

Market Entry Costs: Evidence from Motion Picture Exports

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Abstract

This paper examines how market entry costs affect the choice of export mode. I use internal company records to examine market entry in motion picture markets. I document different modes of entry across markets, with more intensive modes used for large markets. Markets with the largest sales are more costly to serve, since they require more extensive sales office networks. While costs are higher in large markets, revenue is even larger. The number of films released is unrelated to market size but the margin on each movie released is higher. Most of the costs of selling to a market are fixed costs. Costs directly related to the number of releases are minor.

JEL classification: F1.

Keywords: Heterogeneous Firm Trade Models; Services Trade; Motion Pictures.

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1 Introduction

The last decade has seen an explosion of interest in the industrial organization of international trade. New micro datasets have led to the development of heterogeneous firm trade (HFT) models, which link firm characteristics with export participation. Important contributions include Eaton & Kortum (2002), Bernard, Eaton, Jensen & Kortum (2003) and Melitz (2003). HFT models have been used to explore a wide variety of topics, including trade patterns (Baldwin & Harrigan 2011), Armington elasticities (Ruhl 2005), and exchange rate pass through (Berman, Martin & Mayer 2011). (See Bernard, Jensen, Redding & Schott (2007) for a survey.)

This paper examines how market entry costs affect the choice of mode of export. There is a variety of methods that a firm can use to export. Since the cost structures of these different modes may be different, exports may respond to shocks differently depending on the mode used (Bernard, Grazi & Tomasi 2011). Data constraints have restricted our knowledge of this decision. A recent literature has examined the use of intermediaries in trade, including Ahn, Khandelwal & Wei (2011), Akerman (2011) and Bernard et al. (2011). These datasets do not link a transaction to a firm unless the firm exports directly. At best, they link an export transaction with the last domestic firm to handle it. Since we do not know which firm made the products intermediaries export, it is difficult to examine export mode choice. In addition, the only costs of trading they report are tariffs and freight. They do not provide information about the sunk costs of exporting, the key cost in HFT models.

This paper uses a novel data source that provides very detailed information on market entry for the motion picture industry. Internal company data for United Artists (UA) from 1935 to 1949 are available from an archival source. UA was a major motion picture exporter with sales to over 50 countries. These data give country level detail on mode of entry, sales and distribution costs. In addition to a rich set of data, the archives include memos and other documents that give direct insight into how the decisions to enter markets were made.

This paper makes two main contributions. The data allow us to examine directly the

modes of entry a firm uses to export to different markets. The literature has emphasized firm characteristics: Large, productive firms use FDI, small firms use exports and the smallest do not export at all (Helpman, Melitz & Yeaple 2004). This paper shows that a single firm may use a number of different methods of exporting depending on a market's characteristics. Guided by the UA data, I develop a theory that generates the empirical pattern of modes of entry.

The data also allow us to examine directly the structure and magnitude of market entry costs. There is surprisingly little direct evidence on the magnitude or even the nature of these costs. In fact, I am not aware of a single paper that that directly measures these costs. Existing estimates of their magnitude use a structural model to back out these costs. For example, see Das, Roberts & Tybout (2007), Ruhl & Willis (2009) and Morales, Sheu & Zahler (2011). This paper provides direct data of market entry costs.

I show theoretically that a firm will use a hierarchy of modes to export, with more intensive modes used for larger markets. More intensive modes, such as opening a foreign affiliate, require the firm to pay more in distribution costs but generate more revenue. The firm is willing to pay distribution costs in major markets. I then show that this finding is supported by the data.

I find that markets with the largest sales are more costly to enter. The primary function of distribution is contracting with theaters and publicizing movies. Big markets have large populations and high income per capita. Large populations have more potential viewers and high income increases the number of movie tickets each person buys. Both effects increase the number of theaters. Large markets are more likely to be served by affiliates rather than agents, which is more costly. They also require more extensive sales office networks to service the larger number of theaters.

Despite having higher costs, larger markets are more profitable. Higher costs are not due to a greater number of movies being released in large markets. The number of films released is unrelated to market size but the margin on each movie released is higher. While costs are higher in large markets, revenue is even larger.

The data show significant fixed market entry costs. Most of the costs of selling to a market are fixed costs such as sales office personnel and rent. Costs directly related to the number of varieties (movie releases) exported to a market, such as copying prints, are minor. On average, they constitute only 10 percent of the costs of exporting. The findings provide direct validation of the HFT literature's emphasis on fixed costs.

I also examine the impact of trade barriers. Distance, the key ingredient in gravity models, is not as big a barrier as cultural difference. Whether a country speaks English is a much more important predictor of revenue. Physical distance does not have a significant effect. This finding is surprising given that communications and travel technology were unreliable at long distances and more recent studies have found distance to be important (Marvasti & Canterbury 2005).

These findings are generally consistent with previous theoretical findings. Hanson & Xiang (2011) apply a HFT model to more recent data to back out the costs of selling motion pictures abroad. Though they cover a different time period than the UA data, the sales behavior is similar in the two cases. The basic economics of film exports does not appear to have changed significantly between the two time periods. They find that fixed costs are the most important costs of exporting motion pictures. However, I do not find a global cost of market entry as they do. However, my findings are not greatly different than their predictions. Costs are much more stable across markets than revenues. Therefore, the strategy of backing out costs using HFT models is a reasonable, if imperfect, proxy for actual costs.

These data are also interesting in their own right. They provide a detailed picture of an important export industry. Despite a great deal of interest in services trade, a lack of data requires indirect methods to study these markets (Anderson, Milot & Yotov 2011). The extensive network of sale offices within countries is consistent with the importance of renegotiation of contracts in maximizing motion picture revenue, as emphasized by Gil (2009). The data show Hollywood's surprising resilience to the shocks of the Great Depression and World War Two. UA quickly reentered markets after liberation from Axis armies. UA reopened

its French affiliate in 1944, the same year as D-Day.

This paper helps fill in the historical data on services trade. Even recently, the coverage of services trade is much less detailed than goods production (Gervais & Jensen 2010). Disaggregated official data only begin in 1986. A reason for the neglect of services trade is that service industries have not been significant exporters. In contrast, the U.S. motion picture industry has been a major exporter for virtually its entire life. Overseas sales already totaled a third of revenue by 1925 (Walsh 2008). Official statistical agencies are expanding their coverage of intangible assets and services trade (Soloveichik 2010). Estimates of the early experience in such large services exporters are important in maintaining consistent time series.

A small literature has examined trade in motion pictures. Hanson & Xiang (2009) document the underreporting of motion picture services trade. Marvasti & Canterbury (2005) use a gravity approach to U.S. motion picture exports to determine cultural distance. McCalman (2004) examines the impact of intellectual property rights protection on the mode of market entry. Chan-Olmsted, Cha & Oba (2008) do a similar exercise with video exports. Holloway (2011) examines the impact of film quality on market entry. Unlike the existing literature, this paper examines costs directly.

Other papers, such as Glancy (1992) and Glancy (1995), have used internal documents from film studios. This paper emphasizes distribution costs, while they have examined film production costs and the distribution of grosses by release.

2 Theory

This section sets out the theoretical framework for the paper. The model is adapted from Holmes (2005) to match the features of the motion picture industry.

2.1 Environment

There are J countries of size n_j . A firm i has q_i varieties to sell.

The firm chooses what mode to use to distribute its varieties. There are three modes of entry which vary at the level of intensity of the firm's engagement in a market. More intensive modes require more expenditure by the firm, but also generate higher revenue. At the least intensive is an export sale, in the middle is to use a licensed agent and the most intensive is a sales office. The firm chooses the mode that generates the largest profit.

If a firm sets up an office in county j , it receives revenue $q_i n_j$ and pays variable cost $c_{i,j} = \bar{c} - \gamma n_j$ and fixed cost ϕn_j . The parameter $\gamma > 0$ governs how much easier it is to sell in large markets. Profit from this mode is $\pi^O = q_i n_j - q_i(c_{i,j} - \gamma n_j) - \phi n_j$.

If a firm uses a licensed agent, it receives revenue $(1 - \tau)q_i n_j$ and pays fixed cost ϕ^L . The fixed cost represents the cost of contracting with and monitoring the agent. The parameter τ governs the degree of revenue lost by licensing. As discussed below, this loss may be due to profit sharing, contracting frictions or both. Profit from this mode is $\pi^L = (1 - \tau)q_i n_j - \phi^L$.

If it uses an export sale, it receives revenue θq_i and pays no cost. Profit from this mode is $\pi^E = \theta q_i$.

2.2 Mode Selection

The mode that the firm selects is a function of the number of varieties it has to sell and the size of the market. I will emphasize the impact of market size for "large" firms. This emphasis matches the data available in the empirical analysis. The movie industry was heavily skewed to a few large firms. I only have detailed data for one of these large firm's choices over different markets.

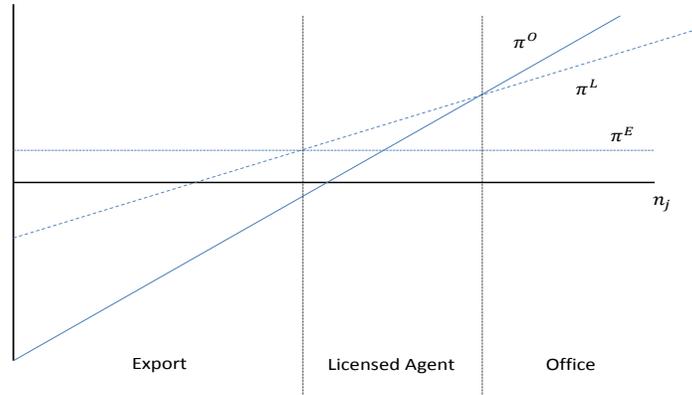
The firm selects the mode that provides the highest profit. Profits from each mode are a linear function of market size. They can be described by the intercept and the slope.

The intercept is profit evaluated when $n_j = 0$. The intercept for the three modes are given by $\pi^O = -q_i \bar{c}$, $\pi^L = -\phi^L$ and $\pi^E = \theta q_i$. As market size increases, office profits increase by slope $n_j[q_i(1 + \gamma) - \phi]$ and licensed agent profits increase by $n_j(1 - \tau)q_i$. Export sale profits do not increase in market size.

The ranking of these modes depends on the number of varieties q_i . The intercept for export sales is always positive while those for offices and licensed agents are negative. The ranking of offices and agents depends on varieties. If $q_i > \frac{\phi^L}{\bar{c}}$, then the intercept for offices is less than that of agents. If $q_i > \frac{\phi}{\tau+\gamma}$, the slope of the office profit function greater than that of licensed agents.

As can be seen from Figure 1, the model generates a hierarchy of markets for large firms. The mode of entry will be more intensive for larger markets. The smallest markets are served by export sales. Mid-sized markets are served by licensed agents and the largest are served directly by sales offices.

Figure 1: Mode Selection



The cutoff between exports and licensed agents \bar{n}^{EL} is given by: $\bar{n}^{EL} = \frac{q_i \theta + \phi^L}{q_i(1-\tau)}$. The cutoff between licensed agents and offices \bar{n}^{LO} is given by: $\bar{n}^{LO} = \frac{q_i \bar{c} - \phi^L}{q_i(\tau+\gamma) - \phi}$.

This hierarchy is summarized in the following proposition.

Proposition 2.1. *If $q_i > \frac{\phi}{\tau+\gamma}$ and $q_i > \frac{\phi^L}{\bar{c}}$, then the firm will serve markets of size:*

1. $n_j \leq \bar{n}^{EL}$ with export sales,
2. $\bar{n}^{EL} < n_j \leq \bar{n}^{LO}$ with licensed agents,
3. $\bar{n}^{LO} < n_j$ with offices.

Larger markets generate more revenue. More intensive modes allow the firm to participate more in those revenues, but it has to pay more of the cost of distribution. Intensive modes require paying fixed costs, which increase in the intensity of the mode. In small markets, the benefits of capturing revenues are small so it is not worth it to the firm to pay those costs. There are enough revenues to cover fixed costs in large markets, so the firm will use more intensive modes of entry.

It is possible that a large firm will not use agents, using export sales for small markets and offices for large markets. If profitability of offices increases in market size fast enough, offices will dominate agents before becoming more profitable than export sales. While not every slot in the hierarchy is used, the order is preserved.

The hierarchy mode choice is generally maintained for smaller firms, although not all modes are used. All firms will use export sale for the smallest markets due to the fixed costs of the more intensive modes. Very small firms do not use offices. If $q_i < \frac{\phi}{1+\gamma}$, it will never be profitable to open an office. The firm has too few varieties to overcome the fixed costs of opening an office. Profitability of offices declines in market size (the slope is negative), so offices never generate positive profits. For large markets, small firms use licensed agents but never graduate to offices.

It is theoretically possible that a mid-sized firm would use offices for mid-sized markets and agents for large markets. If $q_i \in [\frac{\phi}{1+\gamma}, \min\{\frac{\phi}{\tau+\gamma}, \frac{\phi^L}{\bar{c}}\}]$, offices are more profitable than agents for the smallest markets (the intercept is higher) but offices' profitability grows slower than that of agents. Therefore, the profit functions for offices and agents in Figure 1 are switched and the hierarchy could be changed to export sales, agents and offices as market size increases.

For the motion picture industry, the large firm model is the relevant case. The industry

very quickly consolidated into 8 major studios. I will show below that they were the only firms to have overseas offices. The inverted hierarchy is not empirically relevant in this industry.

Among large firms, those with more varieties will use more intensive modes in the same market. Both cutoffs are decreasing in the number of varieties q_i . Expanding out the cutoff between exports and agents, $\bar{n}^{EL} = \frac{\theta}{1-\tau} + \frac{\phi^L}{q_i(1-\tau)}$. By inspection, this cutoff is declining in q_i . If $(\tau + \gamma)\phi^L < \bar{c}\phi$, then \bar{n}^{LO} is decreasing in q_i . Taking the partial with respect to q_i , we have $\frac{\partial \bar{n}^{LO}}{\partial q_i} = \frac{\bar{c}}{q_i(\tau+\gamma)-\phi} - \frac{(\tau+\gamma)(q_i\bar{c}-\phi^L)}{[q_i(\tau+\gamma)-\phi]^2}$. Rearranging gives the condition.

The intuition for this result is similar to that of the hierarchy of modes. Having a lot of varieties makes a market large, even if it is small in terms of n_j . The pool of revenues available to pay for fixed costs is larger for firms with large q_i , so they are more likely to take on those costs. This result is similar to Das et al. (2007), where larger (more productive) firms sell to markets using FDI rather than export sales.

The model predicts that larger markets will have more offices. In the largest markets, most firms will find it worth the cost to open an affiliate. Mid-size markets will have a mix of affiliates and agents. The largest firms use offices and smaller firms use agents.

3 Data

This section describes the data that will be used in the empirical section. The primary data are drawn from the United Artists collection housed at the University of Wisconsin. This collection holds the company's internal records, including income and costs for its foreign distribution network over the period 1935 to 1949. This section describes how UA distributed motion pictures overseas and describes the data item used in greater detail.

3.1 United Artists's Foreign Distribution

United Artists had a major business as a distributor of independent producers' films. The cost data do not include film production expenses, only distribution costs. Other companies were

vertically integrated, owning production studios, exhibition theaters and distribution networks. Most of the movies UA distributed were features rather than serials or newsreels, so each release is in a uniform format.

All major motion picture distributors had a significant overseas presence. UA's was particularly big even though UA was the smallest of the major studios. (It was one of the "little three" studios, along with Universal and Columbia Pictures.) Even with World War Two limiting overseas revenue, 44 percent of grosses came from non-U.S. sources in 1944. During the 1930s, the company had up to 30 overseas subsidiaries and sales to another 17 markets through agents. (Recall that due to colonialism, the number of countries was much smaller during the period studied compared to today.) These markets range from large markets like the United Kingdom to tiny markets like Estonia. UA sold to countries on every inhabited continent. Therefore, the UA data have good coverage of nearly every market to which U.S. films were exported.

UA's network was largely established by the beginning of period covered in this paper. Most affiliates were established between 1920 and 1926. A couple of agencies were replaced with affiliates: Chile and Peru in 1937 and South Africa in 1938. Therefore, the data generally reflect the costs of servicing a market rather than establishing an affiliate, a distinction emphasized by Gibson & Graciano (2011).

The time period covered was a tumultuous time in history. The Great Depression stretched into World War Two. One might be concerned that data from this period will have little to tell us. The motion picture industry was quite resilient to the shocks of this period.

The Great Depression was a period of expansion for the motion picture industry. Unlike manufacturing or even recorded music or books, film sales did not show a decline due to the Depression (Soloveichik 2011). Sound was introduced in 1927 and rapidly took over the U.S. market. While sales no doubt would have been higher without the depression, the film industry was not under the distress that most other industries faced. The largest studios remained profitable and the rest returned to profitability by the mid-1930s (Schatz 1999).

The war had more impact, but film sales were surprisingly resilient to the war. While the war removed certain markets in Europe and Asia, U.S. exports were strong after the early 1940s. Foreign sources were back to a third of Hollywood's sales in 1944-5 (Schatz 1999). Sales to the British Isles continued to grow during the war. UA and the other American studios reopened their French offices in 1944, the same year as D-Day! Aside from countries that saw heavy bombing, like Germany and Japan, movie theaters were largely spared. Of the nearly 5,000 theaters in England, only 300 were not open at the end of the war (Schatz 1999).

3.2 Data Items

The records report total rental income, total sales, print costs and operating costs for each overseas affiliate and licensed agency for all years. For four years (1939 to 1942), the income sheets report the number of releases for each affiliate.

The measure of sales I use is "played and earned," which is gross rental income. The vast majority of income was earned in this category. There are additional sources of revenue, such as the sales of accessories and foreign exchange earnings and losses. Gross rentals are clearly related to film sales, in a way that the other categories are not. Played and earned is gross of producer's share, so reflects the total sales not just what accrued to UA.

I concentrate on two cost categories. "Print, duties, censorship" costs are directly related to the number of releases so only include variable costs. These are the costs of importing original film, duplicating them and clearing them through censorship boards. "Operating costs" are mostly fixed costs, though it likely includes some variable costs. These include fixed costs such as staff salaries, depreciation and rent. Some are variable costs, such as shipping and advertising. I add the two categories together to generate "Total Costs." All data are reported in U.S. dollars. I deflate all series by the U.S. GDP deflator to put them in 2005 dollars. The Appendix reports summary statistics for the data set.

The motion picture industry has a reputation for manipulative accounting practices, which begs the question of how reliable the data are. The data are internal documents pre-

pared for high ranking executives, so they should be free of outright manipulation used to fool producers or tax authorities. They predate the more complex accounting of recent times where stars are given shares of net rentals and a number of tax subsidies exist. Sharing contracts appear to use gross not net rentals. The only manipulation UA used that I am aware of is UA would use licence fees to reduce profit in high tax locations. These fees are reported as a separate line item and are excluded from the analysis.

Another issue is that costs may be shared among affiliates. They were not independent and were generally run from New York. In a few years, print expenses are either zero or negative, indicating prints were transferred from or sold to other affiliates. This is a rare occurrence when the disruptions of World War Two limited available film stock in some locations. Duties on imported film discouraged sharing prints across borders in more normal times. As we will see below, print expenses are a small portion of the total so errors in this item should have a small effect on the results.

4 Market Entry

4.1 Modes of Entry

To sell to a market, UA needed personnel to find theaters to show a film and publicize it. Since the audience reception of a film in a market was uncertain, the length of an engagement often needed to be renegotiated on the fly (Gil & Lafontaine 2011). Sound movies were more uncertain in their reception than silent ones, which led studios to become more hands on in contracting (Hanssen 2002).

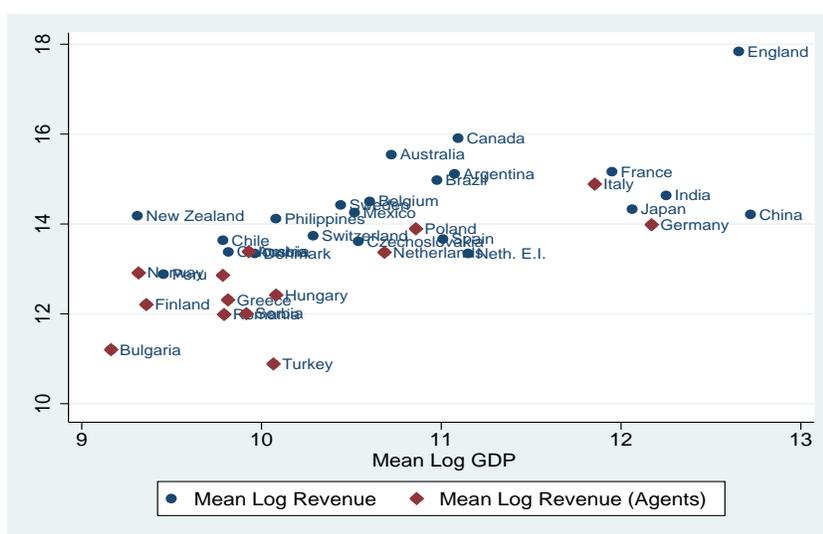
As discussed in the model, there were three organizational forms that UA used to sell to a market: Through an affiliate, through a local licensed agent or as an outright sale of film rights. With an affiliate, staff were direct employees of the company and all expenses were kept in-house.

Licensed agencies were domestic companies that distributed films on UA's behalf.

Agents were not employees and paid for a portion, in some cases all, of the costs of distribution. They were generally compensated through a revenue sharing contract.

Finally, rights to a film in a territory could be sold outright for a flat fee. The company did not share in the revenue, but did not expend any costs to distribute films.

Figure 2: Revenue: Affiliates vs. Agents



UA maintained an extensive network of affiliates and most revenue was generated through this channel. Figure 2 shows the average revenue and GDP for affiliates and agents. Nearly every large market was served by an affiliate. The exceptions, Germany and Italy, had hosted affiliates until restrictions on the film industry imposed by those countries' Fascist governments caused them to be closed (Balio 1976). Smaller markets were generally served through licensed distributors. Peripheral markets were served by export sales. Only 4 percent of income from film rentals and sales in 1936 came from outright sales of rights. The company showed a strong preference for retaining rights and serving markets directly.

The data support the model's prediction of a hierarchy of markets. Ramsaye (various) reports the locations of sales offices for studios. Figure 3 shows the number of companies that

have affiliates in a market and real GDP, a measure of market size¹. There were eight major studios in 1935. All eight exported to Canada, which was considered a domestic market. RKO did not have a foreign presence beyond Canada. The other seven had affiliates in the major markets for U.S. films, such as the British Isles and Argentina. Peripheral markets only had affiliates from a couple of the “Big Five” major studios. For example, Norway had affiliates of four studios, all from the Big Five. UA used a licensed agent to sell to Norway.

Figure 3: Number of Affiliates and Market Size, 1935

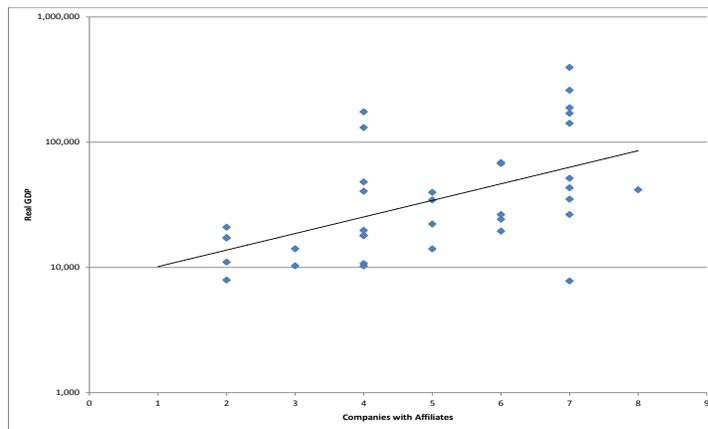


Figure 2 shows that agents had lower revenues compared to affiliates in markets of the same size. The first column of Table 1 reports the impact of organizational form on revenues². The variable “Agent” is a dummy variable that is equal to one if the country is served by a licensed agent and zero if it is served by an affiliate. Markets served by agents earn significantly less revenue. They also cost significantly less to serve, as shown in the second column. In some

¹I discuss GDP as an indicator of market size in detail below.

²These and all subsequent estimates use GLS random effects estimation. Standard errors are clustered by country and coefficient estimates for year dummies and constant are not reported.

cases, UA did not spend on distribution, leaving all such cost to the agent.

Table 1: Agents vs. Affiliates

	Log Rentals	Log Total Cost
Log GDP per capita	1.293**	1.022**
(SE)	(0.144)	(0.159)
Log Population	0.704**	0.610**
	(0.083)	(0.096)
Agent	-1.183**	-3.437**
	(0.180)	(0.227)
N	316	302
R^2	0.63	0.74

** : Significant at 1 percent level.

* : Significant at 5 percent level.

There is evidence that converting from an agent to an affiliate directly increased revenue. Agents were less likely to push a film for longer periods of time, at more locations and at more lucrative times (such as holiday weekends). Agents often handled films for more than one company, so would not have the same incentive to push weaker films from each studio's catalog. Studios did not put out enough product to fill an entire schedule, so they could not demand exclusive contracts. Even theaters owned by studios used other studios' films. Gil (2009) documents the agency distortions that can occur in movie exhibition contracting. Internal company memos reflect the belief that agents did not generate as much revenue. For example, the conversion of an office to a licensed agency in Brazil was dismissed out of hand due to these concerns (de Usabel 1975). Revenues increased immediately once UA established foreign offices in the early 1920s (Walsh 2008).

In addition, agents were harder to monitor. They could underreport grosses. Unscrupulous agents would pirate films, re-export prints to unauthorized markets or stage off the books

engagements. Walsh (2008) suggests that intellectual property issues were important in UA's decision to open foreign offices in Latin America and Asia. The Japanese branch spent years litigating pirating cases in its early years, which generated large losses. These results indicate that the lost revenue parameter τ in the model reflects lower revenue from contracting frictions and not just the fees paid to agents. (Played and earned is total revenue, not just what UA received.)

I will concentrate on markets that were served by an overseas office since a more complete accounting of costs will be included in the dataset. For other modes of entry, companies outside of UA are making expenditures. All major markets and many minor ones across the world were served by affiliates, so these data provide good coverage and heterogeneity of markets.

Subsidiaries sometimes served more than one market. In most cases, the additional markets were small adjacent countries. For example, the Argentine subsidiary served Uruguay and Paraguay as well as Argentina. In a couple of cases, a subsidiary served a number of small markets. The Panamanian subsidiary oversaw the agencies that served much of Central America and Venezuela. In the basic data work, this issue should not matter much since both revenue and costs are reported on the same basis.

This issue becomes more of an issue when auxiliary country level data is used. In cases such as Argentina, it is not a serious problem. The secondary markets are much smaller than the primary market so the error is likely to be small. They tend to share attributes that are used in gravity equations: They are near to each other, speak the same languages and are at similar levels of development. Data limitations remove Panama, the most questionable affiliate, from the data for these exercises.

4.2 Market Entry Costs

This section documents the determinants of costs across markets. The main results is that larger markets are more costly to enter. However, costs grow much slower than income so large

markets are more profitable.

Table 2 reports regressions of log costs on log gross rentals. There is a strong positive relationship between rental income and costs. All costs are higher in markets with larger sales. Print expenses make up a very small portion of the cost of selling to a market. On average only 10 percent of total expenses were in this category.

Table 2: Log Gross Rentals Regressions

	(1)	(2)	(3)	(4)	(5)
Log Total Cost	1.098**				
(SE)	(0.033)				
Log Operating		1.085**		0.958**	
		(0.033)		(0.067)	
Log Print			0.310**	0.067**	
			(0.032)	(0.010)	
Log GDP per capita					1.107**
					(0.177)
Log Population					0.613**
					(0.109)
N	361	361	340	340	266
$Adj. - R^2$	0.86	0.86	0.34	0.89	0.56

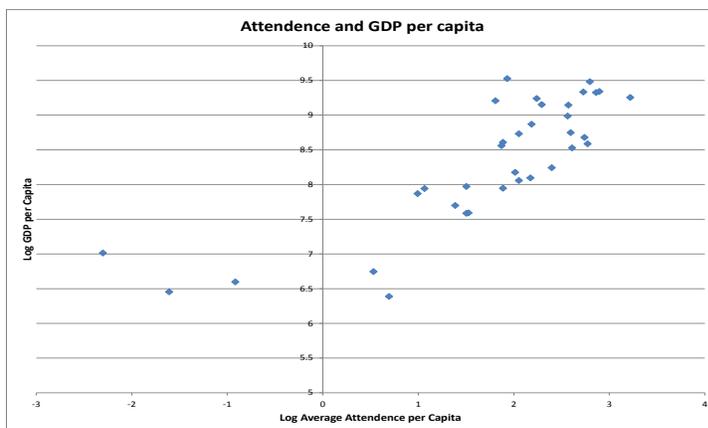
** : Significant at 1 percent level.

* : Significant at 5 percent level.

Why are large markets more costly to serve? Large markets tend to be large economies, both in terms of income per capita and total population. As can be seen in Table 2, column 5, both per capita income and population increase sales³. Higher population means more potential viewers, so it is intuitive that populous countries have a large total demand.

³Population and income data are from Maddison (1995). The appendix gives details on the data used.

Figure 4: Average Cinema Attendance vs. GDP per Capita 1950



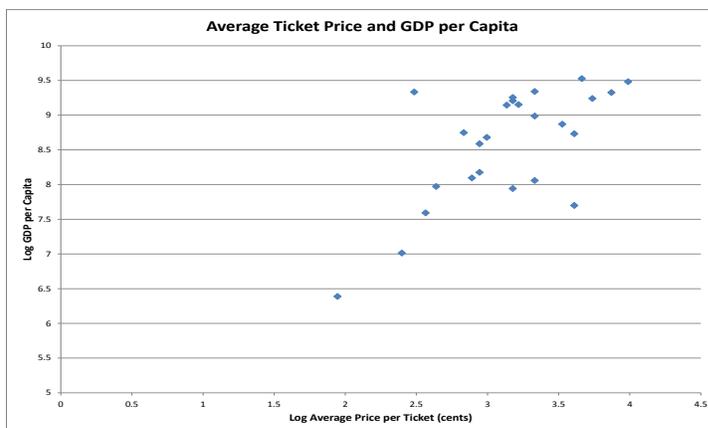
Higher income means more potential dollars. This effect could either work through higher ticket prices or by wealthier people going to the movies more often. There is evidence for both effects. Figure 4 shows average cinema attendance per capita and GDP per capita in 1950⁴. There is a strong correlation between attendance and income. Residents of wealthy countries went to the movies frequently. The average American went over 16 times a year compared to 0.1 times in Nigeria. The cinema was most popular in the United Kingdom, where the average Briton went 25 times a year.

Residents of wealthy countries also paid higher prices. Figure 4 shows average ticket price in U.S. dollars and GDP per capita in 1950⁵. The average ticket cost 24 cent in the United Kingdom while it was only 11 cents in Nigeria. The difference reflects the well known disparity in price levels between rich and poor countries. (Ticket prices are converted using non-PPP adjusted exchange rates.)

⁴The attendance data comes from UNESCO (1955) and GDP data is from the Penn World Table.

⁵The data sources are the same as for Figure 4.

Figure 5: Average Ticket Price vs. GDP per Capita 1950



Large markets required more extensive sales office networks. The biggest market, the British Isles, had branch offices in nine cities in 1935. Some of the offices were in close proximity. UA had branches in Liverpool, Manchester and Leeds, all within 70 miles of each other. Despite having a small population, Australia was a large enough market to support branches in five cities. Figure 6 shows that there is a strong relationship between operating costs and the number of branches.

Larger expenses are not due to more movies being released in large markets. There is not a strong relationship between the number of films released and the size of the market. Figure 7 plots the number of releases against a measure of market size, log real GDP. There is not a strong correlation.

However, each release earns more revenue in large markets. Figure 8 shows revenue per movie released plotted against log real GDP. There is a positive relationship between the two.

To confirm this statistically, Table 3 reports regressions with revenue per release as the dependent variable. As column 1 shows, the number of releases does not have a statistically

Figure 6: Branches and Operating Costs

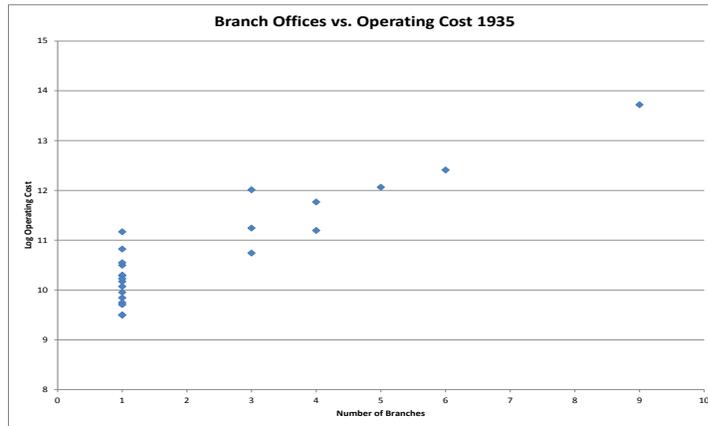


Figure 7: Log GDP vs. Log Releases

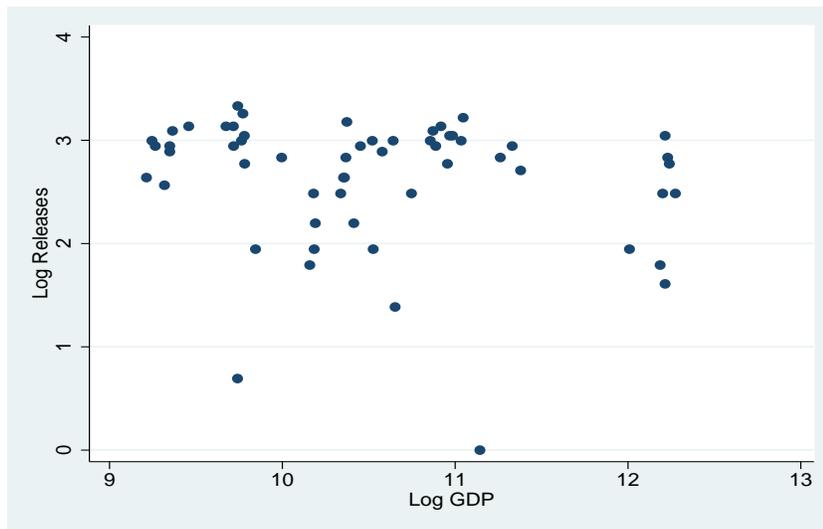
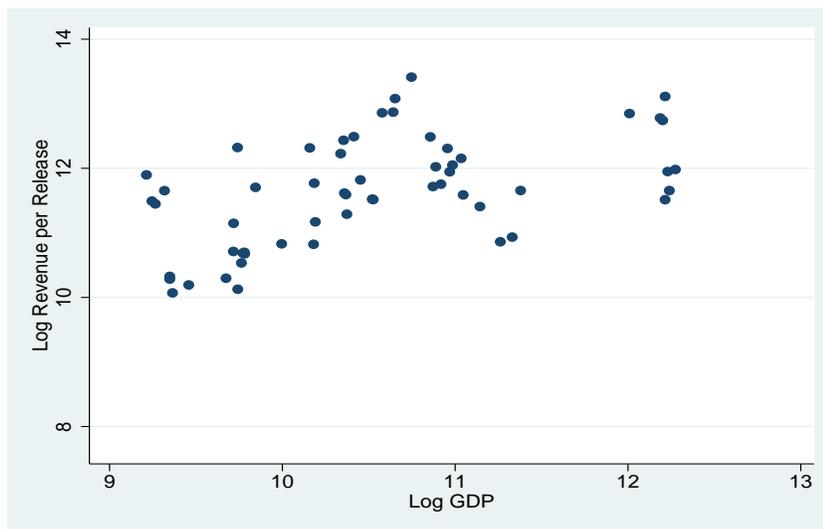


Figure 8: Log GDP vs. Log Revenue per Release



significant impact on the revenue each release makes. Rather, it is the size of the market that matters. Column 2 shows that the measures of market size have a much more important impact on how much a release makes.

These results suggest that costs rise slower than revenues so large markets are also more profitable markets. Table 4 reports regressions of gross rentals on the margins. Margins are calculated as a rate over total costs. Specifically, $Margin = \frac{GrossRentals - TotalCosts}{TotalCosts}$. There is a strong positive relationship between margins and total sales. No such relationship holds for releases. Since there are fewer observations, one might be concerned that the results are driven by the limited sample. Rerunning regression 1 on the same sample does not change the results, indicating that the relationships are not driven by the sample selection.

To examine the degree to which operating costs are fixed costs, the upper panel of Table 5 shows the correlation between the number of releases in a country and the costs of distribution. All costs are positively correlated with the number of releases. However, this relationship may be an artifact of the impact of World War Two. A number of affiliates in

Table 3: Log Revenue per Release Regressions

	(1)	(2)
Log Releases	0.059 (0.114)	
Log GDP per Capita		1.619** (0.214)
Log Population		0.840** (.118)
N	87	60
$Adj. - R^2$	0.01	0.79

** : Significant at 1 percent level.

* : Significant at 5 percent level.

Europe and Asia drop out due to invasion by Axis powers. When a country was invaded, the affiliate only operated early in the year. This effect can generate spurious correlation between releases and costs.

The lower panel of Table 5 show the releases regression restricting the sample to countries with full samples of data⁶. Print expenses continue to be correlated with the number of releases. However, there is no longer a correlation to operating costs. This result is consistent with operating costs being largely fixed costs.

An additional confirmation that the company thought of costs as fixed can be found in their discussion on whether to open a subsidiary in Peru (de Usabel 1975). UA estimated the costs of the office and determined how many films would have to be released to justify the expense. This exercise is consistent with the logic of HFT models.

The results are generally consistent with the results found in Hanson & Xiang (2011)

⁶The sample is Argentina, Australia, Brazil, Columbia, Cuba, Mexico, New Zealand, Panama, Puerto Rico, India, Spain, Sweden, Switzerland and the United Kingdom.

Table 4: Margin Regressions

	(1)	(2)
Log Gross Rentals	0.602**	
(SE)	(0.077)	
Releases		0.792**
		(0.154)
N	361	87
$Adj. - R^2$	0.31	0.02

** : Significant at 1 percent level.

* : Significant at 5 percent level.

for more recent data. Most costs are fixed costs and the number of releases is not related to market size. However, I do not find a global fixed cost: Larger markets are more costly to serve. However, the costs grow slower than revenue as markets get larger. The basic logic of their results hold: Large markets are more profitable since each release makes more revenue. The variable costs of adding a release are negligible, so movies are released to almost every market.

4.3 Barriers to Trade

This section examines barriers to trade. I examine physical barriers to trade and cultural distance. I find that cultural distance has a stronger impact on sales.

The gravity literature emphasizes distance as a measure of trade barriers. There are two concepts of distance when it comes to cultural goods, physical and cultural. Physical distance may make it difficult to get original prints to a subsidiary or to communicate with the head office.

To measure physical distance, I use the great circle distance from New York City, where

Table 5: Releases Regressions

Full Sample	Log Cost	Log Print	Log Operating
Log Releases	0.619**	0.917**	0.597**
(SE)	(0.065)	(0.104)	(0.064)
N	87	83	87
$Adj. - R^2$	0.25	0.36	0.25
Balanced Panel			
Log Releases	0.033	1.032**	0.015
(SE)	(0.126)	(0.350)	(0.126)
N	53	52	53
R^2	0.00	0.37	0.00

** : Significant at 1 percent level.

* : Significant at 5 percent level.

UA's foreign office was based, to the "main city" in the CEPII gravity indicator dataset⁷. When the capital and the main city are different, UA's subsidiary was generally based in the main city. For example, UA in Canada was based in Toronto, not Ottawa.

Physical distance is not an important trade barrier. Column 1 in Table 6 shows that distance is insignificant and has the wrong sign for explaining the profitability of a market. This finding differs from Hanson & Xiang (2011), who find a negative relationship between sales penetration and distance. It is somewhat surprising given that technological changes and a more stable political situation should make distance less of an impediment.

Cultural distance seems to be more important. Whether English is an official language is significant and positive while distance continues to be insignificant (Column 2). Column 3 includes the linguistic distance indicator developed by Hanson & Xiang (2011) which measures

⁷Despite the vast majority of film production occurring in Los Angeles, all major studios ran their foreign operations out of New York.

Table 6: Margin Regressions: Distance

	(1)	(2)	(3)	(4)
Log Distance	0.114 (0.314)	0.052 (0.266)	0.151 (0.362)	-1.255 (1.278)
English		1.040** (0.408)		1.492** (0.414)
Linguistic Dist.			-0.785 (1.337)	
Lat. Diff.				-0.025** (0.006)
Long. Diff.				0.002 (0.002)
N	361	361	346	361
$Adj. - R^2$	0.08	0.09	0.09	0.37

** : Significant at 1 percent level.

* : Significant at 5 percent level.

how different the languages spoken in a country are from English. This indicator is not significant. Column 4 includes additional geographical indicators, which measure the difference in latitude and longitude of the main city from New York. Difference in latitude is the only geographic variable that is significant, while English language is strongly significant.

Cultural differences limit the appeal of American films in two ways. Non-English speaking audiences will be less able to understand English language movies. They may need to be subtitled or dubbed into other languages. A factor in making linguistic differences more important was that in many markets, there was widespread illiteracy. In such markets where English was not spoken, an English language film needed to be dubbed or a portion of the population could not understand it. In fact, the advent of sound initially caused UA to pull

back its presence in non-English speaking markets (Walsh 2008).

Language may also be a mark of cultural difference. Some stories may be too specific to the American market: westerns did poorly in many markets. Some motifs were offensive to local tastes. For example, films with stereotypical Latin villains could not be released in Latin America (de Usabel 1975). Using Korean data, Chung & Song (2007) show that consumers have a preference for home culture films.

Examining the data indicates that cultural distance trumps physical distance. Great Britain was UA's most consistently profitable affiliate. Australia and New Zealand were profitable markets that were a long distance from New York. Aside from Canada, most nearby markets are not English speaking and were not as profitable.

The importance of English reflects UA strategy of serving English speaking populations, even in countries where English is not an official language. In Japan and China, UA concentrated on urban elites and expatriates that understood English. In South Africa, it distributed to theaters that catered to the English-speaking minority and made no effort to sell to the black majority or even Afrikaaners (Walsh 2008).

The lack of importance for distance may reflect that the use of subsidiaries may overcome the forces of "gravity." A trade network can overcome higher costs in distant locations (Chaney 2011). Markets that are similar in other attributes may be easier to enter, even if they are not in close physical proximity. Morales et al. (2011) call this effect "extended gravity." They find a significant extended gravity effects to language even for manufactured goods.

5 Conclusion

A firm can choose how intensely to serve a market. Small markets are not as profitable, so they are served by intermediaries. They generate less revenue but cost less. The return to effort in large markets is much higher, so the company was willing to expend the effort of establishing affiliates. These facts also suggest that modal choice may be an important aspect of trade and

this choice is driven by market attributes.

The data suggest areas for future refinements of HFT models. Even within a country, there may be a number of market segments. In the case of movies, speakers of different languages within a country were distinct markets. UA generally was only interested in serving English speakers, since they were low cost. Dubbing into other languages was higher cost and was only undertaken in lucrative markets.

A Data

Foreign Income Sheets Basic data: United Artists Corporation Records (U.S. Mss 99AN): Series 10C: Cabled Foreign Reports, 1935-1951. Wisconsin Historical Society Archives. Supplemented with: United Artists Corporation Records: Series 4C: Balance Sheets and Associated Papers, 1919-1951.

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Language, geographic indicators CEPII. Accessed August 23rd, 2011.

B Summary Statistics

Table 7: Summary Statistics

Item	Obs.	Mean	Std. Dev	Min	Max
Played	454	3758211	1.14e+07	876.1817	9.63e+07
Operating	424	770344.6	1428194	0	1.10e+07
Print	446	71825.42	116250.5	-31002.41	1290101
Releases	88	16.42045	6.394541	1	29

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