Admission Prices in the German Motion Picture Exhibition Market

Estimating Quantitative Effects of Cinemas in Large German Cities

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Sincerely

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Abstract

This Thesis aims to estimate the quantitative effect of the number of cinemas on ticket prices. The analysis uses a dataset comprising German cities with more than 200,000 inhabitants and non-monopolistic market conditions. Furthermore, the determining factors for the number of cinemas in those cities are also analyzed. For both questions, a panel data set containing those cities for the time period 2007-2016 was studied by means of panel regression with fixed effects. The results suggest even smaller effects that cinema numbers have on ticket prices for Germany than found by Davis (2005) in his seminal paper for the US. In addition, cinema numbers are mostly affected by labor costs. Against theoretic expectation, past revenue data is estimated to have detrimental effects on cinema numbers.

Key words: cinema demand, cinema supply, cinema ticket price, fixed effects.
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1. Introduction

Going to the cinema is perceived to be expensive (The Telegraph, 2015). While Bahrain and Switzerland are the most expensive countries with respectively an average price of 15.76 and 15.15 EUR, also Scandinavian countries are cited to have “scandalous” prices with around 14.24 and 13.72 EUR in Norway and Sweden (Worldatlas, 2017). Questions that economists ask themselves are why this is the case and what factors affect those ticket prices? This thesis studies these questions for Germany which represents the eighth biggest market globally and the third biggest market in the European Union (MPAA, 2016).

One answer can be detected in the market structure. With the cinema visit, all over the world people associate a certain kind of experience: a big cinema lobby where movies are advertised and tickets can be bought along with concessions such as popcorn or other snacks. The cinema visitor goes to the counter, presents his ticket and gets granted access to the cinema screening room with a big screen and good sound. The cinema experience may be perceived as a rather homogenous good by the consumer and therefore the number of cinemas competing for visitors could potentially be an important determinant of cinema ticket prices.

Therefore, the aim of this paper is to analyze the effects of cinema openings and closings, respectively, on the average ticket price in German cities with more than 200,000 inhabitants with duo- or oligopolistic market structures, using a panel dataset with 208 observations (on average 21 cities each year) and a fixed effect regression model. The analysis was performed for the time period 2007-2016. The present study may prove to be relevant for cinema owners who would like to know how additional cinemas could influence average prices. The magnitude of an effect that cinema numbers have on ticket prices is also relevant from a policy perspective. It may help the respective governmental institutions to assess the necessity and urgency to react to changes in this market.

Furthermore, factors that define the number of cinemas are also briefly discussed. Basis for the analysis is the seminal paper of Davis (2005), who estimated the effect of additional screens on cinema ticket prices in the United States market. In his paper, he distinguishes and estimates the effects of additional screens owned by the same owner and those owned by competitors. As interesting result, similar effects were found for both types.

In contrast to Davis, information on the ownership of German cinemas was not available for the used dataset. Nevertheless, given the results from Davis, the analysis of a quantitative effect
of cinemas on ticket prices may still be interesting without being able to differentiate between the ownership of the venues.

Section two of this paper will present an assessment of the German and US market to facilitate comparisons between effects estimated in this paper and, on the other hand, effects found by Davis (2005), who reported his finding for the latter market.

Section three will provide an overview of the economic literature that exists on this topic as well as provide the theoretic foundation for the empirical estimation. The presented literature’s focus is laid on literature covering studies which describe the history of the cinema market, the determinants of demand and how the distribution of movies is affected.

Factors such as the upcoming of complementary goods like television, VHS and DVD affected the demand for cinema visits and are, among other topics, discussed by the literature on determinants for demand. The literature on movie distribution, for example, analyses how the screening of the movie is timed by the distributor. His considerations also incorporate expectations concerning the success of the movie.

An additional branch of the presented literature comprises questions of competition and pricing. This allows to identify theoretic explanations for the effects estimated in the ensuing empirical analysis of this paper and thus is the most relevant part of the literature review.

Section four estimates the quantitative effects which the number of cinemas have on German movie ticket prices. First, the data and used variables are discussed and descriptive statistics are provided. Secondly, the method is described and results are presented. They show smaller effects than those found by Davis for the US market (2005). The effect that an increase in cinemas in large German cities has on the ticket price is estimated to range between only -3.5 and 7.5 Euro-Cents.

Furthermore, section four also addresses the question of the determinants for the number of cinemas themselves. Annual cinema visits per inhabitant, wage costs and population density are used as regressors in a fixed effects OLS framework. Long- and short-run effects are possible to be distinguished here, since a lagged version of the dependent variable is also used as explanatory variable. The results give a hint that long-run effects of wages are the most influential factor on the number of cinemas in a city. Moreover, a negative effect of revenue was found, which could be interpreted as a hint for collusive behavior when the number of cinemas is concerned.
The last section of the paper presents concluding remarks and summarizes the findings of this thesis.

In addition, the appendix provides a thorough overview of the global cinema market for the interested reader. It gives a supplement to the comparison between the German and US market in section two by setting both markets into a global perspective.

2. The German Cinema Market in an International Perspective

This section provides a comparison between the US and German markets considering the empirical work done in the second half of this paper.

An international comparison of cinema market sizes in relation to each other is reported in the appendix. Box office revenues\(^1\) as an indicator are compared and a structural assessment of the cinema markets is given. It is achieved by presenting the development of average national ticket prices in the respective markets. Furthermore, the number of cinemas and screens as well as other aspects of the market such as the age structure of cinema visitors are discussed.

2.1. Comparison of the US- and German Cinema Market

The German and US market is compared in Figure 1 by depicting admissions, national average ticket prices, and number of indoor screens. The German market experienced a four percent decrease in screen numbers from 2007 to 2013 followed by a recovery with a three percent increase from 2013 to 2016. In contrast, the US market experienced a continuous increase of four percent from 2007 to 2016.

Average ticket prices experienced a positive trend, both in the US and Germany. In Germany, the average growth rate from 2007 to 2014 was 4.23 percent and 2.46 percent thereafter during 2014 to 2016. The average price increase from 2007 to 2016 laid at 3.84 percent\(^2\). The estimated 1.7 percent average increase from 2013-17 by PWC (2013) was surpassed as by 2016 an average annual increase of 2.32 percent is documented in Figure 1. The 2017 price is not expected to decrease substantially. In the US, prices increased by 2.59 percent during 2007 to 2016.

\(^1\) Gross Box Office: “The revenue generated from ticket sales (receipts) including any taxes and other levies.” (OECD 2017)

\(^2\) Basis for this calculation are the non-exchanged EUR values as much of the results may also be driven and distorted by exchange rate effects.
Considering the annual increase in consumer price indexes (CPI), they average 2.11 percent in the US and 1.26 percent in Germany from 2007 to 2016. Therefore, the real change in ticket prices is modest. This has also been recognized by Marvasti & Canterbery (2005) and Mckenzie (2012).

A reason for the price level is addressed by Castendyk (2014). He states that in Germany the pricing is done according to the economic potential due to high average incomes. Thus, ticket prices are in the upper quarter of the distribution of European countries. This possibly indicates a low price elasticity of demand. He also reports a correlation of 0.287 between ticket prices and number of sold tickets.

In technical terms, the German and US markets are both very similar. In 2016, both markets had almost 100 percent of their screens in digital format (MPAA 2016). The cinema density per one million inhabitants was 19.6 and 21.9 for the US and Germany, respectively. The differences in screen numbers, as shown in Figure 1, are therefore relatively small.

\[3\text{ Own calculation using US CPI Values 2007-2007 from MPAA (2016) and German CPI-Data from Statistisches Bundesamt (2017a)}\]
Differences, however, were found concerning the concentration of screens over the individual cinemas. MPAA (2016) lists the number of screens by venue. According to that study, in 2016 roughly 85 percent of all 39,579 indoor screens in the US were situated in cinemas with more than five screens. German data is not available for that year but the UNESCO (2017) dataset provides the number of multiplex cinemas with eight and more screens, cinemas with two to seven screens, and the absolute number of (indoor) monoscreen cinemas along with the total number of cinemas. Using this data, each percentage of the different groups can be calculated for Germany and the USA.

Figure 2 gives a summary for the period 2007 to 2013 (2007 to 2009 for the USA). Here, a substantial difference between both markets is visible as the US market counts on five times more cinemas with more than eight screens – so called multiplexes – whereas the German market exhibits nearly twice as much cinemas that have only one screen and more middle-sized cinemas in the spectrum of two-to-seven screens per movie theater. Currently, Germany’s largest cinema is located in Nuremberg with 23 screens (Castendyk, 2014; Cinecitta, 2017).

Another interesting question is what characteristics does the demand side of the cinema show. Here, both compared markets are similar. In 2015, the group of 25 to 39-year-old persons represented 21 percent of visitors in the US (MPAA, 2015) and 25 percent in Germany (FFA, 2016b). These values represent the share of the age group in total visitors.

When contemplating the share of the age groups of visitors in relation to the share of the age groups in the population, then the age group 12 to 17 years is most overrepresented in the US. There, it represents 11 percent of the cinema visitors but only 8 percent of the US population.
The 10 to 19-year-olds in Germany alone made up 21 percent of the visitors but only 10 percent of the population. Using a wider range, the age group of 10 to 25-year-olds makes up 31 percent of visitors and 16 percent of the total population.

The average cinema visitor in Germany is 36.9 years old. 54 percent of the visitors were female (FFA, 2016b). The US gender share is more balanced with a 51 to 49 ratio of female to male visitors (MPAA, 2015).

In a long-term perspective in Germany, the distribution of percentage of visits for the different age groups converged to a more even distribution. While in the beginning of the 1990s the age group of 20 to 29 made up 41 percent of visitors (28 percent for 10 to 19 group) by 2013, it was down to merely 21 percent (20 percent for 10 to 19 group). The most extensive growth was experienced by the 40 to 49 age group and the 60-plus age group. Those groups initially made up 8 and 4 percent and 19 and 12 percent by 2013, respectively (Castendyk, 2014). In sum, cinema visits became more and more popular with older population groups, whereas younger visitors still constitute the biggest share in visitors with a slight bias towards being female.

So far, from the discussion above, a comparison of the US and German market yielded differences in the increase of screen numbers. In contrast to Germany, the US experienced a constant growth. Coinciding with the financial crisis around 2007, German screen numbers experienced a decrease with eventual recovery. Ticket prices in both countries experienced an upward sloping trend.

Now that a broad overview on the empirics and development on the movie markets has been provided, the subsequent section three turns to a discussion about the market on a theoretical perspective. It revises the current literature on economic theory in this market and shows the different interests a movie theater owner might pursue in the light of competition in the market. The German market is part of one of those markets that provide less opportunities for box office revenue increases that can be achieved by high growth in the number of cinemas. In this market, an increase in revenues is achieved primarily through price increases. Thus, the literature on price setting mechanisms and how prices are affected by competition will be reviewed in more detail.
3. Economic Theory and Previous Studies of the Movie Theater Market

The economic literature on the movie market is diverse and can be grouped according different topics. In the following, the history of 1940s and 50s studio era and anti-trust cases is presented initially. Second, the literature covering the factors that influence demand for movies, revenue, financing and distribution is discussed. For example, movie stars and their effect on a movie’s success is paraphrased here. The emergence of complementary goods such as television and DVD also led to changed demand faced by the cinema market. The last group of literature covers competition and pricing in the cinema market. The focus often lies on the exhibitors. The market structure’s influence on ticket prices as well as incentives of the different market actors is the center of interest in this part.

3.1. Literature on History, Demand and Distribution

Historical reviews summarize the creation of today’s US movie market as a consequence of court orders. They saw the previously integrated organization of the market – distribution and exhibition before 1948 was often done by the film studios – to be contrary to theoretical assumptions of competition at that time. The literature also often discusses legal and procedural questions. In addition, a description of the development of the cinema market down to the present day is given (McKenzie, 2012; Vogel, 2011).

The literature further focuses on topics such as evaluating and forecasting demand for a movie. It discusses the importance of the cast in form of known movie ‘stars’, critics and ratings, awards and award nominations and finally genres. Moreover, economic aspects on production, distribution and exhibition of movies are reviewed here (McKenzie, 2012). In sum, the literature suggests that although stars are important, particularly concerning on how to get a film financed, they do not guarantee the movie’s success (McKenzie, 2012). Positively biased critics are correlated with higher box office revenues\textsuperscript{4}. Awards and nominations for them have a significant impact on box revenues. Here, the kind of award matters for international successfulness. Particularly, in Asian markets, negative correlations with awards defined as ‘drama awards’\textsuperscript{5} have been found. The reasoning is that East Asian audience is more appealed by movies with e.g. awards due to special effects rather than awards due to storylines with a

\textsuperscript{4} Movie criticism was found to be biased for distributors and the reviewing persons. McKenzie (2012) found an inclination towards giving positive reviews by L.A.-based critics is observable.

\textsuperscript{5} McKenzie (2012) here cites a study that defines best director, best leading and supporting actor or actress, best screenplay and best film editing awards as drama awards and all others as non-drama awards.
more western cultural orientation (McKenzie, 2012). Movie revenues are also affected by ratings and genres in the way that violence in movies and thus a stricter rating\(^6\) translates into higher revenues. Interestingly, while sexual content does not significantly increase revenues alone, together with violence these movies still do not necessarily increase profits but they lose money less frequently (McKenzie, 2012).

Altogether, studies that attempt to model a movie’s revenue and explain it by variables for the above mentioned influencing factors, face the problem of potential endogeneity of those factors and particularly a non-normal distribution of revenues which also often comprises “[…] extreme skew and theoretically infinite variance” (McKenzie, 2012: 46–47), giving support for the ‘Nobody knows anything principle’\(^7\) when trying to estimate a specific movie’s success in terms of box office revenues and demand for it. A typical feature for most movies though, is that demand for movies changes very smoothly and declines monotonically (Krider et al. 2005).

The literature on production and distribution of movies often analyses contractual arrangements for the different actors in the movie production process, such as actors, producers, etc. It also deals with financial decisions in different setups like co-financing between major studios and independent studios or about questions of efficiency for vertically organized firms or divisionalized firms.

The distribution market considers timing of release for movies. Seasonality and release of movies relative to each other are discussed by McKenzie (2012). More successful movies are more prone to be released earlier in the season and the expectedly weaker movie would experience a delay of its starting date (McKenzie, 2012)

The change of demand and revenues as a consequence of the emergence of complementary goods like TV, VCR (and later DVD, Bluray and Video-on-Demand) is discussed in various studies for different markets such as the US, UK, Germany and Spain, just to name a few (McKenzie, 2012).

Literature on trade of movies and industry structure is also available. A Cobb-Douglas production function with constant returns to scale was estimated and movie producers were found to use stars to differentiate their product –movies– to signal quality. Particularly imperfect competition is seen as an important factor that determined the success of the US

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6 Rating refers to restrictions and recommendation on the age of the viewers.
7 The phrase “Nobody knows anything” is attributed to screenwriter William Goldman, who described the movie market to be unpredictable, especially concerning the risk involved in filmmaking (Borcherding & Filson, 2001)
movie market in increasing revenue. Furthermore, a low price elasticity for demand for admissions was found. The movie experience itself was found to be an inferior good. An increase in per capita income had negative effects on demand and revenue (McKenzie, 2012; Canterbery & Marvasti, 2001). On the other hand, Dewenter & Westermann (2005) report findings from a study on Germany that cinema demand had positive and smaller income elasticity, therefore hinting that cinema demand does not proportionately follow increases in per capita income.

3.2. Literature on Competition and Pricing

Generally, traditional models on oligopoly and markets with imperfect competition imply rent-capturing by the firms by collusion to maximize long-run profits. This regularly results in higher prices than under fiercer competition (Fraas & Greer, 1977; Clarke & Davis, 1982 and Domberger, 1979). Stigler (1964) furthermore argues that some kind of homogeneity of goods has to be given in the eyes of the consumer for oligopoly markets. Thus, an “[…] identity of products or of (what is presumed to be equivalent) pairs of products between which the elasticity of substitution is infinity” (Stigler, 1964: 44) is present to facilitate collusive behavior by the firms. Products that are perceived to be different by the consumer debilitate the possibilities and need for collusion by the firms. The speed and flexibility of price adjustments in relation to market structure show evidence that less concentrated markets exhibit quicker price adjustments (Martin, 1993).

Taking the airline ticket market as an example, theoretic predictions of simple oligopolistic competition models as the Cournot model are met according to Hazledine (2010) in the sense that less competition leads to higher average prices. Another study on the market for medical treatments found evidence that less competition also led to higher prices charged for common high-cost procedures (Austin & Baker, 2015). Oligopoly markets so far follow the predictions theoretic models. This may very well apply to the cinema market, where a cinema visit can be argued to be very similar within different cinemas providing a relatively homogenous good.

Current economic literature on the exhibition market is of particular interest for this paper as this literature covers the application of techniques of empirical industrial organization in order to study structure, conduct and performance of the market. Considered topics are questions such as the effects of market structure –the degree of competition in a market– on prices, rival companies. These effects of competition are small and market expansion and market entry occurred via the building of upmarket cinemas close to rivals. In addition, when to change the
movie-program in a specific movie theater or contractual design for exhibition contracts between exhibitor – the cinema – and the distributor were addressed (McKenzie, 2012).

The high costs to enter the cinema market in terms of building costs and technical equipment led to relatively few cinemas even in bigger cities (McKenzie, 2008). Oligopolistic market conditions are furthermore often assumed in the literature (Canterbery & Marvasti, 2001) and Eliashberg, Elberse & Leenders (2006) even write about movie theaters being small local monopolists.

Besides having few movie theaters per city, on top the ownership of these cinemas is often also consolidated into financially strong chains that own multiple cinemas in different cities – mostly in the form of multi-screen theaters or multiplexes (Vogel, 2011).

From this theoretical point of view, market concentration should lead to higher expected prices in the sense that cities with fewer cinema theater owners should exhibit higher average ticket prices. Interestingly, the cinema market features some peculiarities that make it somewhat special when compared with the above-mentioned markets (airline and medical treatments). This market is embedded between the consumer on the demand side and the producer and distributor of movies on the supply side.

In his seminal paper, Davis (2005) discusses the fact that the relationship between price and market structure is rather contradictory. Rather than causing harm to the consumer, market concentration harms distributors in the sense that movie owners use their market power to exert pressure on them while negotiating terms and conditions for distribution. This is because of two conflicting interests the cinema owner faces when he contemplates rising ticket prices (Borcherding & Filson, 2001; McKenzie, 2012).

On the one hand, distributors receive a share of ticket revenues from the cinemas that rent their movies. On the other hand, they have an interest of filling the theater and selling ‘concession’-goods such as popcorn and soft drinks for which they do not have to give up any share to the distributor (Davis, 2005; Filson, Switzer & Besocke, 2005; Vogel, 2011; McKenzie, 2012). Both different sources of income, ticket sales and concessions, are discussed in turn along with literature covering implications from both income sources for the market:

3.2.1. Ticket sales

The cinema owner has to share revenues of cinema ticket sales with the movie distributor. The latter earns his money primarily with these shares. He is not allowed to set or mandate cinema ticket prices to the cinema owner due to antitrust law. However, he uses indirect incentives to
get the cinema owner to abstain from charging too low ticket prices from the perspective of the distributor.

Concerning the shares in ticket revenue, payable to the distributor in the US, they usually comprise 90 percent of the box office revenues minus a negotiated allowance for the theater’s cost of running the theater (often called ‘house nut’) during the starting period of the movie’s screening. After some weeks, this share is reduced to approximately 80 and eventually 65 percent. The decreasing shares here are aimed to provide an incentive for longer screening periods by the exhibitor. For the distributor, the returns increase from longer screenings. (Canterbery & Marvasti, 2001; see also Borcherding & Filson, 2001; Chen, 2009).

Castendyk (2014) provides current data for 2013 to this topic. He confirms the above numbers and shows that German shares in box office revenues are much lower. German cinemas paid a ‘minimum warranty’, usually ranging between 100 EUR and 250 EUR that is later deducted from the negotiated movie-rental contract.

Furthermore, Castendyk (2014) states that during the first run week, 53.5 to 43.1 percent of the net ticket earnings\(^8\) were taken by the distributor. Shares below 38 percent were not very common and mostly restricted to low-budget-productions. The average share in 2013 was 44.5 percent. An interesting point is the further separation of average rental share for multiplexes and traditional cinemas. The former faced averages of 43.3 percent, the latter 46.3 percent. The differences were small and these results stemmed from a survey with a relatively low answering rate from multiplex-cinemas. Castendyk (2014) estimated the interval for multiplex shares between 43.1 and 47.3 percent and concedes that these differences could be smaller or greater.

3.2.2. Concession sales

Concession goods are of considerable importance for the movie theater owner as they constitute the second biggest source of total operating revenues. In Germany, the sale of concession-goods contributed to 27.5 percent of net revenue on average (Castendyk, 2014).

Gil & Hartmann (2009) investigate the function of high concession prices as a strategy of metering price discrimination where the willingness to pay for the primary good –ticket– is

\(^8\) As in the US, here also theater net earnings are considered before splitting the earnings. Turnover tax and fees for the German Federal Film Board (FFA - Filmförderanstalt) as well as for the Society for Musical Performing and Mechanical Reproduction Rights (GEMA) are deducted in the German case. The ‘house nut’ in the US represents that the distributor also covers costs such as water, electricity, cleaning and rent. This is not the case in Germany and it implies that in the US the risk of a movie being a ‘flop’ is completely on the side of the distributor while in Germany the risk is shared between both parties (distributor and exhibitor) (Castendyk, 2014).
metered. Thus, the customer’s willingness to pay for it is evaluated with the intensity of demand for aftermarket goods such as popcorn and other concessions.

Using data of a Spanish cinema chain, Gil & Hartmann (2009) found that persons with higher willingness to pay for admissions also consume more concessions. An interesting point in this context of market structure and prices is the discussion, that Gil and Hartmann (2009) argue that the price of the primary good must be lower than it would be in a competitive market. Keeping the present discussion on the cinema owner’s interest in mind, this gives another reason as why market structure could well have an effect on prices, albeit in the direction that is less intuitive–namely towards lower prices–than expected from the perspective of standard oligopoly and monopoly theories.

Ticket prices and concession goods are both not chosen independently when the exhibitor maximizes his profits and both influence the decision on whether uniform ticket pricing or differentiated pricing is optimal.9

Chen (2009) discusses that the high mark-ups and profits on concessions make exhibitors to choose uniform pricing. Uniform prices are thus chosen by the cinema owner on purpose. One reason may be that nowadays a small share of the shown movies is expected to be a hit. Unless the movie is a real blockbuster, price differentiation would not be preferred by the exhibitor.

Distributors are more in favor of uniform pricing because shares of revenue are negotiated before the screening. Thus, risks due to varying success of movies can be mitigated. Chen (2009) refuted arguments that distributors put pressure on cinema owners to apply uniform prices by not engaging in business relation if they do not do so. This way, movie owners would be unable to rent mayor movies. According to Chen (2009), variable pricing is said to be the preferred pricing strategy for them in some of the other literature.

Some price differentiation in Germany however, is usually performed by weekdays, visitor groups such as students or pensioners and the position of the seat in the screening room according to Castendyk (2014). He also argues that exhibitors could benefit more from differentiated ticket prices as lower average prices and a higher degree of capacity utilization could be achieved.

9 The discussion on differentiated and uniform pricing refers to, on the first hand, possibly charging different ticket prices according to categories such as e. g. gender, weekdays, position of the seat in the former case. On the other hand, uniform pricing refers to same prices regardless of the different criteria mentioned before.
In practice, though, distributors in Germany formulate their contracts to entail provisions besides the above-mentioned shares on revenues. They include further clauses on a minimum fee the distributor receives for each sold ticket. Thus, the fee per ticket as share of the charged ticket price can be compared with the revenue share. This fee to ticket price ratio could surpass the box office revenue share for those tickets that are sold too cheap. This way, the distributor gives an incentive to higher ticket prices. For the cheap tickets, the cinema owner could end up paying the distributor a greater fee–per ticket–than the implied per-ticket-share from the total box office revenue share (Castendyk, 2014).

The following example illustrates the above: a distributor takes 53 percent of the box office revenues as rental share. In addition, the distributor has a contract with the cinema owner that the distributor is entitled to a minimum of 3.18 EUR for each ticket sold. If the cinema sells a certain number of tickets too cheap (from the distributor’s perspective), it may occur that the cinema owner ends up paying more than a 53 percent share on the cheap tickets and thus prefers to charge higher prices. With the minimum fee per ticket, distributors can set a minimum income per ticket and circumvent the problem of setting a price, which would be forbidden under antitrust law. Moreover, low price elasticities on this market may hint that dynamic pricing is less effective here than in other markets as cinema visitors anyway do not strongly react to price changes and (even) small menu costs for changing them may still be present.

In summary, the distributor’s source of income is still only the share of the ticket sale revenue. In Germany, these shares are lower than in the US. He further can insure himself against a flop of the movie by a minimum rental fee he will receive in case the box revenues are lower than this. Furthermore, being aware of the incentives for the cinema owner, the distributor also contractually often fixes a minimum price per ticket. This ensures that cinemas that apply dynamic pricing are discouraged from setting prices that would imply a higher transfer to the distributor when the revenue share is calculated per ticket.

A similar perspective to this question is given by a Bertrand competition model where prices are changed by the competitors. According to Dufwenberg and Gneezy (2000) as well as Maskin and Tirole (1988), classical models of Bertrand competition entail prices that are equal to marginal cost when at least two competing firms are on the market.

According to the above and considering the cinema market, where a small number of competitors compete, we could therefore expect prices to be near the zero-profit level. This could explain the rather stable number of competitors in the German market over the years as additional profits are small.
Furthermore, incumbent firms could discourage market entry by committing to a low price. Large sunk cost investments in excess capacity are named by Dixit (1980) as example for market entry deterrents. They represent credible threats that low prices are maintained even after the market entry of the new competitor.

Castendyk (2014) reports low capacity utilization numbers for Germany with 13.6 percent in 2013. Excess capacity may therefore be present in the cinema market.

From a theoretical perspective, ticket prices therefore may be only mildly affected by additional competitors (who would increase the number of cinemas in a market) as they may already be close to the zero-profit boundary.

In their experimental setup however, Dufwenberg and Gneezy (2000) let a number of players set prices over a number of games. The number of players varied between two to four players who could set a price between 2 and 100. The player with the lowest bid won, or if multiple players set the same price, the bid was divided by the number of players who bid that price. In addition, the players were assigned randomly. Dufwenberg and Gneezy’s results hint that prices rapidly converged to the prediction of near zero profits for the groups of three to four players. When two competitors faced each other, the prices remained at a higher level. The authors cite previous, similar studies, which used non-random assignment of the players and discuss even bigger cooperative behavior – also in the groups with three players.

This section so far gave different arguments why the cinema market may represent a special case of an oligopolistic market. Rather than providing a clear direction of the development of prices in response to changes of market concentration, less competition could lead to either higher or lower prices in this case. This is due to the different incentives the owner faces by having two sources of revenue – ticket sales and concession – where reducing ticket prices can increase revenues from concessions.

Also, when Bertrand price competition among a small number of competitors is considered, collusive behavior may result in higher or lower prices depending on whether it is used to increase prices or to discourage further market entry by possible competitors.

The question to be discussed next is whether ticket prices for the German market now increase or decrease with growing cinema numbers. Davis (2005) performed an analysis for the US market and hereby inspires to approach this question for the German market in a similar way. Davis was able to get access to data on almost all individual US cinemas and their prices.
addition, he also could calculate relative distances from each cinema to others in miles. In contrast, this paper has only much more limited data available to draw conclusions from.

Using a panel dataset for the years 1993 and 1997, Davis (2005) estimated the effect of the opening of one more screen on admission prices. Further, he distinguished effects for whether the screen belongs to the same cinema owning chain or whether it is from a competitor. Additionally, the effect of the distance of those screens to each other was taken into account. Increasing intervals in miles from 0 to 0.5 to 25-30 were used by Davis (2005) for the distances between cinemas.

Two hypotheses were examined: First, that the number of rivals and screens have an effect on prices charged by a specific cinema. Second, that the effect varies, depending on whether the additional cinema is part of the same chain or from a competitor (Davis, 2005).

The analysis by Davis is performed using a panel and OLS estimation with fixed and random effect for individual theaters.

For the US market, the results give a hint that market structure explains “[…] only a remarkably small fraction of the variation both across time and across locations. Such a finding is consistent with the widely-held belief that factors other than exhibition market structure variables are the primary determinants of the level of admission prices in the motion picture industry” (Davis, 2005: 696). The estimated effects are very small with the biggest effect in a 1-2 miles (approximately 1.6-3.2 km) radius around a cinema where one more screen is predicted to lower ticket prices by 8 USD cents. These effects already shrink to half at the 5-6 miles (8-10 km) radius to 4 cents and quickly go towards zero.

As far as the differences in the effects of an additional screen is concerned, they are very small notwithstanding whether the screen was owned by the same owner or the competitor. They show a bigger downward effect on the price when it is from the same chain than a rival one. This can be seen as conclusive with the theory that a cinema can use its market power to lower ticket prices in favor of filling seats and selling concessions. The difference in the effect between own and rival screens, however, is very small.

In the previous sections a similarity between the German and US market was discussed, hence similar results are expected for the former market. Similar to the above-mentioned hypothesis by Davis (2005), the main hypothesis to be tested here is that additional cinemas do have an effect on ticket prices charged to the public by the cinema owner.
In summary, Davis (2005) uses a dataset with the number of screens. He estimates the effect of additional screens depending whether they belong to the competition or to the own chain. Furthermore, he is able to estimate those effects of new screens depending on different distances between each cinema.

In contrast to Davis (2005), cinemas rather than screens will be used in this thesis. This is done due to data limitations in the available dataset for German data. Moreover, this thesis will also not be able to distinguish whether a cinema is part of the same chain or is owned by competitors. It was therefore not possible to observe market concentration. The estimated effects in this thesis should therefore reflect an average effect of one additional cinema on the ticket price. Given the previously discussed results that the effect does not differ largely depending on whether the additional screen is own or rival-owned, this may well also apply for cinemas themselves. The analysis of a quantitative effect of cinemas on ticket prices may therefore still be interesting without being able to differentiate between the ownership of the venues. In addition, Davis was able to estimate an effect of additional screens on ticket prices in general. This thesis can only estimate the effect of additional cinemas in cities with more than 200,000 inhabitants and those that are not monopolistic.

4. Estimation of Quantitative Effects on German Movie Ticket Prices

This section will now proceed to estimate the effects of an increase in cinemas on ticket prices in Germany by presenting the relevant data and its sources as well as descriptive statistics. A more detailed discussion of the empirical method used will follow afterwards together with the reporting of results.

4.1. Data

Contrary to Davis, data on cinema level in Germany was not made available. The source of data for this analysis is the German Federal Film Board (FFA), which publishes annual reports providing statistics about cinemas aggregated at the level of cities with more than 200,000 inhabitants. Information on average ticket prices, the number of cinemas and screens are given on this basis. The reports from 2007 to 2016 could be retrieved as the 2007 vintage is the first that reports average ticket prices. Unfortunately, the reports from 2007-2015 only report data for those cities that have two or more different cinema owners. The last 2016 vintage only reports cities with three or more owners. Therefore, information on cities with monopolistic
market structure is not provided\textsuperscript{10}. Table 1 shows the number of cities for which information is available in the first line.

Table 1: Number of total and reported cities in the dataset

<table>
<thead>
<tr>
<th>Year</th>
<th>Reported cities</th>
<th>Not reported cities</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>27</td>
<td>10</td>
<td>37</td>
</tr>
<tr>
<td>2008</td>
<td>25</td>
<td>13</td>
<td>38</td>
</tr>
<tr>
<td>2009</td>
<td>23</td>
<td>16</td>
<td>39</td>
</tr>
<tr>
<td>2010</td>
<td>23</td>
<td>16</td>
<td>39</td>
</tr>
<tr>
<td>2011</td>
<td>20</td>
<td>19</td>
<td>39</td>
</tr>
<tr>
<td>2012</td>
<td>19</td>
<td>20</td>
<td>39</td>
</tr>
<tr>
<td>2013</td>
<td>18</td>
<td>21</td>
<td>39</td>
</tr>
<tr>
<td>2014</td>
<td>17</td>
<td>22</td>
<td>39</td>
</tr>
<tr>
<td>2015</td>
<td>18</td>
<td>21</td>
<td>39</td>
</tr>
<tr>
<td>2016</td>
<td>18</td>
<td>21</td>
<td>39</td>
</tr>
</tbody>
</table>

Source: Own elaboration based on Statistisches Bundesamt (2017b) and FFA Reports (2007-2016). Note: line three reports the sum of reported and not reported cities. It is equivalent to the total number of cities with more than 200,000 inhabitants in Germany for each year.

Since the FFA drew their population information from the German Statistical Office, the population number by community and city level for each corresponding year was accessible through that institution (Statistisches Bundesamt, 2017b). As a result, the total number of all German cities with more than 200,000 inhabitants from 2007 to 2016 could be established and except for 2007 with 37 and 2008 with 38 the number was constantly lying at 39 cities that met that requirement (see third line in Table 1). The second line of the table eventually shows the number of non-reported cities and thus the number of cities missing for each year. It indicates the number of cities that are missing in the FFA reports and therefore should have only one owner (one and two owners in 2016) for 2007 to 2015. This implies monopolistic competition in the missing cities.

The general limitation of using a dataset for cities with this population size is not seen as a great setback as even for those cities a great share shows a monopolistic market structure.

Furthermore, the German market is characterized by having a large fraction of medium-sized family enterprises, which have less screens and have often existed for several decades (Castendyk, 2014).

Effects of additional cinemas and competition are expected to be negligible in small cities. Estimating effects of changes in cinema numbers in large cities where large multinational chains are active is deemed to be more promising when trying to identify effects of market structure on cinema ticket prices. The needed variation within time should almost exclusively be found here.

\textsuperscript{10} Reporting cities with monopolistic structure would imply revealing average pricing by one company by the FFA, which is not possible due to German data security laws.
It was also attempted to extend the dataset using data from the German movie distributors association (Verband der Filmverleiher – VDF 2017). The number of screens could be established for the non-reported cities in 2016. Using a website that lists cinemas per city\textsuperscript{11}, the corresponding movie theaters for each of those cities were found. The respective number of cinemas could be identified and contacted via email with the request of providing a time series for regular ticket prices. The aim was to average the received price information or at least get one price time series and use this as a best proxy of the years’ average cinema price in the respective city. Thus, to include information about cities not included in the dataset was intended. In total, 49 cinemas were contacted. By the end of the writing period for this thesis, only five replies were received of which only three provided the required information.

4.2. Descriptive Statistics

The previously discussed individual report vintages were used to build a panel-dataset that contains variables such as population per city, number of screens per city, number of cinemas per city, and average cinema ticket price per city. As shown in Table 1, the panel has a diminishing number of cities over the years.

City sizes in terms of population range from the 206,011 inhabitants in Rostock to Berlin with 3,520,031 inhabitants in 2016. Generally, the distribution of population numbers is right-skewed as the average population was around 650,000 inhabitants between 2007 and 2016.

\textsuperscript{11} The Website \url{www.kino.de} permits to search cities cinemas listed there
Concerning the theoretically most interesting variables, namely ticket prices and the number of cinemas and screens, Figures 3, 4, and 5 show histograms. It is visible that the number of screens varied slightly over the years with a mean number of around 40 screens over the period 2007-2016. If Berlin was included, this average would be contorted upwards by the very big number of screens in Berlin, which had an average of 274 screens (std. deviation of 8.52). With this outlier, the average would increase to approximately 51 screens. The number of screens varied between 13 and 89 in 2012 and between 20 and 82 in 2016 (285 and 275 as maximum values in 2012 and 2016 respectively in the case Berlin was included).

The histograms of Figure 4 depict the distribution of cinemas for 2007, 2012, and 2016. Here, the distribution is very similar as in Figure 3 as the number of cinemas is very highly correlated with the number of screens. The minimum of cinemas is 6 in 2007 and 5 for the remaining periods. The maximum of 41 to 38 cinemas was found in München (98 to 93 in the case Berlin was included).

The average number of cinemas for the contemplated period is 18 including Berlin and 14
excluding Berlin. Therefore, a cinema in this dataset has approximately three screens on average.

Figure 4: Number of German cinemas (2007, 2012 and 2016)

![Graphs by year](image)

Source: Own elaboration width of bin of 5. Histograms exclude Berlin. Normal distribution included for comparison.

Figure 5 below shows prices charged for tickets. Berlin was included here. At first glance, a trend of increasing prices is visible during the years. In the sample, average ticket prices for all cities increased from 6.22 EUR to 8.94 EUR between 2007 and 2016 and thus were always slightly higher than the national average shown in Figure 1. In 2007, the lowest prices were charged in Halle with an average price of 5.44 EUR. The most expensive city was Nuremberg with a price of 7.18 EUR. By 2016, this has changed to a minimum of 7.84 EUR in Dresden and 9.90 EUR in Hannover as the maximum value.
Additional variables included into the dataset, consist of a consumer price index (CPI) at the level of the German states with 2010 representing the value 100. This information is taken from the website of the German Statistical Office (Statistisches Bundesamt, 2017c). Price increases could only follow inflationary trends and false conclusions could be drawn without the inclusion of this variable. Effects of inflation could be identified with this variable.

The share of the population under 26 years to total population is used as a proxy for demand. It is constructed by division of the number of the population between 10 and 25 years by the total number of the population for each city and year. This variable could also reflect price sensitivity where the younger part of the population is relatively more price sensitive than older age groups. A cinema owner that faces demand from a population that is composed by a big share of young persons may need to sell cinema tickets cheaper than in cities with older persons.

---

12 No data is given for the states of Hamburg and Schleswig Holstein as their respective Statistical Offices do not collect data at that level. The national average reported by the Federal Statistical office is used for those states instead.
Moreover, a variable containing cinema visits per inhabitants is used to control for demand along with a variable that comprises total number of cinema visits per city and year in some specifications. Data for this variable was available for the periods 2007 to 2015.

Another measure of demand in form of a weighted cinema visits variable was included in the dataset. It was constructed using data on the age composition of cinema visitors at the federal level in Germany. A visit propensity for the individual age groups to go to the cinema was calculated by dividing the share of each age group on total visits by the share of that specific age group on total German population for each year. This cinema visit propensity was then multiplied with the number in each age and gender group of each city for every year. This variable is expected to capture similar effect as the share of the population below 26.

Another variable, namely the available income per inhabitant, is used as a further mean to control for demand as more cinema visits are expected with rising available incomes. The variable contains the average available income per inhabitant per city and year in Euros.

To proxy for personnel expenditure faced by cinemas as a driver of ticket prices, gross average wages per worker in each city and year in Euros is included.

Considering both variables presented above, gross average wages per worker and available income per inhabitant, two different perspectives are assumed here. On the one hand, wages are considered as a cost variable from the point of view of the cinema owner. On the other hand, available incomes are incomes for the households. The former therefore affects the supply side and the latter is associated to the demand side although they are highly correlated and often are assumed to measure similar things.

In addition, total revenues per city and year as well as a measure of population density and surface of each city in km² are also included in some specifications. These latter variables are additional controls for possible effects on cinema numbers due to higher population densities across cities. Two cities with a very similar number of inhabitants may have differences in the number of cinemas due to one being more densely populated. The cinemas may be bigger and have more screens in more densely populated cities. In the similar city, where the population is more dispersed in terms of city surface area and therefore less densely populated, it may have more cinemas where owners possibly find it more appropriate to have additional cinemas rather in different parts of the city than increasing the size of their existing cinemas.
Table 2 summarizes and reports means and standard deviations of the used variables together with minimum and maximum values. Because of the panel nature of the dataset, overall, between and within variation of the variables is reported.

Table 2: Descriptive statistics of used variables

<table>
<thead>
<tr>
<th>Variable (Unit)</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Min</th>
<th>Max</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Overall</td>
<td>Between</td>
<td>Within</td>
<td></td>
</tr>
<tr>
<td>Ticket price (in Euros)</td>
<td>7.61</td>
<td>1.03</td>
<td>0.76</td>
<td>0.86</td>
<td>5.44</td>
</tr>
<tr>
<td>Cinemas (number)</td>
<td>17.12</td>
<td>19.06</td>
<td>17.51</td>
<td>1.04</td>
<td>5.00</td>
</tr>
<tr>
<td>Screens (number)</td>
<td>51.10</td>
<td>52.95</td>
<td>48.75</td>
<td>2.74</td>
<td>13.00</td>
</tr>
<tr>
<td>Cinema visit (per inhabitant)</td>
<td>2.89</td>
<td>0.89</td>
<td>0.78</td>
<td>0.52</td>
<td>0.30</td>
</tr>
<tr>
<td>Share of population below 26 years of age</td>
<td>0.156</td>
<td>0.013</td>
<td>0.011</td>
<td>0.008</td>
<td>0.13</td>
</tr>
<tr>
<td>CPI rates (index: 2010=100)</td>
<td>102.14</td>
<td>3.95</td>
<td>2.41</td>
<td>3.66</td>
<td>95.80</td>
</tr>
<tr>
<td>Gross wage per worker (Euros, Annual)</td>
<td>31,047.37</td>
<td>4814.49</td>
<td>4596.34</td>
<td>2376.74</td>
<td>20892.00</td>
</tr>
<tr>
<td>Available income per inhabitant (Euros, annual)</td>
<td>19,548.41</td>
<td>2624.92</td>
<td>2594.07</td>
<td>606.21</td>
<td>14230.00</td>
</tr>
<tr>
<td>Population (number)</td>
<td>725,605.10</td>
<td>708429.60</td>
<td>661016.70</td>
<td>32711.66</td>
<td>217547.00</td>
</tr>
<tr>
<td>Surface (km²)</td>
<td>285.40</td>
<td>191.46</td>
<td>177.70</td>
<td>0.29</td>
<td>118.65</td>
</tr>
<tr>
<td>Population density (Pop/km²)</td>
<td>2,358.32</td>
<td>759.14</td>
<td>774.90</td>
<td>65.41</td>
<td>1109.13</td>
</tr>
</tbody>
</table>

Source: Own elaboration
4.3. Econometric Specification

Based on Davis’ (2005) approach, Ordinary Least Squares (OLS) with fixed effects will be applied to estimate effects of increased numbers of cinemas on ticket prices. The following regression equations are set up:

\[
Ticket\ Price_{i,t} = \beta_0 + \beta_1 \cdot Cinemas_{i,t} + \beta \cdot x'_{i,t} + \mu_i + \epsilon_{i,t},
\]  

where \( i \) denotes the individual city at time period \( t \), \( x'_{i,t} \) is a vector of control variables. Such controls are e.g. the consumer price index (CPI) as discussed above to control for increased inflation on the ticket prices and the share of the population below 26 years per city to try to control for demand.

\( \mu_i \) are city fixed effects to control for further non-observed characteristics such as the location-specific and over time unchanged characteristics. Thus, it is tried to avoid omitted variable bias as far as possible.

A second regression model where the number of cinemas is used as dependent variable is subsequently set up the following way:

\[
Numer\ of\ Cinemas_{i,t} = \beta_0 + \beta_1 \cdot Population\ Density_{i,t} + \beta \cdot x'_{i,t} + \mu_i + \epsilon_{i,t}.
\]

Here again, the indexes \( i \) and \( t \) refer to the \( i \)-th observation at time \( t \). \( \mu_i \) represents city fixed effects and \( x'_{i,t} \) a vector of additional explanatory variables. The explanatory variables used are population density, annual gross wage per worker, revenues lagged by one year, cinema visits per inhabitant lagged by one year, and a lagged version of the dependent variable.

A problem of this kind of analysis that is encountered quite often, is the problem of endogeneity and reversed causality. Instead of having the number of cinemas in a city, influencing the ticket price, the ticket price possibly also has an effect on the number of cinemas.

Indeed, in a study for Japan, Yamamura (2008) finds evidence that the construction of multiplexes created demand for cinema visits and multiplex construction is increased by prices, too. At the same time multiplexes are less likely to be built where multiplexes have already been built (Yamamura, 2008. See also McKenzie, 2012).

Davis (2005) tries to circumvent this problem by using lagged variables of the market structure in some of the presented regression results. Further, he argues from a theoretic perspective that the cinema market represents a case of a two-stage game where the first stage is the one where the entry decision is made and the second stage consists of decision making on prices and
quantities, whereby the price becomes a function of the market structure. Assuming this direction of causality, often resulted helpful for a multitude of studies. These studies have often been performed in this vein and can “[…] usefully be interpreted as casting light on the prediction on most oligopoly models” (Davis, 2005: 691).

From a theoretical perspective, the fixed effects approach suffers from the mayor drawback of loss of degrees of freedom by inserting dummies for each city and year (for additional time-fixed effects) into the regression. Moreover, the possibility of including time-invariant variables is not possible anymore. The latter though, in this case, too, is also a mayor advantage as uncontrolled and unobservable variance for each city is no longer affecting the interesting estimates for the effect of the number of cinemas on ticket prices.

Time invariant characteristics (at least expected for the 10-year period under investigation) are, for example, the location of the city, the culture and other unmeasured factors that create heterogeneity between cities. In cross-section regressions, this could lead to omitted variable bias. By using a fixed or random-effects approach, this missing variable problem is reduced considerably.

Fixed effects integrate a different intercept for each city and estimate a common slope. A random effect setup is similar in permitting different intercepts for each city. Those intercepts though, are seen as random and drawn from a normal distribution of possible intercepts and treated as belonging to the error term. In this setup, the inclusion of time-invariant variables is again possible (Kennedy, 2003).

While the random effect estimator is a more efficient estimator of the slope coefficients as less degrees of freedom are lost, this is only applicable when the composite error term does not correlate with the explanatory variables. This could be tested by means of the Hausman-test\textsuperscript{13}. Furthermore, the fixed effects estimator is more robust to selection bias and when considering population data rather than samples, it is appropriate as it will yield results and inference based on the cities in the dataset. This is the case even when the random effects estimator’s composite error is uncorrelated with the explanatory variables (Kennedy, 2003).

As the population of cities with more than 200,000 inhabitants and with a non-monopolistic cinema market is analyzed in this study, the fixed effects estimator is the preferred method.

\textsuperscript{13} The Hausman test also was in favor of the use of a fixed effects model for this thesis.
4.3.1 Regression with price as dependent variable

The regression model \( (I) \) was performed in different specifications and is shown in Table 3. All specifications are fixed effects models and further include time fixed effects. Starting from the specification (1) with merely the prime theoretically interesting variable, namely the number of cinemas and year dummies, additional controls are sequentially added up to the benchmark specification in column (5).

Besides the presented, also specifications that included a variable containing the square of the number of cinemas or logged versions of the dependent variable and different explanatory variables were executed without altering the general results.

From specification (3) to (5), gross wages (changed to 10,000 EUR units) are included as control variables. Specification (6) replaces gross wages by a variable including available income (in 10,000 EUR). The use of both variables together in one specification encounters high collinearity problems due to the high correlation of 0.87 between the two.

Some specifications (not reported) also present negative estimates for the effect of an increase in the number of annual visits per inhabitant on ticket prices. This is the case where instead of the share of visitors under 26, the number of annual cinema visits per inhabitant, city and year was used.

Endogeneity could be present here in the sense that the negative coefficient could wrongly reflect the effect of ticket prices on visits instead of the reversed effect that is expected to be reflected in the present work.

To address this endogeneity issue, also an IV-approach was attempted for cinema visits per inhabitant. It was instrumented by the population size in the city and a variable representing the weighted cinema visit measure. Unfortunately, the first stage presented an F-value far below the rule of thumb of 10. Because of this, also a reduced-form regression was attempted where the weighted population variable was inserted in the regression instead of cinema visits in column (7).

Specification (5) to (7) also include a variable which contains the deviation of expected cinema screens. This variable is equal to the number of screens in each city and year minus the average screen number for each city over the whole time series multiplied with the number of cinemas in each year. Including the deviation variable helps to identify the effects of more screens rather than a whole new cinema. Also, using the variable in this way helps to circumvent problems
that may arise due to very high multicollinearity if one merely included cinemas and screens simultaneously into the model.

4.3.2 Regression with number of cinemas as dependent variable

Table 4 reports estimates from a regression model (II) which uses the number of cinemas as the dependent variable. As in Table 3, an OLS model with fixed effects was used. Specification (1) at first regresses the number of cinemas on the lagged annual cinema visits per inhabitant and city, a lagged variable of the number of cinemas and year, which represents a control for a time trend. Specification (2) to (4) subsequently add further controls.

In the framework of Table 4, with the inclusion of the lag of the endogenous variable as another explanatory variable, the reported effects can be interpreted as short-run effects.

This is the case as the fixed effects estimator draws on time series components of the data and the model can be made dynamic by incorporating lagged values of the endogenous variable (Kennedy, 2003).

Using a dynamic model is in line with the intuition here that the effects on cinema numbers are not expected to lead to simultaneous and immediate adjustments.

By including the lag of the dependent variable, it is possible to distinguish between the short-run effects reported in Table 4 and long-run effects, too. These long-run effects are reported in Table 5.

Take the equation:

\[ Y_{i,t} = \beta_0 + \beta_1 \cdot X_{i,t} + \theta \cdot Y_{i,t-1} + \mu_i + \epsilon_{i,t}, \]  

(III)

where imposing \( E[Y_{i,t}] = E[Y_{i,t-1}] \), the equation can be solved to:

\[ E[Y_{i,t}] = \frac{\beta_0}{(1 - \theta)} + \frac{\beta_1 \cdot E[X_{i,t}]}{(1 - \theta)} + \frac{\mu_i}{(1 - \theta)}. \]  

(IV)

\( (1 - \theta) \) represents the speed of adjustment. The long-run effect can be calculated by dividing the short-run estimates by this. The long-run effect of \( X_{i,t} \) on \( Y_{i,t} \) is equal to the differential and therefore \( \frac{\partial Y_{i,t}}{\partial X_{i,t}} = \frac{\beta_1}{(1 - \theta)}. \)
4.4. Results

4.4.1. Determinants for cinema ticket prices

All specifications of Table 3 show a statistically insignificant effect of the theoretically interesting variable – number of cinemas – which is estimated close to zero. Significance levels are though needed for inference from the used data to the population from which the data is sampled from. The observant reader of Davis (2005) will notice that for an empirical paper, significance is merely mentioned seven times throughout the paper. The reason is that Davis was able to analyze data on practically all of the theaters in the market, including both first- and second run theaters, or at least was very close to it (Davis, 2005). This implied that inference statistics play a minor role in that paper and the point of interest is laid on a precise estimation of the coefficients for data.

In this thesis, the approach is the same because, as discussed above, already a great number of cities with 200,000 inhabitants show a monopolistic market structure. Effects on prices by increases in cinema numbers is expected to almost exclusively be found here.

The present data is thus seen as a full sample of non-monopolistic cinema-markets with more than 200,000 inhabitants. The focus here also lies on trying to estimate the effect of additional cinemas with small standard errors with inference being of secondary interest.
Table 3: Regression results with ticket prices as dependent variable

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1) Ticket Price</th>
<th>(2) Ticket Price</th>
<th>(3) Ticket Price</th>
<th>(4) Ticket Price</th>
<th>(5) Ticket Price</th>
<th>(6) Ticket Price</th>
<th>(7) Ticket Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cinemas</td>
<td>0.0100</td>
<td>0.0088</td>
<td>0.0080</td>
<td>0.0082</td>
<td>0.0193</td>
<td>0.0185</td>
<td>0.0160</td>
</tr>
<tr>
<td>Population (in 10,000 inhabitants)</td>
<td>-0.0058 (0.00457)</td>
<td>-0.0059 (0.00460)</td>
<td>-0.0059 (0.00467)</td>
<td>-0.0064 (0.00465)</td>
<td>-0.0054 (0.00402)</td>
<td>-0.0047 (0.00377)</td>
<td></td>
</tr>
<tr>
<td>Share of Population Below 26</td>
<td>-0.0400 (0.0636)</td>
<td>-0.0360 (0.0638)</td>
<td>-0.0354 (0.0680)</td>
<td>-0.0378 (0.0666)</td>
<td>-0.0288 (0.0519)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross Wage per Worker (in 10,000 EUR, Annually)</td>
<td>0.0773 (0.0683)</td>
<td>0.0756 (0.0757)</td>
<td>0.0786 (0.0746)</td>
<td>0.0992 (0.0849)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPI States</td>
<td>0.0048 (0.108)</td>
<td>0.0051 (0.110)</td>
<td>-0.0098 (0.0691)</td>
<td>-0.0034 (0.113)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Screens (Deviation from expected)</td>
<td>-0.0064 (0.00981)</td>
<td>-0.0097 (0.00958)</td>
<td>-0.0052 (0.0107)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Available Income per Inhabitant (in 10,000 EUR, annually)</td>
<td>1.074* (0.542)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weighted Visit Measure</td>
<td>-9.27e-07 (8.09e-07)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Observations</td>
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<td>208</td>
<td>208</td>
<td>208</td>
<td>190</td>
<td>208</td>
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<tr>
<td>Within R²</td>
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<td>0.963</td>
<td>0.964</td>
<td>0.964</td>
<td>0.964</td>
<td>0.969</td>
<td>0.964</td>
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<tr>
<td>Number of id</td>
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<td>City FE</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
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<td>YES</td>
</tr>
<tr>
<td>Year FE</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
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<td>YES</td>
<td>YES</td>
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</tbody>
</table>

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The estimates for the number of cinemas are of similar size and have the same sign in all specifications. Concluding from the confidence intervals, the estimated monetary effect of additional cinemas on ticket prices lies between roughly -3.5 and 7.5 EUR-Cents. This effect is very small, considering the sample average ticket price of 7.61 EUR. One more Cinema therefore would imply a change in the ticket price of 0.25 percent when the point estimate of 1.9 EUR-Cents is applied.
Average distances between cinemas in Germany can be determined by using a website that lists all cinemas per city\textsuperscript{14} and their location in 2016 at the time of writing this thesis. The distances between each cinema in kilometers was calculated by means of Google Maps. Thus, an average distance between cinemas within a city could be calculated. The average distances range from 1.28 km in Bielefeld and 7.05 km in Bremen.

In the dataset used here, the mean value of the average distances between cinemas is 4 km or approximately 2.5 miles.

This measure can be used to set the regression results into perspective with the results found by Davis (2005). He estimated that the effect on the ticket price ranges from -9.8 to 4 US-Dollar Cents (-7.9 to 3.2 EUR-Cents\textsuperscript{15}) for additional own and rival screens with a distance of 2 to 3 and 3 to 4 miles from another, depending on the model.

His fixed effects results, which are most comparable to the result found in this paper, range between -1.5 and -6.3 US-Dollar Cents (-1.2 to -5.1 EUR-Cent) for one more screen. For three screens, which is equal to one average German cinema, thus the effect is estimated between -4.5 and -18.9 US-Dollar Cents (-3.6 and -15.2 EUR-Cent), ceteris paribus.

This tells that in the United States the effects of increased cinema numbers were found to be bigger than for the analyzed German cities. It becomes evident by contrasting Davis’ the -3.6 and -15.2 EUR-Cents range against -3.5 and 7.5 EUR-Cents range estimated in this thesis.

The estimate for the variable containing the deviation of expected screens can be interpreted as the effect of one additional screen, ceteris paribus. Considering that estimate, one additional screen has an effect on the ticket price between -2.7 and 1.4 EUR-Cents. Although Davis (2005) assessed his effects to be small, even smaller effects were found for Germany so far.

The point estimates for deviation in screens are negative but statistically insignificant with confidence intervals from around -2.7 to 1.4 Cent. The small effect may be due to the above discussed pricing policy by distributors. Two contrary effects could be present here. On the one hand, an increased number of screens allows to show and rent more movies. Thus, cinema owners have to pay higher total rental fees according to the number of screens. Consequently, the total operating costs for the cinema owner will rise. This could make price increases necessary.

\textsuperscript{14}The Website \url{www.kino.de} permits to search cities cinemas are listed there.

\textsuperscript{15}The Euro-Dollar average exchange rate for 2005 from European Parliament (2007) was used to calculate Euro values.
On the other hand, big cinemas with more screens may have more power when negotiating prices. This could result in a downward pressure on prices.

Smaller effects as those found by Davis could be caused by the different levels of aggregation uses by this and Davis’ paper. While he estimates the effect of an additional screen on the price for each cinema, this thesis only shows an effect of one additional screen (keeping the number of cinemas constant) on the average price in a city. This is the case when the variable ‘Deviation of screens’ is considered. Furthermore, the estimated effect in this thesis can be seen as an average effect where it is not differentiated between own or rival-owned screens.

This may also apply when the variable ‘Cinemas’ is contemplated and Davis’ results are made comparable to that level as shown above.

Another reason for lower effects may be, for example, less competition in the German cinema market. High urbanization rates in Germany make it possibly difficult to even add additional screens to an existing cinema due to restrictions on the available space and perhaps more restrictive laws on the construction or expansion of buildings.

The remaining control variables like share of the population under 26 years, gross average wage per worker, and available income coefficient estimates which have the expected signs in the way that ticket price increases were expected to be negatively influences by increases in the price sensitivity in the population, higher costs due to higher wage levels or higher ability to pay due to higher incomes.

The negative coefficient of the CPI variable in specifications (6) and (7) could be explained by a slow adaptation of prices to current inflation levels similarly to menu costs, where prices are kept for multiple years. Cinemas often keep prices for several years, while the included price index in this dataset kept increasing. Therefore, the sign may be caused by this fact. The variable may also capture other changes over time as it is insignificant when compared to a specification where the year dummies were replaced by the variable containing the years (not reported).

A positive and significant coefficient for available income at the 10 percent level in column (6) would imply an increase of the ticket price by 1.07 EUR for an increase in average available income by 10,000 EUR per year, ceteris paribus.

Gross wage increases have an insignificant effect on ticket price as was expected in models (3), (4), (5) and (7). Here an increase of gross wage by 10,000 EUR per year would lead to an increase of ticket prices between -7.5 to 23.2 Euro Cents. Changes in German real gross wages, although during the examined time-period only experienced yearly changes between 0.5 and
2.2 percent (WSI, 2017). From the whole-sample average gross wage of 30,047 EUR this translates to a maximum increase of 601 to 30,648 EUR if an increase of 2 percent on the average gross wage is assumed. The effect of a 600 EUR increase in gross wages implies a far more modest effect of 0.5 Cent, for a coefficient in the size of the point estimate.

As the share of the population below 26 increases by one percentage point, the ticket price will experience a – ceteris paribus – change between -17.4 and 9.9 Cent. The point estimate is around 4 Cent but rather big standard errors are estimated here. This may be due to low variation of this variable over cities and time.

An increase in Population by 10,000 inhabitants also is estimated at -1.6 to 0.3 Cents. This is rather surprising, as an increased number of population, was expected to proxy for an increase in demand and therefore should have led to an increase in prices following economic theory.

The regression, shown in specification (7) replaces the share of the population below 26 years variable by the weighted visits variable. The coefficient here still shows a negative sign and no significance. An increase the weighted visits variable now implies a very precisely estimated change in ticket prices around 0, ceteris paribus.

In sum, Table 3 shows that on average effects of changes in demand and cost seem modest. The effect of more cinemas in a specific market is never significant. Still, the estimated coefficients and confidence intervals are consistent through different modelling approaches. So far, the findings here suggest with a certain degree of confidence that the effect of additional cinemas in mayor German cities does not have any mayor effects on the charged admission prices.

4.4.2. Cinema numbers as dependent variable

The specifications in Table 4 use the number of cinemas as the dependent variable. The population density in km², gross annual average wage per worker for each city and year, as well as lagged variables like revenue of the previous year and previous year’s cinema visits per inhabitant and a lagged version of the endogenous variable are included.

After having shown that more cinemas do not have a very large effect on prices for cinema visits, the purpose of the analysis in Table 4 is to model some of the determinants for an increased number of cinemas among German cities with more than 200,000 inhabitants.

Population density does not have a significant effect on the number of cinemas built. The negative coefficient for annual gross wage is not significant but in line with the assumption
that it acts as a cost of labor for the cinema owner. Higher labor costs and therefore higher operational costs translate into fewer cinemas.

For the lagged revenue variable, a negative and statistically significant effect at the 10 percent significance level is present. Although it is very small, with -0.007 less cinemas for a ceteris paribus increase of previous year’s revenue by 100,000 EUR, this negative effect could potentially be explained by collusion between the market participants. There, the building of more cinemas could be risky and detrimental for future revenue and profit expectations given that the competition’s behavior is unclear if one cinema owner deviates from the status quo in the market.

Cinema visits per inhabitant has an effect that is insignificant, but the estimated 95 percent confidence interval puts the effect to be within -0.091 and 0.301 for the model in column (4). This result implies that cinema visits per inhabitant would have to increase by around three more annual visits per inhabitant for one additional cinema, ceteris paribus.

For example, using the 2016 value of Munich with 2.8 annual cinema visits per inhabitant, the number of annual visits would need to nearly double to 5.8 for one more additional cinema. Keeping the population constant, this would imply an increase from around four to eight million visitors. The reason for this may be that, as discussed above, the variable ‘Cinema visits per inhabitant’ was estimated to have a negative effect on the ticket price (the confidence interval shows an effect of -5 and 7 EUR-Cents). More visitors may make it more attractive to open more cinemas but also the price will fall due to the latter.

Also, as only the number of cinemas is considered, the existing cinemas could be enlarged to accommodate more visitors or additional screens. When the number of screens is used as dependent variable instead of cinemas as in specification (4) of Table 4 (not reported), the estimate of 0.753 for additional annual visits on the number of screens is still not statistically significant but is in the interval of -0.551 and 2.70. Additional annual visits therefore are assumed to more likely increase the number of screens rather than being the main determinant for the building of cinemas.

In total, around 30 percent of the variation in the number of cinemas can be explained by the variables used in Table 4.
Table 4: Regression results with cinemas as dependent variable

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population Density (Pop. per km²)</td>
<td></td>
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<td>Annual Gross wage per worker (in 10,000 €)</td>
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<td></td>
<td>-0.226</td>
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<tr>
<td>lag1 Revenue (in 100,000€)</td>
<td>-0.0070*</td>
<td>-0.0071*</td>
<td>-0.0071*</td>
<td></td>
</tr>
<tr>
<td>lag1 Cinema Visits per inhabitants</td>
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<td>0.110</td>
<td>0.0963</td>
<td>0.105</td>
</tr>
<tr>
<td>lag1Cinemas</td>
<td>0.482***</td>
<td>0.431***</td>
<td>0.424***</td>
<td>0.428***</td>
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<td>Constant</td>
<td>39.46</td>
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<td>-49.92</td>
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<td>181</td>
<td>181</td>
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</tr>
<tr>
<td>Within R²</td>
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<td>0.311</td>
<td>0.314</td>
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</tr>
</tbody>
</table>

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5 reports a long-run effect or long-run multiplier\(^{16}\) for a change in population density, annual gross wage per worker, revenue and cinema visits per worker on cinemas, based on the estimates from specification (4).

Table 5: Short- and long-run effects of variables on number of cinemas

| variable                          | Short-Run Effect | Long-Run Effect | Std.- Err. | P>|t| | 95% Conf. Interval |
|-----------------------------------|------------------|----------------|------------|-------|-------------------|
| Pop. Density                      | 0.0006           | 0.0011         | 0.003      | 0.714 | -0.0048           | 0.0069 |
| Annual Gross Wage per Worker (in 10,000 €) | -0.1850         | -0.3231        | 0.296      | 0.286 | -0.9341           | 0.2879 |
| Lag1_Revenue                      | -0.0071          | -0.0125        | 0.006      | 0.058 | -0.0254           | 0.0004 |
| Lag1_Cinema Visits per Inhabitant | 0.1050           | 0.1835         | 0.179      | 0.317 | -0.1869           | 0.5539 |

\(^{16}\) Verbeek (2008) uses the terminology of a “long-run multiplier” in this context.
The long-run effects of all variables increase in size and are roughly twice in size. The results suggest that wage increases in the long run have bigger effects as in the short run. The estimated short-run effect of one year lagged gross wage per worker lays between -0.54 and 0.17 while the long-run effect ranges between -0.93 and 0.28 in the 95 percent interval.

Also, long-run revenue effects increase with the 95 percent intervals from [-0.014; -0.00004] to [-0.025; 0.00044], respectively. This is the only statistically significant estimate with -0.007.

The estimate of long-run effects of cinema visits is estimated within the interval [-0.19; 0.55] and [-0.09; 0.30] for the short-run effect. The long-run effect implies one more cinema for around two to five more visits per inhabitant and year in the long run.

In addition to the reasons discussed for the short run effect of annual cinema visits on the number of cinemas built, the rather low effects of large increases of visitor numbers may also be explained by the capacity utilization statistics for German cinemas from 2003 to 2014. The average capacity utilization was rather small and around 14 percent in that time period (Castendyk, 2014).

Increases in visitors may therefore need to be large before additional screens or even cinemas are built.

Increased demand, proxied by cinema visits may have a more indirect effect on ticket prices by foremost affecting the construction on the number of cinemas in the long-run.

The coefficient of the lagged cinema variable in Table 4 reveals the speed of the adjustment process. One minus the coefficient reveals the ratio of short run to long run for changes within one year. Here, with an estimated and significant value of 0.428, it translates into a 57.2 percent of the long run adjustment occurring within one year. Given that number, 92 percent of the adjustment process is achieved within three years. This is a rather short adjustment time given the fact that the building of cinemas is analyzed here. They have to be planned and built. The estimation of such a short time frame may also be due to re-openings of previously existing cinemas or closures which are then reflected as changes in the number of cinemas in the statistics of the FFA.
5. Concluding Remarks

The aim of this paper was to analyze the German cinema market by first providing a comparison between the German and the US market, for which Davis (2005) realized his study.

Furthermore, a review of the present economic literature was discussed and it was found, that there is a great and varied amount of literature about the cinema market, which ranges from topics such as the historic and legal developments to a variety of other studies that cover topics from analyzing the effect of movie stars on a movie’s success to the discussion of the influence of market structure on pricing in the cinema market.

The rather special situation of the cinema market was also of special interest in this paper. It is wedged between the visitor who demands cinema visits as service or ‘product’ by the cinema and the cinema on the other hand having the distributor from whom he rents the movies for screening.

Different incentives such as the possibility to earn high profits from concessions make the pricing decision of the cinema owner rather ambiguous. The cinema owner theoretically prefers to charge low admission prices and charge more for concession goods. For the former, he needs to share the earnings with the distributor. For the latter, he keeps all the earnings.

The empirical paper of Davis (2005), which analyses effects of market concentration in the US market and similar theoretical assumptions served as a blueprint for the analysis performed in this thesis.

Contrary to Davis, market concentration was not possible to be observed. Therefore, the focus was laid on estimating the effect of additional cinemas in a city on the charged ticket prices. Cities with more than 200,000 inhabitants in Germany were used as the unit of analysis.

The analysis was based on a dataset that was compiled from official reports by the German Film Board (FFA) covering cities with a non-monopolistic cinema market structure and more than 200,000 inhabitants from 2007 to 2016.

The results indicate that the effect of additional cinemas on cinema ticket prices is not statistically significant and the estimated confidence intervals are very small.

Also, the effect of increased costs due to higher wages, and possibly higher demand for cinema visits due to increased income levels were not significant and small.
The effects of the share of population under 26 as a variable, which was thought to capture price sensitivity and also to control for demand showed an insignificant effect with rather large confidence intervals. However, when the variable is replaced by a variably measuring a weighted visit measure that also includes age characteristics of the population, this effect is estimated to very close to zero. This indicates that the true effect on an increased price sensitivity is probably overstated by the regression result found by the former variable.

After discussing the effects of cinemas numbers on ticket prices, the question which factors determined the number of cinemas was also addressed. While around a third of the variation in cinema numbers could be explained by the model used, only one year lags of revenue were statistically significant.

Furthermore, the model used allowed to differ between long- and short-run effects where population density, gross wage and revenue increases played a more important role on the long-run. The former had a positive effect, while both latter variables presented to be detrimental for the building of new cinemas. Particularly, a negative effect of previous year’s revenue hints to the fact that collusion may be present in the German cinema markets.

The datasets provided by the German Film Board which did not additionally report average city prices for cities with monopolistic market structure due to data protection laws, represented a limitation for this thesis.

Future research should therefore try to acquire better and more comprehensive data that also includes those cities here classified as monopolistic markets. A difference between monopolistic, duopolistic and oligopolistic markets should thus be possible. As mentioned in the data section, too few answers by cinema owners were received to address and discuss these questions in this thesis.
References


European Central Bank (ECB), 2017, ECB euro reference exchange rate: US dollar (USD), viewed 03 April 2017, Database, available online under:


Appendix

Corresponding to section 2, this appendix aims to give a further overview of the cinema market on beyond the comparison of the German and US markets. The focus here lies on the most relevant countries like the United States and the continuously growing Chinese market as well as the other EU states in an attempt to position the German cinema market in terms of relative size, dynamic and importance on the global and regional stage.

The Global Cinema Market in Comparison

The Cinema market is usually globally split into the North American-, European Middle-Eastern and African (EMEA)-, Asia Pacific- as well as Latin American markets. Here, the Motion Picture Association of America (MPAA 2016) reports a global total box office for all films of 38.6 Billion (Bn) USD, from which 11.4 Bn- USD were achieved by the United States and Canada Markets (North America). The remaining 27.2 Bn- USD are split into 14.9, 9.5 and 2.8 Bn- USD for the Asia Pacific, EMEA and Latin American markets, respectively.

The German cinema market therefore is part of the third largest global cinema market region. Considering individual countries worldwide, the United States/Canada box office in 2016 still leads in the international comparison of the top ten countries in box office revenues with 11.4 Bn- USD, followed by China (6.6 Bn- USD), Japan (2.0 Bn- USD), India (1.9 Bn- USD), the United Kingdom (1.7 Bn- USD), France (1.6 Bn- USD) and South Korea (1.5 Bn- USD) in the places two to seven respectively. Germany holds the eighth position with 1.1 Bn- USD, thus also making it the third biggest cinema market in the European Union (EU) when box office revenues are used as indicator of market size (MPAA 2016). Behind Germany Australia and Mexico are on ninth and tenth place with correspondingly 0.9 and 0.8 Bn- USD box office revenue. Table A.1 summarizes these statistics.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>US/Canada</td>
<td>11.4</td>
</tr>
<tr>
<td>2</td>
<td>China</td>
<td>6.6</td>
</tr>
<tr>
<td>3</td>
<td>Japan</td>
<td>2.0</td>
</tr>
<tr>
<td>4</td>
<td>India</td>
<td>1.9</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>France</td>
<td>1.6</td>
</tr>
<tr>
<td>7</td>
<td>South Korea</td>
<td>1.5</td>
</tr>
<tr>
<td>8</td>
<td>Germany</td>
<td>1.1</td>
</tr>
<tr>
<td>9</td>
<td>Australia</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Table A.1: Box Office 2016 (Billion US-Dollar)
Table A.1: Box Office Revenue (Top 10 countries, 2016)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Revenue (Bn-USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>United Kingdom</td>
<td>1.7</td>
</tr>
<tr>
<td>10</td>
<td>Mexico</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Source: MPAA (2016), Own Elaboration.

Figure A.1: Gross Box Office for selected countries (Bn-USD, 2005-2013)

Note: Gross revenue data extracted from UNESCO (2017) in local currency. The data was normalized into US-Dollars using each years official average exchange rate from the Worldbank (2017). Numbers shown for the United States and Germany

Source: UNESCO (2017) and Worldbank (2017); Own calculations

Figure A.1 shows the development of the top 10 countries from 2005 to 2013 with data drawn from the UNESCO Institute for Statistics (UNESCO 2017). A positive developing trend is visible for all countries, although countries in the Latin American and EMEA-markets experienced less pronounced upward tendencies for their box office revenues than the North American market. Especially Chinese box office revenue growth during the period is considerable with an increase from 0.24Bn-USD in 2005 to 3.51 Bn-USD in 2013. This trend accelerated even further as, according to the 2014 and 2015 editions of the MPAA Theatrical Market Statistics, the Chinese market achieved revenues of 4.8 and 6.8 Bn-USD in 2014 and 2015, thus growing by 34 and 49 percent in both years (MPAA 2014, 2015).

Revenues of the three biggest European countries – United Kingdom, France and Germany – experience rather low growth. German figures (red line) show less growth of box office
revenues of 1.04 Bn-USD in 2007 up to 1.31 Bn-USD in 2013. A decrease was experienced 2009 to 2010, where revenues dropped by 10.3 percent (from 1.36 to 1.22 Bn-USD) (UNESCO 2017; Worldbank 2017).

PriceWaterhouseCoopers (PWC) made an assessment of the cinema market development from 2016-2020 (PWC 2016). They report the expected global box office revenue growth to be around 6.0 percent for the five-year period. Revenues of the entire Asian region are expected to surpass that of the North America market and to eventually encompass nearly 50 percent of the entire box office revenues as forecasted for 2020. Especially China is seen as a key player again. The country is expected to overtake the United States by 2017 and box office revenues are likely to be nearly a third (28.4 percent) higher by the end of the forecasted period in 2020 (US and Chinese revenues are estimated at 11.87 and 15.24 Bn-USD, respectively). Growth figures for the Latin-American market also are expected to be slightly above average with 6.4 percent. Western European and North American markets on the other hand “[…] may lag behind in terms of growth, [but] they are expected to continue to expand” (PWC 2016, 2 addition by author).

Studies for the German market estimated average growth rates of 2.5 percent from 2013 to 2017 for box office revenues (PWC 2013). However, the PWC (2017) revised this and now expects average revenues to fall one percent on average from 2016 to 2020 (PWC 2016). This decrease in revenues from ticket sales is happening among other factors due to the growing competition on the cinema market by Video-on-Demand (VoD) and streaming services such as Netflix and Amazon Prime just to name some of the most renowned services. The time span of 16 to 17 weeks that movies were usually exclusively shown on cinemas has come under pressure so that release models are changing (PWC 2017).

Cinemas now are more and more shifting to provide and render the cinema visit as whole experience (MacMillan and Smith 2001) with increased comfort and high technical equipment concerning video and audio experience for visitors and focus on movies with big budget, special screenings of blockbusters such as Star Wars or Jurassic Park which were designed to be viewed in cinemas and hereby justify higher ticket prices (PWC 2017, 5).

This leads to a discussion of structural differences in the cinema markets such as underlying factors for growth differences. Most notably, the Asian market at the moment still profits from increasing living standards and increased urbanization rates and “[…] as urbanisation continues, with shopping malls, skyscrapers and airports being built at a prodigious rate, cinema multiplexes are continuing to spring up alongside them” (PWC 2016, 2). In contrast, the North
American and EMEA markets exhibit a much more saturated market. Here, growth in revenue is mostly achieved through increases in ticket prices and to a lesser extent to an increase in the number of cinemas (PWC 2013, 2016). The above-mentioned estimate of average 2.5 percent growth of box-office revenues from 2013 to 2017 was expected to be mostly due to ticket price increases (PWC 2013). The expected decline of average one percent in 2016 to 2020 could not be mitigated even by the expected increase in ticket prices (PWC 2017).

Stagnation in revenues as a consequence of substitution of cinema by Television and VCR media are discussed by McKenzie (2012) and Cameron (1986, 1988) for England. Here, cinema demand shows strong positive income elasticity. In addition, a constant decline of the UK cinema industry since the late 1950s has been identified to have been partially caused by increases in ticket prices. MacMillan & Smith (2001) find a slight reversal in this trend. The ticket prices grew along with the introduction of multiplexes in the mid-1980s without lowering demand. This contrasts with the previous 1950s and 60s trend of exclusively raising ticket prices to compensate losses due to less demand caused by television which then only diverted demand further away (MacMillan & Smith 2001). According to The Telegraph (2015), for 46 percent of cinema goers in 2015 ticket prices were decisive for whether going to the cinema or not.

Dewenter & Westermann (2005) specifically studied the German market and also find negative effects of television and VCR introduction on the number of screens and seats in along with a positive income elasticity and negative elasticity regarding prices of substitutes, thus yielding qualitatively similar results as the UK studies.