than the number of public theatres, the same occurring in theatre stages. The majority of public theatres do not experience severe competition from private theatres, and theatres located in small cities do not face competition from private theatres.

Figure 2.A.1 examines tour events and the impacts of the touring activities on the results of the PAO. Public theatres located in large cities tend to perform more in other municipalities than to have foreign ensembles performing in their theatres. As they receive fees for outside performances and have to pay others to perform at their location, theatres in large cities present a financial surplus from tour activities, which are very profitable. However, performances from foreign ensembles either break even or produce losses, and are in general financially non profitable. Benefits may accrue in the form of creative spillovers and experience gains from contact with other ensembles. Theatres located in smaller cities tend to complement their supply with performances by foreign ensembles, which are significantly more numerous than the own ensemble as guest performers. While the own ensemble as a guest performer almost always produces a net profit, inviting others as guest performers normally results in small losses, but occasionally generates huge losses.

Regarding gender equality³⁸, small theatres employ more women as a percentage of their labour force. In the majority of public theatres less than half of the workforce is female. Large theatres are very homogeneous and employ about 40 percent of women. Medium size theatres present a similar figure, but the ratio of women employed increases as medium theatres in smaller cities are considered. There is also more variation. For small theatres there is more variation, but many employ between 40

³⁷ Subtracting the number of theatre stages yields the same conclusions.

³⁸ Assessed by the ratio of women employed as full time workers in public theatres.

percent and 60 percent of female workers. This is relevant because there are more women in drama school and one would expect this to be reflected in the employment of theatres³⁹. The data indicate that it is in smaller cities, where there are fewer theatres, and not in the large cities where public and private theatres compete for artists, that more women are employed in public theatres. There is no information on the ratio of women workers in private theatres.

2.3.2 *Orchestras*

In the 1998/99 season, concerts by orchestras attracted 2.5 million visits. The data refer to 53 orchestras located in 50 municipalities; with circa 4,000 members, performing 5,200 concerts (3,300 at own location and 1,900 outside the own location). Public subsidies received amounted to 365 million DM (circa 187 million euros), and public subsidy per inhabitant was of 22.46 DM.

Descriptive statistics in Table 2.4 indicate wide variation in the data, ranging from orchestras performing three to 240 concerts per season; orchestra members ranging from 15 to 183; and percent of main performances⁴⁰ ranging from 14 percent to 100 percent.

Table 2.4: Orchestra Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Total Concerts	53	84.60	45.01	3	240
% Main Performances	53	62.89	26.10	14.17	100
Number of Members	53	76.13	37.58	15	183
Population	53	494,862.8	808,832.5	4,445	3,398,822

Source: same as Table 2.2

Of the 53 orchestras in the sample, 70 percent were located in West Germany and 30 percent in East Germany. In relation to legal entity (ownership of the orchestra), 42 percent of the orchestras were owned by municipalities (Gemeinde), nine percent were owned by Länder and another nine percent were publicly owned as GmbH.

Orchestras located in larger cities present mostly main performances, which involve full utilization of the organizations complement of performing artists. Since

³⁹ This result raises the question of sex-biased hiring in public theatres. This is in line with the remark made by Hofmann (1988) that of the 150 or so public theatres of the extended Federal Republic of Germany less than five were run by women, and the investigation of employment of women in US symphony orchestras, by Goldin and Rouse (2000), where the authors find evidence that “blind” auditions increase the probability that a woman will be advanced and hired. Further evidence of this gender bias is provided by Glejser and Heyndels (2001) and Ginsburg and van Ours (2003) who report that females are ranked below men in musical competitions.

⁴⁰ Performances at own location.

labour costs constitute the bulk of all costs, the greater the percentage of main performances in the overall performance total, the greater should be overall production costs. Other performances (presentations by a subset of the group's artists) are more significant for orchestras located in smaller cities.

Orchestras in larger cities appear to have more members, and this result holds for orchestras located in both East and West Germany.

Total subsidy per inhabitant is smaller in larger cities both in East Germany and in West Germany, although the levels of support per inhabitant appear to be higher in the East Länder.

Figure 2.A.2 displays the relation between total subsidy and refunding from theatre. Some orchestras are associated with a theatre, in which case they receive funds from the theatre, as part of its support. For the majority of the orchestras that is not the case, as seen in the relative importance of refunding to total subsidy. Orchestras generate income from operating revenues (ticket sales), refunding from theatre, and other revenue from theatre. When it exists, refunding from theatre appears to decline with the size of the city where the orchestra is located, and the same trend can be identified for total subsidies.

2.4 Estimation Results

The models were estimated using OLS. Tests for non-normality, heteroscedasticity and omitted variables were conducted and misspecification problems were corrected when necessary⁴¹. The econometric results presented are based on the most robust models.

2.4.1 Public Theatres

The correlation among the variables in the regression model indicates that the strongest linear associations of total costs occur with opera, ballet, theatre size, capacity, total performances, population, and competition level. These correlations are positive,

⁴¹ Unusual observations were investigated, plotting leverage versus residual squared. The most problematic outliers were identified in data for orchestras corresponding to observations 43 (with both high leverage and a large residual), and observations 28 and 48 (that have a very large residual but do not have exceptionally high leverage). Observations 43 and 28 are both named Philharmonisches Orchester, located in Land NW (city codes 52 and 265, in the 1998/99 Report). As possible outliers, these most problematic observations were omitted and the model rerun. The coefficients and the standard errors estimated did not change much whether the problematic observations were included or not in the data, so they were included in the data.

meaning that as the value of one variable goes up, the value of the other variable tends to go up as well. Knowing that these variables are strongly associated with total costs, it is expected that they would be significant predictor variables in the regression model.

Table 2.5 presents the results of the estimation and testing⁴². The first regression corresponds to Model 1 and the second to Model 2⁴³. In the first regression, the p-value of the F-test indicates whether the overall model is significant. With a p-value of zero up to four decimal places, the model is statistical significant. The R-squared is 0.9125, meaning that approximately 91 percent of the variability of total costs is accounted for by the model. The coefficients for each of the variables indicates the amount of change expected in total costs given a one unit change in the value of that variable, given that all other variables in the model are held constant. Bold parameters indicate statistical significance at the five percent level.

The t-test for places for sale equals 2.60 and is statistically significant, meaning that the regression coefficient for places for sale is significantly different from zero. The data are in levels (1,000 DM) and so are the coefficients. The coefficient for places for sale is 1.69 meaning that for a unit increase in places for sale (an extra seat in a theatre hall) an increase of 1.690 DM is expected in total costs. A one unit increase in child and youth plays would yield a 34.000 DM decrease in total costs.

To compare the strength of the coefficients of the various variables, standardized regression coefficients are used. The beta coefficients reported are used to compare the relative strength of the various predictors within the model. Because the beta coefficients are all measured in standard deviations, instead of the units of the variables, they can be compared to one another.

The relatively strongest predictors within the model are total performances, opera, theatre size, competition level, size of the city where the theatre is located, and capacity. A one standard deviation increase in total performances leads to a 0.70 standard deviation increase in predicted total costs with the other variables held constant. A one standard deviation increase in child and youth plays, in turn, leads to a 0.09 standard deviation decrease in predicted total costs with the other variables in the model held constant.

The first three coefficients are total concerts, total concerts squared and total concerts cubed. These variables are intended to control for the effect of economies of scale in the production process. The positive coefficient of total concerts implies that

⁴² Models including the East dummy and interaction effects were tested, producing no significant results. These variables were not included in the model.

⁴³ As estimated by Robledo (2002).

costs increase with the number of performances. The negative estimated coefficient on output squared implies that the effect of additional concerts becomes more moderate over some ranges, though the positive coefficient of output cubed indicates that this moderating effect dissipates as the number of concerts rises.

A Wald test evaluates if the contribution of total performances, total performances squared, and total performances cubed is significant to the model. The resulting F-test of 3.80 means the collective contribution of these three variables is significant. There is a significant difference between a model with those variables (full model) as compared to a model without them (reduced model).

The estimation results indicate that total costs increase with: capacity (measured by number of places for sale), total performances, city size (measured by population), size of the PAO (measured by employment size), and the level of competition. By performance type, total costs increase with opera, ballet, musicals, concerts, and guest performances by foreign companies. They decrease with operettas, theatre plays (including child and youth plays), guest performances in other municipalities, and other types of performances.

Theatres owned by Municipalities (Gemeinde) appear to have lower costs than theatres with other legal entity (ownership), except for other governing bodies (Mehrträgerschaft). Theatres run as administrative firms (Regiebetrieb) have lower costs than all other theatre legal forms. It cannot be concluded that the more autonomous legal forms of the own establishment or the anonymous society are more economical than a public utility.

The results regarding quality are mixed: it positively affects total costs when quality is proxied by attendance at guest performances in other locations and by box office results, but it negatively impacts total costs when measured as the percentage of new stagings in total stagings.

To assess gender equality, the proportion of women as full time workers was included as a variable, questioning if employing a larger percentage of women had an impact on total costs. This variable was statistically insignificant, and was later dropped from the model.

Table 2.5: Regression estimates for Models 1 and 2

Total Costs	Model 1			Model 2	
	Coefficient	P-value	Beta	Coefficient	P-value
Places for Sale	1.6884	0.0100	0.1031	0.6585	0.4200
Total Productions	1,170.4370	0.0220	0.6983	413.5563	2.5600
Total Productions ^2	-25.2421	0.0740	-1.2170		
Total Productions ^3	0.2011	0.0760	0.7489		
Opera Performances	213.8994	0.0000	0.4095	265.8518	4.4100
Ballet Performances	140.3056	0.0860	0.1145	77.4015	0.7300
Operettas	-110.9431	0.0750	-0.0798	-30.4140	-0.4500
Musicals	11.9849	0.6140	0.0148	55.4886	2.2100
Theatre Plays	-5.1525	0.6150	-0.0270	18.2705	1.1200
Child and Youth Plays	-34.1040	0.0190	-0.0917	-21.5777	-1.4500
Concerts	2.1110	0.9750	0.0014	-3.8142	-0.0500
Other Performances	-25.2090	0.1020	-0.0628	-16.5285	-1.0900
Guest Performances by Foreign	3.2646	0.8190	0.0059	14.5071	0.8700
Guest Performances in Other	-8.9954	0.6500	-0.0227	-3.7303	-0.2800
Log Population	2,442.0370	0.0200	0.1116		
Population				-0.0003	-0.1000
% of New Stagings in Total Stagings	-69.9995	0.0990	-0.0695	-54.3436	-1.2300
Total Attendance as Guest Perf. in Other	0.0308	0.7140	0.0206		
Theatre Employment Size	7,772.3290	0.0020	0.1626		
Box Office as a % of Results	227.2160	0.0440	0.0748		
N° Private - N° Public Stages	565.6837	0.0130	0.1413	556.0957	2.3400
Dummy Legal Entity M	-400.6549	0.8870	-0.0062		
Dummy Legal Entity L	5,175.7400	0.1160	0.0746		
Dummy Legal Entity K	1,987.2930	0.5990	0.0119		
Dummy Legal Entity e.V.	4,865.9750	0.1350	0.0254		
Dummy Legal Form GmbH	1,501.9900	0.5880	0.0241		
Dummy Legal Form E	5,457.6200	0.0810	0.0689		
Dummy Legal Form Other	498.6271	0.8680	0.0063		
East*Places for Sale				1.7962	1.1800
East*Total Performances				-12.6417	-1.4000
L. Form Dummy GmbH x Places for Sale				-0.9004	-0.5000
LF Dummy GmbH x Total Events				7.0431	0.9000
LF Dummy E x Places for Sale				(dropped)	
LF Dummy E x Total Events				4.7550	0.6800
LF Dummy Other x Places for Sale				0.0697	0.0200
LF Dummy Other x Total Events				-3.9619	-0.2700
L. Entity Dummy M x Places for Sale				0.1500	0.0600
LE Dummy M x Total Events				-3.7022	-0.3400
LE Dummy L x Places for Sale				6.5103	3.1300
LE Dummy L x Total Events				-20.1344	-2.1000
Constant	-43,140.99	0.002			
N° Observations	140			145	
R-Squared	0.9125			0.9061	
F-statistic P-Value	0.0000			0.0000	
Shapiro-Wilk P-Value	0.2055			0.2317	
Breusch-Pagan P-Value	0.0000			0.0000	
Ramsey Test P-Value	0.0000			0.0110	
linktest (_hatsq)	0.0000			0.0160	

Source: own calculations

2.4.2 *Orchestras*

The limitations of the data and its implication in the choice of variables prompt a discussion of biases, potential endogeneity, and causality.

Of particular importance is the possibility of a quality bias not controlled for in the model. Unobserved quality will directly impact on the relation between costs and output, biasing the estimates, thus leaving the scale effects inaccurate. Attendance at own concerts is used to proxy quality, as attendance at tour concerts is not available⁴⁴. Any single variable used to measure quality would be imperfect, because of the multi-dimensional nature of quality, requiring a set of variables to measure the different dimensions. By failing to fully capture quality, the unobserved component of the regression will also include dimensions of quality, thus biasing the regression coefficients. Furthermore, it could be argued that higher quality will increase costs and also increase attendance, worsening the endogeneity problem.

In relation to the assumption of exogeneity, OLS assumes that the predictors are uncorrelated with the error term of the regression, so that the causes that are included in the model are unrelated to causes that have been left out.

Regarding causality, it must be noted that establishing causality with observational data is problematic because variables (such as lagged variables) that are not included in the model and that account for prior effects, may bias the estimation results by exaggerating the effects of some of the predictors, leading to spurious conclusions and errors of causal inference.

In the model for total costs of orchestras, it is reasonable to expect lagged costs to impact total costs. Data from previous seasons is not included in the dataset, and, at best, it is possible to consider total subsidy received in the current season as a proxy for lagged total costs⁴⁵. However, unobserved factors such as preferences and tastes, which affect costs, also affect the subsidy. The subsidy variable as a proxy for lagged total cost would be endogenous if the unobservables (such as tastes) that affect costs in the previous period are persistent over time (which is not unreasonable), and this variable was dropped.

These problems could be treated as omitted variable problems, and instrumental variables estimation used. However, having employed all the variables available in the

⁴⁴ Attendance as a proportion of capacity cannot be calculated either, as capacity is not available.

⁴⁵ Total subsidy takes into account the incremental nature of public funding, by assuming that the amount of subsidy received in the current season is similar to the amount received in the previous season. This assumption follows Schulze and Rose (1998), who observed that over 80 percent of the total budgets of German orchestras come from direct public subsidies.

dataset, and given the difficulties with finding adequate instruments, this methodology was not feasible.

Table 2.6 presents the results of OLS estimation and testing. The first regression corresponds to Model 3 and the second to Model 4⁴⁶. Log transformations were required to improve normality of the residuals. Bold parameters indicate statistical significance at the five percent level.

Since IV is not being used, it is important to include controls to eliminate the omitted variable bias. As it is known that the leading ensembles are the Berlin and Munich Philharmonic orchestras, the Gewandhaus Orchestra in Leipzig, the Dresden Staatskapelle and a number of orchestras engaged by the public radio stations⁴⁷, controls for these (dummy variables) were included in the cost function. The same was done for orchestras that tour abroad. These controls were expected to be positive and significant. Although the results do not change when these controls are included, the fact that they are not significant suggests that the results are not robust to quality differences.

Table 2.6: Regression estimates for Models 3 and 4

Log Total Costs	Model 3		Model 4	
	Coefficient	P-value	Coefficient	P-value
Total Concerts	0.0486	0.0130	0.0506	0.0020
Total Concerts^2	-0.0003	0.0220	-0.0004	0.0100
Total Concerts^3	0.0000	0.0410	0.0000	0.0320
% Main Performances	-0.0038	0.2690	-0.0014	0.7060
Nº Members	0.0150	0.0000	0.0212	0.0000
Log Population	-0.0538	0.5130	0.1689	0.0170
Log Average Attendance	0.4891	0.0120		
Dummy East	-0.4369	0.0200		
Dummy Refunding	0.5421	0.0060		
Dummy Touring Orchestra	0.2240	0.4350		
Dummy Quality Orchestra	-0.4374	0.2260		
Constant	2.0176	0.1210	3.6247	0.0000
Nº Observations	51		51	
R-Squared	0.8685		0.7851	
F-statistic P-Value	0.0000		0.0000	
Shapiro-Wilk P-Value	0.2284		0.0022	
Breusch-Pagan P-Value	0.0000		0.0009	
Ramsey Test P-Value	0.0003		0.0000	
linktest (_hatsq)	0.0060		0.0010	

Source: same as Table 2.5

In the first regression (Model 3) the p-value of the F-test indicates that the model is statistically significant. The F-statistics corresponds to the test that the coefficients of

⁴⁶ As estimated by Globerman and Book (1974).

⁴⁷ http://www.germany.info/relaunch/culture/performing_arts/music.html

all the variables are equal to zero, with the alternative hypothesis that at least one of them is not zero. The R squared means that 87 percent of the variation in total costs is explained by the model. The p-values associated with the predictors suggest that output (total concerts), quality, orchestra size (number of members), East/West location and association with a theatre have a significant influence in costs. City size and proportion of main performances were not statistically significant.

The first three coefficients are total concerts, total concerts squared and total concerts cubed⁴⁸. The positive coefficient of total concerts implies that costs increase with the number of performances. The negative estimated coefficient on output squared implies that the effect of additional concerts becomes more moderate over some ranges, though the positive coefficient (9.03e-07) of output cubed indicates that this moderating effect dissipates as the number of concerts rises.

The size of the orchestra, measured by the number of musicians, has a positive effect on total costs. The coefficient of city size is insignificant, not confirming the positive relation suggested by the scatterplot matrix⁴⁹.

Average attendance is proxied to measure quality, as low attendances would translate the dislike of the public to the concerts being offered. Quality is positively related to total costs, as expected.

The coefficient of the East dummy indicates that orchestras located in East German Länder have lower total costs. The dummy for refunding from theatre indicates that orchestras associated with theatres have higher total costs. Both results are as expected.

The results of estimation by multiple regressions presented here are consistent with previous findings in the literature and with what is predicted by economic theory.

2.5 Conclusions

An empirical evaluation of cost functions for public theatres and orchestras is important because public or subsidized arts institutions are financed out of taxation.

Public or subsidized arts institutions do not act as profit maximizers, as they aim to promote access to the arts and to foster quality and innovation. Whereas in private sector culture industries such as books and film there is an international convergence of

⁴⁸ These variables are intended to control for the effect of economies of scale in the production process.

⁴⁹ Not shown here.

prices for the same good (a book, or a cinema ticket), when it comes to public or subsidized arts institutions, international prices (entrance fees, hourly rates for music lessons) are very heterogeneous, reflecting preferences and history.

In Germany, recreation and culture represents 12 percent of the individual consumption of households. In relation to State support to culture, 45 percent of funds are allocated to the performing arts (music and theatre), 16 percent to museums and archives, and 11 percent to libraries and literature.

This chapter set out to quantify the impact of different cost factors on the cost structure of German performing arts organizations, using data from the 1998/99 Theaterstatistik report. This study adds to the existing literature on German PAO cost studies by including an analysis of German Kulturorchester and by extending the set of cost factors considered to affect total costs of public theatres.

Different models were estimated for orchestras and for public theatres, using OLS. The results obtained are in line with the previous findings in the literature, confirming that total costs depend to a large extent on the outputs (performances and productions) and quality.

Economies of scale were found both in the production of orchestras and of public theatres, as seen from the coefficients of total output, total output squared and total output cubed. The measure of total output for orchestras was the number of total concerts, while for theatres it was the number of total performances. It is found that total costs increase with total output, but the effect of additional output becomes more moderate over some ranges, and this moderating effect dissipates as output rises.

For theatres, the results correspond with the previous findings of Muehlenkamp and Robledo (2002), and confirm the basic statements made by these studies. The costs of the theatres depend to a large extent on their outputs with the number of productions and the number of opera performances as the most significant cost factors.

Size is found to have a significant effect, with an extra theatre seat increasing costs by 1.700 DM (circa 870 euros). The number of performances also has a significant impact of total costs. Increasing one more opera performance, all else equal, increases total costs by 214.000 DM (circa 110.000 euros). All else equal, an extra ballet performance drives costs up by 140.000 DM (circa 72.000 euros). This effect precipitates with musicals, concerts and guest performances by foreign ensembles. All else equal, an extra performance of operettas, child and youth theatre plays, other performances, guest performances in other municipalities, and theatre plays, all reduce

total costs. This suggests that the portfolio of performances may be optimized to reduce total expenditures.

Theatres located in larger cities (measured by population) have higher costs, and when theatres face stronger competition this also leads to an increase in costs. Increasing the size of the theatre in terms of employment size also leads to higher total costs.

The impact of quality on total costs depends on the proxy used to measure quality. When using the proportion of the new productions on all productions, an increase in this percentage leads to a fall in total costs, and this coefficient is significant at the 90 percent level. When measuring quality by attendance at guest performances in other locations, the coefficient is not significant. Measuring quality by box office results, then as quality increases total costs increase, and this coefficient is statistically significant.

No evidence is found to support the hypothesis that the more autonomous forms of management (own establishment or GmbH) are more economical than a public utility. This suggests that large savings are not to be expected from legal form transformations.

For orchestras, evidence was not found to support the hypothesis put forward by Globerman and Book (1974), that the larger the proportion of concerts involving full utilization of orchestra members, the larger total expenditures. This could be related to changes in programmes or a result of increased touring and guest artist collaboration. Special series of blockbuster concerts with renowned artist are likely to achieve full houses, maybe with fewer musicians, but with higher costs.

It was also found that the size of the orchestra has a positive effect on total costs. The scatterplot suggested a positive relation between city size and total costs, but the coefficient was found to be not statistically significant. Quality was proxied by average attendance. As expected, increases in quality have a positive impact on total costs. Furthermore, the results suggest that orchestras located in East German Länder have lower total costs, and that orchestras associated with theatres have higher total costs.

This cost study suggests that no simple prescription exists to lower costs in performing arts organizations, and that there is no immediate substitute for good management.

One of the conclusions of the Globerman and Book (1974) paper was that as there were significant economies of scale in performing activities, it was probably more efficient from a cost standpoint to encourage greater touring by medium sized organizations than to subsidize the development of new local groups. More touring would also alleviate the need to present more diversified performing seasons.

In Germany, almost all public theatres are involved in guest performances. Theatres located in smaller cities generally supply their audiences with a relative large number of performances by foreign ensembles, whereas for theatres located in larger cities, this proportion is smaller. However, as noted previously, and seen in Figure 2.A.1, whereas being invited to perform in other localities generally is a profitable venture, inviting foreign ensembles can produce large deficits, that will have to be matched by public subsidies from the municipality where the theatre is located⁵⁰. Greater care in the organization of guest performances may provide cost savings to public theatres.

The existing cost studies on performing arts organisations have never investigated gender issues, despite the fact that performing arts organisations are the recipients of substantial amounts of public funding, as described in Chapter 1⁵¹. In 1998, public subsidies to PAO amounted to 3.7 billion DM and operating subsidy per visitor amounted to 170 DM.

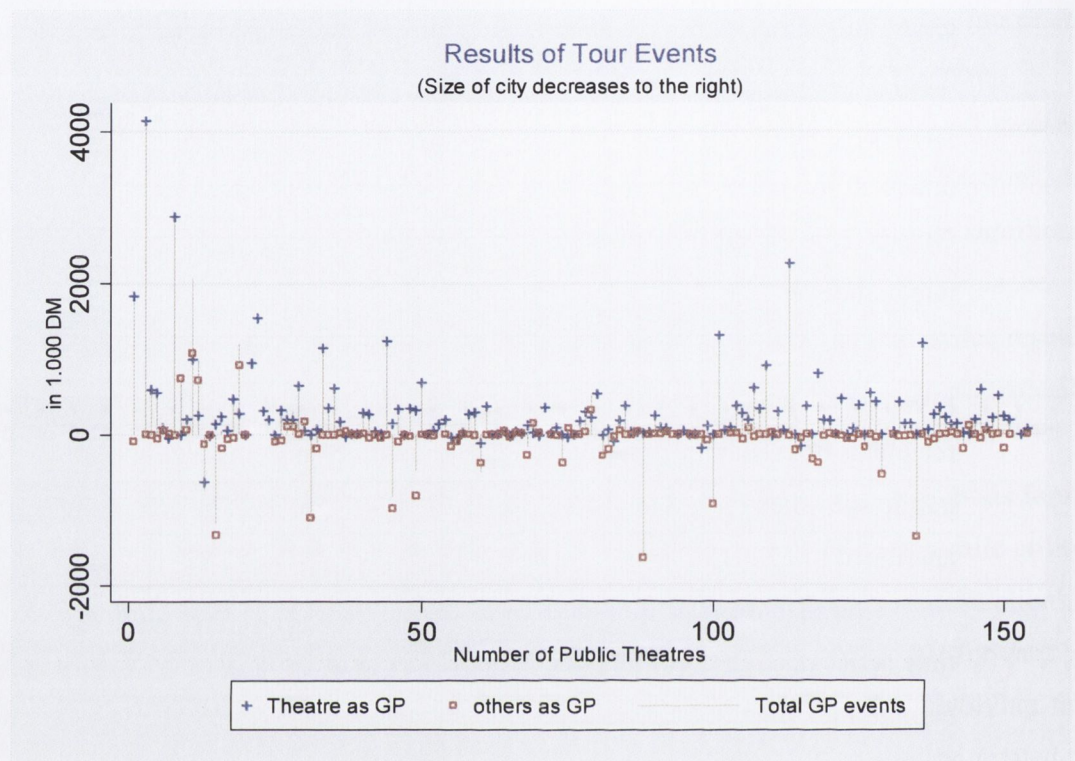
Further work on the issues discussed in this Chapter should consider a panel data time series dataset, compiling data from 1965 until 2004. It would also be interesting to explore the effect of lagged costs on total costs, and to assess the impact of subsidies on total costs of performing arts organisations.

⁵⁰ If the theatre is owned by the Municipality, as it cannot produce a deficit.

⁵¹ (see Figures 1.2.16 and 1.A.5, in Chapter 1)

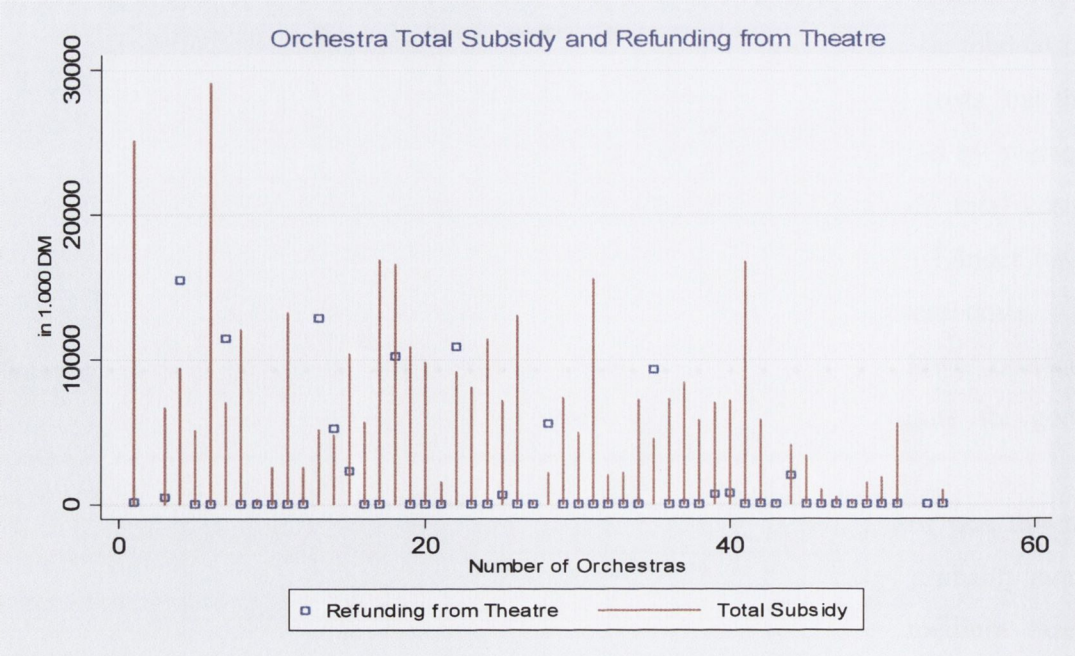
2A **Figures**

Figure 2.A.1: Theatres: Results of Tour Events



Source: Theatrestatistik Report 1998/1999

Figure 2.A.2: Orchestras: Total Subsidy and Refunding from Theatre



Source: same as Figure 2.A.1

CHAPTER 3

DEMAND FOR GERMAN THEATRE

3.1 Introduction

This chapter aims to investigate theatre demand, to provide estimates for price and income elasticities⁵² of demand, and to address the issue of the use of reduced rates of VAT in promoting theatre attendance.

Empirical studies on the demand for the live performing arts generally focus on providing estimates of price and income elasticities. The two fundamental questions are whether an increase in price will increase revenue or reduce it, due to a corresponding fall in attendance (law of demand); and if increases in income will result in higher levels of attendance. This chapter addresses these questions by empirically estimating the demand for live theatre in Germany, contrasting the standard methodology used in the literature to the cointegrated VAR model approach.

Baumol and Bowen's (1965) seminal work addressing the financial problems of the performing arts triggered research in this area. The Baumol-Bowen thesis states that faced with ever increasing costs, the price of the product or service offered by performing arts organizations is expected to rise relative to the general price level. However, Baumol and Bowen reported that ticket prices in the US had not been soaring and they barely kept up with the price level and lagged substantially behind increases in costs. Similarly, it was shown in Chapter 1 (Figure 1.2.14) that in Germany, in the period 1965-2004, performing arts prices increased slowly.

Performing arts tend to be either state owned/run or organized as non-profit institutions. Quality aspirations and social goals often cause operating revenue to be lower than would be the case if services were priced to satisfy a simple profit-

⁵² These elasticities give the percentage change in demand for good x per (marginal) percentage change in the price of good x or income. Elasticities are independent of the units chosen for measuring commodities and therefore provide a unit-free way of capturing demand responsiveness (Mas-Colell et al., 1995).

maximization goal. As high prices serve as a deterrent to consumption, a low price for the product of a non-profit is normally an inevitable consequence of its objectives.

Lower prices can be achieved with cost savings (as addressed in Chapter 2), or can be the result of government intervention. In Europe, prices for services or products provided by public or subsidized arts institutions vary widely. For example, relative to the German lower bound theatre price, a theatre ticket in France is 90 percent more expensive, 71 percent in the UK and 21 percent in Italy.

State support for the arts takes the form of public policies to maintain and promote production and consumption, based on merit good arguments. Cowen (2002) refers that the long run trend in most of the EU countries is to reduce the reliance on subsidies to support culture. Direct support to the arts is achieved using subsidies, grants and public provision, while indirect aid is less visible and takes the form of deductions, credits and exemptions. O'Hagan (1998) notes that, in Europe, the use of reduced rates of VAT is the most important form of indirect aid to the arts.

This Chapter uses data for German public theatres, from 1965 to 2004, to study the determinants of theatre demand. It adds to this discussion by evaluating if the use of reduced rates of VAT fosters attendance to the live performing arts, or is a form of welfare for the *well educated*.

3.2 Economic Model and Theory

3.2.1 *Theoretical Model and Empirical Models used*

Research on the performing arts demand has dealt mostly with the live arts (theatre, music, opera, and dance) and the cinema, considered to be a good substitute. Corning and Levy (2002) report that studies of demand for the performing arts typically take one of two basic approaches: survey studies which seek to characterize the demographics of theatre patrons and econometric studies which seek to quantify demand and income elasticities. This Chapter follows the latter.

Standard economic theory holds that the demand for a commodity depends negatively upon the commodity's own real price, positively upon the real prices of substitute commodities, and positively upon the demanders' real income.

The price elasticity of demand⁵³ tells us how sensitive the consumption of a good or service is to changes in its price. When demand is price elastic, total revenue rises if price falls: the gain on quantity outweighs the loss on price, and total revenue increases as price falls.

Price elasticity rises with the availability of substitutes. The more, or the closer, the available substitutes for a given good or service, the more readily consumers will switch to something else when the price of that good or service rises relative to other prices. For the live performing arts there are a large number of substitutes available, competing for the consumer's leisure time and spending power, suggesting that a fairly high price elasticity of demand for the live performing arts is expected. The acquired taste effect⁵⁴ (meaning one that grows stronger with exposure, making substitutes less acceptable) acts as a contrary force, holding down the price elasticity of demand.

The income elasticity of demand⁵⁵ measures the responsiveness of demand to changes in income, when price and other variables are held constant. If a good has income elasticity greater than one (income elastic), consumers' spending on it rises faster than their income does: the proportion of income spent on the item increases as income increases. Such things are often described as luxuries, goods that are consumed never or rarely when income is low, entering the typical consumer's budget only when income reaches the middle or upper range. If the good is an inferior good, as consumer's income rises, the absolute amount spent on this good falls. If the income elasticity of demand for a product is around one, at constant relative prices, the industry producing the good could be expected to grow at about the same annual rate as the economy as a whole.

It must be noted that income elasticity of demand is not constant with respect to income, and may change sign at different levels of income. A luxury good may become a normal good or even an inferior good at different income levels.

Measured income elasticities are the net result of a positive pure income effect, offset in part by a negative time cost effect. The effect of increased income on theatre attendance is uncertain. In light of time allocation analysis, as income rises, so does the

⁵³ Defined as the percent change in quantity demanded that results from a given percent change in price, all other things remaining the same. If larger than one (in absolute value), demand is said to be elastic; if smaller than one it is called inelastic demand. If equal to one it is called unitary elasticity.

⁵⁴ Art is said to be an *acquired taste*, in the sense that you need to be exposed to it to develop the taste, and perhaps exposed under the right circumstances and for a long time. To stimulate consumption, people need help to acquire the taste both by making the arts accessible and by directly stimulating exposure.

⁵⁵ Defined as the percent change in quantity demanded that results from a given percent change in income. If equal to one it is said to be unitary elastic. If it lies between zero and one it is called income inelastic. If positive, the good is called a normal good. If negative, the good is called an inferior good.

shadow price of time (the opportunity cost of attending the theatre). The pure income effect is expected to impact attendance positively, while the leisure price substitution effect would decrease theatre attendance.

When income is measured longitudinally, using historic time series, its value suggests how consumer spending on the arts will be affected by economic growth. The cross-sectional approach measures variation in income and quantity demanded (consumer spending) among households, at a moment in time.

A cross-price elasticity (cross elasticity) measures responsiveness of quantity purchased to changes in the prices of substitutes or complements. The sign of the cross elasticity indicates whether the two goods are substitutes or complements: it will be positive for substitutes, negative for complements. The size of the elasticity coefficient may be of interest in indicating the strength of the indicated relation. The closer it is to zero, the weaker the relation.

In performing arts studies, output is measured either by attendance figures or number of performances. In empirical demand studies, attendance figures have been consistently used as the measure of lively arts output. The same will be done here.

Moore's (1966) elegant study of the Broadway theatre set the reference demand model for the live performing arts. Demand for theatrical performances (measured by attendance, A) is modelled as a function of permanent income (Y), the cost of attending the theatre (C), and the number of shows (S). The supply of musicals and plays on Broadway (S) is a function of attendance (A), ticket prices (P) and is affected by sound motion pictures (dummy variable M). The cost of attending the theatre (C) is a function of ticket prices (P), transportation costs to the theatre (T) and other costs of attending a Broadway show (O). Moore postulates that in the long run, average attendance per show is probably a constant.

Moore's original structural equation model is:

$$(1) \quad A_i = f(Y_i, C_i, S_i)$$

$$(2) \quad S_i = g(A_i, P_i, M_i)$$

$$(3) \quad C_i = h(P_i, T_i, O_i)$$

$$(4) \quad A = \alpha S$$

For the estimation, equation (3) is dropped from the model and P_i substituted for C_i in equation (1). The model, aimed at deriving the long-run effects of income and price, is then given by:

$$(5) \quad A_i = f^*(Y_i, P_i, S_i)$$

$$(6) \quad S_i = g(A_i, P_i, M_i)$$

Moore found no bias from simultaneity and that single equation estimation produced equivalent results.

The model used in this Chapter identifies the determinants of theatre demand (ATT) as own price (P), income (Y), prices of substitutes (Ps), price of complementary goods (Pc), quality (Q), income distribution (Gini), demographics (proportion of population aged 25-49), experience (past attendance) and taste. It also considers the effects of the VAT reduced rate and German reunification.

Heibrun and Grey (1993) note that the tradition in economics has been to assume that consumer taste cannot be explained. There is no variable to measure taste, because taste is not truly quantifiable. The OLS estimating form is given by⁵⁶:

$$(7) \quad ATT_t = \alpha + \beta P_t + \chi Y_t + \delta PO_t + \phi Q_t + \varphi Pop_{49}^{25} + \gamma Gini_t + \eta ATT_{t-1} + \nu VAT_t + \kappa D91_t + \varepsilon_t$$

The Cointegrated VAR Model

An alternative methodology considered is the cointegrated VAR model. Following Todani(2005) and Juselius (2006), a VAR model considers each endogenous variable as a function of k lags of itself and of each of the remaining endogenous variables in the system. For k lags on a vector of $n=1...N$ variables X_t , with m deterministic terms D_t , it is assumed that a VAR(k) representation of X_t exists and is of the form:

$$(8) \quad X_t = \sum_{i=1}^k \Pi_i X_{t-i} + \Theta D_t + \varepsilon_t$$

where $\Pi_1, \dots, \Pi_k$ are $n \times n$ autoregressive parameter matrices, Θ is a $n \times m$ matrix of coefficients for the m deterministic variables. Innovations ε_t are n -dimensional independent and identically distributed, with mean zero and positive definite covariance matrix Ω , i.e. $\varepsilon_t \sim IN(0, \Omega)$. T represents the sample size and $t=1, \dots, T$. Throughout this Chapter, the k -initial values $X_{-k+1}, \dots, X_0$ are assumed to be fixed.

X_t is an autoregressive process including stochastic and deterministic components. The stochastic components are theatre attendance per capita, real household disposable income, real theatre ticket price, theatre price inflation

⁵⁶ It was not possible to obtain a variable to measure the composite price of complementary goods (transportation to theatre, dinner out, etc.), and this effect is not included in the estimation form. The price of orchestra tickets is used to measure the price of substitutes, and VAT is measured as the spread between the standard rate and the reduced rate (the rate applicable to theatre tickets).

(Δ NominalPT), and real orchestra ticket price⁵⁷. All the variables are in logs. The deterministic components, D_t , contains a re-unification dummy (D91), a constant (unrestricted), and a deterministic trend restricted to the cointegrating space.

The vector error correction representation of (8) is of the following form:

$$(9) \Delta X_t = \sum_{i=1}^{k-1} \Gamma_i \Delta X_{t-i} + \Pi X_{t-1} + \Theta D_t + \varepsilon_t$$

with Δ denoting the first difference operator, $\Gamma_i = -\sum_{j=i+1}^k \Pi_j$ and $\Pi = -(I_n - \sum_{i=1}^k \Pi_i)$.

Now, consider the characteristic polynomial: $\Pi(z) = I_n - \Pi_1(z) - \dots - \Pi_k z^k$, where I_n is an identity matrix. The properties of this polynomial determine the properties of the process. Let $|\Pi(z)|$ denote the determinant of $\Pi(z)$. If the roots of $|\Pi(z)|$ are all inside the unit circle (or alternatively if the eigenvalues of the companion matrix are all inside the unit circle) then $\{X_t\}$ is stationary. Specifically, according to Theorem 4.2 of Johansen (1995), if $\text{rank}(\Pi) = r < n$, then Π can be decomposed as $\Pi = \alpha\beta'$, where α and β are $n \times r$ matrices of full rank $r < n$. Thus, X_t is cointegrated $I(1)$ process with cointegrating vectors β . This implies that there are $r < n$ stationary linear combinations of X_t . The matrix α contains adjustment parameters measuring how deviations from long run equilibrium feed back into the system. Inserting $\Pi = \alpha\beta'$ into (9) allows the error correction representation to be rewritten as:

$$(10) \Delta X_t = \sum_{i=1}^{k-1} \Gamma_i \Delta X_{t-i} + \alpha\beta' X_{t-1} + \Theta D_t + \varepsilon_t$$

Matrices α and β are not uniquely defined without additional information and this corresponds to the identification problem in VAR analysis⁵⁸. In general, just identification is achieved by imposing a normalisation and $r-1$ restrictions.

The unrestricted five-equation VAR model in logged levels forms the basis for empirical analysis in this Chapter, and can be written as:

$$(11) \begin{bmatrix} ATT \\ Y \\ PT \\ \Delta \text{Nominal } PT \\ PO \end{bmatrix}_t = \Pi_1 \begin{bmatrix} ATT \\ Y \\ PT \\ \Delta \text{Nominal } PT \\ PO \end{bmatrix}_{t-1} + \Pi_2 \begin{bmatrix} ATT \\ Y \\ PT \\ \Delta \text{Nominal } PT \\ PO \end{bmatrix}_{t-2} + \Phi \begin{bmatrix} D91 \\ VAT \end{bmatrix} + \mu_0 + \varepsilon_t$$

⁵⁷ Due to the small sample size (40 annual observations), quality can not be included in the empirical testing of the cointegrated VAR model. Part of the effect quality has on demand may fall on the other variables, with the estimated coefficients being larger than if quality was included as an explanatory variable.

⁵⁸ Note that for any $r \times r$ non singular matrix Φ , it is possible to define matrices $\alpha^* = \alpha\Phi$ and $\beta^* = \Phi^{-1}\beta'$ such that $\Pi = \alpha^*\beta^*$.

3.2.2 *Previous Demand Studies*

In relation to survey studies, a large number have focused on identifying the typical patron at live theatre events, reporting similar findings: compared to the population as a whole, audiences have higher education levels, earn higher incomes, and are more likely to hold professional jobs.

Empirical theatre demand studies have investigated the determinants of demand using standard economic theory and stationary methods, by regressing attendance on own price, price of substitutes, and income. Table 3.1 provides an overview of the econometric literature on demand for the arts. The standard model has been expanded to incorporate the role of the price of complements, demographics, tourism, experience, quality, and heterogeneity of demand and price discrimination.

As in Chapter 2, most studies tend to focus on one country experience and one branch of the performing arts, employing very different datasets and methodologies. As a result, the findings are often contradictory, mainly regarding the main parameters of interest: the price and income elasticities. Early papers reported price inelastic demands, suggesting theatres could raise revenue by raising prices. However, when considering time series data of ticket prices, it is observed that theatres have not made use of these results. More recent studies report a price elastic demand which is in line with what is expected, given the wide range of substitutes available. The debate regarding the sign and magnitude of the income elasticity is still very much open, as studies often fail to find statistically significant estimates.

Regarding the roles of quality and experience, quality is found to have a positive impact on attendance, but the caveats discussed in Chapter 2 apply, regarding definition and measurement. The role of experience has been incorporated into theatre demand either by considering specific consumption capital and rational addiction, or learning by consuming. The empirical results suggest that culture or art is at the very least habit forming rather than addictive.

Levy-Garboua and Montmarquette (2002) note that in addition to empirical estimation of demand (see for example Moore, 1968; Weinberg and Shachmut, 1978; Throsby and Withers, 1979; Throsby, 1983; Greckel and Felton, 1987; Krebs and Pommerehne, 1995; Schimmelpfennig, 1997; Levy-Garbou and Montmarquette, 2002, for a survey), some efforts to construct theoretical microeconomic models have appeared (see for example Steinberg, 1986; Levy-Garboua and Montmarquette, 1996) as well as the political economy aspects of public support of the arts (see Krebs and Pommerehne, 1995; Schulze and Rose, 1998).

Table 3.1: Literature Review covering estimates of the elasticity of demand for attendance at the live performing arts

Researcher(s)	Industry and Country	Type of study and data	Time period	Estimated Model Specification	Results ⁵⁹	Conclusions
Moore (1966)	Broadway Theatre [US]	cross section (individual data) time series (aggregate data)	1.228 questionnaires 1928-1963	$A=f(P, Inc, Shows)$ $Shows=g(A, P, dummy\ film)$	ie 1.03 (not sig diff from 1) pe -0.33 to -0.63 ie 0.34 to 0.42	price inelastic income inelastic (normal good)
Withers (1977)	All arts [Australia]	time series (aggregate data)	1964-1974 6 companies	$A=f(P, Ps, Inc(FI, PI), Inc\ Dist)$ Inc is full inc+price leisure	pe 0.6 to -1.16 ie 0.33 to 0.51 (not sig) full inc 1.44 to 3.19 (not sig) price leis -0.42 to -4.50 (not sig) ce 2.38 to 5.39 (not sig)	relative inelasticity inc and substitutes not sig diff 0
Withers (1980)	All arts [US]	time series (aggregate data)	1929-1973	$A=f(P, Ps, Inc, Inc\ Dist)$	pe -0.9 (-0.62 to -1.19) ie 1.08 (0.64 to 1.55) full inc 1.43 to 2.78 price of leisure -0.59 to -1.61 ce 0.68 (0.62 to 1.35)	results depend of time frame substitutes
Gapinski (1984)	Royal Shakespeare Company Theatre [UK]	time series (aggregate data)	1965/66-1979/80 n=30	$A=f(P, Ps, Inc)$	pe -0.657 ie 1.327	price inelastic income elastic (luxury good)
Gapinski (1986)	Theatre, Opera, Symphony, Dance (London) [UK]	time series (aggregate data)	1971/72-1982/83 13 companies (2 Th) n=156	$A=f(P, Ps, Inc)$	pe -0.07 to -0.29 ce 0.12 to 0.50 ie 0.06 to 0.26 (not sig diff 0)	price inelastic substitutes income inelastic (normal good)
Gapinski (1988)	Theatre, Opera, Symphony, Ballet, Modern Dance (London) [UK]	time series (aggregate data)	1971/72-1982/83 13 companies (2 Th) n=156	$A=f(P, Ps, Inc)$ separates tourist, resident demands Tourism accounts for 65% attendance	pe not sig resident inc not sig tourism's att elasticity 0.645 high roller' elasticity 0.227	
Heilbrun and Gray (1993)	All arts	Literature Review			Houthakker and Taylor (1970) pe -0.18, ie 0.74 Lange and Luksetich (1984) pe -0.49	expect a fairly high pe Most studies show pe inelastic expect ie>1 (luxury good)

Source: see References

⁵⁹ ie refers the estimated income elasticity of demand, pe to the estimated price elasticity of demand, and ce to the cross price elasticity of demand.

Table 3.1 (continued)

Researcher(s)	Industry and Country	Type of study and data	Time period	Estimated Model Specification	Results	Conclusions
Abbe-Decarroux (1994)	Theatre (Geneva) [Switzerland]	time series (individual data)	1982/83-1988/89 64 productions	$A=f(\text{Perf}, P, \text{Quality}, \text{who produces})$ 3 D: full p, reduced p, total tickets no inc, no Ps	pe total demand -0.99 pe full price tickets -0.30 (not sig) pe reduced tickets -2.44	pe varies with category of patrons price inelastic price elastic
Throsby (1994)	All arts	Literature Review			Felton (1992) pe major US orch -0.6 pe major ballet, opera -0.1 to -0.6 pe individual companies >1	
Krebs and Pommerehne (1995)	Public Perf Arts Org [Germany]	time series (aggregate data)	1961/92-1991/92 West Germany	$Att=f(\text{Inc}, Ps, \text{lowbrow}, Att-1, P, \text{Pleisure})$	short run pe -0.16 long run pe -2.6 ie 0.1 (not sig) Ps not sig & wrong sign (dropped)	price inelastic price elastic
Levy-Garboua and Montmarquette (1996)	Theatre [France]	cross section (individual data)	1987 8.000 individuals inc 1.000 theatregoers	learning by consuming (vs. rational addiction)	pe -1.47 familiar theatregoers pe -1 for others	price elastic the demand for the theatregoers who have completed their learning process becomes price elastic
Schimmelpfennig (1997)	Royal Ballet Summer Season (London) [UK]	cross section (individual data)	1995 2 full length work 16 performances	5 ticket categories non parametric techniques $Att=f(P)$	pe orch -348, -5.56 pe grand tier -1.34, -1.72 pe rear amph -3.02, -4.30	pe for different seating categories price elastic
Levy-Garboua and Montmarquette (2002)	All Arts	Literature Review			pe >1 ie >1	price elastic luxury good

Source: see References

Table 3.1 (continued)

Researcher(s)	Industry and Country	Type of study and data	Time period	Estimated Model Specification	Results	Conclusions
Coming and Levy (2002)	Theatre (California) [US]	time series (individual data)	Nov 1999-Oct 1999 2113 performances	Att=f(P, Inc, performance characteristics) Heterogeneity of demand 3 locations	pe Marian inelastic (not sig) pe Festival -1.26 (open air) pe Severson -3.42 (highbrow) ie Severson elastic (luxury)	price elastic price elastic income elastic (luxury good)
				double log model	pe Marian -0.05 (not sig) pe Festival -1.36 (not sig) pe Severson -4.87 ie Marian positive (not sig) ie Festival positive (not sig) ie Severson positive	price elastic
Urrutiaguer (2002)	Public Theatre [France]	cross section (aggregate data)	1995-1996 group 1 n=80 group 2 n=94	Att=f(P, Perfor, Capacity, Quality) 2 groups: agree with critics, disagree no inc, no Ps	pe positive pe 0.358 pe positive (not sig) p seen as indicator of quality	price inelastic
Leslie (2003)	Broadway Theatre [US]	cross section (individual data) time series (prices)	1996 199 performances	Price discrimination 17 different ticket categories	pe are almost all greater than 1 exception is low quality sector pe high quality -2.5 ce no capacity constr all + ce with capacity constr some - ie some + some -	price elastic substitutes

Source: see References

Estimates for Price, Income and Cross Price Elasticities of Demand

Earlier studies have shown the demand for attendance at the live performing arts to be price inelastic. If the empirical estimates seem surprising low, one reason may be that most performing arts institutions are in the non-profit sector of the economy. They are strongly motivated toward holding ticket prices down in order to increase attendance. But at very low prices demand is very likely to become inelastic.

Furthermore, the firm's demand curve is expected to be more elastic than that of the industry. Elasticity rises with the availability of substitutes, and unless the single firm enjoys a local monopoly, the outputs of other local performing arts institutions are available to consumers as substitutes. Thus, the individual firm may face a price-elastic demand curve, even though the industry does not.

Overall, in terms of results, papers until the mid 1990s report price inelastic and income inelastic demands, suggesting that increases in prices would generate revenue increases. Live performing arts attendance appears to be a normal good, but the income elasticity estimate is often not significant. Papers that appeared after the mid 1990s suggest price elastic and expect income elastic demand for the arts.

The variability in these findings is related to different datasets, methodologies, models being estimated, and the particular research question of interest to the author. Levy-Garboua and Montmarquette (2002) note that data problems justify the often only partial results and that the methodology varies considerably from one study to another.

The role of Substitutes

Baumol and Bowen (1966) contend that movies substitute for live performances; while Moore (1966) notes that the theatre can compete only by offering better diversion than is offered in other fields. Gapinski (1986) remarks that if movies or reading or recreation are substitutes for the lively arts, then so are those arts themselves. However, the lively arts are not homogenous. Each has its own set of characteristics and consequently substitutes lie within the arts spectrum.

Levy-Garboua and Montmarquette (1996) note that the cinema also provides the same kind of satisfaction as the theatre, and find evidence that beyond a certain threshold of cinema-going, the complementarity of the two recreations in producing utility is transmuted into substitutability and the spill over effect that cinema initially had on theatre becomes a factor reducing theatre outings.

The role of Demographics

Moore (1966) notes that population clearly affects theatregoing: the greater the population, the more tickets will be sold, *ceteris paribus*. Therefore, a population increase is expected to have a positive impact on theatre attendance.

Throsby and Withers (1979) remark that at the broadest level, the size and demographic composition of the population will set the overall scene for audience numbers⁶⁰. Demographic factors may play a part in the determination of arts participation rates (the proportion of the population which attends the arts and with what frequency). With performing arts being an acquired taste, age composition may be influential. A population with a higher proportion of children will not tend to provide as large an audience for professional theatre performances.

Withers (1977) notes that the subscribing audience for performing arts is highly skewed towards older, better educated and higher income groups, and reports that compared to opera and concerts, theatre attracts a younger but more educated group of subscribers. MacMillan and Smith (2001) refer that cinema attendance also varies with age groups, with high attendance frequencies for youth.

The role of Tourism

Theatre demand is composed by resident demand and tourism demand.

Moore (1966) finds that contrary to popular opinion, the New York theatre was sustained by New Yorkers⁶¹; and that patronage by out-of-towners varies with the season, and also differs by type of show. Levy-Garboua and Montmarquette (1996) find that theatregoing seems to be a relatively uncommon type of consumption, essentially confined to city-dwellers.

Gapinski (1988) finds that tourism is a major factor in the demand for London's lively arts⁶², and that tourist demand depends importantly upon income whereas resident demand does not. The same result is reported by Corning and Levy (2002). They find that expenditures on tickets are likely a small portion of outlays for visitors, and so less price sensitivity is expected among patrons if they enjoy theatre. If the visitors are not regular theatregoers, they may have a low valuation of the performance and be more price sensitive.

⁶⁰ A country of large population is expected to sustain bigger aggregate attendances at arts activities than a country of small population, other things being equal.

⁶¹ Only about 30 percent of the audience came from outside the metropolitan area.

⁶² Surveys of London audiences show that tourists from overseas and from elsewhere in the UK account for 60 percent of total attendance.

Gapinski (1988) adds that in a broader sense, tourism's estimate may be conservative because it ignores the cascading effect of tourist expenditure. Tourist spending bolsters resident income and thus heightens resident demand.

The role of Experience as specific consumption capital

Moore (1966) pointed out that an individual's taste⁶³ for theatregoing appeared to be strongly related to his early experiences with drama. Levy-Garboua and Montmarquette (1996) find a significant positive effect of accumulated theatregoing experience on current theatre consumption, suggesting past attendance is a strong determinant of current theatre consumption.

Withers (1977) noted that demand for aesthetic quality in the arts is aesthetic judgment based in acquired taste and not simple opinion. The taste here itself felt to be a product of certain abilities, skills and experiences which, just as with performance skills, are found only in a small proportion of the population. Other activities such as pop concerts and spectator sports with similar ticket price levels attract audiences with quite different social characteristics. It would seem to be lack of sustained interest rather than high cost which constrains the less advantaged from participating in performing arts attendance.

Throsby (1994) points that the new consumer theory suggests that tastes are similar between individuals, with variations in behaviour caused by differing shadow prices of commodities produced according to household production functions in which material goods and services, including the arts, enter as inputs. But the arts can be further distinguished in this theory by their being addictive, in the sense that an increase in an individual's present consumption of the arts will increase her future consumption. In the household production model, the relative consumption of the arts will rise over time, not because of a shift in tastes, but because the shadow price of the arts falls as experience, understanding and other human capital attributes associated with the arts are acquired.

Levy-Garboua and Montmarquette (2002) refer that education and learning experiences are also important factors affecting demand, and that the consumption of art challenges the conventional assumptions of homogeneous goods and services, completed learning of tastes, independence of choice among individuals and so forth.

⁶³ Active theatregoers liked straight plays, while those who went to the theatre less frequently preferred musicals.

Levy-Garboua and Montmarquette (1996) note that there are two possible answers to incorporating the role of experience into the theory of consumer choice: the first emphasizes the deterministic and predictable formation of habits or a consumption capital. The specific feature of this hypothesis is that no one really escapes from this determinism. The second possible answer is that consumers are unaware of their own tastes and depend on experience to discover them at the end of a process of learning by consuming that takes some time. These two classes of theories of specific consumption capital and rational addiction (Stigler and Becker 1977, Becker and Murphy 1988) and learning by consuming (Levy-Garboua and Montmarquette 1996) can predict the dependence of current consumption of art goods upon past behaviour. Moreover, recognition of the cast heterogeneity of tastes allows for the great differentiation of art and cultural goods.

According to rational addiction theories, current taste has been shaped by the past consumption history. The taste for theatre is generated by a theatre specific capital which raises theatrical appreciation in the future. The rate of addiction is the rate at which the taste for art increases with the consumption of art. An increase of the demand for art appreciation over time does not necessarily entail that the demand for consumption also rise because the cultivation of taste allows consumers of art to maintain their level of appreciation by a diminishing level of consumption. Rational addiction enhances the positive influence of cultivated taste on the consumption of art in spite of the lesser need to consume for producing a given level of art appreciation.

Learning by consuming (Levy-Garboua and Montmarquette 1996) postulates that consumers are supposed to be unaware of their true taste and to discover it through repeated experiences in a sequential process of unsystematic learning by consuming. Tastes are given but unknown. Every new experience of a given art form reveals to the consumer an unexpected positive or negative increment in her taste for it. Instead of assuming a deterministic increase in taste, the shift is stochastic and may take negative as well as positive values with an expected value of zero. Consumers base their expectation of taste solely on their own past experience of the specific art form. Each time the consumer watches a play, he experiences a degree of pleasant or unpleasant surprise on the basis of which he will revise his future expectations of his own taste. The learning phase is likely to be unusually long for highly differentiated cultural goods.

Rational addiction and learning by consuming describe distinct processes of taste formation which may both be present at successive stages of consumption. West and McKee (1983) have suggested a threshold in the demand for the arts with art

consumption climbing slowly for some time and then rising quite rapidly as the effect strengthens. The idea that early exposure to arts or investment in human capital increases interest in art consumption has been supported by various studies (Ekelund and Ritenour 1999, Smith 1998, Dobson & West 1997, McCain 1995, Levi-Garboua and Montmarquette 1996). Smith (1998) concluded that culture or art is at the very least habit forming rather than addictive. Results by Cameron (1999) on the demand for cinema mildly support the rational addiction model.

Part of the ignorance and uncertainty which surrounds the demand for arts is resolved by repeated exposure and experience. However, an element of short run uncertainty is inevitable for live performances whose subjective quality cannot be assessed prior to own experience. The presence of risk also helps to explain the role of critics and herd behaviour in the consumption of arts.

The role of Quality

Moore (1966) notes that as shows run longer, personal recommendations become more important than critics (press reviews). Without these personal favourable comments, good notices and newspaper advertising cannot long sustain a production. Paid publicity probably has little effect on habitual theatre-goers, who depend strongly on personal recommendations, but may reach the casual theatre-goer. New Yorkers virtually ignored magazine critics, while tourists credited them with as much influence as newspaper reviews.

Abbe-Decarroux (1994) follows Throsby (1983) in that the quality of a production does not have only one dimension derived from a theory of aestheticism. Instead, quality can be determined only with the help of several criteria of different types. Aspects of the artistic production related to work and its interpretation (the repertoire classification, the reputation of the author, of the play, of the producer, and of the cast) can be observed in advance (media reviews were also added), others are hard to evaluate before seeing the performance itself. Gathering such information allows the consumer (who faces incomplete information) to reduce the a priori risk associated with quality. There is also variation in quality over time, as each performance is unique because audiences' reactions affect its quality. From a demand standpoint, it is necessarily the consumer's perception of quality prior to consumption that applies. Its perceived and anticipated quality is the factor that will have economic effects on demand.

Levy-Garboua and Montmarquette (1996) note that quality has two components: objective (that everyone measures in the same way) and subjective. The objective quality of the outing can be captured in terms of use of a parking facility and having a meal after the performance⁶⁴. Two factors essentially contribute to the subjective quality of the performance: intrinsic taste for the theatre and degree of familiarity with the theatre.

Urrutiaguer (2002) notes that regression models often reveal a low statistical significance for the quality variables that are used to explain theatrical demand. He attributes this result to opposing opinions on quality, and shows the opposing effects of press reviews and artistic reputation on demand. With respect to theatrical activity, Urrutiaguer (2002) notes that the hedonic model of Rosen (1974), with its definition of a product as an indivisible package of characteristics, fits better than Lancaster's model (1966). The market for the product reveals a hedonic price function that relates the price of brands to characteristics of the product. Therefore, consumers are assumed to have the same perception of the quantity of each characteristic that is present. Tastes differ only in the valuation of alternative packages.

The role of Price Discrimination and Heterogeneity of Demand

Moore (1966) notes that identification and anticipation of a "big night out" are the two primary causes of theatre going. Prestige and cultural interaction played a secondary role. The total cost of an evening at the theatre was affected by the marital status of the playgoer, his sex, his family income, the time it took him to reach Times Square, and the price he paid for a seat.

High cost, commuting distance, difficulty of purchasing tickets, and bad plays were the most frequently mentioned reasons for failing to attend the theatre more often. Of the enthusiastic group of constant playgoers, 81 percent brought up ticket prices as a problem. Between 50 percent and 60 percent of the people who attended less frequently referred to the cost of seeing a shown (the cost of the whole night)⁶⁵.

Corning and Levy (2002) note that a common practice in the marketing of entertainment goods such as live theatre and cinema is price discrimination across groups of patrons. Price discrimination allows firms to increase their revenue by above what may be obtained from uniform pricing.

⁶⁴ Moore's (1966) survey of Broadway audiences revealed that about 71 percent of the local audience members had combined a restaurant meal with the play.

⁶⁵ Moore (1966) found that, on average, complementary expenditures accounted for half the cost of an evening at Broadway play or musical.

Schimmelpfennig (1997) investigates demand for ballet, considering five ticket categories. A pricing policy using price discrimination would make sense especially in view of the steady decline, in real terms, of public subsidies, with box office receipts playing an increasingly important role in meeting production costs and, thus, safeguarding artistic diversity and short-term cancellation of new productions.

Leslie (2003) models price discrimination in Broadway theatre, considering 17 different ticket categories. Leslie (2003) notes that heterogeneous consumers choose between tickets for various seat qualities, tickets sold at a discount booth, and tickets requiring a coupon available to a subset of the potential consumers. Setting different prices for different seat qualities is an example of second degree price discrimination, or nonlinear pricing. Discount mail coupons are targeted to consumers with lower willingness to pay, which provides an example of third degree price discrimination, or market segmentation. The sale of day-of-performance half price tickets sold at a discount booth is modelled as a damaged good which further discriminated among self selecting consumers.

In the cultural economics literature several researchers have analysed theatre demand and pricing and two of these studies focus on the presence of multiple ticket prices. Huntington (1993) investigates whether revenue differs for theatres charging a range of ticket prices, over theatres that charge a single price for all tickets. In a theoretical study, Rosen and Rosenfield (1997) describe a model of ticket pricing that involves second-degree price discrimination.

Corning and Levy (2002) examine heterogeneity of demand for a not-for-profit theatre arts company which produces live theatre on a year round basis at three venues. The audience is segmented into at least four groups: those who bought a subscription (of which the current show is a part), patrons who bought a single ticket at the box office, patrons who received a complimentary ticket (free passes to critics and friends of the theatre) and those who received a discounted ticket (students, senior citizens, etc.).

A major difference between single tickets and subscriptions is that while subscriptions entail a discount on cost per performance, single tickets offer the advantage of reducing the risk of attending a bad performance since more information about the quality of the performance is available just before the show (from reviews and word of mouth) than before the season begins. Additionally, single tickets can be made at the last minute and hence are inherently more flexible in that they require no pre-commitment.

Survey results suggest that there are differences in the demographics between theatregoers who choose season tickets versus single ticket purchases. Subscribers are typically older, have more children and usually attend with their spouses. Relative to the single ticket buyer, subscribers are expected to be more income elastic since the money outlay for a subscription is relatively large. Single ticket subscribers typically have a higher opportunity cost of time, and hence prefer to insure themselves against flops by purchasing at the box office at higher cost.

3.2.3 *Methodology*

Differences in the time series characteristics of stationary and integrated data affect the properties of linear regression. Previous theatre demand empirical work based on time series data assumed that the underlying time series were stationary. The determinants of demand have been identified by regressing attendance on a vector of variables: own price, price of substitutes, price of complements, income, quality, income distribution, demographics, and experience (measured by lagged attendance). In these studies all variables in the model are stationary. If the data are not stationary this will lead to spurious results unless the series are cointegrated.

The fundamental difference between a stationary and a unit root series is the response of the series to a transitory shock. If the series is stationary, the transitory shock imparts a short run effect on the series and it returns to the same path it would have followed had the shock not occurred. Therefore, $I(0)$ series should cross the mean frequently. This means that the future path of the variable is predictable.

If the data are drawn from unit root processes, then a transitory shock to one of these variables forever alters the future path of its series and so imparts a long run or permanent effect on the time series. Future paths cannot be reliably predicted from past patterns. $I(1)$ and $I(2)$ series can wander a long way from their mean value and cross this mean value rarely.

A linear combination of integrated series can be stationary, and this property is known as cointegration. Such a linear combination defines a cointegrated relation between the variables, and explains how the individual data series move together in a way that can be reliably predicted from past realizations of their stationary combination. Once it is known that a pair of variables has the cointegration property, they can be considered to be generated by what is known as an error correction model, in which the change of one of the series is explained in terms of the lag of the difference between the

series, possibly after scaling, and lags of the differences of each series. The other series will be represented by a similar dynamic equation.

In this sense, a cointegrating relation among attendance, prices, income, and policy variables describes a stable long run (equilibrium) relation between permanent movement in attendance and permanent movement in the economic and policy variables. If no such linear combination exists, the estimated OLS relation among the variables would be spurious and the linear combination defined by OLS coefficients would behave like a non stationary time series and yield unreliable predictions. Tests of cointegration are, therefore, tests of the existence of long run equilibrium relations, and can be interpreted as tests of model specification.

Granger (2003) illustrates the spurious regression problem: *if two independent integrated series were used in a regression, one chosen as the dependent variable and the other the explanatory variable, the standard regression computer package would very often appear to find a relationship whereas in fact there was none.* Putting the analysis in the form of the error-correction model resolves many of the difficulties found with spurious regression. If the variables in the regression model are not stationary, then the standard assumptions for asymptotic analysis are not valid, the t-ratios will not follow a t-distribution, and it is not possible to validate hypothesis tests about the regression parameters.

The Almost Ideal Demand System (AIDS) of Deaton and Muellbauer (1980) has been used in demand contexts, using household budget data. It expresses demand functions in budget share form (budget shares as a function of prices and total expenditure), in a system of demand equations that add up to total expenditure. The model's specification includes an assumed endogenous-exogenous division of variables that may be questionable. In the German public theatre case, with theatres and orchestras being owned and run by public entities, the exogeneity of prices (theatre ticket price and orchestra ticket price) is likely to be violated. The dataset used does not include theatre expenditure data and the AIDS model is discarded.

With integrated data, the concept of cointegration is synonymous with the concept of long run equilibrium, and failure to establish cointegration often means the non existence of a steady state relation among the variables. Hence, the estimation results obtained with an AIDS model can be deemed spurious and the statistical inference invalid, if the assumption of exogenous regressors does not hold and/or no cointegrated relation exist. There seems to be a risk involved in the estimation of

systems with integrated data which regress endogenous variables on several assumed exogenous variables, without testing their statistical validity.

Given that the number of cointegrated vectors is unknown, and allowing for simultaneously determined variables, an alternative is to apply the cointegrated vector autoregressive framework of Johansen (1991, 1995). In particular, this study seeks to determine if there exists a stationary long run theatre demand function. It further seeks to understand how adjustments to disequilibrium theatre demand take place, assuming that a stationary long run theatre demand relation exists. The magnitude of the effects of the relevant variables on the demand function will also be explored.

The main advantages of the Johansen's vector autoregressive estimation procedure are the testing and estimation of multiple long-run equilibrium relations. It also permits testing restricted versions of vectors and speeds of adjustment. Furthermore, by treating all variables as endogenous, it is not necessary to specify which variables are endogenous or exogenous.

The main weakness in Johansen's modelling approach is its largely unknown small sample properties. This is an important issue for this study, as there are only 40 observations available, corresponding to yearly data. The information set has been extended twice, when the 2003/04 and 2004/05 data became available. The estimation results did not vary much, which indicates stability and may attenuate the small sample problem. Problems in identifying (multiple) cointegration vectors with theoretical economic relations are also possible when using the Johansen method.

There are also disadvantages to using this methodology to conduct economic analysis: the VAR approach is a-theoretical to long run equilibrium analysis since much of the long run analysis is conducted without providing an explicit account of the type of equilibrium theory that may underlie it. Unlike the traditional structural systems, an unrestricted VAR does not use any a priori information and, unless the underlying structural model can be identified from the reduced form, the interpretation of its estimates is difficult. Furthermore, if autocorrelation exists in the error term of a VAR, the predetermined right hand side variables can be correlated with the error terms leading to inconsistent estimations, making lag length a crucial choice. Sample size constraints mean that there is always a limit to the number of variables and lags included, as the introduction of several lags of each variable consumes degrees of freedom.

The objective of this chapter is to empirically analyse the existence of long run relations among integrated series. The assumed exogeneity of the price variables is

questioned, and an appropriate modelling strategy consists of the cointegrated VAR model that sets all its variables as endogenous. It is argued here that the hypothesis of bilateral causality (feedback) in the case German public theatre cannot be rejected, and therefore, the methodology used will be the cointegrated VAR application.

The Johansen approach provides a general framework for identification, estimation and hypothesis testing of the structural model within a VAR specification. Once the endogenous-exogenous division is established, the Johansen approach is used to test for the existence of cointegrated relations. The number of cointegrated vectors establishes the number of meaningful long run relations in the system. The estimates of the long run coefficients can be assessed by imposing restrictions to exactly identify the underlying structural VAR. Once the structural form is identified, additional restrictions making the VAR compatible with specific economic theory of theatre demand can also be tested.

3.3 Data Sources and Description

The data⁶⁶ are time series, corresponding to yearly values of variables collected over time, for the period 1965 to 2004. Table 3.2 and Table 3.3 provide data description, sources and descriptive statistics for the main variables, before nominal to real and natural logarithm (ln) transformations.

Schimmelpfennig (1997) notes that most econometric demand studies for the performing arts have focused on aggregate data rather than attendance figures for individual performances, which seems well justified within the context of discussing long-term developments. However, the use of aggregate data has serious drawbacks: neither seasonal variations in demand nor variations in demand with respect to specific productions or to casting can be detected and by ignoring the possibility of such links, their existence is implicitly denied. Levy-Garboua and Montmarquette (2002) also refer that since attendance to live performances is typically an infrequent event; the use of aggregate data requires caution in interpreting the price and income elasticities of demand when the frequency rate changes over time.

Total attendance corresponds to the aggregation of attendance at all public theatres, in a given year. The impact of German re-unification corresponds to a shift in the level of this variable, and this effect needs to be included in the model, which is done

⁶⁶ Database construction details were discussed in Chapter 1; Appendix 1.2.B.

by including a shift dummy for 1991. Total population increased with re-unification, from about 65 million to circa 80 million. As German population rose over the sample period, theatre attendance and household income are deflated by total population to give per capita measures.

Table 3.2: Data description

Name	Data	Source
ATT	Theatre Attendance	Deutscher Bühnenverein
INC	Household disposable income	OECD
PT	Average theatre ticket price	Deutscher Bühnenverein
PO	average orchestra ticket price	Deutscher Bühnenverein
CPI	Consumer Price Index	Statistisches Bundesamt Deutschland
CPIS	CPI Services	OECD
VAT	Spread between Standard and Reduced VAT rates	Statistisches Bundesamt Deutschland
POP	Population	Statistisches Bundesamt Deutschland
POP2549	Proportion of population aged 25-49	Eurostat
PCNEW	Percentage of new stagings in total stagings	own calculation
PCBOREV	Percentage of box office results	own calculation

Source: own calculations

Table 3.3: Descriptive Statistics, 1965-2004

Series	Obs	Mean	Std Error	Minimum	Maximum
ATT	40	0.30	0.03	0.26	0.39
INC	40	23,707.48	4,832.58	14,239.12	30,199.00
PT	40	15.65	7.73	5.05	30.37
DLPT ⁶⁷	39	0.05	0.03	-0.08	0.11
PO	40	21.91	10.47	2.53	37.85
DUM91S ⁶⁸	40	0.35	0.48	0.00	1.00
VAT	40	6.44	2.26	0.00	9.00
CPI	40	69.64	23.95	32.89	106.20

Source: same as Table 3.2

Figure 3.1 plots per capita attendance, the first difference of the ln of attendance; real household disposable income in DM and the first difference of the ln of real income. The variables in levels have clear drifts (are trending) and are hence not stationary. Per capita attendance decreased steadily over time and income⁶⁹ has a clear positive drift, having increased rapidly until 1991 and slowly after re-unification.

The first difference plots show mean reversion and the fluctuations around the mean suggest broadly constant amplitudes, thus indicating that the variables, in levels,

⁶⁷ DLPT is the first difference of the ln of nominal price of theatre tickets ($\ln PT_t - \ln PT_{t-1}$).

⁶⁸ DUM91S is a shift dummy to account for German reunification.

⁶⁹ In 1965-2004, both real household income and real savings by domestic individuals have increased.

are integrated. Integrated time series are *unsuitable for analysis with standard statistical procedures, which assumes data to have a property known as stationarity*⁷⁰.

Figure 3.2 depicts the $\ln$ of real ticket prices, for theatrical and orchestral performances. The variables in levels are shown on the left side and the variables in first differences on the right side. Real prices have trended upwards and the series appear stationary on first differences.

Ticket prices are average prices and are calculated, for theatres, as total box office revenues divided by total attendance; and for orchestras, as the quotient between total operating revenue and total attendance. Real ticket prices are obtained deflating the nominal variables by the consumer price index⁷¹. This nominal to real transformation needs to be tested, as it imposes a homogeneity constraint.

Price of orchestra tickets is included as a proxy for the price of substitutes⁷², as the price of private theatre tickets could not be calculated from the data. Cinema prices were only available after 1974 and TV and broadcasting fees have a compulsory feature, thus they were not included. Real hourly wage rate was also considered as a proxy for the price of leisure. As the decision to attend a performing arts event may incorporate income foregone considerations, and given that most lively art performances occur outside working hours, this variable was not included.

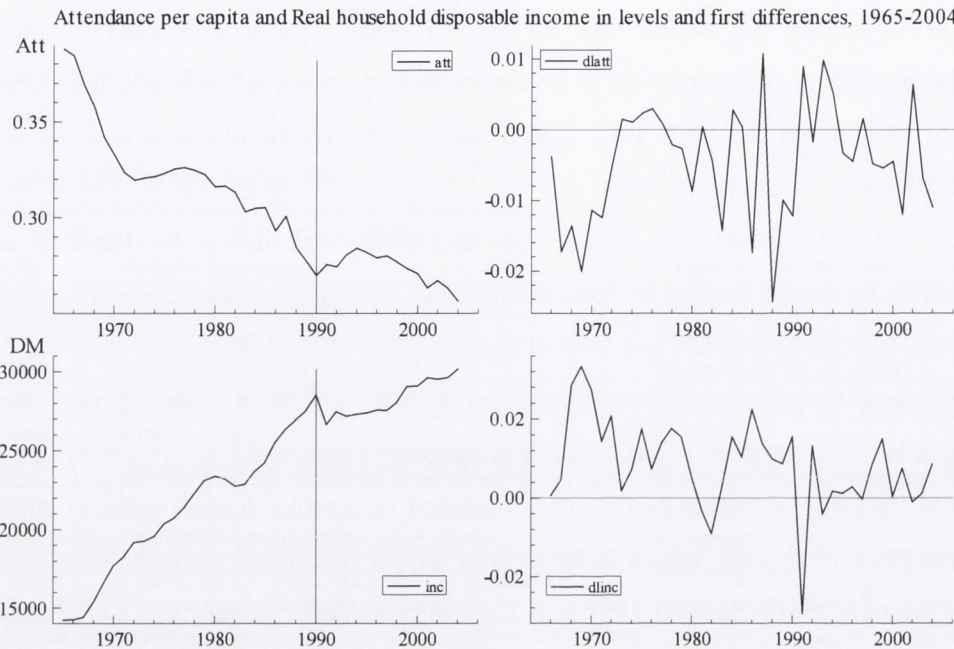
Figure 3.3 plots the $\ln$ of CPI in levels, first and second differences; and the variable VAT, which is constructed as the spread between the standard rate and the reduced rate of the value added tax.

⁷⁰ Granger (2003)

⁷¹ ($\ln$ of real price is calculated as the $\ln$ of nominal price minus the $\ln$ of CPI).

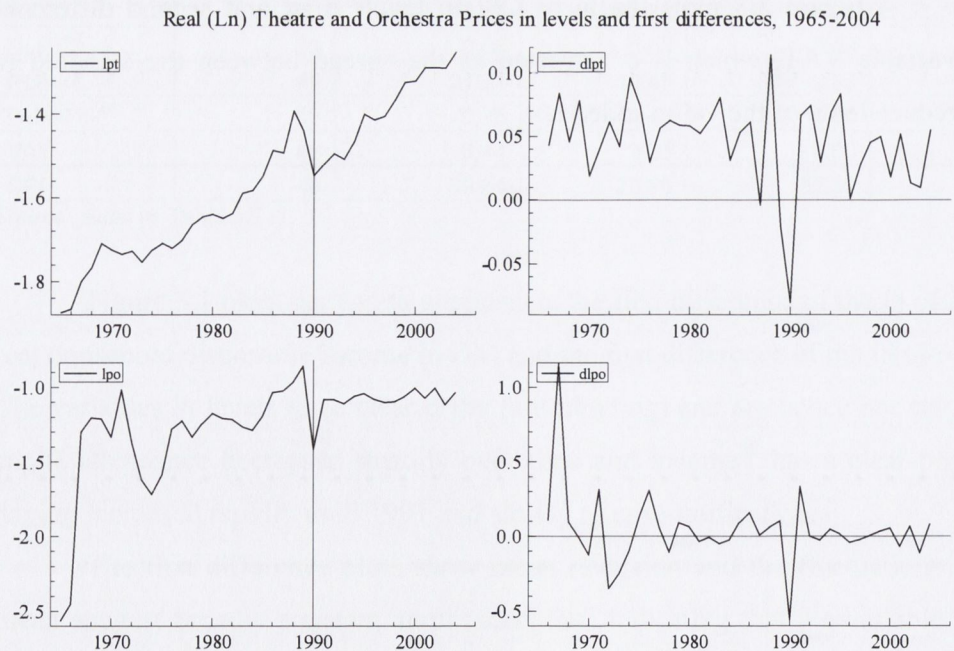
⁷² Figure 1.2.14 in Chapter 1 provides a plot of the prices of substitutes.

Figure 3.1: Attendance per capita and Real Household Disposable Income, in levels and first differences, 1965-2004



Source: own calculations for per capita attendance, using data from the Theaterstatistik; Income series from OECD

Figure 3.2: Real (Ln) Ticket and Orchestra Prices, in level and first differences, 1965-2004

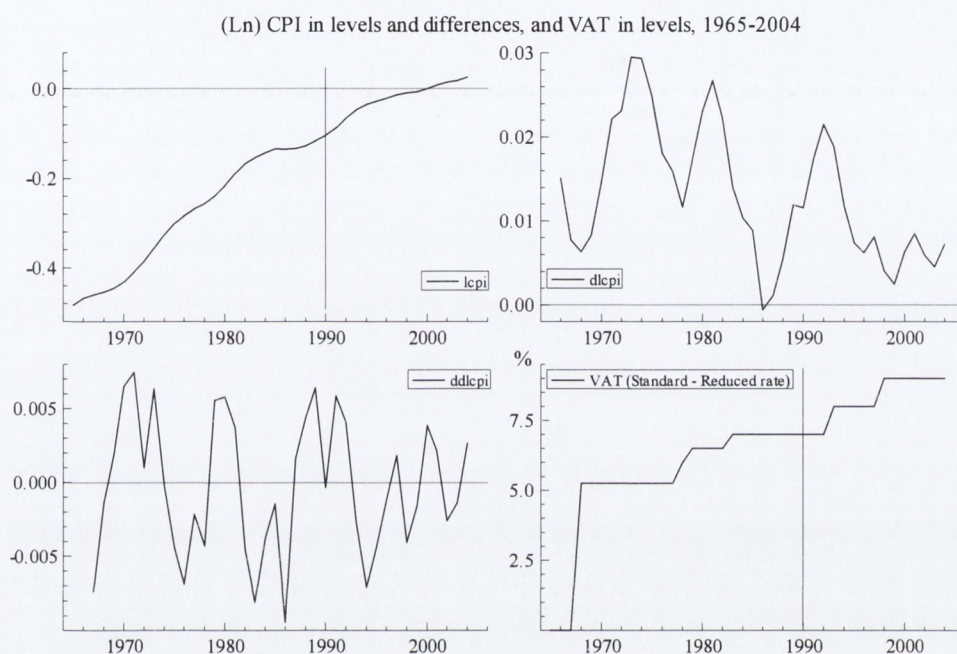


Source: same as Figure 3.1

CPI appears to be integrated of order two, as it is stationary only after differencing two times. As the dataset consists of nominal data, it is necessary to test for the admissibility of data transformation to real values. As this transformation throws out

the I(2) trend, in order to keep the information corresponding to the first differences in the model, a variable that corresponds to the first difference of theatre nominal prices (DLPT) has to be included.

Figure 3.3: (Ln) CPI in level and differences, and VAT spread in levels, 1965-2004



Source: Statistisches Bundesamt Deutschland

The value added tax⁷³ was introduced in Germany in 1968, when it replaced a general sales tax⁷⁴. VAT rates have been increased eight times since VAT was introduced, and the spread between the two rates (standard and reduced) has also increased, from five percent to twelve percent⁷⁵. As seen in Table 3.4, in the period 1965 to 2007, the standard rate of VAT increased from 10 percent to 19 percent, while the reduced rate increased from five percent to seven percent. The standard rate increased by one percent every time the VAT rates have been changed (except for 2007, when it increased by two percent), while the reduced rate increased by half a percent in the first four VAT rate changes, remaining unchanged in the last four. The standard rate was last changed in 2007 and the reduced rate in 1983.

As tickets sold for performances to the live arts benefit from the reduced rate of VAT instead of the standard rate, the question being addressed in this chapter is whether this special treatment that applies to attendance of live performing arts serves, or not, to

⁷³ The value added tax is an ad valorem tax, and therefore it is a percentage of the price.

⁷⁴ A brief discussion of VAT in Germany is included in Annex A.

⁷⁵ Estimation in 3.4 will refer to the period 1965-2004. In 2004, the VAT spread was nine percent.

promote attendance. Therefore, VAT is not measured directly by the reduced rate, but by the difference between the two VAT rates.

Table 3.4: VAT rate changes in Germany, 1965-2007

Date	Steuersatz (Sales Tax)	VAT Standard Rate	VAT Reduced Rate
1951-1967	4 %	-	-
01.01.1968	-	10 %	5 %
01.07.1968	-	11 %	5.5 %
01.01.1978	-	12 %	6 %
01.07.1979	-	13 %	6.5 %
01.07.1983	-	14 %	7 %
01.01.1993	-	15 %	7 %
01.04.1998	-	16 %	7 %
01.01.2007	-	19 %	7 %

Source: Statistisches Bundesamt Deutschland

Withers (1977) introduced the distribution of income in the formulation of demand, to test the hypothesis of increasing equality reducing arts attendance rates. Income distribution is measured by the Gini index. As increases in inequality favour the wealthy, who are more affluent patrons to the lively arts, a positive effect is expected. The Gini decreased by about 10 percent during the period of the sample.

An increase in labour participation is expected to reduce performing arts attendance, due to the decline in leisure time. Increased income may offset part of that effect, and the overall impact is uncertain. Labour participation increased from 70.18 percent in 1965, to 75.76 percent in 2004, but this increase only occurred after 1982.

Unemployment rate rose significantly during the period, from 0.38 percent in 1965 to 9.25 percent in 2004. A rise in unemployment is expected to have a positive effect on theatre attendance, due to increase leisure time, but income effects may offset the increased time result.

The consumer confidence index is negative for most of the sample period when it is available. It signals consumer expectations in terms of general economic performance and it may be linked to entertainment expenditure decisions. If a slowdown in economic activity is expected, consumers may substitute theatre outings with cheaper forms of entertainment, such as staying indoors watching television.

Schulze and Rose (1998) noted that public support for orchestras in Germany was related to the indebtedness of municipalities. Public theatres are heavily dependent on public support, as noted in Chapter 1. Government net financial liabilities went from a superavit of 14.53 percent of GDP, in 1965, to a debt representing 54.75 percent of

GDP, in 2004. This suggests that availability of funds was not much of a problem, at least not until German re-unification.

Quality is expected to have a positive effect on attendance, but is the most difficult variable to measure. In Chapter 2 reported that quality had a statistically significant impact on costs, but that different indicators often yield different results. When measured by per capita attendance at guest performances in other locations, the ratio of grants to box office revenues, and percentage of new stagings in total stagings, it suggests that quality decreased until the mid 1980s, having increased after German re-unification. Other proxies for quality such as accreditation of the institution and artistic production expenditures per events suggest quality increased in the total sample period.

Another proxy for quality is discussed by Krebs and Pommerehne (1995). It consists of approximating the production's average runs by dividing the number of total performances by the number of premieres. Average runs increased until 1987, but decreased sharply in the period before German re-unification. Average runs continued to decline after re-unification. This variable is introduced as it will be used when replicating the estimation of previous models used in the literature.

With the arts being an acquired taste, demographic factors are expected to impact theatre attendance. In the period 1965-2004, the proportions of population in age brackets 25-49 and 65 or more increased, respectively, 2.1 percent and six percent. When plotting attendance alongside the proportion of population aged 25-49, a positive relation was expected. However, a negative relation was found, and it is believed that omitting the proportion of population aged 25-49 as a proxy for education will not bias the results.

3.4 Estimation Results

Section 3.2.3 has discussed the methodological approach and section 3.3 has shown that the time series are not stationary. Previous studies in the literature have used either pooled or pure time series data to investigate the determinants of live performing arts demand. In line with these studies, section 3.4.1 presents the results of the estimation using OLS, and replicates the performing arts demand models estimated by Withers (1977) and Krebs and Pommerehne (1995).

Due to the nature of the data, it is suggested that a more appropriate methodology should be used, and that OLS findings should be interpreted with reserves.

Section 3.4.2 considers that the time series are not stationary, and uses cointegration to estimate the determinants of public theatre demand in Germany. The cointegration estimation results are contrasted with the previous OLS findings.

The computer software used for OLS estimation was STATA, and for cointegration analysis CATS for RATS was used.

3.4.1 OLS

Table 3.5 presents the results of OLS estimation, including the Withers (1977) and Krebs and Pommerehne (1995) models. The model estimated by Withers (1977) does not include lagged dependent variables, but the model estimated by Krebs and Pommerehne (1995) considers experience, which is measured by lagged attendance.

With time series data, in models without lagged dependent variables the OLS is still unbiased⁷⁶, even with serial correlation. The existence of serial autocorrelation violates the assumptions of the Gauss Markov theorem and OLS estimators are no longer efficient. The implication is that the t- and F-statistics, and the confidence intervals are no more valid. Furthermore, in terms of consistency⁷⁷, the asymptotic normality of the OLS estimator is not always true. OLS is consistent if the explanatory variables are contemporaneously uncorrelated with the error term. In a regression model including the lagged dependent variable, the OLS estimator is, in general, not consistent in the presence of autocorrelation of the error term (the moment condition $E(x_t \varepsilon_t) = 0$ is violated). Moreover, in general, the OLS estimator is not unbiased in regression models with lagged dependent variables.

The residuals of a regression model pick up the composite effect of everything not accounted for by the explanatory variables, and autocorrelation is often interpreted as a sign of misspecification. Moreover, when testing for autocorrelation, the (finite sample) Durbin Watson test is based on the assumption of strict exogeneity ($E[\varepsilon_t | x_1, x_2, \dots, x_t, \dots, x_T] = 0$), which makes it invalid in most time series settings.

When regression is applied to variables that are not stationary, in general, the residual is not stationary and standard results for OLS do not hold. Regression models for variables that are not stationary give spurious results, except if the model eliminates the stochastic trends to produce stationary results: cointegration. Therefore, for variables that are not stationary it is best to think in terms of cointegration and the regression output should only be considered if the variables cointegrate.

⁷⁶ The expectation of the estimator equals the true value for all sample lengths.

⁷⁷ The estimator converges to the true parameter as we get more and more observations.

Table 3.5 indicates the variables used in models of live performing arts demand and the expected coefficient signs. The relevant regressors are pointed out by economic theory and include own price, price of substitutes, quality, experience, and demographics. The general model is tested for different definitions/dimensions of quality (numbers one to six), the specific Krebs and Pommerehne (1995) model corresponds to model seven; and the specific Withers (1977) model is model eight.

It is shown that the Withers (1977) model is too restrictive, and that by leaving out important variables, estimation and inference will be invalid.

Coefficients in bold indicate reported statistical significance at the 10 percent level. Except for lagged attendance, it can be seen that most coefficients go in and out of significance with the different specifications, although the signs of the coefficients appear not to change and are in line with the expected coefficient signs. These OLS results are in line with the previous findings in the literature, suggesting a price inelastic demand; and non significant income coefficients. It suggests orchestra and theatre to be complements, and habits to play a major role in explaining lively arts demand. The VAT variable is never statistically significant. German reunification and the proportion of the population aged 25 to 49 appear to have a positive impact on theatre attendance. However, these results should be interpreted with caution, given the nature of the data and the considerations made in section 3.2.3.

Table 3.5: Estimation results using OLS

Model			Own price	Income	Substitutes	Inc Distrib.	VAT	Unification	Demographics	Quality					Experience		Number of Observations	Adjusted R-Squared
	Coefficient Expected Sign		(-)	(+/-)	(+/-)	(+)		(+)	(+)	(+) (+)					(+)			
	Variable (in the Dataset)		lpt	linc	lpo	gini	vat (standard-reduced)	dummy 1991	% Population 25-49	% New Stagings	Att GP in other	% Box Office Results	Luksetich/ Lange	Average runs (Krebs)	lag att	ct	N	Adj. R2
1	Model with Quality measured by Att GP in Other and Average Runs	coeff	-0.1056	-0.0362	-0.0075	0.0026	-0.003	0.026	0.1006		2.3117			0.0064	0.5692	-0.9635		
		p-value	0.034	0.471	0.442	0.001	0.163	0.019	0.003		0.078			0.004	0.000	0.017	39	0.989
		newey p-value	0.013	0.461	0.481	0.002	0.153	0.002	0.003		0.056			0.001	0.000	0.010		
2	Model with Quality measured by Average Runs	coeff	-0.1573	-0.0321	-0.0185	0.0026	-0.0008	0.0283	0.0085					0.0062	0.6472	-0.8672		
		p-value	0.000	0.574	0.019	0.003	0.712	0.011	0.024					0.002	0.000	0.050	39	0.988
		newey p-value	0.000	0.557	0.030	0.007	0.667	0.001	0.025					0.000	0.000	0.029		
3	Model with Quality measured by % of New Stagings	coeff	-0.1520	-0.0247	-0.0201	0.0025	-0.0050	0.0278	0.0090	-0.0186					0.6646	-0.7146		
		p-value		0.676	0.012	0.006	0.822	0.019	0.027	0.006					0.000	0.108	39	0.986
		newey p-value	0.001	0.665	0.016	0.014	0.791	0.002	0.026	0.002					0.000	0.144		
4	Model with Quality measured by Att at GP in Other	coeff	-0.1573	0.0627	-0.0031	0.0012	-0.0012	0.0171	0.0028		1.8122				0.7566	-1.3755		
		p-value	0.002	0.136	0.783	0.276	0.579	0.357	0.604		0.318				0.000	0.002	39	0.978
		newey p-value	0.001	0.158	0.795	0.322	0.545	0.337	0.619		0.290				0.000	0.002		
5	Model with Quality measured by % of Box Office Results	coeff	-0.1003	-0.0387	-0.0148	0.0011	-0.0008	0.0144	0.0017			-0.0032			0.8274	0.7780		
		p-value	0.472	0.765	0.111	0.339	0.756	0.362	0.685			0.420			0.000	0.940	39	0.978
		newey p-value	0.445	0.757	0.104	0.387	0.684	0.261	0.687			0.410			0.000	0.940		
6	Model with Quality measured by Real Luksetich and Lange	coeff	-0.1832	-0.0761	-0.0103	0.0011	0.0012	0.0196	-0.0015				0.0017		0.7303	-0.0602		
		p-value	0.001	0.459	0.265	0.358	0.631	0.230	0.786				0.119		0.000	0.929	38	0.984
		newey p-value	0.000	0.468	0.266	0.381	0.576	0.200	0.773				0.118		0.000	0.933		
7	Krebs and Pommerehne (1995)	coeff	-0.0843	-0.0588	-0.0193									0.0026	0.6291	0.9141		
		p-value	0.211	0.400	0.055									0.223	0.000	0.150	39	0.979
		newey p-value	0.198	0.441	0.054									0.216	0.000	0.086		
8	Withers (1977)	coeff	-0.1935	-0.2513	-0.0119	0.0033												
		p-value	0.002	0.000	0.427	0.057											40	0.948
		newey p-value	0.010	0.000	0.485	0.032												

Source: own calculations

3.4.2 *Cointegrated VAR model*

The cointegrated VAR model is used here to estimate policy-relevant market parameters that drive the public theatre market in Germany, as well as to gain insight into the dynamic nature of the relations describing theatre demand. The overall hypothesis to be tested is if, as predicted by theory, prices and quantities of public theatre form a cointegrated econometric system. The estimation of the parameters that drive this system will yield price and income elasticities of demand, and cross price relations between performing arts.

The model in (10) is set up for the data: $X_t = [ATT_t, Y_t, PT_t, \Delta NPT_t, PO_t]'$, where the variables are defined as before and $t = 1965 - 2004$.

This subsection proceeds by first estimating the baseline VAR model. The cointegration rank is then determined, followed by hypothesis testing and tests of model specific data properties. The discussion then proceeds to long run identification, to provide an economic interpretation of the cointegrated relations that are fully restricted for rank and for statistically supported restrictions that emerged from the hypothesis tests.

Estimation of the baseline VAR model

Preliminary data analysis revealed some I(2) symptoms. The analysis begins in the set of nominal variables, testing for I(2) as a misspecification. The results indicate that I(2) is not present⁷⁸, and the data are transformed to real values.

The first step is to specify and estimate an unrestricted VAR model in levels with the data that initially reflect statistically non-normal behaviour⁷⁹. Adequate specification assumes estimated residual behaviour which approximates well-known assumptions of multivariate normality.

The lag structure was chosen based on a likelihood ratio test procedure. The information criteria seem to increase with the number of lags. As these criteria

⁷⁸ I(2) problems were expected as income and prices are in nominal values. Rejection may be related to sample size.

⁷⁹ Misspecifications tests indicate that residuals are normally distributed, and by inspecting the individual residual plots for all variables, it is learnt that the residuals corresponding to the prices of theatre and orchestra tickets individually reject normality. When testing for independency, it is noted that autocorrelation is present at lags one and two, violating the assumption of independent errors. Testing for homoscedasticity rejects the hypothesis of ARCH effects.

Inspection of the alpha matrix indicates that none of the coefficients in alpha4 and alpha5 are significant and that the remaining columns of alpha have significant coefficients. The PI matrix has negative signs in the diagonal elements and significant entries.

correspond to a compromise between fit and number of parameters, given the sample size, too many parameters are being estimated at larger lags. Given this, a 'rule of thumb' two-order lag structure is selected⁸⁰.

Parameter constancy testing suggests time invariance of estimated parameters, with known beta values below unit for both versions of the model: the version incorporating short run effects (information on short run dynamics and dummies) and for the concentrated version which corrects for the short run influences.

Visual inspection of the cointegrating relations helps to identify the mean reverting ones. Beta1 and Beta2 frequently revert to the zero mean in short cycles, while Beta3 reverts to zero only after more enduring cycles, indicating it might not be stationary. This seems to indicate two or possibly three cointegrating relations.

Determination of cointegration rank

Given a well specified VAR, the following step is to determine the rank of Π , i.e. determine the number of cointegrating vectors. Cointegration rank is the result of a process that starts with the trace test⁸¹. The results should be complemented with information from the examination of the characteristic roots of the companion matrix, econometric results on relevant alpha coefficients, and an inspection of the cointegrating relations.

The trace test is used to determine the rank⁸² of Π , the matrix that contains all the information of the long run, of dimension 5×5 ($p \times p$). The eigenvalues can be interpreted as measuring the strength of the cointegrating relationship.

Table 3.6 reproduces the results, which suggest a choice of rank of two. Having determined the rank of two, the focus then turns to the roots of the companion matrix⁸³ for a visual inspection, checking the modulus of the roots⁸⁴ under different ranks. The eigenvalues of the companion matrix are all inside the unit circle; therefore $\{X_t\}$ is stationary.

⁸⁰ A sensitivity analysis for lag lengths of one and three was performed, and as for other misspecified models tested, the estimated coefficients seem to have the correct expected signs, but magnitudes that are not credible.

⁸¹ The test is a top-bottom, sequential procedure, where the eigenvalues are listed in descending order and it is tested, for a rank of r , if the eigenvalues for $r+1$ to p are all equal to zero. The idea of testing corresponds to listing all possible hypotheses and testing them sequentially.

⁸² The rank of a matrix is the number of independent rows or the number of independent columns.

⁸³ The roots of the companion matrix are the inverses of the roots of the characteristic polynomial.

⁸⁴ As there are five variables (p), the VAR(2) model has $pk=10$ roots (k is the lag length, that was set equal to two).

Table 3.6: Rank test statistic

p-r	r	Eigen Value	Trace	Trace*	Frac95	p-value	p-value*
5	0	0.867	186.17	147.09	111.60	0.000	0.000
4	1	0.748	111.58	90.95	82.50	0.000	0.010
3	2	0.625	60.56	51.57	57.32	0.025	0.142
2	3	0.323	24.24	21.06	35.96	0.471	0.670
1	4	0.233	9.82	8.29	18.16	0.481	0.632
* Bartlett corrected trace statistics							

Source: own calculations

The existence of a limiting distribution for the trace test requires fulfilling five assumptions: $\text{rank}(\pi)=r$, $(p-r)$ unit roots, no correlation in the residuals, $T=\infty$ (with the Bartlett correction for small samples) and constant parameters. From the tests discussed so far, the rank was found to be two, but there is autocorrelation in the residuals, which means that one assumption has been violated. Furthermore, the model includes a level shift and it has to be taken into account that this changes the limit distribution and the corresponding Frac95 values. Changing the model from the base model implies new limit distributions need to be calculated and the correct critical values obtained.

The model also includes VAT as an exogenous regressor (it is not interesting to model this variable in the long run). CATS will assume that VAT behaves like a random walk, but VAT is not a stochastic variable, and the limit distributions reported will be wrong. Therefore, the asymptotic tables will be wrong, critical values cannot be obtained, the trace test will generally give us the wrong answer, and it is necessary to rely on all the previous information to determine the cointegration rank.

The rank of the cointegration space was set to two and a sensitivity analysis⁸⁵ was done to test the plausibility of this choice, confirming the rank of two and the number of long run cointegrating relations.

Hypothesis Tests and Inference on the Economic Content of the Cointegrating Relations

The restricted VAR model is estimated for the rank of two. Imposing the rank of $r = 2$, and normalising on price of theatres (PT) in the first relation and on attendance (ATT) in the second relation, respectively, produces the unrestricted cointegrating system depicted in Table 3.7. The coefficients of PT in α_1 and ATT in α_2 indicate that the adjustments are consistent with an error correction mechanism.

⁸⁵ Experimentation with $r=1$ and $r=3$ did not yield any significant improved results with respect to the demand for public theatre. With $r=3$ there was the possibility of finding a dynamic adjustment relation in theatre price inflation, but possibly given the sample size, this yield no relevant results.

Table 3.7: Unrestricted Cointegration Relations

	PT	ATT	INC	DLPT	PO	D91S	VAT	Trend
<i>Beta1</i>	1.000	-1.140	0.112	-4.370	-0.240	0.028	0.026	-0.316
<i>Beta2</i>	-1.477	1.000	-0.195	2.930	-0.050	-0.059	-0.034	2.928

Source: own calculations

It is important to refer that the normalization chosen is arbitrary, and that cointegration vectors are only unique in terms of the space they span. To consider a relation a theatre demand function, it must be identified as such. The identification process starts by testing various restrictions on the cointegrating vectors. Therefore, inference on the economic content of the two cointegrated relations requires the imposition of economic restrictions which emerge from hypothesis tests on the $\alpha\beta' = \Pi$. Hypothesis tests can be conducted on the adjustment speed coefficients (the alphas) or on the beta coefficients.

There are three sets of hypothesis tests⁸⁶ on the beta coefficients: tests to examine if each endogenous variable is stationary under the imposed rank of two, tests of whether each variable is zero in the two cointegrating relations (variable exclusion), and tests on individual beta estimates.

The test of stationary rejects that there are stationary variables in the model. Sensitivity is tested for by increasing the rank from two to three, i.e. lowering the speed of adjustment (how fast it should go to the equilibrium), and the results of the test do not change.

The tests of variable exclusion suggest that at the correct rank the variables income and the dummy could be excluded from the long run relations. At the rank of three no variables would be excluded, while with rank one it suggests exclusion of most of the variables. These results are interpreted as an indication of model misspecification, for the correct rank of two, and the variables are kept in the model, despite the low test value of the hypothesis test of exclusion.

The test for weak exogeneity is a hypothesis test on the alphas, and tests if a variable influences the others in the error correction process without itself being influenced by (without adjusting to) the process⁸⁷. The tests indicates that PO is weakly exogenous and does not adjust to the long run parameters.

⁸⁶ The tests are standard likelihood ratio (LR) tests which are asymptotically χ^2 distributed.

⁸⁷ The hypothesis is equivalent to testing if the particular variable's alphas are all zero.

Given the sample size, it is preferred to estimate a partial system, conditioning on PO as a weakly exogenous variable. Estimating a partial system is done to obtain more stable parameters. However, in order to know whether β can be estimated from a partial system, first the full system needs to be estimated and $\alpha=0$ tested in that system. The results of the test confirm that PO is weakly exogenous.

The tests for unit vector in alpha reject the null, thus indicating that there are no variables in the model that are exclusively adjusting.

The reduced VAR model is estimated with the inclusion of PO as an exogenous variable.

Identification of the long run structure involves testing hypothesis, imposing restrictions on each cointegration vector so that a fully identified structure is obtained. By taking linear combinations of the cointegrating relations it is possible to obtain a zero coefficient in each of the relations without changing the likelihood function. This is useful as it allows a just identified system to be obtained by restricting the coefficient of theatre ticket inflation to zero in the second relation and restricting income to zero in the first relation (theatre prices should be related to total costs and not be determined by household disposable income). The rationale for this choice is motivated from the inspection of the alpha matrix, where it is observed that theatre price is adjusting in an error correcting way in the first relation, but not in the second relation. As a demand and a price equation are expected to be found as the long run relations, the second relation where attendance is adjusting in an error correcting way is taken as the demand relation. Table 3.B.1 depicts the just identified system.

To obtain irreducible cointegrating relations insignificant coefficients are set to zero and then it is tested if the restricted model is accepted. These restrictions produce the over identified system depicted in Table 3.8, where the adjustment speed coefficients (or α) are indicated. The p-value of 0.844 clearly indicates the restricted model is accepted.

The cointegrating relations define the long run relations (steady states), while the α coefficients adjust the system back to the long run equilibrium (steady state), and are often interpreted as the speed of adjustment, as they pull the system back to equilibrium.

Table 3.8: Long Run Theatre Demand Model

	<i>Alpha1</i>	<i>Alpha2</i>	<i>Beta1</i>	<i>Beta2</i>
LATT	0.094	-0.517	-1.002	1
	(0.798)	(-6.144)	(11.168)	
LINC	-0.735	0.447	0	-0.080
	(-5.819)	(4.933)		(1.133)
DLPT	-1.151	0.983	-2.205	0
	(-5.429)	(6.468)		
LPT	-1.144	0.852	1	-1.198
	(-5.596)	(5.811)		(11.024)
D91S			0	-0.025
				(1.794)
VAT			0.010	-0.009
			(-1.232)	(0.630)
LPO			-0.149	-0.104
			(7.478)	(2.970)
TREND			0.485	1.515
			(-3.155)	(-4.193)
Test of Restricted Model: p-value = 0.844				
Values in Parenthesis are t-values				

Source: own calculations

This long run cointegrated theatre demand function can be written in the usual way as:

$$(11) \quad LPT = -1.002 LATT - 2.205 DLPT + 0.010 VAT - 0.149 LPO + 0.485 TREND$$

(11.168) (13.796) (-1.232) (7.478) (-3.155)

$$(12) \quad LATT = -0.080 LINC - 1.198 LPT - 0.025 D91S - 0.009 VAT - 0.104 LPO + 1.515 TREND$$

(1.133) (11.024) (1.794) (0.630) (2.970) (-4.193)

Equation (12) appears to be a German public theatre demand equation, and the coefficients can be interpreted as long run elasticities. The income elasticity is inconclusive as the beta coefficient is not statistically significant. However, the sign and magnitude seem to suggest that theatre attendance could be an inferior good (negative income inelastic), with a 10 percent increase in income depressing attendance by one percent. This would be consistent with Becker's (1965) theory of time allocation and reflect the net effect of a rise in income.

Theatre demand is price elastic (modulus), indicating that a one percent increase in the price of tickets would reduce attendance by slightly more than one percent. This result is in line with other findings in the literature, confirming an elastic demand that reflects the availability of substitutes.

VAT measures the spread between the standard rate and the reduced rate. An increase in this variable corresponds to either an increase in the standard rate, a decrease in the reduced rate, or an increase in the standard rate by a factor larger than the

increased in the reduced rate. The coefficient of VAT is not statistically significant. However, in the attendance equation it is negative, suggesting it will depress attendance, but the magnitude of the effect is close to zero, which indicates that VAT is not seriously affecting demand. No empirical support is found to the established assumption that reduced rates of VAT have an important impact on attendance. There appears to be a negative effect, but with an irrelevant magnitude.

German reunification seems to have had a small negative impact on attendance per capita.

Orchestras and theatre performances are complements, as the cross price elasticity is negative.

Equation (11) seems to be a long run relation corresponding to a price equation. It suggests that an increase in attendance will have a negative impact on price. This can be interpreted by considering that theatre supply is characterized by excess capacity. An increase in attendance will increase box office revenue, and as demand is price sensitive, theatre managers seem to decide to lower prices, thus generating the same amount of revenue. This behaviour is consistent with the traditional view of theatres as public goods with positive externalities characteristics.

VAT has a small positive impact on price, which corresponds to the fact that the VAT reduced rate is part of theatre prices. The magnitude of this effect appears to be negligible, as the coefficient is very close to zero.

The interpretation of the negative and large coefficient of theatre price inflation is related to the 'pricing bias' discussion. It corresponds to the fact that performing arts ticket prices do not follow the general price level trend, thus creating an income gap that has to be compensated for, either by public subsidies or private donations. Therefore, the estimated beta suggests that if the theatre prices have risen (theatre price inflation is positive) theatre managers will be reluctant to rise prices again, and will prefer to reduce them in order to regain some of the attendance that was lost (this is consistent with an elastic demand, as predicted by the model). Theatres do not operate as profit maximizing agents, with circa 77 percent of total income originating from public funds. Most German theatres are run by local (Gemeinde) or state (Land) governments and the apparently odd coefficient of DLPT appears to be consistent with theatre's pricing behaviour.

The negative coefficient of the price of orchestra tickets, -0.15, is small but statistically significant and indicates that an increase in the price of orchestras has a negative impact on the own price. An explanation would be to consider that as the price

of orchestra increases, own price decreases to capture market share. However, this result is apparently puzzling and an alternative explanation is attempted, by plotting both prices in nominal and real values. This indicates that there is a wedge between the real prices, and that this gap has been fairly stable, although the price lines appear to be converging in the long run. O'Hagan (1998) notes that the pattern of state support for the arts changes slowly, both in level and nature of involvement, and Zimmer and Toepler (1999) refer that tradition and path-dependence explain different cultural policies in Europe and the US. As both German theatres and orchestras are heavily subsidized by local and state governments, the price wedge may reflect an implicit legislators' preference that the prices of both goods should not be equal, thus the stable wedge. If the price of orchestra tickets increases, as it did in the last years of the sample, then the price of theatre tickets either does not increase (as in the last years of the sample), or it is reduced to maintain the wedge. But this is more a hypothesis than an explanation.

Common Driving Trends

The common trends representation illustrates how the variables move in a nonstationary manner. The common trends push the system out of equilibrium, away from the steady state defined by the cointegrating relations, and the alpha coefficients adjust the system back to the long run equilibrium.

From the alpha orthogonal matrix the origins of the common trends (the pushing forces) can be identified. The first common trend is normalized on theatre prices (income is restricted to zero) and originates in attendance and theatre price inflation. The second common trend is normalized on income (theatre price is restricted to zero for identification) and includes theatre ticket price inflation. This suggests that CT(1) a price trend and CT(2) is an income trend, which is consistent with the belief that income and prices push the system out of equilibrium.

3.5 Conclusions

This Chapter investigated demand for public theatres in Germany, using time series data. Two different methodologies were considered: OLS, as used in the previous studies in the literature, and the cointegrated VAR model.

The results obtained from OLS are consistent with previous findings, with the main result being that demand is found to be price inelastic, which suggests that theatres

could raise price and increase revenue. However, theatre ticket prices have increased slowly over the period. Theatre price increases are normally planned in advance, and the pricing policy reflects the fact that public theatres are influenced, owned, or run by municipalities and Länder.

The cointegration results find demand to be price elastic. A one percent increase in price leads to a 1.2 percent fall in attendance. Demand was expected to be elastic, due to the availability and the increased range of substitutes produced by technological progress. Substitutes for the live performing arts are varied, ranging from attendance at sporting events to recorded music or videotaped performances. The estimated long run price elasticity is in line with the findings by Krebs and Pommerehne (1995). In their study of German theatre for 1961-1991, a price elasticity of demand of -2.6 is reported.

The long run elasticities suggest that attendance is negative income inelastic, with increases in income depressing attendance. However, the estimate of the income elasticity of demand fails to reach statistical significance, which only occurs in the OLS Withers (1977) model formulation. There, a one percent increase in income depresses attendance by 0.3 percent.

The negative income elasticity corresponds to the net effect of rising incomes on demand. It might also reflect the fact that the sign of the income elasticity of demand depends on the level of income. Moore (1966) noted that as income increases, attendees demand better (and more expensive) seats, and that with the development of film and television patrons became more selective.

Increased consumption enhances experience and in order to obtain the same level of utility, individuals may consume less and not more of the live performing arts, as posited by Gossen's first law of diminishing marginal utility. Furthermore, individuals may decide not to attend if they consider quality to be below a certain individual and subjective threshold.

As incomes rise, the live arts enthusiasts also have the possibility of substituting attending a local (national) performance by a foreign presentation. This effect would have certainly been enhanced by the decrease in air fares, lower transportation costs, internet booking and so forth. Furthermore, time allocation theory suggests that as income rises, the opportunity cost of attending the theatre also increases. Although income foregone considerations may be a minor issue, as performances normally occur outside working hours, Moore (1966) noted that complementary expenditures accounted for half of the cost of a theatre outing, which normally combined a restaurant meal with

the play. Even if real theatre ticket prices have not increased much, restaurant meals are likely to follow inflation. This only strengthens the reasoning for low income elasticities.

A final point relates to the influence of subscribers, who are expected to be more demand inelastic and income elastic than the single ticket buyer. As shown in Chapter 1 (Figure 1.2.13), attendance by ticket category has been characterized by an increase in the importance of day tickets and the decline of place rents and visitors organizations. This change in the structure of type of tickets sold is expected to increase the price elasticity and lower the income elasticity of demand.

This Chapter also questions the use of reduced rates of VAT to stimulate theatre demand. VAT is a regressive tax and performing arts attendance is skewed towards a minority of high income individuals. Revenue loss due to the VAT tax expenditures has to be raised by general taxation, leading to a higher level of taxes for all taxpayers. The effectiveness or not of such uses of the tax system has immediate policy implications.

VAT shifts the supply curve vertically upward as the firm will require a higher price to supply the same quantity. VAT is a tax, and as such, it introduces distortions and causes excess burden. The Corlett-Hague rule implies that efficient taxation requires taxing the commodity that is complementary to leisure at a relatively higher rate. Attendance at performing arts events can be considered a leisure activity, therefore the use of reduced rates of VAT increases inefficiency.

In Europe, the application of the reduced rate of VAT is subject to rules that increase the complexity of the VAT system and generate inconsistent application of VAT rates. The Commission writes: *VAT is a consumption tax and its main objective is to generate tax revenue: each Member State uses this revenue according to its own priorities. It should not be used to subsidise certain particular sectors. At the moment it is clear from many of the requests to apply reduced rates that one of the main objectives is to help a particular sector because of its social, cultural or other features or the particular problems it is experiencing*⁸⁸.

The Commission acknowledges that a reduction in VAT rates cannot have a significant impact on demand, and believes that *the reduction of VAT rates is not the best way of encouraging consumers to use certain goods or services*, as VAT is not aimed at consumer behaviour. *A reduction in VAT rates is never passed on in full in consumer prices, thus a reduction in VAT rates very often has only a minor, temporary impact on consumer prices.* Considering cultural goods (such as books, newspapers and periodicals) the Commission views the reduced rates as *an inescapable fact of history*.

⁸⁸ See COM (2003) 397 final.

The estimation results find no evidence to support the hypothesis that VAT⁸⁹ has a positive effect on theatre attendance. VAT impacts theatre attendance through ticket prices, as VAT is part of the price. From the first cointegrating relation, the pricing policy of German public theatres appears to be relatively insensitive to VAT. The beta coefficient is statistically significant and positive, but close to zero, indicating a negligible effect.

The use of VAT as a mechanism to promote attendance at performing arts is a form of state support which has several disadvantages: its cost is unknown in advance (it depends on the number of tickets sold), it is not approved by parliaments or subject to suffrage by voters, and it takes precedence over other expenditures, because it does not require previous approval. The use of multi rate VAT as a tax break to support the arts makes the tax system more complex and introduces inefficiencies, by altering the relative prices of the goods for consumers.

Tax breaks worsen the tax system on fairness, efficiency and simplicity, and carry a lack of understanding as to who finances what, together with a general assumption of no cost to the state. Although the cost of the tax expenditures is proportionally distributed among taxpayers, the benefits may not be equally shared, which is particularly true for the arts, as individuals with higher consumption benefit more.

Feld, O'Hare and Schuster (1983) described tax based incentives for contributions and sponsorship as an *underground river that flows through the tax system*. The results of this Chapter find no evidence that, for Germany, the use of reduced rates of VAT on admission prices has a positive effect on attendance. It suggests that the VAT rates should be raised to the standard rates, thus reducing the regressive impact of VAT, raising tax revenue and making the tax system simpler.

This suggestion is controversial as it challenges the general accepted assumption that allowed for the reduced rates to be applied to cultural services. Further research is necessary to evaluate if for other arts sectors VAT has any impact on attendance, as well as cross country studies to analyse if the German findings are consistent with other European experiences.

⁸⁹ (measured by the spread between the standard and the reduced rates)

In Germany, VAT revenues accounted for 31.2 percent of tax receipts in 2005⁹⁰, up from 21.3 percent in 2000⁹¹. Income taxes represented 35.7 percent in 2000 and 38 percent in 2005.

The value added tax in Germany is a standard European VAT. Tax is waived in the case of small traders, but otherwise the following rates apply: 19 percent to every taxable supply of goods and services not subject to the reduced or zero rate; seven percent to the supply of essential goods and services, such as food and beverages (but 19 percent if consumed on the spot), pharmaceuticals, newspapers, books, the services of theatres, museums and concert halls; and percent zero to exports and intra-community supplies. The taxpayer is generally entitled to offset against the value added tax payable the amount of such tax charged by suppliers or paid on imports.

VAT was first introduced in Germany in 1968 and VAT rates have been altered eight times (see Table 3.4). Before 1968 a sales tax of four percent applied. Regarding admissions to cultural services, the applicable VAT rate is the reduced rate, a feature that has been constant since 1968, although the reduced rate has increased. Another feature of German VAT rates is that there has never been a second, super reduced VAT rate, nor are there any plans to introduce one.

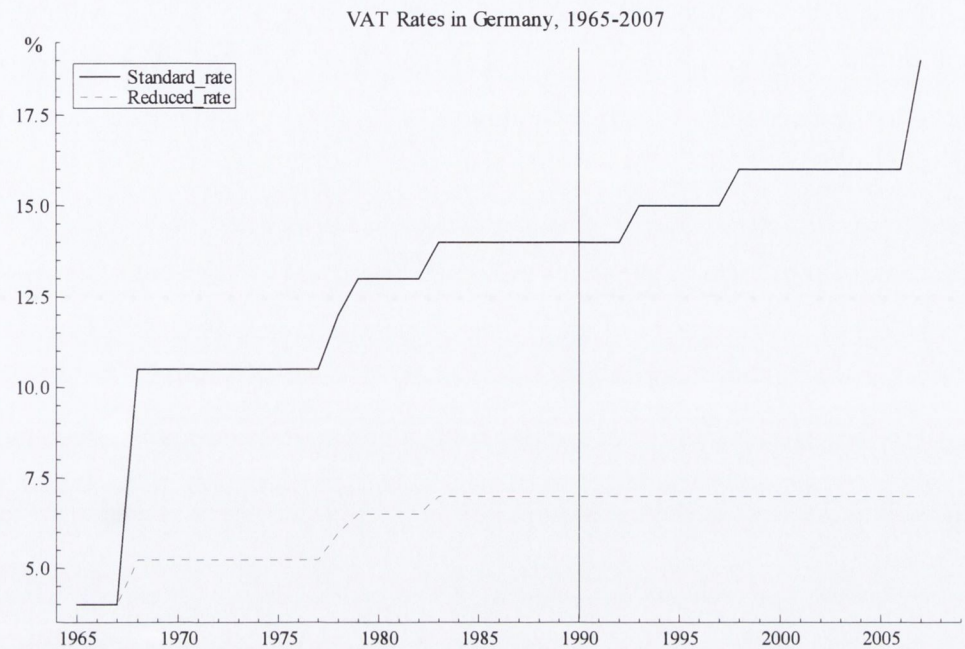
Figures 3.A.1 illustrates the VAT rate changes in Germany, indicating that they have never been reduced, since their introduction. Standard rates always increase by more than reduced rates and as a result the spread between the two rates has been increasing, as seen from Figure 3.A.2, and is currently at 12 percent.

The Federal Republic of Germany is a federation composed of five different levels of government: the national government (Bund), the administrative departments (Regierungbezirke), the provinces (Landkreise), 16 states (Länder) and the municipalities (Gemeinde). The Bund, Länder and Gemeinde share tax revenues. Länder budgets predominantly depend on tax revenue from shared taxes. Normally more than 80 percent of the taxes of all levels are in shared taxes and, more importantly, all of these shared taxes are federally determined.

⁹⁰ BMF (2006)

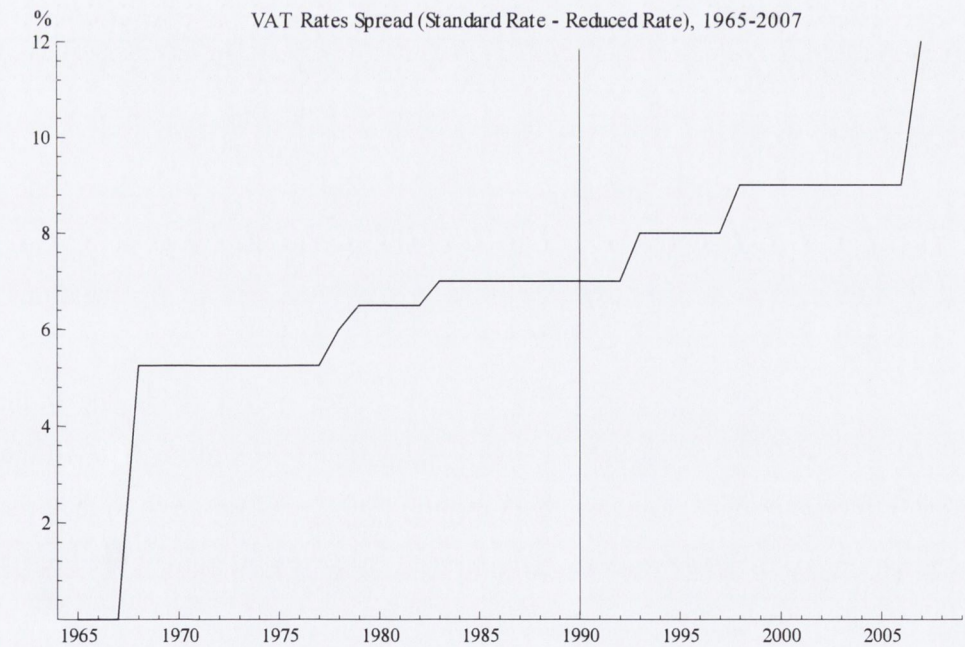
⁹¹ Statistisches Bundesamt (2000)

Figure 3.A.1: VAT rates in Germany (in percentage)



Source: BMF (German Finance Ministry)

Figure 3.A.2: VAT rates spread (in percentage)



Source: BMF (German Finance Ministry)

The federal constitution itself states that 42.5 percent of the income tax revenue must be retained by the national government, 42.5 percent by Länder, and 15 percent by municipalities. The beneficiaries of VAT are the federal government (52 percent), Länder governments (45.9 percent) and municipalities (2.1 percent). As with the income tax, VAT is also split. At a first level, three-quarters of it is apportioned to the states according to their population. Another quarter is reserved for those states considered

financially weak. They receive supplementary transfers from VAT in order to bring their fiscal potential up to at least 92 percent of the average of total regional taxes per capita. In practice, this means that Eastern states acquire roughly twice as much VAT revenue per capita than their Western counterparts.

VAT rate differentiation for Cultural Goods in Germany

Article 12(3)(a) allows Member States to apply either one or two reduced rates to supplies of the categories of goods and services in Annex H, *a list of supplies of goods and services which may be subject to reduced rates of VAT*.

Considering the arts, a number of goods and services are listed, by categories. Category six includes books, newspapers and periodicals, and, in Germany, the reduced rate applies.

Category seven includes admissions to shows, theatres, circuses, fairs, amusement parks, concerts, museums, zoos, cinemas, exhibitions and similar cultural events and facilities. In Germany, admissions are either exemption or the reduced rate applies. Theatre admissions are taxed at the reduced rate.

Category seven also includes reception of broadcasting services (pay TV/cable TV, where the standard rate is applicable, and TV licences, which is VAT exempt and compulsory for all people owning a TV set).

Category eight applies to services supplied by or royalties due to writers, composers and performing artists, and the reduced rate is applicable.

Category 14 refers to supply of goods and services by organizations recognized as charities by Member States.

Article 12(3)(c) states that Member States may provide the reduced rate to imports of works of art, collectors' items and antiques, according to in Article 26a(A)(a), that refers to Annex I where the meanings of works or arts, collector's items and antiques are specified. As noted before, super reduced rates are not used in Germany.

3B

Tables

Table 3.B.1: Just Identified System

	<i>Alpha1</i>	<i>Alpha2</i>	<i>Beta1</i>	<i>Beta2</i>
LATT	0.084	-0.513	-1.048	1
	(0.910)	(-7.230)	(9.120)	
LINC	-0.575	0.311	0	-0.109
	(-5.834)	(4.115)		(1.288)
DLPT	-0.907	0.778	-2.815	0
	(-5.469)	(6.110)	(14.298)	
LPT	-0.900	0.642	1	-1.201
	(-5.631)	(5.228)		(8.683)
D91S			0.003	0.029
			(-0.424)	(1.582)
VAT			0.015	-0.008
			(-1.790)	(0.600)
LPO			-0.161	-0.095
			(8.082)	(2.665)
TREND			0.298	1.564
			(-1.590)	(-3.593)
Values in Parenthesis are t-values				

Source: own calculations

CHAPTER 4

PHILANTHROPIC GIVING IN GERMANY

4.1 Introduction

This Chapter investigates giving by living individuals, in Germany, by focusing on gifts of money to philanthropy. Individuals may dispose of their income (or wealth) through consumption, saving or giving it away, for example, by selecting to donate money to nonprofits. Jencks (1987) notes that economists label philanthropy gifts as charity, but that very few contributions are charitable in the sense of the rich helping the poor. Roberts (1984) estimates that less than a tenth of philanthropic giving is charitable in this sense.

Empirical studies on philanthropic giving estimate demand functions for contributions, to obtain price and income elasticities. The main question of interest is whether contributions are treasury efficient, i.e. if because of the tax incentive the increase in giving exceeds the amount of Treasury revenue losses. A price elasticity of giving greater than one, in absolute value, indicates treasury efficiency.

Another objective of this Chapter is to investigate giving to different types of organisations. Philanthropic giving consists of religious and secular contributions, and the latter include gifts to charity, education, political, association of voters, heritage, and other. It is also relevant to perceive how giving varies with income, how much taxpayers give as a share of their income, and how this share changes with income.

Philanthropic giving is linked to the non-profit sector of the economy, and refers to gifts of money to organizations that are eligible to receive tax deductible donations. In Germany, this is dependent on the organization being public benefit (*gemeinnützig*). As noted in Chapter 1, the non-profit sector is not entirely distinct from government and the for profit sector, with significant overlaps between all sectors.

Clotfelter (1985) identifies three classes of original donors: living individuals, the estates of decedents, and corporations. Individuals and corporations may contribute

money or volunteer services. The gifts of money may go directly to tax exempt organizations or may pass through some tax exempt intermediary institution. These intermediaries include charitable trusts, private foundations, and corporate foundations. Joulfaian (2001) notes that transfers to charity during life benefit from an income tax deduction and transfers at death benefit from an estate tax deduction.

The importance of individual contributions to an organization depends on its alternative sources of income. The revenue structure of German civil society organizations is dominated by Government, with philanthropy accounting for three percent of total revenues⁹². The non-profit sector is supported directly (subsidies and grants) and indirectly (tax exemption and provisions for the deduction of philanthropic gifts) through the tax system.

The financial strains of unification, the stability pact, and an ageing population that burdens the welfare State have increased the pressure on federal spending. At the same time that philanthropy is expected to fill the gaps in State provision, nonprofits are faced with an increased demand for many of their services. This is the case because the subsidiarity principle assigns priority to non-profit over public provision of social services.

This Chapter contributes to the study of the relation between taxes and philanthropic giving, by estimating income and price elasticities, as well as investigating the determinants of contributions, for a dataset of German taxpayers. It separately estimates giving to different types of organisations and contributions made by taxpayers in different income deciles.

4.2 Previous Philanthropic Giving Studies

Andreoni (2006), Steinberg (1990) and Clotfelter (1985) provide surveys of the economic research on charitable giving. Studies of charitable contributions have used aggregate and individual data, data from tax returns and survey data, and foreign as well as U.S. data.

Until the 1990s, the empirical work on tax effects and individual giving was notable for the number and variety of studies and the consistency of their findings. The consensus in these studies was that the price elasticity for the population of taxpayers was probably greater than one in absolute value, with the most likely range of values

⁹² Salamon (1995)

being about -0.9 to -1.4. Taxes also influenced giving through an income effect, with most estimates of the income elasticity falling between 0.6 and 0.9. Feldman and Hines (2003) note that estimated income elasticities of charitable giving lie generally below one, typically taking values around 0.70.

In contrast to earlier studies, recent studies by Broman (1989), Randolph (1995), Barrett et al. (1997), and Bradley, Holden and McClelland (2005) find that charitable contributions are tax price inelastic. The estimated elasticities suggest that the long run tax price elasticity may be substantially lower than unity, making the charitable deduction inefficient in that the long run loss to the Treasury exceeds the gains to charities. Questioning these results is the study by Auten, Sieg, and Clotfelter (2002) where the authors conclude that the consensus view of a price elasticity of -1.3 is actually quite accurate.

The variability in these findings is mostly related to different methodologies. Clotfelter (1985) investigates econometric issues in the analysis of charitable giving using OLS. Kokoski and McClelland (1994) note that because of the large number of households that do not make charitable contributions, an attempt is made to eliminate the censoring bias by using the Tobit regression technique. Banks and Tanner (1997) note that modelling charitable giving raises an important question about how to treat the zeros in the sample. They propose that the decision about whether to give at all should be modelled separately from the decision about how much to give and condition on the probability of giving in measuring the effects of different factors on the level of donations. This approach follows that of Heckman (1979).

Bradley, Holden and McClelland (2005) report that standard tests of the distributional assumptions necessary for the consistency of the Heckman and Tobit estimators often reject the null hypothesis that the authors are using the correct distributions. This renders the parametric estimators inconsistent, suggesting that price elasticity estimates in previous research may be too high. The authors use a two stage semi parametric method and find that contributions are price inelastic.

Besides price and income, the variable with the most consistent effect on contribution is age. Measured by a continuous variable or by one or more dichotomous variables, age is consistently associated with higher levels of giving. Giving increases monotonically with age. There are two possible interpretations of this result: either individuals give more generously as they get older or else young cohorts are, and will remain, less generous than their parents and grandparents were.

In relation to different types of philanthropic giving, Taussig (1967) speculates that contributions can be separated into two distinct categories, religious and secular, that respond differently to changes in income and price. While religious gifts are relatively unresponsive, elasticities for secular giving are larger. Kokoski and McClelland (1994) report that compared to giving to all organizations, the price elasticity of giving to service organizations is substantially higher, whereas the price elasticity of giving to religious organizations is substantially lower. Bradley, Holden and McClelland (2005) estimate separately the elasticity of giving to all organizations and to social welfare organizations. The low elasticity found indicates that the deduction for contributions is not treasury efficient. However, the elasticity of contributions to social welfare organizations exceeds unity, suggesting that giving to these types of organizations may be treasury efficient.

Of particular interest to this Chapter are the unpublished findings of Paqué (1982a)⁹³ that extend the econometric analysis of giving to Germany⁹⁴. It should be noted that differences in data and definitions make precise comparisons difficult. In Germany, non religious giving in 1974 was 0.2 percent of gross income, and the church raised another 1.5 percent, for a total of 1.7 percent of income directed toward charitable organisations. Contributions in the U.S. have been about two percent of personal income.

Paqué (1982a) analysed a pooled sample of contributors in the Federal Republic of Germany for five years between 1961 and 1974. After eliminating the six lowest income classes for each year, he obtained a sample of 40 observations. Using weighted least squares, he estimated the equation:

$$(1) \quad \ln \text{ Giving} = -12.48 + 1.247 \ln \text{ Income} - 1.378 \ln \text{ TaxPrice} + 0.308 \text{ National Income per Employee} \\ (0.018) \quad (0.128) \quad (0.444)$$

The implied income elasticity of 1.27 is much larger than most comparable estimates, and the price elasticity is somewhat larger than the median of estimates from previous work. Paqué's explanation is that these differences reflect the virtual exclusion of religious giving from the German contributions data by virtue of the separate church tax.

⁹³ Reported in Clotfelter (1985).

⁹⁴ Paqué (1982a) notes that, in contrast to the US, the German tax law allows contributions to some political organizations to be deducted. Furthermore, members of organized religious bodies – the vast majority in Germany – pay a church tax calculated as a percentage of regular tax liability. These differences would be expected to have an impact on the amount and composition of deductible contributions. The differences in tax law and the size of government are reflected in differences in private giving among countries. In comparison to the US, Germany has significantly lower levels of charitable giving and, correspondingly, less dependence on private contributions.

Clotfelter (1985) notes that given the lower income elasticity of religious giving obtained in other studies this hypothesis seems quite reasonable.

In a companion study Paqué (1982b) examined the crowding out hypothesis for Germany, using public welfare expenditures as a measure of government activity. His results provide no evidence that crowding out had occurred.

This Chapter builds on the previous literature and estimates price and income elasticities for gifts by living individuals, in Germany. As noted before, giving to some types of organisations may be treasury efficient. Furthermore, it is important to understand how these elasticities change throughout the income distribution.

4.3 Economic Model and Theory

4.3.1 Theoretical Model and Empirical Models used

The utility maximizing framework can be used to model why people donate to philanthropy, and the stochastic utility theory framework used as the theoretical model of choice behaviour. The stochastic utility model (random utility model) finds its roots in both economics (e.g. Neuman and Morgenstern) and psychology (e.g. Thurstone). Following Steenbergen (2007a), let y_i indicate the choice between two alternatives, θ and $\bar{\theta}$ such that $y_i = 1$ if θ is chosen and $y_i = 0$ if $\bar{\theta}$ is chosen. Further, let U_i^θ and $U_i^{\bar{\theta}}$ be the utilities of both alternatives. In the stochastic utility model, these utilities have both fixed and stochastic components:

$$(2) \quad U_i^\theta = x_i \beta_\theta + \varepsilon_{i,\theta}$$

$$(3) \quad U_i^{\bar{\theta}} = x_i \beta_{\bar{\theta}} + \varepsilon_{i,\bar{\theta}}$$

Here, x_i is a vector of observed attributes of the decision maker, β_θ and $\beta_{\bar{\theta}}$ are the effects of those attributes on the utilities of alternatives θ and $\bar{\theta}$, respectively, and $\varepsilon_{i,\theta}$ and $\varepsilon_{i,\bar{\theta}}$ are random and unobserved components, including attributes of the decision maker that are hidden from the modeller.

The stochastic utility model assumes that decision makers are utility maximizers. This means that $y_i = 1$ if $U_i^\theta > U_i^{\bar{\theta}}$. Since the utilities contain a stochastic component, choice is probabilistic. Thus,

$$(4) \quad \Pr[y_i = 1] = \pi_i = \Pr[U_i^\theta > U_i^{\bar{\theta}}] = \Pr[\varepsilon_i > -x_i \beta], \quad \text{where} \quad \beta = \beta_\theta - \beta_{\bar{\theta}} \quad \text{and} \\ \varepsilon_i = \varepsilon_{i,\theta} - \varepsilon_{i,\bar{\theta}}.$$

Stochastic utility theory provides a powerful framework for understanding binary and other choices, and can be employed to theoretically model philanthropic giving.

Clotfelter (1985) notes that helping behaviour in the form of donations or charitable actions may be divided, roughly, into altruism, reciprocal helping, or strictly self interested activity. Except for Sen's notion of commitment, this behaviour can be analysed in terms of a general utility maximization problem. In analysing the effects of income tax treatment, individuals are simply assumed to value contributions and their own consumption as two goods and to maximize utility subject to a tax defined budget constraint. Maximizing the utility function yields a reduced form demand function for contributions.

Most alternative explanations for giving are consistent with the standard economic model of utility maximization subject to a budget constraint. By focusing on the effects of various tax provisions on possible combinations of consumption and contributions, it is possible to show the effects of tax provisions on an individual with given income and preferences. The price of giving under a deduction depends on the taxpayer's marginal rate. In general, the deductibility of contributions has an income effect and a substitution effect. If giving is a normal good, both effects will tend to encourage contributions.

Although not explicitly a policy directed toward philanthropic giving, changes in the tax rate schedule will generally have an effect on the individual's choice between giving and own consumption. Such tax rate changes may arise from tax legislation or from inflationary bracket creep.

A question of considerable theoretical interest is how the well being of potential recipients affects donations. Donors motivated by interdependence in utility functions will tend to give more as the income of recipients, relative to theirs, falls. Some studies include relative income as an explanatory variable for giving.

Government expenditures will tend to crowd out private giving to the extent that government programs make recipients better off or provide similar services to those provided through charitable organizations. How complete this effect is depends upon how closely substitutable government services are with private gifts and what exactly enters the utility function of donors. If donors care only about recipients' income levels, a public income maintenance program may well completely supplant private charity. If, however, donors value attributes that cannot be provided by government, or if donors value the act of giving itself, private giving is less likely to be crowded out.

Jencks (1987) follows Clotfelter (1985) in asking behavioural questions that have to do with how exactly the model of individual giving is to be specified. The focus is on the mechanism by which tax policy influences contributions. The effects of taxation on philanthropic contributions are important because the response of donors affects government revenue and because tax changes may inadvertently harm recipients of contributions.

The major tax policy instrument affecting individual giving is the philanthropic deduction allowed in the calculation of taxable income for taxpayers who itemize their deductions. As a result of this tax treatment, there are two major effects on individual giving: the tax liability affects the after tax income from which taxpayers can make contributions and the deduction reduces the net price per dollar of contribution made.

The econometric analysis of individual giving implies that the income tax has a strong effect on giving. Although the magnitude of the elasticity is obviously important in determining the effect of tax incentives, there is one critical value that is of particular, if partly symbolic importance. An elasticity of minus one implies that the increased contributions received by philanthropic organizations as a result of the present deduction exactly offset the loss in tax revenue to the Treasury. For price elasticities larger than one in absolute value, contributions increase by more (as a result of the tax incentive) than the amount of revenue lost by the Treasury.

The literature on determinants of lifetime charitable contributions traditionally emphasizes income taxation, and, except for Auten and Joulfaian (1996), ignores the effects of the estate tax. Hines (2001) notes that the tax treatment of charitable giving influences its magnitude, since higher estate tax rates are associated with greater charitable bequests, while higher income tax rates are associated with greater lifetime contributions.

Econometric studies of contributions by individuals examine the effect on contributions of income, the income tax, and a host of other non-economic factors. The methodology consists of multivariate analysis to explore the determinants of giving, measured as the sum of transfers to philanthropic organizations (the dependent variable), considering the effects of taxes, wealth, and a set of demographic variables related to household characteristics, that normally include age of household head, gender, ethnicity and religion, family structure, education, occupation, employment status, region, community ties, community characteristics, and family background (the independent variables).

Analogous to the specification of demand functions in consumer theory, an individual's demand for contributions usually takes the form:

(5) $G = f(Y, P, Z)$, where G measures contributions, Y is disposable income, P is the price of giving, and Z is a vector of other explanatory variables.

In most empirical studies the demand function takes the log linear form:

(6) $G = AY^a P^b e^{hZ}$, where A , a and b are constants and h is a vector of constants. For estimation purposes, (6) can be transformed by taking logarithms:

(7) $\ln G = \ln A + a \ln Y + b \ln P + hZ$, leaving a form that is linear in its parameters.

The general regression model to be estimated can be specified as:

(8) $\text{Contribution}_i = \beta_0 + \beta_1 \text{Income}_i + \beta_2 \text{TaxPrice}_i + \beta_3 \text{DemographicCharacteristics}_i + \varepsilon_i$

A principal assumption implicit in the adoption of the log linear model is that the income and price elasticities are constant. Several of the most important issues of specification in this literature come down to a question of whether this constant elasticity assumption is valid. This study adds to this debate in that it decomposes philanthropic giving into its various types, showing that the elasticities vary considerably depending on type.

In studies of individual contributions, observations of zero contributions present a special problem. Where such observations represent a sizable portion of the sample a technique that accounts for the zero constraint like Tobit is called for. When only a small proportion of the sample gives nothing, OLS is appropriate, but the zero observations make it impossible to take logarithms directly. Transformations to allow a logarithmic form include adding \$1 or \$10 to all giving amounts or setting a minimum contribution, based in part on convenience and in part on the idea that virtually everybody gives something. Because of the steepness of the logarithmic function in the vicinity of one, Boskin and Feldstein (1977) opted for adding \$10.

The empirical model used considers the following variables in the analysis of giving by living individuals, in Germany: the dependent variable is the amount given, and the independent variables considered are the tax price, age, the number of children, religion, social classification, Land of residence, gender, marital status, whether the taxpayer lives in a Eastern Land, whether a tax consultant was employed, and if the taxpayer is an independent worker or not.

The dependent variable: Contributions

Philanthropic giving is measured by the sum of religious and secular contributions, in DM, as reported by German taxpayers in their tax returns. Secular

giving is calculated as the sum of contributions to the following types of non-profit organizations: charity, education, political, association of voters, heritage, and other.

The dependent variable, the measure of contributions, is invariably based on the monetary value of gifts made. The dollar value of contributions is not necessarily an ideal measure of giving. Like expenditures in education and other areas of service delivery, contributions measure the cost of inputs, not output. On the other hand, one may argue that the dollar value of contributions is the most appropriate measure of giving when individuals typically have only vague notions on how their gifts are translated into the provision of services. In any case, the form in which data are available dictates that giving will be measured by the monetary value of contributions.

The two basic sources for contributions data used in econometric studies of individual giving are tax returns of taxpayers who itemize their deductions (as used in this Chapter), and household surveys. There are two principal weaknesses of the contributions data based on itemized deductions. First, no data are available for taxpayers who elect to take the standard deduction. The result is that econometric studies using tax return data are necessarily based on itemizers only. If the behaviour of itemizers is different from that of other taxpayers, the resulting estimates will not be representative of the latter. More important, equations based on samples of itemizers may be subject to sample selection bias if the decision to itemize is itself a function of contributions. A second potential weakness of contributions data is the possibility of systematic overstatement. Available data suggests that this is relatively small for contributions.

Household surveys responses may be less accurate than information given on tax returns, but surveys have the advantage of including nonitemizers as well as itemizers. One possible bias remains if nonitemizers underreport their giving. No evidence exists of this bias or its extent.

Joulfaian (2001) refers that studies on lifetime contributions have traditionally focused on the reported deduction as the measure of charitable contributions and used one year snapshots. Actual contributions, however, may not be adequately reflected in the claimed deduction, as the deductibility of gifts is subject to a number of limitations depending on the type of underlying asset transferred.

Auten and Joulfaian (1996) and Hines (2001) further note that the estate tax should be considered in the analysis of philanthropic giving. Charitable bequests represent the lion's share of transfers, but individuals are more likely to give during

life⁹⁵. Furthermore, the wealthy realize little of their income⁹⁶. Hines (2001) comments that charitable donations during lifetime are tax preferred to charitable donations at death, for the simple reason that both are deductible against the estate tax base while only gifts during lifetime are also deductible against ordinary income for the purpose of calculating the personal income tax.

The independent variables: Price

The price of giving would be defined as the foregone consumption to an individual of providing a unit of output to a given recipient. Virtually all of the econometric studies of contributions use as the basic measure of the price the after tax foregone consumption per dollar of giving. In the presence of an income tax with marginal rate m , the basic price of giving is simply $1 - m$. This is the measure of price used in this Chapter, as the dataset used details the marginal tax rate of each taxpayer.

A gift of g which is deductible from taxable income will reduce taxes owed by mg . Hence, the effective price of a dollar of giving is $1 - m$ ⁹⁷. With progressive rates, this means those with higher incomes get higher marginal subsidies.

Andreoni (2006) notes that the importance for policy makers of the charitable deduction is first that it reduces tax revenues – a so-called tax expenditure. This is one cost of the program. The benefit is that it also reduces the cost of giving and thus may encourage more of it. A question policy makers have often raised is whether the cost, measured in foregone tax revenues, is less than the benefit, measured by increased dollars of giving. The answer will be yes if the price elasticity of giving, ε , is less than negative one, that is, if giving is price elastic. It is also true that at $\varepsilon = -1$ the policy will be revenue neutral. Hence, searching for $\varepsilon < -1$ has been the “gold-standard” for some policy analysis.

Rather than simply calculating taxable income and referring to the appropriate tax schedule, a complete calculation of marginal tax rates usually requires calculation of tax liability at two levels of contributions and then calculating the slope. In studies using

⁹⁵ Using US tax data, Joulfaian (2001) reports that about 27 percent of the transfers to philanthropic organizations were made during life and the remaining 73 percent at death.

⁹⁶ Using US tax data, Joulfaian (2001) reports that the average income (defined as AGI) represents less than four percent in the case of the wealthiest group.

⁹⁷ Since state taxes as well as contributions are deductible in calculating the federal income tax (in the US, but not in Germany), the inclusion of state income taxes makes the price of giving: $P = 1 - (m_f(1 - m_s) + m_s)$, where m_f and m_s are the applicable federal and state marginal income tax rates. State taxes provide a source of variation in net prices that is quite independent of income.

aggregated data, the usual approach is to calculate the taxable income and corresponding marginal tax rate for the average income value in a given income class.

A final point relating to the calculation of the net price of giving arises from the dependence of the price on the amount that is contributed, an attribute resulting from the nonlinearity of the budget set. The approach adopted by Feldstein (1975a) and most succeeding studies was to calculate the price of giving for the first dollar of contributions. This first dollar price is clearly independent of the contributions decision.

The independent variables: Income

Income is measured in DM, as the total amount of the income (*Gesamtbetrag der Einkünfte*, *GDE*) reported by German taxpayers in their tax returns. This allows for reported negative incomes.

Demand theory clearly implies that income is a determinant of demand (except in the unlikely case that the income elasticity is everywhere zero), but it is often less clear how, exactly, income comes into play.

Clotfelter (1985) points out that not only are there large absolute differences in average contributions over the income scale, but also the distribution of gifts by donee classes varies by income. Since tax incentives typically differ as to their impact over the income distribution, the level and distribution of gifts resulting from each incentive are also likely to differ. This fact makes it important to know if incentive effects differ by income level. Jencks (1987) reports that the assumed view is that both the level of giving and the percentage of total income given to philanthropy would rise as income rose, that is, the income elasticity of philanthropic giving would be greater than one. However, he finds that the relationship between income and the fraction of income allocated to philanthropy appears to be U-shaped, with the rich and the poor making more effort than those in the middle.

Disposable income is seen as the appropriate measure in most studies, that define income as gross income less the federal income tax (in order to make this an exogenous measure of income, the tax is usually calculated as if no contributions were made). The federal tax definition of adjusted gross income (AGI) is usually used for gross income because of its easy availability.

Two principal alternatives to the use of disposable income are permanent income and relative income. Developed by Friedman (1957) the theory of permanent income is based on the notion that a household's consumption depends on its normal or permanent level of income, not on actual income received in any given year. If permanent income is

the correct income measure, the use of annual income will tend to result in a downward bias in the estimated income coefficient due to the presence of the transitory component in annual income.

Following the simple consumer demand model, empirical models of contributions implicitly assume that labour supply is fixed and thus that gross income is exogenous. One must assume that the labour supply effects of the philanthropic deduction are not of sufficient magnitude to create significant bias in estimates of the income elasticity of philanthropic giving. This assumption does not seem unreasonable.

The independent variables: Other variables

Besides price and income, other variables have been included in models of giving in order to reflect the possible effects of personal, social, or demographic characteristics of donors. However, many of the household characteristics considered (age, income, education, occupation) are likely to be correlated.

Age has been used and consistently found to be an important factor in explaining differences in personal giving propensities. Other variables that have been employed include marital status, wealth, education, dependents, and past giving. Community characteristics include measures of relative income and poverty, as well as measures of government programs intended to benefit potential recipients, the idea being that government programs may reduce contributions. Not all of these variables are available in the dataset, and the variables used are slightly different.

The demographic variables related to household composition that are included in the model are: age, gender, marital status, and number of children. Age is expected to have a positive effect on contributions, and number of children is expected to have a negative impact on donations. Religion is also considered as a determinant of giving, and of particular interest is evaluating if individuals without religious denomination give less than individuals who have a faith.

Employing a tax consultant or claiming tax deductions from inheritance tax paid⁹⁸ can be seen as measures of wealth, and are expected to increase giving.

Living in an Eastern Land (Federal State), and residence by Land are considered as region variables. Employment status is accounted for by social classification. Occupation is measured by the industry code of the individual. Education can be proxied by assessing whether an individual is an independent worker or not, and by the classification of independent workers by class.

⁹⁸ This variable is later dropped in the estimation, due to not being significant in any specification.

4.3.2 Methodology

Philanthropic giving will be modelled empirically using limited dependent variable models. As the dependent variable (amount given to philanthropy) is limited in its range, if the model is estimated with OLS, then estimates⁹⁹ will be biased, even asymptotically. The extent of the bias in OLS is directly proportional to the extent of the limiting of the dependent variable. If only a few observations are limited, then there may be little bias. If a lot, then there will be much bias.

The models that can be considered for estimating the model that examines the effects on contributions of income, the income tax, and a host of other factors that include demographic characteristics of the taxpayer, are the Tobit (Tobit I) and the Heckman (Tobit II). Both techniques take into account the large number of zeros observed for the dependent variable, which is constrained to be greater than some value y_0 (usually zero). OLS cannot be used either on the full sample or in the positive subsample. As possible solutions, the Tobit can be used if it is a censored data set¹⁰⁰, and Heckman used it is a self-selected data set¹⁰¹.

In the Tobit model, the estimated parameters have two interpretations. They affect the probability of participation and the conditional level of contributions. The Tobit coefficients represent the effects on the value of expected contributions unconstrained by a lower bound. The change in the expected value of observed contributions is equal to the coefficient multiplied by the probability of a positive contribution. The downside is that the Tobit structure imposes that the sign on each relationship be the same.

Maddala (1992) notes that Tobit is used inappropriately most of the time. The decision of which model to use should focus on why the zeros arise, what the latent variable, y^* , is measuring in the model. For philanthropic giving, zeros may be the result of a choice, and some unobserved values may also be above zero. This suggests that the Heckman model should be considered.

Selection models are identified either through satisfying assumptions about the likelihood function or through an exclusion restriction in the second stage. Such a

⁹⁹ The OLS coefficients represent the effects of the variables on the expected value of observed contributions.

¹⁰⁰ Regarding the Y variable, y is known exactly only if some criterion defined in terms of y is met. As for the X variables, x variables are observed for the entire sample, regardless of whether y is observed exactly.

¹⁰¹ If sample selected, then y is observed only if a criteria defined in terms of some other random variable (Z) is met. x and w (the determinants of whether $Z=1$) are observed for the entire sample, regardless of whether y is observed or not.

variable should be exogenous, affect the decision to give, and not affect the decision over how much to give. In the Heckman, the choice model variables (w) should differ from the outcome model variables (x)¹⁰².

Both the Tobit and Heckman models make parametric assumptions about the distributional and functional form of the disturbances. A common drawback is that a failure of the distributional assumptions on the disturbances makes the coefficient estimates biased and inconsistent. Often, specification tests (tests for heteroscedasticity and non-normality are standard practices) raise doubts about the consistency of these methods. For the Heckman, the estimate is only consistent if the normality assumption in the first stage is satisfied. The Tobit also relies on the assumption of normality of disturbances.

As noted previously, the treatment of zero observations has implications for the correct modelling of charitable giving. Banks and Tanner (1997) note that since the non zero observations will represent a random subsample from the total population of givers, the results of estimation on the subsample of non zero observations should not be affected by excluding the zeros, and OLS will be an appropriate technique.

However, if the factors that determine the decision to give are different from the factors that determine the level of charitable giving, then there would be self selection, and the sample would be non random. If the participation decision is non random with respect to the decision about the level of giving, the set of taxpayers who donate is likely to be systematically different from the set of non givers¹⁰³.

A final remark made by Banks and Tanner (1997) notes that cross section profiles of charitable giving enable the identification of those characteristics that are likely to be important. However, simply observing variation in giving across a cross section of households is not sufficient to identify a particular factor as a determinant of charitable giving, since several of the characteristics considered are likely to be highly correlated (age and income, education and income).

4.4 Data Sources and Description

¹⁰² If the same variables are used, the second equation is only specified by the non-linearity of the probit selection equation. Thus, it is required to have additional variables in w . Thus, a variable controlling for employing a tax consultant is included only in the selection equation.

¹⁰³ Clotfelter (1985) notes that in samples containing both itemizers and nonitemizers it is incorrect to assume that the itemization decision is exogenous with respect to contributions.

The data are taken from the official FAST98 file of 1998 German tax declarations. It consists of a 10 percent representative random sample of all taxpayers, and contains information from income tax returns of circa three million tax declarations. For each income tax return, total taxable income is given as well as the deduction amount for all tax exemptions. It is therefore possible to separately list all tax deductions claimed for different types of giving. A plot of the main variables indicates a positive correlation between giving and income, and suggests donations increase with age.

Using the same dataset, Barbaro and Kaul (2006a) note that the top 20 percent of households earn about 50 percent of all income and the bottom 20 percent of all households earn about two percent of all income. Most taxes are paid by upper income groups. Given the progressive nature of the German tax system, such a result can be taken for granted for taxable income. The results also hold for gross income, which the authors take as a first indicator for effective progressivity of the German tax system. Taxpayers in the top 20 percent of the gross income distribution pay 65 percent of all income taxes, while taxpayers in the bottom 20 percent contribute almost nothing to total revenue. Roughly half of federal taxes are paid by taxpayers in the top 10 percent of the distribution and more than one fifth by the top one percent.

Several questions are of particular relevance to the understanding of contributions by individuals. First, it should be noted that the proportion of individuals who engage in philanthropic giving varies by type of giving. Overall, half of the individuals in the sample donate to philanthropy, with the other half deciding not to participate. The proportion of religious givers is about one third. For secular giving, this value is slightly higher, but below 0.4. Of the individuals in the sample, slightly less than 30 percent declare charitable contributions. This proportion falls to about 11 percent for education giving, five percent for political giving, and is indistinguishable from zero for giving to association of voters and heritage. However, about one third of the taxpayers in the sample declare giving to other non-profit organizations (Other).

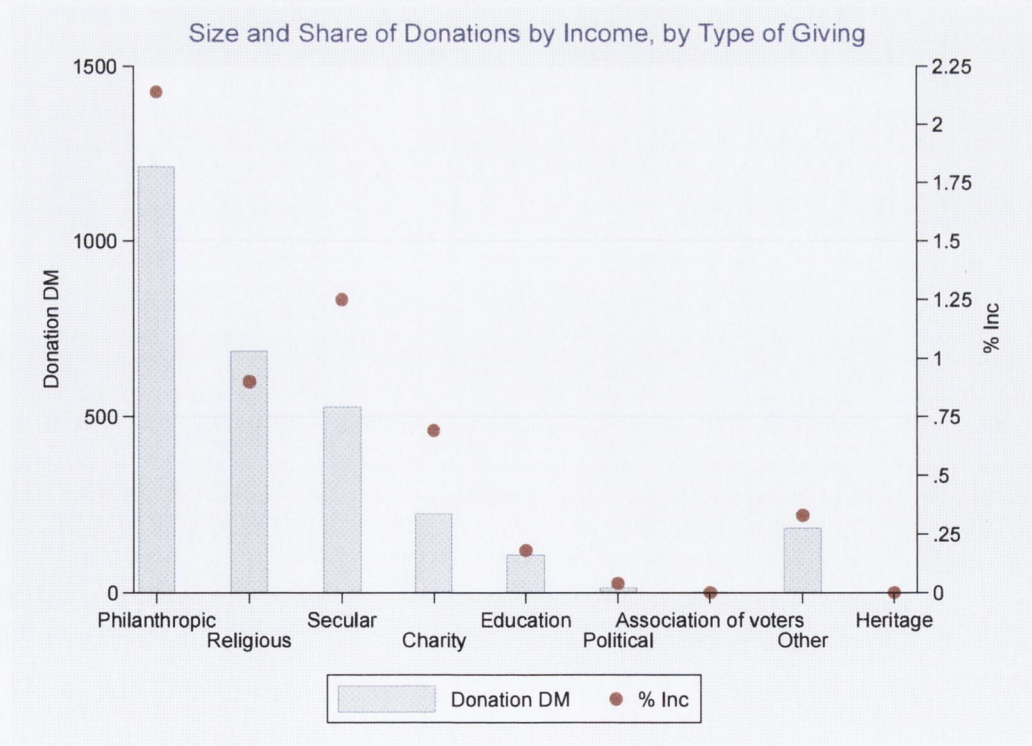
Second, the size of donations in DM is found to vary by type of giving. The average philanthropic contribution is of circa DM 1,200. Average religious donations are about one third higher than secular contributions, which are just above DM 500. Average donation to charity and Other appear similar in value, education contributions are circa half of the value of charitable giving, and average political giving is small, as illustrated in Figure 4.1.

Third, as a percentage of the income of taxpayers, philanthropic giving represents about 2.2 percent of total income. Secular giving corresponds to circa 1.25

percent of income, and religious giving is slightly below one percent. Charity contributions represent about 0.7 percent of income, and giving to Other is about 0.3 percent of the income of taxpayers. Contributions to political, association of voters and heritage are a very small percentage of income.

Fourth, it is important to understand the patterns of philanthropic giving when income changes. This can be done by looking at giving for the different income deciles. As a percentage of income, philanthropic contributions reach a peak of about eight percent of income for individuals in the first income decile (lowest 10 percent). It falls to about 1.5 percent for taxpayers in the second income decile, and continues to fall to a value slightly above one percent for the fourth decile. In the fifth decile, there is a marginal increase in the percentage of income donated to philanthropy. There is a significant increase in the sixth decile, to a value slightly below three percent. For the seventh income decile, this share drops to a value similar to that of the second decile, increasing slowly until the tenth decile, where the percentage of income donated by individual is about 2.5.

Figure 4.1: Size and share of contributions by Income, by Type of Giving

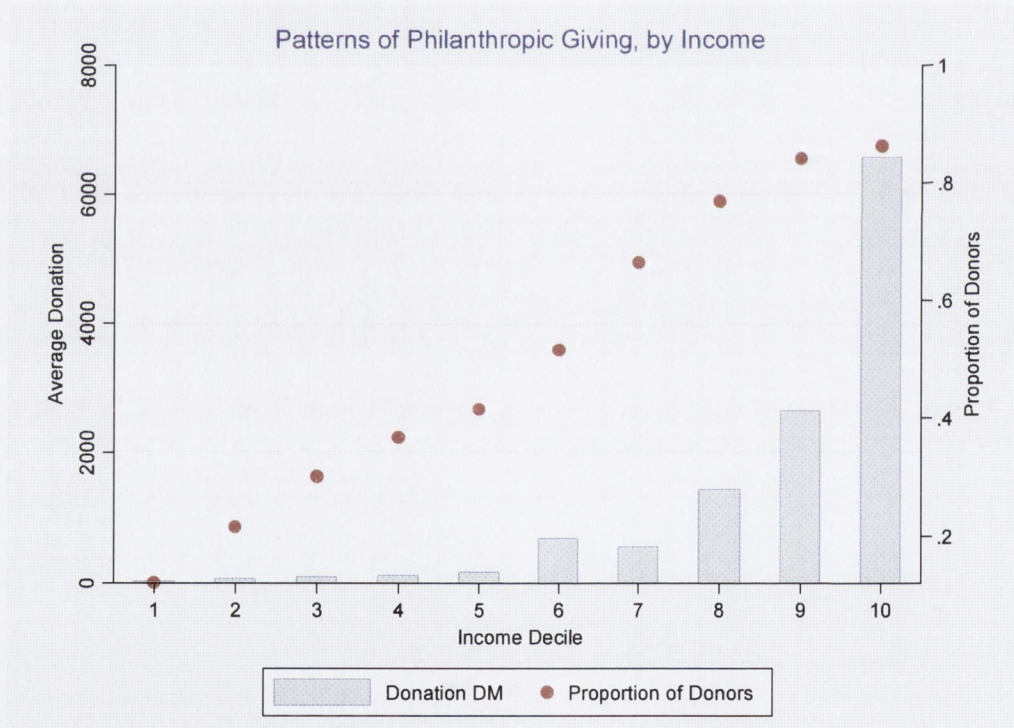


Source: own calculation

Fifth, the average donation in DM increases with income, in an exponential way. This is illustrated in Figure 4.2. The average donation in the tenth income decile is more than double of that of the ninth decile.

Sixth, the proportion of individuals who engage in philanthropic giving also increases with income. This probably occurs in a non linear way, as it increases at decreasing rates from the lowest income decile up to the fifth decile, and again at a decreasing rate from the sixth until the tenth¹⁰⁴. The proportion of taxpayers who contribute in the first income decile is close to zero, increasing to above 0.2 for the second decile, reaching 0.5 in the sixth decile, and leveling at a value above 0.8 at the ninth decile.

Figure 4.2: Patterns of Philanthropic Giving, by Income Decile



Source: own calculation

Finally, it is also relevant to note how contributions to different types of giving, as a percentage of total philanthropic giving, change as income increases. Figures 4.B.1 to 4.B.4 graphically display these relations, for secular and religious giving. As a share of total philanthropic giving, religious contributions increase with income. Secular giving represents about 80 percent of philanthropic giving for individuals in the lowest

¹⁰⁴ A logarithm function running from income deciles one to five, and another from income deciles six to ten would probably fit the data better than a simple line.

income decile and remains the main type of philanthropic giving for individuals until the sixth decile. However, for taxpayers in the upper half of the income distribution, religious contributions dominate philanthropic giving. In income deciles seven, eight and nine, secular giving represents 40 percent of total philanthropic giving. This share increases slightly for individuals in the highest income decile.

Table 4.1 provides descriptive statistics of the main variables used. The dependent variable is the amount donated by the individual¹⁰⁵. Education, Charitable, Political, Association of Voters refer to contributions listed by taxpayers as special expenses, in their tax returns. Heritage refers to the asset tax, to allowances for built monuments and historic buildings. Religious corresponds to the special expenses listed as deductible church tax¹⁰⁶. Secular refers to the sum of non religious giving, and philanthropy to the sum of religious and secular contributions.

In the sample, 94.3 percent of taxpayers pay income tax, and 5.3 percent have no income tax due. Taxpayers with zero taxable income don't report any donations at all, but it is not true that they are all very low income taxpayers. The majority of taxpayers are male, 73.3 percent. The average age of taxpayers in the sample is 45.56 years, with standard deviation 17.76. The median age is 42 years. There is not much difference in age between males and females: the average age of males is 45.2 years (standard deviation 16.69) and for females it is 46.27 (standard deviation 19.68).

Table 4.1: Descriptive statistics

Variable	n	Mean	S.D.	Min	Quantiles			Max
					0.25	Median	0.75	
Philanthropy	2,867,337	1,214	81,682	-51	0	0	554	1.23E+08
Religious	2,867,337	686	6,434	0	0	0	168	9.21E+06
Secular	2,867,337	528	81,399	-51	0	0	124	1.23E+08
Education	2,867,337	107	20,771	0	0	0	0	2.97E+07
Charity	2,867,337	222	78,626	0	0	0	31	1.23E+08
Political	2,867,337	14	1,166	0	0	0	0	1.70E+06
Association of Voters	2,867,337	0.41	98	0	0	0	0	1.61E+05
Heritage	2,867,337	0.08	53	0	0	0	0	60,403
Other	2,867,337	184	1,073	-102	0	0	60	2.38E+05
Income	2,792,860	68,305	5.13E+05	-3.50E+08	7,361	15,714	74,806	1.63E+08
Tax Price	2,150,372	0.89	0.16	0.23	0.80	0.97	0.99	1
Age	1,747,248	46	18	9	31	42	60	78

Source: own calculation

¹⁰⁵ It is important to note that due to the tax code, the value of contributions for fiscal purposes can be negative.

¹⁰⁶ This variable is very similar to another containing church tax paid.

The average taxpayer marginal tax rate is 11 percent, with standard deviation 0.16. The median is 0.03, the minimum is zero and the maximum is 77 percent. The average taxpayer income is 68,305 euros, and the standard deviation is huge, as expected. A small number of individuals reports very large losses or very high incomes. Males have average incomes of 81,114 euros, while for females this average is only 28,516 euros. The overall median income is 15,714 euros, 23,620 euros for males, and 9,729 euros for females. As the marginal tax rate is a function of income, males have higher marginal tax rates than females. The average marginal tax rate for males is 0.12, while for females it is only 0.01. As the marginal tax rate increases, the tax price of giving decreases. This implies female taxpayers have, on average, very high tax prices.

The majority of taxpayers in the sample are residents in West Germany, 74.41 percent. In relation to the percentage of population per Länder and the proportion of population in sample, the dataset overrepresents smaller Länder.

There are four types of assessment in the sample: individual assessment (single persons), remainder (widows/widowers), and separate or together (married persons). The majority of tax returns in the sample correspond to taxpayers filing together, 55.45 percent. 42.45 percent are individual assessments. Separate assessments represent 1.59 percent and widows/widowers 0.51 percent. A cross tabulation of joint or individual assessment and the type of assessment is presented in Table 4.2.

Table 4.2: Cross tabulation Joint (dummy) and Type of Assessment

Type of Assessment	Marital Status: Married (dummy)		
	% Individual	% Joint	Total Taxpayers
Separate Assessment	3.61	0	42,941
Together (without widows/widowers)	0	99.09	1,499,172
Individual assessment	96.39	0	1,147,840
Remainders (Widows/er)	0	0.91	13,818
Total	100	100	2,703,771

Source: *own calculation*

A variable to control for marital status is created by coding taxpayers with individual assessments as being single and taxpayers who elect to report their income tax return together as being married. If married individuals give more to charity than single individuals, the coding of taxpayers with separate assessment (but married) as single should bias the estimate of single upwards.

In their investigation of the impact of estate and gift taxes on charitable giving in the US, Bakija, Galle, and Slemrod (2003) note that the returns filled by widowers represent 63 percent of the aggregate value of charitable bequest deductions. In the

FAST98 dataset, widows/widowers are classified as filing jointly. Considering widows/widowers as married individuals may also introduce bias to the estimates, if their giving behaviour is different from that of married individuals. However, given both the relatively small number of taxpayers with separate assessment and widows/widowers, it is unlikely that these biases will be significant.

The number of dependents is assumed to impact charitable giving, and information on the number of children is included in the dataset. 55.69 percent of taxpayers have no children, 21.43 percent have one child, 16.77 percent have two children, 4.71 percent have three, and 1.4 percent of taxpayers have four children. It is also possible to identify the importance of different sources of income, the amount spent on tax consultants, and the amount deducted due to charges with inheritance taxes. These last two variables are transformed into dummies. 75.11 percent of taxpayers report no expenses with tax consultancy, and 99.99 percent do not deduct charges associated with inheritance taxes.

Income tax returns contain information on the single taxpayers, or both taxpayers, if married. To account for the effects of age, religion, social classification, industry code and independent worker by class, these variables are considered for the head of household (HOH), considered as the individual who filed the tax return. In relation to the head of household, 49.52 percent are not self employed, 43.85 percent are self employed, and 6.63 percent are old age beneficiaries. 36.55 percent report to have no religious denomination, 35.2 percent to be Evangelic, 28.22 percent to be Catholics, and 0.04 percent as other denominations.

4.5 Empirical Results

The results for both the Tobit and the Heckman¹⁰⁷ are reported in Annex 4.C. Comparing the magnitude of the Tobit and Heckman estimates is not appropriate, as they refer to different models.

For philanthropic giving, the results of the Probit estimation¹⁰⁸ in the first step of the Heckman are reported in Table 4.C.1, indicating that all the variables in the model

¹⁰⁷ The two step method is used in the estimation.

¹⁰⁸ The value of the log likelihood is -568,883. The Wald test for the hypothesis that all coefficients, except the intercept term, are equal to zero, produces highly significant values. The Stata reported Pseudo R² is 0.292. Heteroscedasticity and non normality were tested for. As the correct form of heteroscedasticity was not found, robust standard errors were used in the estimation. Non normality is also detected, indicating the parametric assumptions may be violated.

have a significant effect on the probability of giving to philanthropy. The variables that have a positive effect on the probability of philanthropic giving are: income, age, being a female, being an independent worker, having employed a tax consultant and having a religious faith. The variables that negatively impact the probability of philanthropic giving are: the price of giving, the number of children, being married, and living in an Eastern Land. In relation to the predictive accuracy of the Probit model, the percentage of correctly classified predictions is 78 percent.

The probability of giving to philanthropy is 0.368 probability points, or 37 percent points. In terms of elasticities, a one percent increase in income increases the probability of giving by 0.492 percent points. A one percent increase in the price of giving decreases the probability of giving by 0.489 percent. In terms of marginal effects, being female increases the probability of giving by 0.009 probability points. Being married, and being a resident of an Eastern Land decrease the probability of giving. Compared to taxpayers who declare to have no religious denomination, being religious increases the probability of giving. The probability of giving by individuals living in Western Länder, either married or not, is always higher than the probability of giving by those that live in Eastern Länder.

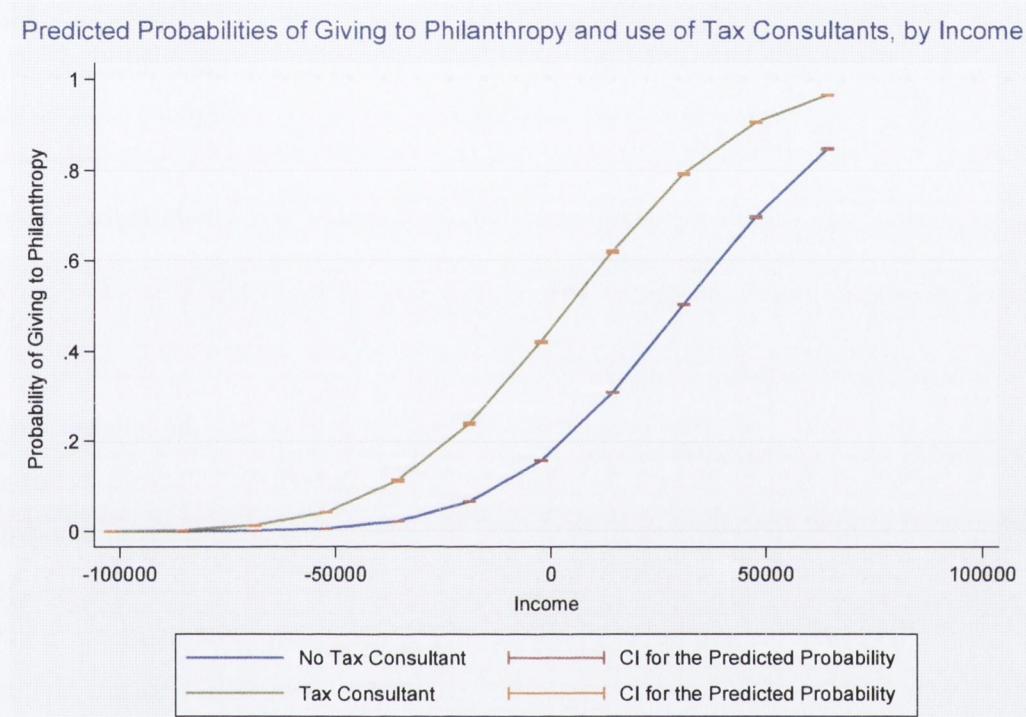
Increasing income from the minimum to the maximum increases the probability of contributing to philanthropy by 0.86 probability points. Likewise, varying age from the minimum to the maximum increases the probability of contributing by 0.24. Increasing the price of giving from the minimum to the maximum decreases the probability of giving to philanthropy by 0.13 probability points.

Being an independent worker and employing a tax consultant results in a probability of giving of 0.70, while for those not employing a tax consultant the probability is only 0.42. The probability of being a giver, not being an independent worker and not employing a tax consultant is 0.32, while for those employing a tax consultant this predicted probability increases to 0.61. Figure 4.3 illustrates this relation, showing that the probability of contributing to philanthropy increases as income increases, being always higher for taxpayers employing tax consultants.

The probability of giving varies by income decile, as reported in Table 4.C.2. The positive effect of employing a tax consultant, being an independent worker, having a faith, and the negative effect of living in an Eastern Land are consistent for all the

income deciles¹⁰⁹. The effects of being a female, being married, age, and number of children change sign as income increases.

Figure 4.3: Predicted Probabilities of Giving to Philanthropy and use of Tax Consultants, by Income



Source: own calculation

The probability of giving to philanthropy for a taxpayer in the first income decile is 0.402 probability points. This value drops to 0.156 for taxpayers in the second income decile, increasing for all the remaining income deciles. For taxpayers in the third and fourth income deciles, a one percent increase in income increases the probability of giving by more than one percent. For taxpayers in income deciles higher than the sixth, this effect precipitates. A one percent increase in the price of giving decreases the probability of giving by 1.625 percent for taxpayers in the first income decile. For all the other income deciles this value is smaller than one percent, varying considerably.

The probability of giving also varies for different types of giving. For secular giving it is 0.19 probability points, falling to 0.14 for religious giving. For charity and other contributions the probabilities are similar, in the range of 0.13, dropping to 0.05 for giving to education, and to 0.01 for political contributions.

¹⁰⁹ For income deciles nine and ten it is not possible to obtain estimation results.

The positive effect on the probability of giving of employing a tax consulting and having a faith are observed for all types of contributions. The variables number of children, age, and being married have positive impact on contributions, except for religious donations, where they impact the probability of giving negatively. Being a female has a positive impact on secular giving, charity, education, and other. Living in Eastern Länder has a positive effect in the probability of giving to education and to associations of voters. Being an independent worker has a positive effect on giving, except for associations of voters, where it decreases the probability of contributing.

A one percent increase in income has the highest impact on the probability of giving for religious contributions, where it increases the probability by 1.04 percent. For secular, charity, education and association of voters, the effect is very similar, being in the range of 0.37 percent. It is slightly lower for political contributions, 0.33 percent, and higher for other donations, 0.55 percent.

A one percent increase in the tax price also has the highest impact on the probability of giving for religious giving, where it falls by 1.80 percent. For political and contributions to associations of voters, increases in the tax price lead to a decrease in the probability of giving. A one percent increase in the tax price increases the probability of secular giving by 0.03 percent, charitable giving by 0.04 percent, contributions to education by 0.002 percent, and other contributions by 0.15 percent. The estimates for heritage giving are not statistically significant.

The OLS results in the second step of the Heckman are reported in Table 4.C.3, indicating that contributions are tax price inelastic and that the deductions for contributions lose more tax revenue than the increases in contributions¹¹⁰. The price elasticities found do not exceed the gold standard of minus one that would indicate treasury efficiency. Tests of sample selection indicate that the coefficients of lambda are statistically different from zero, thus indicating that sample selection is present¹¹¹.

For philanthropic giving, the coefficient on the inverse Mills ratio term is 307.89 (reported p-value is 0.000). The sign of this coefficient is the same as the sign for ρ , which indicates the correlation between the unobservables in the selection and outcome equations.

For philanthropic giving, the income elasticity of contributions is marginally above unity, indicating that a one percent increase in income will increase philanthropic

¹¹⁰ Elasticities are computed at the mean values.

¹¹¹ The standard t-test of the null that $\beta_\lambda = 0$ is a test of the null that there is no selection bias, conditional on the assumptions of the model.

contributions by 1.005 percent. The price elasticity found is very small, -0.055, and contributions are not sensitive to price changes. Age, being an independent worker, and having a faith positively affect the amount given to philanthropy. Being female, married, the number of children, and living in the Eastern Länder have a negative impact on the amount donated. Self employed individuals contribute more than not self employed, and old age beneficiaries contribute the least. In relation to Land or residence, taxpayers residing in Hamburg, Niedersachsen, Bremen, Brandenburg, and Sachsen-Anhalt contribute less than those living in Nordrhein-Westfalen (reference category).

Being an independent worker increases the amount given to philanthropy by DM 181, living in an Eastern Land decreases the contribution by DM 89, being female reduces the amount given by DM 15, being married by DM 83. Increasing age by one year increases (all else equal) increases giving by DM 5. Compared to a taxpayer who claims to have no religious denomination, Evangelics give more DM 438, Catholics more DM 446, and those who profess other religions more DM 503.

By type of giving, it is found that the elasticities vary considerably depending on type. For secular giving, the income elasticity found is 0.393 and the price elasticity 0.2, indicating secular giving is a normal good and price inelastic. In relation to religious giving, the income elasticity is 2.067 and the price elasticity is -0.58. Thus, religious contributions are a luxury good and less price inelastic than secular donations. The signs of the demographic variables are overall consistent with the findings for philanthropic giving.

Secular giving can be further decomposed into giving to charity, education, political parties, association of voters, heritage, and other. The elasticities found indicate income and price elasticities both below unity.

Table 4.C.4 reports the Heckman estimation results for philanthropic giving, by income decile, indicating that there are substantial variations in the elasticities by level of income. For taxpayers in income deciles up to the sixth, contributions to philanthropy are a normal good, becoming a luxury good for taxpayers in the higher income deciles. The highest price elasticity is found for taxpayers in the fourth income decile, 0.577, and the lowest value is found for taxpayers in the sixth income decile, -0.069.

The Tobit results are reported in Tables 4.C.5 and 4.C.6. Most of the predictions in the model are significant at the 0.001 level. Overall, the conclusions do not differ very much from the Heckman findings. For philanthropic giving, the Tobit produces an income elasticity of 2.168 and a price elasticity of -0.405. For secular contributions, the income and price elasticities are 5.274 and 0.066, respectively; while for religious

contributions they are, respectively, 2.302 and -0.643. Only for political donations does the Tobit produce a price elasticity greater than one in absolute value, indicating treasury efficiency.

For philanthropic giving, the log likelihood is -4,697,774. The Likelihood Ratio test for the hypothesis that all coefficients, except the intercept term, are equal to zero, is 253.93. The corresponding p-value is reported as 0.000. The Pseudo R squared is 0.0263¹¹². Testing for normality indicates mild non normality in the tails.

4.6 Conclusions

The results reported in the previous section are in line with recent research findings that giving is tax price inelastic, suggesting that the itemized deductions for contributions lose more tax revenue than the increase in giving, and are therefore not treasury efficient. This adds to the literature that challenges the *consensus view* that prevailed in the charitable contributions literature until the 1990s.

Andreoni (2006) provides an overview of the literature, noting that there is a wide range of price elasticity estimates found. Because of the major policy implications of this difference, further research is required. The first empirical analysis by Taussig (1967) introduced the constant elasticity, or log-log specification, and the set of variables that would become standard in the literature: the amount of gifts to charity, the tax price of giving, and the set of demographic variables, such as age, education, marital status, number of children, and state of residence. The important studies by Feldstein and Clotfelter (1976) and Feldstein and Taylor (1976) found price elasticities of -1.1 to -1.5 and income elasticities of 0.70 to 0.80, estimates that did not change much in the extensive literature that followed. In Clotfelter's 1985 survey, the consensus was that price elasticities were in the range of -1.3 and income elasticities around 0.7. However, in the 1990s studies began to report price elasticities that fell much higher and lower than -1. Studies that used specifications other than the log-log consistently found smaller price elasticities.

Two relevant investigations, because they use panels of tax returns that include periods of tax reform, are the Randolph (1995) and the Auten, Sieg and Clotfelter (2002) papers. Randolph (1995) notes that in a cross section people are adjusting the timing of their contributions because of fluctuations in their own marginal tax rates, and this will

¹¹² Woolridge (2002) notes that the Tobit estimates are not chosen to maximize and R-squared, they maximize the log likelihood function.

have the effect of overstating the price elasticities of giving. By differentiating between temporary and permanent changes in price, it is possible to identify short run and long run elasticities. Randolph (1995) reports that the *consensus* elasticities of the prior literature fall between the permanent and transitory measures, with permanent income elasticity being 1.3 and permanent price elasticity -0.08. Transitory income elasticity is much lower, 0.09, and transitory price elasticity much higher, -2.27. This supported the speculation that the prior literature had both understated income elasticities and overstated price elasticities. Randolph notes that for tax policy predictions, it is the permanent behavioural effects that matter most. Auten, Sieg, and Clotfelter (2002) use a different approach and extend the same dataset, reporting findings that contradict those of Randolph (1995). The elasticity of the permanent income is 0.87 and the permanent price elasticity -1.26, exceeding the gold standard of -1. These findings question that cross sectional studies seriously overstate price elasticities by merging temporary and permanent effects. The transitory income elasticity reported is 0.29, and the price elasticity -0.40. Different estimation methods and different specifications of the regression equation help explain the different findings.

Most of the literature uses U.S. data and focuses on charitable giving, where charitable is used to represent philanthropic giving, and not exclusively giving to charity. Although one of the objectives of this study is to contribute to the discussion on charitable/philanthropic giving, international comparisons can only be made with caution. This is related to differences in data and definitions, different tax systems and national preferences. For example, the U.S. and the German tax systems are distinct: the amount deductible is much lower in Germany (up to 50 percent in the U.S., in contrast with five or ten percent in Germany), and German Länder do not impose income taxes and allow tax deductions, as US States do.

The findings reported in the previous section can be referenced to the study of charitable giving in West Germany, by Paqué (1982a). The estimate of the income elasticity is similar, indicating giving is a luxury good. However, the most important estimate in philanthropic giving studies is the price elasticity, and the results are very different. Where Paqué (1982a) reports a value of 1.378, the results presented in the previous section indicate philanthropic contributions to be very price inelastic. The differences are certainly attributable to different data being used, different years, and the fact that Germany was a re-unified country in 1998.

The main result found is that the losses to the treasury in foregone revenue are larger than the increase in the amount donated to philanthropy. If the tax deduction did

not exist, taxpayers would not be able to use it to avoid taxes, and a general lower level of taxation for all taxpayers would generate the same amount of tax revenue. This lower level of taxation would leave all non givers to philanthropy (about half of the taxpayers in the sample) with higher disposable incomes, thus improving their welfare.

In line with other findings in the literature on charitable giving, age is associated with higher levels of giving. Other factors that impact giving positively are being an independent worker, employing a tax consultant, and being religious. In contrast to results from other countries, females and married taxpayers donate less. This can be due to the fact that female taxpayers report much lower incomes than males, and thus face a much higher tax price of giving. The number of dependents (number of children) also reduces both the probability of being a giver and the amount given to philanthropy.

The interpretation of the impact of religion should bear in mind that in Germany there is a church tax of eight or nine percent of income, which is deductible, and compulsory for taxpayers who are religious. The majority of taxpayers in the sample report having no religious denomination, and in reference to them, Evangelics, Catholics and taxpayers with other denominations give more to philanthropy.

This Chapter separately estimates the elasticity of giving to all organizations (philanthropic giving), separates between religious and secular giving, and further details secular giving by contributions to charity, education, political, association of voters, heritage and other. It also investigates giving by income decile, thus helping to better display how giving changes as income increases.

As a consideration for tax design, the existence of tax deductions increases the complexity of the tax system and raises the administrative and tax compliance costs. In Germany, no definite answer exists as to whether the tax deductions in the tax system counteract the pretended progressivity of the income tax. As the difference between gross income and taxable income rises with income, it is evident that richer taxpayers are more likely to manipulate their tax base. Donating to charity can be seen as engaging in tax avoidance. Tax deductions question the distributional effect of progressive income taxation, reinforcing the view of taxpayers with lower income that tax breaks are a means for richer taxpayers to avoid paying taxes.

The design of a tax system consists of defining a tax base and a tax schedule that applies to the tax base. The tax schedule is progressive: the higher an individual's income, the higher the proportion of income paid in taxes. Tax brackets are defined so that marginal tax rates¹¹³ rise with income. The tax base ought to reflect a comprehensive measure of income adjusted for tax provisions designed to reflect a taxpayer's ability to pay taxes, following Adam Smith's taxation maxims. Tax savings question the intended distributional impact of progressive income taxation, and the German tax system is perceived to be unfair by many taxpayers, in particular those with lower incomes.

The two cornerstones of tax policy towards philanthropic giving are the tax deductions for contributions in the major federal taxes (the personal income tax, the corporate tax, and the estate tax) and the tax exempt status generally accorded to non-profit institutions. The deductions affect philanthropic giving directly¹¹⁴, whereas the tax exempt status has an indirect impact.

There are two kinds of limitations on the deductibility of contributions: limits on the amount that can be deducted and restrictions on what kinds of organizations are qualified to receive tax deductible gifts.

In both Germany and the U.S. the same tax provisions exist, but they are significantly different. In the U.S., the non-profit sector is distinct from government and the for profit sector. Nonprofits qualify to receive tax deductible philanthropic contributions. Philanthropic contributions are deductible in computing the income tax liability but only when deductions are itemized¹¹⁵. The sum of charitable gifts, state and local taxes, mortgage interest, and a number of other items in excess of a certain threshold (the standard deduction) is deductible in computing taxable income. For those who itemize, the general rule is that philanthropic contributions are deductible as long as they do not exceed 50 percent of the adjusted gross income (AGI) or 30 percent for transfers other than cash. The standard deduction is elected by many low and middle income taxpayers, leaving only a portion of the taxpaying public eligible to deduct their contributions (itemizers). The present maximum of 50 percent was adopted in 1969. Charities for which the 50 percent limitation applies include all churches, public

¹¹³ Marginal tax rate is defined as the proportion of an additional euro that must be paid on tax.

¹¹⁴ By reducing taxable income and thus tax liability, the deduction has the effect of lowering the net cost of making donations.

¹¹⁵ Itemizers list deductions from taxable income on their tax returns.

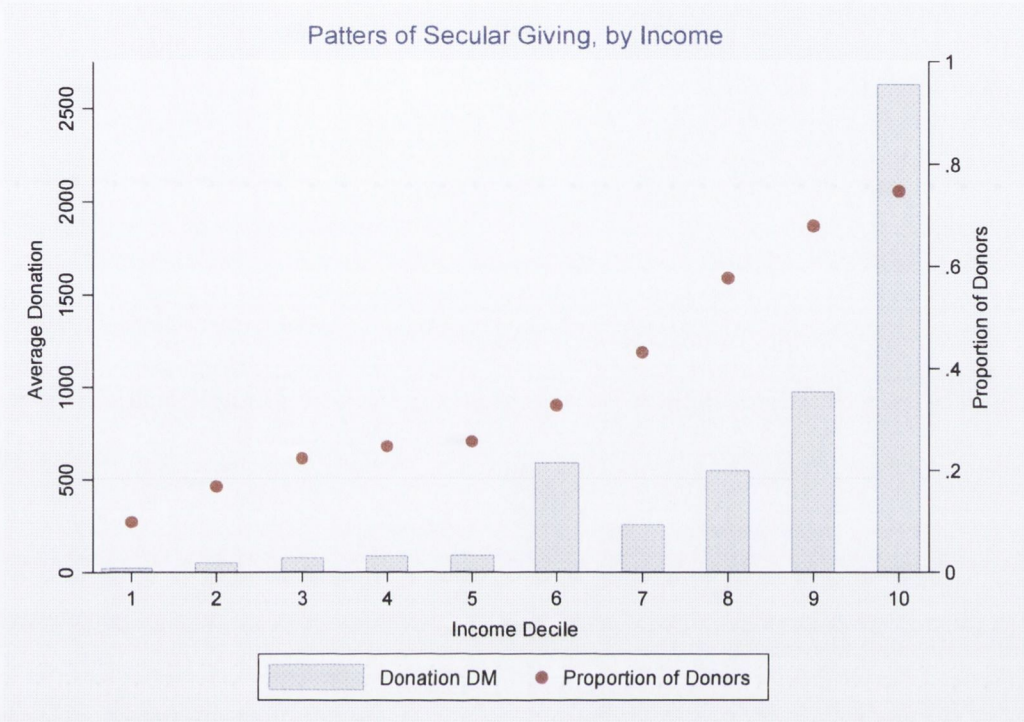
charities, educational institutions, government agencies, and certain private foundations. Contributions to the first group of charities that exceed the 50 percent limit may be carried forward as deductions for five years.

In Germany, the non-profit, Government and for profit sectors overlap. Eligibility to receive tax deductible donations is dependent on an organization being public benefit (*gemeinnützig*), and the definition of what constitutes public benefit is essentially defined by provisions in various tax laws. There is a personal allowance for both single persons and married couples (jointly taxed), and contributions to German charities and certain international charities are deductible up to five or ten percent of AGI. Church members are required to pay a church tax at a rate of eight or nine percent of their income tax payable, which is fully deductible.

Therefore, although the same tax provisions appear to exist in both federal countries, they are substantially different. Different tax policy decisions are a result of pre-existing tax systems and national preferences, with international convergence being unlikely. The different levels and mix of taxes result from differences in the level and composition of public spending. The tax systems are also different. In Germany all the income taxes are federal and income state tax deductions for philanthropic purposes do not exist.

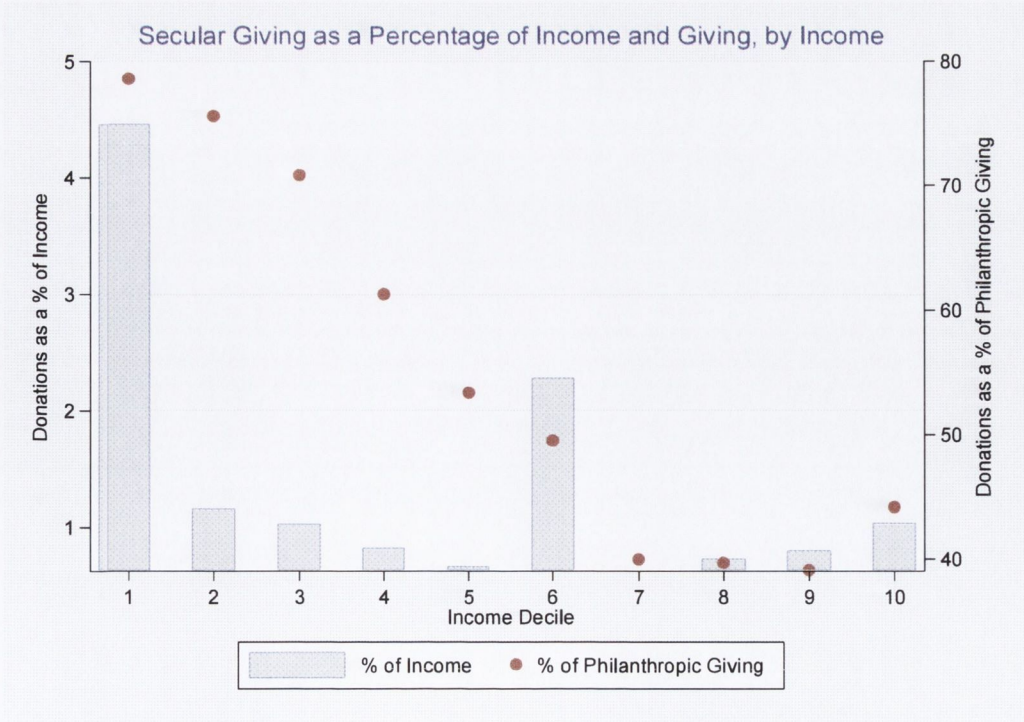
The U.S. tax system is a global system with equity in taxation defined on a citizenship basis. It is also a classical system, with the corporate sphere separated from individual sphere (thus raising the issue of double taxation of dividends). Like other European tax systems, the German tax system is a territorial system with mitigated classical system. A global tax system was replaced by a schedular tax system, in the form of mitigated classical systems (dual income systems): earned income is taxed at higher rates than capital income, which is taxed at flat rates, usually lower.

Figure 4.B.1: Patterns of Secular Giving, by Income Decile



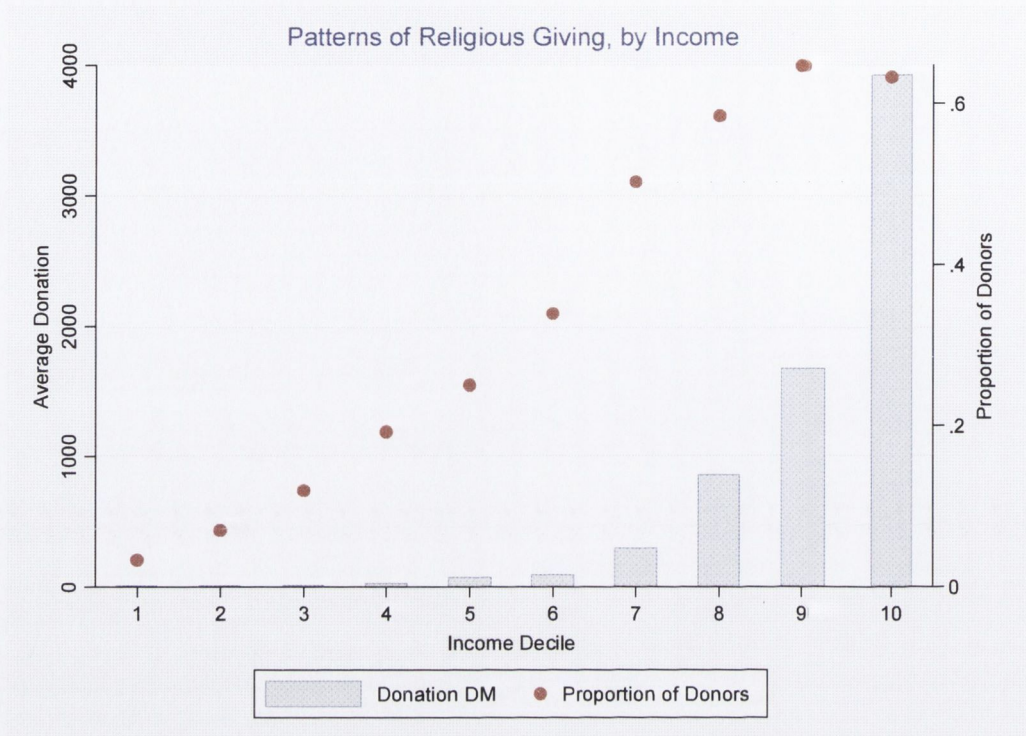
Source: own calculation

Figure 4.B.2: Secular Giving as a % of Income and Giving, by Income Decile



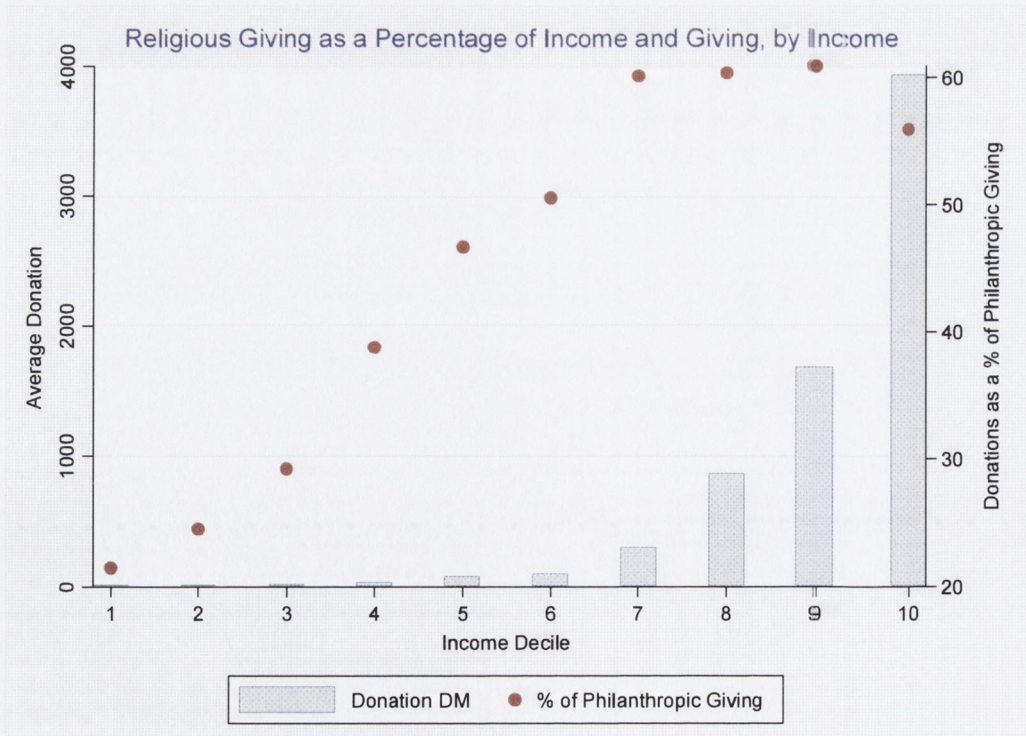
Source: same as Figure 4.B.1

Figure 4.B.3: Patterns of Religious Giving, by Income Decile



Source: same as Figure 4.B.1

Figure 4.B.4: Secular Giving as a % of Income and Giving, by Income Decile



Source: same as Figure 4.B.1

Table 4.C.1: PROBIT estimation results, by Type of Giving (sign of Marginal Effect indicated)

	Pr(Give)	ie		pe		Tax Cons.		Indep. Worker		East		Female		Married		Age		N. of Child.		Evangelic		Catholic		Other		Social Class		Land	
Philanthropy	0.368	0.492	***	-0.489	***	0.285	***	0.101	***	-0.107	***	0.009	***	-0.068	***	0.003	***	-0.024	***	0.454	***	0.453	***	0.387	***	-3,4,5,6	***	-3,12,15	***
Religious	0.144	1.038	***	-1.796	***	0.161	***	0.021	***	-0.066	***	-0.010	***	-0.101	***	-0.000	***	-0.031	***	0.667	***	0.716	***	0.726	***	-3,4,5	***	-3,9	***
Secular	0.188	0.372	***	0.025	***	0.152	***	0.082	***	-0.020	***	0.037	***	0.045	***	0.004	***	0.006	***	0.076	***	0.077	***	0.047	***	-3,4	***	12,15	***
Charity	0.131	0.364	***	0.040	***	0.122	***	0.048	***	-0.043	***	0.030	***	0.037	***	0.003	***	0.005	***	0.064	***	0.069	***	0.052	***	-3,4	***	12,15	***
Education	0.052	0.369	***	0.002	***	0.020	***	0.032	***	0.015	***	0.011	***	0.009	***	0.001	***	0.002	***	0.012	***	0.008	***	-0.014		-4	***	12,15	***
Political	0.013	0.329	***	-0.266	***	0.005	***	0.005	***	-0.006	***	-0.007	***	0.003	***	0.001	***	0.001	***	0.005	***	0.006	***	-0.004		-4	***	-2,4,9	***
Association	0.0004	0.381	***	-0.069	***	0.000	***	0.000		0.001	***	-0.000	***	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***	-4	***	-11	***
Other	0.137	0.549	***	0.154	***	0.176	***	0.062	***	-0.017	***	0.035	***	0.008	***	0.003	***	0.002	***	0.083	***	0.087	***	0.088	***	-4	***	-12	***
Heritage	0.000	-0.098		1.454										-0.000		0.000		0.000				-0.000							

Source: own calculations

Note 1: Social Classes one and two refer to not self employed (with and without lump sum payments, respectively), three and four to old age beneficiaries (with and without lump sum payments, respectively), and classes five and six to self employed taxpayers (with and without lump sum payments, respectively). Base category is Social Class two. Land one corresponds to Schleswig-Holstein, two refers to Hamburg, three to Niedersachsen, four to Bremen, five to Nordrhein-Westfalen, six to Hessen, seven to Rheinland-Westfalen, eight to Baden-Wuttemberg, nine to Bayern, 10 to Saarland, 11 to Berlin, 12 to Brandenburg, 13 to Mecklenburg-Vorpommern, 14 to Sachsen, 15 to Sachsen-Anhalt, and 16 to Thuringen. Lans base category is Nordrhein-Wesfalen.

Note 2: *** indicates estimate is statistically significant at the 1 percent level, ** at 5 percent level, and * at 10 percent level.

Note 3: *ie* correponds to the Income Elasticity ($\delta G / \delta Y \cdot \bar{Y} / \bar{G}$) and *pe* to the Price Elasticity ($\delta G / \delta P \cdot \bar{P} / \bar{G}$).

Note 4: Number of observations for Philanthropy, Religious, Secular, Charity, Education, Political and Other is 1,191,110; for Association is 1,190,828; and for Heritage is 112,657. The number of observations will be the same for Table 4.C.3 and Table 4.C.5.

Table 4.C.2: PROBIT estimation results, by Income Decile, for Philanthropic Giving (Marginal Effects)

	Pr(Give)	ie		pe		Tax Cons.		Indep. Work.		East		Female		Married		Age		N. of Child.		Religion	
Aggregate	0.368	0.492	***	-0.489	***	0.285	***	0.101	***	-0.107	***	0.009	***	-0.068	***	0.003	***	-0.024	***	+	***
1st	0.402	0.306	***	-1.625	***	0.142	***	0.025	***	-0.012	***	0.006	***	0.004	***	0.001	***	0.006	***	+	***
2nd	0.156	0.621	***	-0.515	***	0.252	***	0.077	***	-0.021	***	-0.005	***	-0.025	***	0.002	***	-0.001	***	+	***
3rd	0.252	1.031	***	-0.239	***	0.268	***	0.079	***	-0.022	***	-0.019	***	-0.068	***	0.002	***	-0.023	***	+	***
4th	0.342	1.141	***	-0.067	***	0.286	***	0.103	***	-0.169	***	-0.032	***	-0.132	***	0.0004	***	-0.075	***	+	***
5th	0.417	0.648	***	-0.215	***	0.268	***	0.137	***	-0.203	***	-0.017	***	-0.210	***	-4E-04	***	-0.107	***	+	***
6th	0.556	0.702	***	-0.542	***	0.230	***	0.123	***	-0.063	***	0.047	***	-0.227	***	0.001	***	-0.068	***	+	***
7th	0.794	0.279	***	-0.183	***	0.132	***	0.089	***	-0.146	***	0.060	***	0.001	***	0.003	***	-0.016	***	+	***
8th	0.874	0.072	***	0.002	***	0.076	***	0.053	***	-0.047	***	0.033	***	0.090	***	0.002	***	0.004	***	+	***
9th																					
10th																					

Source: same as Table 4.C.1

Note 1: It was not possible to obtain estimates for the last two income deciles.

Note 2: Number of observations for Aggregate is 1,191,110; for income decile one 148,045; decile two 145,833; decile three 157,807; decile four 169,363; decile five 176,925; decile six 165,503; decile seven 168,494; and decile eight 47,854. The number of observations will be the same for Table 4.C.4 and Table 4.C.6.

Table 4.C.3: HECKMAN estimation results, by Type of Giving

	ie		pe		Indep. Work.		East		Female		Married		Age		N° Child.		Evangelic		Catholic		Other		Länder		Social Class	
Philanthropy	1.01	***	-0.06	***	181.57	***	-89.77	***	-14.84	***	-83.20	***	5.50	***	-25.60	***	438.35	***	446.40	***	503.85	***	-(2,3,4,12,15)	***	+(5,6), -(3,4)	***
Religious	2.07	***	-0.58	***	51.13	***	-122.29	***	-34.94	***	-212.70	***	1.04	***	-60.28	***	1,005.59	***	1,011.25	***	942.26	***	-(12,15)	***	+(3,4,5,6)	***
Secular	0.39	***	0.20	***	94.01	***	-10.56		-7.30	**	-4.43		1.60	***	-0.51		-11.51	***	-5.89		108.65	**	+(12,15)	**	-(3,4,5,6)	***
Charity	0.20	***	0.19	***	37.32	***	2.55		-6.93	***	-2.25		0.41	***	-0.30		-14.09	***	-16.02	***	56.61				+(3,4,5,6)	***
Education	-0.08		0.12	***	5.00		-1.58		-4.06	***	-10.48	*	-0.04		-1.58		-5.54		1.49		15.42					
Political	0.48	***	0.20		4.07	***	0.40		-0.12		0.12		0.04		0.13		0.06		-0.30		0.53					
Association	0.09		0.11		-0.16	***	-0.15		0.05		-0.05		0.00		-0.01		-0.01	***	0.00	***						
Other	0.62	***	0.26	***	36.71	***	1.97	***	-1.60	***	5.46	***	0.58	***	0.24		-2.06	***	-1.13	**	37.61	***	-(12,15)	***	+(3,4,5,6)	***
Heritage	-77.36		309.58								-20.91		1.44		10.91											

Source: same as Table 4.C.1

Table 4.C.4: HECKMAN estimation results, by Income Decile, for Philanthropic Giving

	ie		pe		Tax Cons.		Indep. Work.		East		Female		Married		Age		N° Child.		Religion	
Aggregate	1.01	***	-0.06	***			181.57	***	-89.77	***	-14.84	***	-83.20	***	5.50	***	-25.60	***	+	***
1 st	-0.27	***	0.29				7.01		-4.17		-4.93	***	9.00	***	-0.24	***	-1.14		-	***
2nd	-0.04		-0.04				10.80		0.97		1.59		10.66	***	0.45	***	1.65	**	-	***
3rd	0.02		0.15				40.25	***	19.14	***	5.79	***	2.01		1.32	***	4.35	***	-	***
4th	-0.19		0.58	***			36.74	***	23.91	***	1.58		22.47	***	1.83	***	15.50	***	-	***
5th	0.46	***	0.29	***			92.36	***	-23.70	***	-11.56		-22.40		2.46	***	-2.17		-	
6th	0.48	***	-0.07	***			141.84	***	-34.36	***	7.21		-117.67	***	3.80	***	-36.34	***	+	***
7th	1.75	***	0.15	***			173.09	***	-271.41	***	77.98	**	-173.04	***	10.98	***	-45.17	***	+	***
8th	1.29	***	0.18	***			152.45	***	-4.40		16.32		-233.00	***	10.30	***	-46.82	***	+	***
9 th , 10th																				

Source: same as Table 4.C.1

Table 4.C.5: TOBIT estimation results, by Type of Giving

	ie		pe		Tax Cons.		Indep. Work.		East		Female		Married		Age		N° Child.		Evangelic		Catholic		Other		Länder		Social Class	
Philanthropy	2.62	***	-0.41	***	891.57	***	423.75	***	-773.29	***	23.02	***	-300.52	***	16.36	***	-93.87	***	1,913.79	***	1,912.88	***	1,771.19	***	(3,12,15)	***	(3,4,5,6)	
Religious	2.30	***	-0.64	***	211.77	***	67.51	***	-183.85	***	-46.77	***	-253.77	***	1.00	***	-74.92	***	1,230.69	***	1,236.50	***	1,155.14	***	(3,4,8,9)	**	(3,4,5,6)	***
Secular	5.27	***	0.07		1,146.50	***	650.00	***	-433.29	***	334.19	***	387.25	***	44.09	***	71.27	***	617.26	***	635.41	***	511.42	***	-(12,15)		-(6)	***
Charity	5.83	***	0.17	**	617.58	***	297.04	***	-429.04	***	176.83	***	224.29	***	21.89	***	39.97	***	352.02	***	371.85	***	376.09	***			-(6)	***
Education	33.72	***	-0.26		845.62	***	1,139.45	***	553.56	***	497.90	***	366.93	***	51.92	***	77.08	***	487.54	***	383.28	***	-731.75		-(12,15)	***	-(6)	***
Political	21.28	***	-4.07	***	77.63	***	76.29	***	-97.26	***	-124.71	***	34.37	***	8.38	***	19.52	***	70.86	***	71.70	***	-57.04					
Association	542.83	***	-25.79		51.41	***	-20.65		191.29	***	-57.95	***	56.65	***	5.17	***	32.91	***	52.06		44.69						-(6)	***
Other	3.73	***	0.54	***	226.51	***	117.72	***	-70.41	***	56.17	***	23.72	***	6.35	***	7.60	***	116.68	***	124.24	***	172.98	***	-(12,15)	***	-(6)	***
Heritage																												

Source: same as Table 4.C.1

Table 4.C.6: TOBIT estimation results, by Income Decile, for Philanthropic Giving

	ie		pe		Tax Cons.		Indep. Work.		East		Female		Married		Age		N° Child.		Religion	
Aggregate	2.62	***	-0.41	***	891.57	***	423.75	***	-773.29	***	23.02	***	-300.52	***	16.36	***	-93.87	***	+	***
1st	3.67	***	-17.99	***	526.71	***	164.79	***	-167.69	***	37.07	***	58.43	***	8.04	***	56.65	***	+	***
2nd	4.01	***	-3.52	***	384.33	***	165.81	***	-84.91	***	-8.73		-45.25	***	6.14	***	7.04	***	+	***
3rd	5.03	***	-1.01	***	343.75	***	170.65	***	-74.84	***	-25.05	***	-113.90	***	6.61	***	-29.24	***	+	***
4th	5.72	***	0.19		427.24	***	211.39	***	-440.46	***	-48.31	***	-201.96	***	3.20	***	-115.12	***	+	***
5th	3.32	***	-0.94	***	435.76	***	345.34	***	-547.10	***	-23.86	***	-387.48	***	3.39	***	-185.80	***	+	***
6th	1.09	***	-0.52	***	287.79	***	291.82	***	-141.19	***	65.58	***	-325.71	***	6.01	***	-107.76	***	+	***
7th	3.32	***	-0.54	***	621.24	***	567.87	***	-1407.26	***	336.06	***	-103.10	***	20.34	***	-99.53	***	+	***
8th	1.61	***	0.18	***	204.16	***	303.77	***	-194.38	**	129.96	***	-48.56	*	15.19	***	-43.70	***	+	***
9 th , 10th																				

Source: same as Table 4.C.1

CONCLUSIONS

The purpose of this research work was to investigate the relations binding the State, the performing arts organisations and the taxpayer. The empirical research in Chapter 2, Chapter 3 and Chapter 4 employed data from Germany, a reference of State support for the arts in Europe.

Chapter 2 looked into the cost structure of the performing arts organisations. Chapter 3 studied public theatre demand over a 40 year period, attempting to measure the effect of the use of the reduced rate of VAT on theatre attendance. Chapter 4 approached the relation between the taxpayer and the State sponsoring of the arts by considering the income tax deductions in the income tax code for taxpayers who decide to contribute to philanthropy.

The overall findings follow what is predicted in economic theory and are consistent with previous results reported in the literature. As with most economic studies, most research questions remain unsettled, with different studies often reporting opposite results.

Chapter 2 quantifies the impact of different cost factors on the cost structure of German performing arts organizations, using data from the 1998/99 Theaterstatistik report. The results obtained are in line with the previous findings in the literature, confirming that total costs depend to a large extent on the outputs (performances and productions) and quality. For theatres, the results confirm the basic statements made by Muehlenkamp (1998) and Robledo (2002) that total costs depend largely on the outputs, with the number of productions and the number of opera performances as the most significant cost factors. For orchestras, size and quality have positive effects on total costs.

Economies of scale were found both in the production of orchestras and of public theatres, as seen from the coefficients of total output, total output squared and total output cubed. The measure of total output for orchestras was the number of total

concerts, while for theatres it was the number of total performances. It is found that total costs increase with total output, but the effect of additional output becomes more moderate over some ranges, and this moderating effect dissipates as output rises.

For theatre, size is found to have a significant effect, with an extra theatre seat increasing costs by DM 1.700 (circa 870 euros). Increasing one more opera performance, all else equal, increases total costs by DM 214.000 (circa 110.000 euros). This effect precipitates with musicals, concerts and guest performances by foreign ensembles. All else equal, an extra performance of operettas, child and youth theatre plays, other performances, guest performances in other municipalities, and theatre plays, all reduce total costs. This suggests that the portfolio of performances may be optimized to reduce total expenditures.

Theatres located in larger cities (measured by population) have higher costs, and when theatres face competition this also leads to an increase in costs. Increasing the size of the theatre in terms of employment size also leads to higher total costs. For orchestras, the coefficient measuring the relation between city size and total costs is not statistically significant. Orchestras located in East German Länder have lower total costs, and orchestras associated with theatres have higher total costs.

In relation to quality, the impact on total costs depends on the proxy used to measure quality. When using the proportion of new productions on all productions, an increase in quality leads to a fall in total costs, and this coefficient is significant. When measuring quality by attendance at guest performances in other locations, the coefficient is not significant. Measuring quality by box office results, then as quality increases total costs increase, and this coefficient is statistically significant.

Futhermore, no evidence is found to support the hypothesis that the more autonomous forms of management (own establishment or GmbH) are more economical than a public utility. This suggests that large savings are not to be expected from legal form transformations.

Globerman and Book (1974) found that due to the significant economies of scale in performing activities, it was probably more efficient from a cost standpoint to encourage greater touring by medium sized organizations than to subsidize the development of new local groups. More touring would also alleviate the need to present more diversified performing seasons. In the German dataset, it is found that while being invited to perform in other localities generally is a profitable venture, inviting foreign ensembles can produce large deficits, which will have to be matched by public subsidies

from the municipality where the theatre is located¹¹⁶. Thus, greater care in the organization of guest performances may provide cost savings to public theatres.

Cost savings in PAO are desirable for two fundamental reasons: lower costs allow for lower prices, making it possible for people with lower valuations of live performing arts experiences to participate. Second, the income gap¹¹⁷ requires increased government subsidies to the arts, in order to maintain output and quality. As the performing arts are subsidised using public monies, and subsidies are financed out of general taxation, cost reductions mean less support is required, leaving taxpayers with more disposable income.

Chapter 3 estimates demand for public theatres in Germany, using time series data from 1965 to 2004. It contrasts the estimation results of two alternate methodologies: OLS, as used in the previous studies in the literature, and the cointegrated VAR model, which is required because the data are not stationary.

The results obtained from OLS are consistent with previous findings, with the main result being that demand is found to be price inelastic, which suggests that theatres could raise price and increase revenue. However, theatre ticket prices have increased slowly over the period. Theatre price increases are normally planned in advance, and the pricing policy reflects the fact that public theatres are influenced, owned, or run by municipalities and Länder.

The cointegration results find demand to be price elastic. A one percent increase in price leads to a 1.2 percent fall in attendance. Demand was expected to be elastic, due to the availability and the increased range of substitutes produced by technological progress. Substitutes for the live performing arts are varied, ranging from attendance at sporting events to recorded music or videotaped performances. The estimated long run price elasticity is in line with the findings by Krebs and Pommerehne (1995). Their study of German theatre for 1961-1991 reports a price elasticity of demand of -2.6.

The long run elasticities suggest that attendance is negative income inelastic, with increases in income depressing attendance. However, the estimate of the income elasticity of demand fails to reach statistical significance.

This Chapter also questions the use of the reduce rates of VAT as a mean to promote theatre demand. VAT shifts the supply curve vertically upward as the firm will require a higher price to supply the same quantity. Applying the reduced rate instead of

¹¹⁶ If the theatre is owned by the Municipality, as it cannot produce a deficit.

¹¹⁷ As posited by Baumol and Bowen (1965).

the standard rate to live arts admissions has the effect of shifting the supply curve vertically downwards, thus reducing the equilibrium price and increasing the quantity.

The estimation results find no evidence to support the hypothesis that the reduced rate of VAT¹¹⁸ has a positive effect on theatre attendance. VAT impacts theatre attendance through ticket prices, as VAT is part of the price. From the first cointegrating relation, the pricing policy of German public theatres appears to be relatively insensitive to VAT. The beta coefficient is statistically significant and positive, but close to zero, indicating a negligible effect.

Three considerations are important. First, VAT is a tax, and as such, it introduces distortions and causes excess burden. Second, live arts attendance is skewed towards higher income individuals and VAT is a regressive tax (the amount of VAT on a good will be the same for everyone, irrespective of their income). This means that individuals with lower incomes, who tend not to attend live performances, will be relatively more hurt from VAT than higher income taxpayers. This violates one of the *Canons of Taxation* by Adam Smith, which posits that “the subjects of every state ought to contribute towards the support of the government, as nearly as possible, in proportion to their respective abilities”.

Third, the use of VAT as a mechanism to promote attendance at performing arts is a form of state support which has several disadvantages: its cost is unknown in advance (it depends on the number of tickets sold), it is not approved by parliaments or subject to suffrage by voters, and it takes precedence over other expenditures, because it does not require previous approval. Furthermore, the use of multi rate VAT as a tax break to support the arts makes the tax system more complex and introduces inefficiencies, by altering the relative prices of the goods for consumers.

Chapter 4 studies gifts by living individuals, focusing on the deductions claimed by taxpayers in their income tax returns. It considers contributions to different types of organisations, thus questioning the constant elasticity assumption frequently found in the literature. It also accounts for changes in the elasticity by the income level of the taxpayer.

The results reported in Chapter 4 are in line with recent research findings that giving is tax price inelastic, suggesting that the itemized deductions for contributions lose more tax revenue than the increase in giving, and are therefore not treasury efficient. This adds to the literature that challenges the *consensus view* that prevailed in the charitable contributions literature until the 1990s.

¹¹⁸ (measured by the spread between the standard and the reduced rates)

Most of the literature refers to studies that use U.S. data, study the U.S. experience, and focus on charitable giving. This Chapter uses a random cross section of German taxpayer data. International comparisons can only be made with caution, as there are differences in data and definitions, different tax systems and national preferences. Of particular importance is the amount deductible, which is much lower in Germany (five or 10 percent of taxable income, in contrast to up to 50 percent in the U.S.). Furthermore, the German Länder do not impose income taxes and allow tax deductions, as U.S. States do; and Germany allows for deductions from contributions to political parties, whereas the U.S. does not.

The study of charitable giving in West Germany by Paqué (1982a) provides the best reference for comparison. The estimate of the income elasticity is similar to the one reported in Chapter 4, indicating that giving is a luxury good. However, the most important estimate in philanthropic giving studies is the price elasticity, and the results are very different. Where Paqué (1982a) reports a value of 1.38, the results presented in Chapter 4 indicate philanthropic contributions to be very price inelastic. The differences are certainly attributable to different data being used, different years, and the fact that Germany was a re-unified country in 1998.

The main result found is that the losses to the treasury in foregone revenue are larger than the increase in the amount donated to philanthropy. If the tax deduction did not exist, taxpayers would not be able to use it to avoid taxes, and a general lower level of taxation for all taxpayers would generate the same amount of tax revenue. This lower level of taxation would leave all non givers to philanthropy (about half of the taxpayers in the sample) with higher disposable incomes, thus improving their welfare.

In line with other findings in the literature on charitable giving, age is associated with higher levels of giving. Other factors that impact giving positively are being an independent worker, employing a tax consultant, and being religious. In contrast to results from other countries, females and married taxpayers donate less. This can be due to the fact that female taxpayers report much lower incomes than males, and thus face a much higher tax price of giving. The number of dependents (number of children) also reduces both the probability of being a giver and the amount given to philanthropy.

The interpretation of the impact of religion should bear in mind that in Germany there is a church tax of eight or nine percent of income, which is deductible, and compulsory for taxpayers who are religious. The majority of taxpayers in the sample report having no religious denomination, and in reference to them, taxpayers with religious denominations give more to philanthropy.

Chapter 4 separately estimates the elasticity of giving to all organizations (philanthropic giving), separates between religious and secular giving, and further details secular giving by contributions to charity, education, political, association of voters, heritage and other. It also investigates giving by income decile, thus helping to better display how giving changes as income increases.

The research work developed in this volume provided a study of the relation between the State, the performing arts and the taxpayer. It focused on Germany and applied new German datasets in the empirical analysis. Public support for the arts was examined for performing arts organisations, in Chapter 2, by studying the cost factors of public theatres and orchestras, and what impacts the need for public funding. Economies of scale were found, suggesting costs may be reduced by increasing the scale of operations. In relation to output, it was found that different types of performances have very different effects on total costs. Chapter 3 found that demand for the live arts is price elastic, as predicted by theory. This indicates that patrons will choose alternative forms of entertainment when ticket prices go up. To counteract the rise in price caused by VAT, and promote attendance, admissions to the live arts benefit from the reduced rate of VAT. No evidence of this positive effect was found, when considering the evolution of the spread between the VAT rates over a 40 year period. Finally, Chapter 4 looked at taxpayers' decisions that are directly related to funding of nonprofit organisations, among which are the cultural institutions. Taxpayers are allowed income tax deductions and may directly sponsor organisations of their choice, with the State acting as co contributor. It is found that these deductions are tax inefficient, in that the cost to the Treasury is larger than the amount given to philanthropy.

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