Export Mode and Market Entry Costs

Benjamin Bridgman*

Bureau of Economic Analysis

January 2013

Abstract

This paper provides intangible trade data for an important U.S. export industry during a period when official data are very thin. It examines what modes firms use to export intangible assets. It uses a novel data source that provides very detailed information on export modal choice and market entry costs. Motion picture exporters use different modes of entry across markets. Exporters use more intensive modes, those that require them to pay a higher share of distribution costs, in 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, they are compensated by higher revenue.

JEL classification: F1.

Keywords: Export mode; Intermediaries; Services Trade; Motion Pictures.

*I thank Costas Arkolakis, Stefan Buehler, Ricard Gil and seminar participants at the 2012 International Industrial Organization Conference and Econometric Society Meetings for comments and Andrew Dugan and Mikheal Lal for research assistance. The views expressed in this paper are solely those of the author and not necessarily those of the U.S. Bureau of Economic Analysis or the U.S. Department of Commerce. Address: U.S. Department of Commerce, Bureau of Economic Analysis, Washington, DC 20230. email: Benjamin.Bridgman@bea.gov. Tel. (202) 606-9991. Fax (202) 606-5366.

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). (See Bernard, Jensen, Redding & Schott (2007) for a survey.)

A firm may use different modes of entering a market. In the first wave of HFT models, firms exported directly to foreign markets. As empirical work has progressed, it has become clear that there are a variety of methods that a firm can use to export. A recent literature has examined the use of intermediaries in trade, including Ahn, Khandelwal & Wei (2011), Akerman (2012), Bernard, Grazzi & Tomasi (2011) Blum, Claro & Horstmann (2012), Bernard, Blanchard, Van Beveren & Vandenbussche (2012) and Dasgupta & Mondria (2012). The question of how firms decide what mode to use is important since the cost structures of these different modes may be different. Therefore, exports may respond to shocks differently depending on the mode used (Bernard et al. 2011). These differences have implications for the measurement of trade elasticities. If an exporter uses a mode with higher fixed costs, short run fluctuations will underestimate the long run elasticity (Ruhl 2005). Furthermore, understanding the mode helps to estimate trade in service flows because it helps identify when cross-border transactions occurs. The International Transaction Accounts (ITAs) only include licensing fee based modes. Sales by affiliates are not considered service exports since affiliates are classified as foreign entities in the ITAs.

Data constraints have restricted our knowledge of this decision. Firm level trade datasets generally do not link a transaction to a firm unless the firm exports directly[1]. 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

[1] An exception is the World Bank data analyzed in Abel-Koch (2011) and McCann (forthcoming). These data do not include information regarding to what markets goods are exported.

mode choice. In addition, there is surprisingly little direct evidence on the magnitude or even the nature of the costs firms face when exporting. 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 examines modal choice for U.S. motion picture exports in the 1930s and 1940s. It uses a novel data source that provides very detailed information on market entry. Internal company data for United Artists (UA) from 1928 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. It generates a number of facts about modal choice. A single firm may use a number of different methods of exporting depending on a market's characteristics. It will use a hierarchy of modes to export, with more intensive modes used for larger markets. More intensive modes, such as opening a foreign office, require the firm to pay more in distribution costs but generate more revenue. The firm is willing to pay distribution costs in major markets. This hierarchy implies that even the most productive firms use intermediaries. This finding contrasts with the literature which has emphasized sorting of mode by firm characteristics: Large, productive firms use FDI while small firms use exports (Helpman, Melitz & Yeaple 2004). The larger the market is, the more likely it is that a firm will use intensive modes. Big markets generate big revenues, so firms are more willing to pay costs to capture those revenues. Therefore, large markets have more sales offices.

I develop a theory that generates the empirical pattern of modes of entry and show that the data support the assumptions on cost and revenues. Less intensive modes are cheaper but also generate less revenue for a given market size. Big markets are more costly to enter. They require more extensive sales office networks since there are more theaters to service. Despite

having higher costs, they 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 & Canterbery 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 proxy for actual costs.

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. Despite a great deal of interest in services trade, a

lack of data requires indirect methods to study these markets (Anderson, Milot & Yotov 2011). 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). The data show Hollywood's surprising resilience to the shocks of the Great Depression and World War Two. Official statistical agencies, including the Bureau of Economic Analysis, 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. This paper will aid in filling in providing data for a period where such data is very thin.

This paper contributes to a small literature has examined trade in motion pictures. Ferreira, Petrin & Waldfogel (2012) estimate country level demand for film quality. Hanson & Xiang (2009) document the underreporting of motion picture services trade. Marvasti & Canterbery (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.

2 Theory

This section sets out the theoretical framework for the paper. The model is adapted from the sales office location model in Holmes (2005), modified to match the features of the motion picture industry[2]. It adds an additional method of serving a market, the use of an intermediary.

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

[2] Other papers that have used this model in the international trade context include Cassey (2009).

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. Export sale is the least intensive, a licensed agent is in the middle and a sales office is the most intensive. 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 $\overline{c} - \gamma n_j$ and fixed cost ϕn_j. The parameter γ governs how much easier it is to sell in large markets. Profit from this mode is $\pi^O = q_i n_j - q_i(\overline{c} - \gamma n_j) - \phi n_j$. (All parameters are restricted to be positive.)

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. Profit from this mode is $\pi^L = (1-\tau)q_i n_j - \phi^L$.

If it uses an export sale, it receives revenue $(1-\theta)q_i n_j$, where $1 > \theta > \tau > 0$, and pays no cost. Profit from this mode is $\pi^E = (1-\theta)q_i n_j$.

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 proceed by examining the impact of market size on modal choice for a firm of a fixed size. (I hold q_i constant and vary market size n_j.)

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 $\pi^O = -q_i\overline{c}$, $\pi^L = -\phi^L$ and $\pi^E = 0$. 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 increase by $n_j(1-\theta)q_i$.

Firms will have a hierarchy of modes, with different modes being used depending on the market size. The structure of the hierarchy depends on the number of varieties q_i the firm has to sell. I examine the solution for three regions of firm size: Large, medium and small.

2.2.1 Large Firms

I begin by examining large firms ($q_i > \max\{\frac{\phi}{\tau+\gamma}, \frac{(\theta+\gamma)\phi^L}{(\theta-\tau)\bar{c}}\}$). For much of the empirical analysis, the large firm model is the relevant case. The motion picture industry quickly consolidated into eight major studios. UA, from where most of the data are drawn, was one of these major studios.

Figure 1: Mode Selection

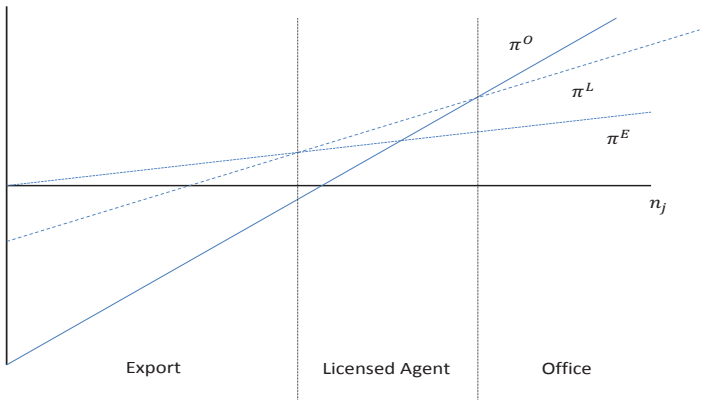


Figure 1 shows profit from the three modes for large firms as a function of market size n. The firm will chose the mode that gives the highest profit for a given market size. The mode of entry is more intensive for larger markets. The smallest markets are served by export sales. Mid-sized markets are served by licensed agents and the largest are served directly by sales offices. This hierarchy is summarized in Proposition 2.1.

Proposition 2.1. *If* $q_i > \max\{\frac{\phi}{\tau+\gamma}, \frac{(\theta+\gamma)\phi^L}{(\theta-\tau)\bar{c}}\}$, *then there exist* $\overline{n}^{EL} < \overline{n}^{LO}$ *such that the firm will serve markets of size:*

1. $n_j \leq \overline{n}^{EL}$ *with export sales,*

2. $\overline{n}^{EL} < n_j \leq \overline{n}^{LO}$ *with licensed agents,*

3. $\overline{n}^{LO} < n_j$ *with offices.*

Proof. Since export sales have no fixed costs and the other modes do, $\pi^O < \pi^E$ and $\pi^L < \pi^E$ if $n_j = 0$. Therefore, small markets ($n_j \approx 0$) will be served by export sales. The assumption $q_i \geq \frac{(\theta+\gamma)\phi^L}{(\theta-\tau)\overline{c}}$ implies that $q_i \geq \frac{\phi^L}{\overline{c}}$ since $\frac{\theta+\gamma}{\theta-\tau} > 1$. Therefore, $\pi^O < \pi^L < \pi^E$ if $n_j \approx 0$.

The ordering is reversed for large n: $\pi^O > \pi^L > \pi^E$ as $n \to \infty$. The assumption $q_i > \frac{\phi}{\tau+\gamma}$ implies that $\frac{\partial \pi^O}{\partial n_j} > \frac{\partial \pi^L}{\partial n_j}$. Therefore, as $n_j \to \infty$, $\pi^O > \pi^L$. By assumption, $\theta > \tau$, so $\frac{\partial \pi^L}{\partial n_j} > \frac{\partial \pi^E}{\partial n_j}$. Therefore, as $n \to \infty$, $\pi^L > \pi^E$.

Profit from offices is higher than from licensed agents if $\pi^O = q_i n_j - q_i(c_{i,j} - \gamma n_j) - \phi n_j > \pi^L = (1-\tau)q_i n_j - \phi^L$. The firm prefers offices to agents if $n_j > \overline{n}^{LO} = \frac{q_i \overline{c} - \phi^L}{q_i(\tau+\gamma)-\phi}$. Using the same method as for $\overline{n}^{LO}$, the cutoff market size between exports and licensed agents is given by: $\overline{n}^{EL} = \frac{\phi^L}{q_i(\theta-\tau)}$. Since $\theta > \tau$, then $\overline{n}^{EL} > 0$.

The cutoffs are ordered $\overline{n}^{EL} < \overline{n}^{LO}$ if $\frac{\phi^L}{q_i(\theta-\tau)} < \frac{q_i \overline{c} - \phi^L}{q_i(\tau+\gamma)-\phi}$. Rearranging, we have $q_i^2(\theta-\tau)\overline{c} - q_i(\tau+\gamma)\phi_L + \phi_L\phi > 0$. A sufficient condition to satisfy this condition is $q_i \geq \frac{(\theta+\gamma)\phi^L}{(\theta-\tau)\overline{c}}$, which is true by assumption.

□

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. 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.

2.2.2 Small Firms

Small firms ($q_i < \frac{\phi}{\theta+\gamma}$) also capture more revenues in large markets with more intensive modes. However, they do not use offices. They serve small markets with export sales and large mar-

kets with agents but never graduate to offices. The small firm hierarchy is summarized in Proposition 2.2.

Proposition 2.2. *If $q_i \leq \frac{\phi}{\theta+\gamma}$, then there exists $\overline{n}^{EL}$ such that the firm will serve markets of size:*

1. *$n_j \leq \overline{n}^{EL}$ with export sales,*
2. *$n_j > \overline{n}^{EL}$ with licensed agents.*

Proof. Since export sales have no fixed costs and the other modes do, $\pi^O < \pi^E$ and $\pi^L < \pi^E$ if $n_j = 0$. Therefore, small markets ($n_j \approx 0$) will be served by export sales. By assumption, $\theta > \tau$, so $\frac{\partial \pi^L}{\partial n} > \frac{\partial \pi^E}{\partial n}$. Therefore, as $n \to \infty$, $\pi^L > \pi^E$.

Offices will never be used since they are never more profitable than exports. Export profits grow faster in market size that offices ($\frac{\partial \pi^O}{\partial n_j} \leq \frac{\partial \pi^E}{\partial n_j}$) if $q_i(1+\gamma) - \phi \leq q_i(1-\theta)$. This condition is true if $q_i \leq \frac{\phi}{\theta+\gamma}$, which is true by assumption. Since $\pi^O < \pi^E$ if $n_j = 0$, this condition implies that $\pi^O < \pi^E$ for all n_j.

□

A small firm's incentive to use offices is very different compared to a large firm. Small firms have too few varieties generate enough revenue to justify the high fixed costs of an office. It will never be more profitable to open an office compared to the other modes.

In fact, if the firm is small enough ($q_i \leq \frac{\phi}{1+\gamma}$), offices never even generate positive profits. Fixed cost (ϕn_j) grows faster than revenue ($(1+\gamma)q_i n_j$) as market size increases, so office profit is declining in market size[3].

2.2.3 Mid-Sized Firms

The hierarchies for small and large firms obtain with only the assumption that the firm retains more earnings with agents compared to export sales ($\tau < \theta$). For mid-sized firms ($q_i \in$

[3]The γ parameter is actually a cost parameter. However, it describes how increasing market size reduces cost, so it is equivalent to an increase in revenue.

$[\frac{\phi}{\theta+\gamma}, \max\{\frac{\phi}{\tau+\gamma}, \frac{(\theta+\gamma)\phi^L}{(\theta-\tau)\bar{c}}\}])$, the analysis depends on parameter values.

For large and small firms, the incentives to use agents and offices are very different. Offices are much more costly but generate much higher returns. These incentives are closer to each other for mid-sized firms. There are two cases, depending on whether office costs are large relative to the extra revenue offices generates or not.

Within each case, mid-size firms choose different hierarchies depending whether they are above or below a cutoff size. I will refer to firm above and below this cutoff as larger and smaller mid-sized firms. This threshold $\frac{\phi}{\tau+\gamma}$ marks the point at which offices become more profitable compared to agents as market size increases. If firm switches from an agent to an office, its profit increases by $\pi^O - \pi^L = (\tau+\gamma)q_i n_j - \phi n_j - \bar{c}q_i + \phi^L$. Larger markets make offices more attractive relative to agents if $(\tau+\gamma)q_i > \phi$. Below the threshold, offices are a worse option as market size increases since costs are increasing faster than revenues. Above the threshold, the opposite is true.

I begin by examining the case where costs are relatively large. Formally, the condition is $\frac{\phi\bar{c}}{\theta+\gamma} \geq \phi^L$. For this condition to hold, the office cost parameters ϕ and $\bar{c}$ must be large relative to the revenue parameters and agent fixed cost.

In this case, the incentives are the same as seen in the previous analysis. Larger mid-sized firms ($q_i > \frac{\phi}{\tau+\gamma}$) use the same hierarchy as large firms and smaller mid-sized firms ($q_i \leq \frac{\phi}{\tau+\gamma}$) use the same hierarchy as small firms[4].

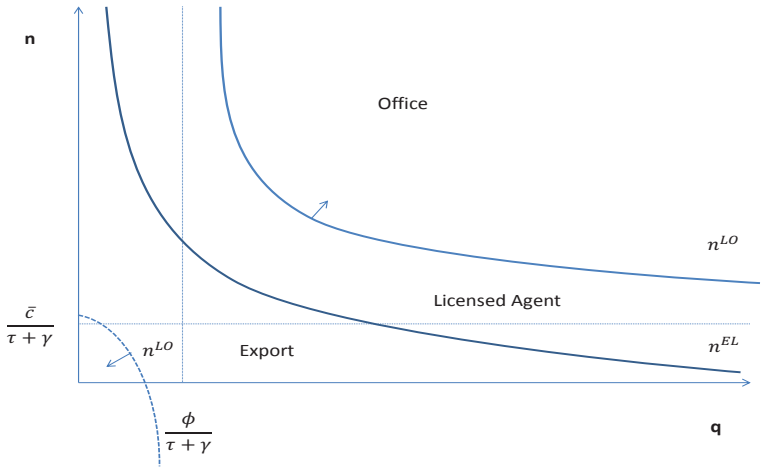
The assumption that office costs are relatively high assure that the model works as it did in the previous analysis. High costs make it so that offices are never the most profitable mode for smaller mid-sized firms. For larger mid-sized firms, the high cost imply that the modal profit as a function of market size is ordered as shown in Figure 1. While there are technical differences in the proofs, the intuition is unchanged in both cases.

To get a better sense of how firm and market size affect modal choice, Figure 2 maps out

[4]The proofs of these hierarchies are reported in the appendix. If $\max\{\frac{\phi}{\tau+\gamma}, \frac{(\theta+\gamma)\phi^L}{(\theta-\tau)\bar{c}}\} = \frac{\phi}{\tau+\gamma}$, then there are no larger mid-sized firms. Proposition 2.1 describes all firms above the $\frac{\phi}{\tau+\gamma}$ threshold.

optimal modal choice when $\frac{\phi}{\tau+\gamma} \geq \frac{\phi^L}{\bar{c}}$. The borders between the different regions are defined by the n^{EL} and n^{LO} curves, the market size where profit from the export and agent modes and agent and office modes respectively are equal as a function of q_i. These curves are given by: $\overline{n}^{LO} = \frac{q_i\bar{c}-\phi^L}{q_i(\tau+\gamma)-\phi}$ and $\overline{n}^{EL} = \frac{\phi^L}{q_i(\theta-\tau)}$[5].

Figure 2: Mode Selection: Firm and Market Size ($\frac{\phi}{\theta+\gamma} \geq \frac{\phi^L}{\bar{c}}$)



Entry mode is more intensive away from the origin. For small markets, firms use exports. For large markets, all but the smallest firms use offices. In between, different firms use different modes with larger firms using more intensive modes.

Firms with more varieties will use more intensive modes in the same market. 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

[5]The asymptotes that define the borders between the regions are: $\overline{n}^{LO} = \infty$ as $q_i \to_+ \frac{\phi}{\tau+\gamma}$ and $\overline{n}^{LO} = -\infty$ as $q_i \to_- \frac{\phi}{\tau+\gamma}$. The cutoff between exports and agents $\overline{n}^{EL} = \frac{\phi^L}{q_i(\theta-\tau)}$, which goes to infinity as $q_i \to 0$. On the other axis, $\overline{n}^{LO} = \frac{\bar{c}}{\tau+\gamma}$ and $\overline{n}^{EL} = 0$ as $q_i \to \infty$.

sell to markets using FDI rather than export sales.

The n^{LO} function is discontinuous at the threshold $q_i = \frac{\phi}{\tau+\gamma}$. The economics of using offices above the threshold are the opposite of those above the threshold. Below this point, the impact of market size on the costs of offices is bigger than its impact on revenue, so office profit is smaller in larger markets. Offices are more profitable than agents *below* the n^{LO} curve if $q_i < \frac{\phi}{\tau+\gamma}$. (The arrows on the n^{LO} curves indicate in which direction offices are more profitable than licensed agents.) Offices only dominate agents in very small markets. The firm uses exports in these markets to avoid paying fixed costs, so offices are never used[6]. (The n^{LO} curve below the threshold is dashed since it is not a border between modal regions.)

I now turn to the case where office costs are relatively small ($\frac{\phi}{\tau+\gamma} < \frac{\phi^L}{\bar{c}}$). Figure 3 shows mode selection in this case[7].

The overall picture is very similar. More intensive modes continue to be used for larger markets. The incentives to use offices flip when firm size falls below the $\frac{\phi}{\tau+\gamma}$ threshold, just as before[8]. (Again, the arrows on the $\overline{n}^{LO}$ curve indicate the direction offices become more profitable than agents.) However, larger mid-sized firms no longer use agents. Since office costs are relatively low, using an agent rather than an office does not lower costs much. It may even increase them. Since offices capture more revenue, there is much less incentive to use agents.

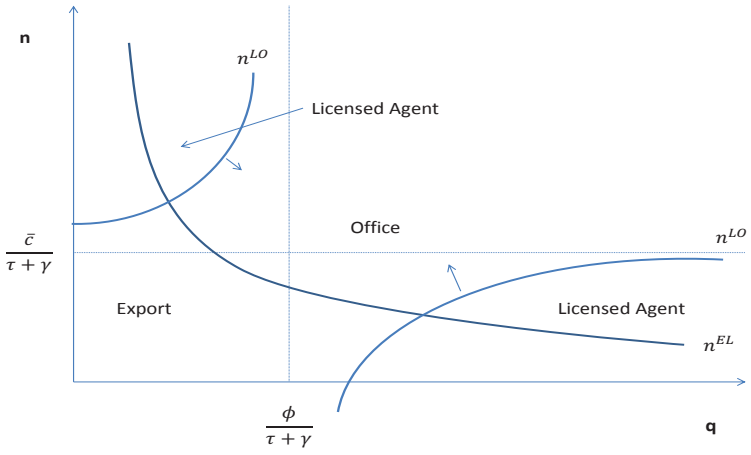
In this case, offices strongly dominate agents around the $\frac{\phi}{\tau+\gamma}$ threshold, while before firms only used offices in very large markets. To understand this difference, recall that for large firms, profit as a function of market size for more intensive modes have more negative intercepts and steeper slopes. (See Figure 1.) As firm size declines, the office intercept becomes

[6]The assumption $\frac{\phi}{\theta+\gamma} \geq \frac{\phi^L}{\bar{c}}$ guarantees that export profit is higher than office profit for $q_i < \frac{\phi}{\tau+\gamma}$. If the assumption were weakened to $q_i \leq \frac{\phi}{\tau+\gamma}$, there may exist parameters such that the $\overline{n}^{LE}$ and $\overline{n}^{LO}$ curves cross below the $\frac{\phi}{\tau+\gamma}$ threshold. If so, offices would be used by some smaller mid-sized firms. The predictions for larger mid-sized firms are unchanged.

[7]The appendix gives the formal proofs of hierarchy.

[8]The asymptotes that define the borders between the regions are the same aside from: $\overline{n}^{LO} = -\infty$ as $q_i \to_+ \frac{\phi}{\tau+\gamma}$ and $\overline{n}^{LO} = \infty$ as $q_i \to_- \frac{\phi}{\tau+\gamma}$.

Figure 3: Mode Selection: Firm and Market Size ($\frac{\phi}{\tau+\gamma} < \frac{\phi^L}{\bar{c}}$)



less negative and the slope less steep. Eventually, offices' intercepts will be less negative and the slope less steep than agents. When $\frac{\phi}{\theta+\gamma} < \frac{\phi^L}{\bar{c}}$, the intercept becomes less negative first. (The threshold marks the point where the office profit slope equals agent profit slope.) Offices have lower fixed costs but generate more revenue, so there is no reason to use agents.

The most significant difference in modal choice when office costs are low is that small mid-sized firms use the full set of modes and the order is shuffled. Agents are used for the largest markets and offices for mid-sized markets. As before, the impact of market size on office cost dominates its impact on revenue so offices are only used in small markets.

At first glance, it appears that this ordering is at odds with the prediction that more intensive modes are used for larger markets. However, in that range, agents are the most intensive mode. The positions of offices and agents in Figure 1 are switched. Agents have lower fixed costs and generate more revenue as market size increased compared to offices.

2.2.4 Theory Summary

The model make a number of predictions that I will investigate in the data.

A single firm will use multiple modes of entry, with more intensive modes for larger markets. While it is theoretically possible for a firm to use an agent for a large market if it used an office for a smaller market, this can only be true for portion of relatively small firms. The largest and smallest firms do not invert the Export, Agent, Office hierarchy.

The model predicts that more firms will open offices in larger markets. In the largest markets, most firms will find it worth the cost to open an affiliate. Mid-size markets will have a mix of offices and agents, with the largest firms using offices and smaller firms using agents. The smallest markets have no offices at all.

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 1928 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 offices were established between 1920 and 1926. A couple of agencies were replaced with offices: 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 office, 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 income and costs for each overseas office. For four years (1939 to 1942), the income sheets report the number of releases for each office. Data for licensed agents is less complete, covering 1935 to 1944. The data for export sales is very thin, with country level data report for a single year (1942).

The measure of sales I use is "played and earned," which is gross film 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. 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 the costs of importing original film, duplicating them and clearing them through censorship boards. "Operating costs" are costs such as staff salaries, rent and other office costs. 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 concept of profit used in the empirical analysis differs from accounting profit. I concentrate on the data items that are most likely to reflect the long run revenues and costs of serving a market. I exclude some items, such as foreign exchange earnings and losses, since they tend to be non-reoccurring costs. For example, the collapse of the gold standard in the early 1930s generated one off losses in a number of offices. I also exclude taxes and items that exist to manipulate accounting profit to reduce taxes. 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.

The fact that license fees are listed separated indicate UA was not manipulating revenue or cost data directly. The data are internal documents prepared for high ranking executives, so they should be free of outright manipulation used to fool producers or tax authorities. The data 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. Therefore, the included data items appear to be reliable.

Costs may be shared among offices. They were not independent and were generally run from New York. The costs represent the revenue and costs inside a country. The data are reported in the home currency and converted to U.S. dollars at nominal exchange rates. Physical distance limits cost sharing for most categories. One exception is print cost. In a few years, print expenses are either zero or negative, indicating prints were transferred from or sold to other offices. This is a rare occurrence when the disruptions of World War Two limited available film stock in some locations. Duties on imported movies 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.

Offices sometimes served more than one market. In most cases, the additional markets were small adjacent countries. For example, the Argentine affiliate served Uruguay and Paraguay as well as Argentina. 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: 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.

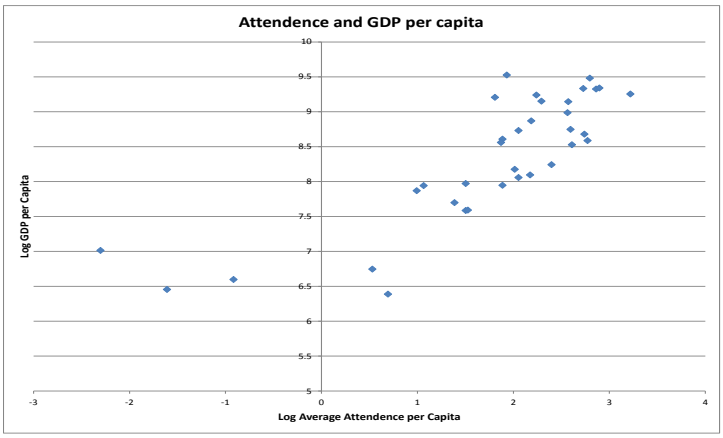
4 Market Entry

4.1 Market and Firm Size

In the model, the two key variables in the model are market and firm size. In taking the model to the data, we have to make a stand on what the empirical counterparts of the these variables are.

For market size, I use GDP. Large markets tend to be large economies, both in terms of income per capita and total population. Higher population means more potential viewers, so it is intuitive that populous countries have a large total demand.

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



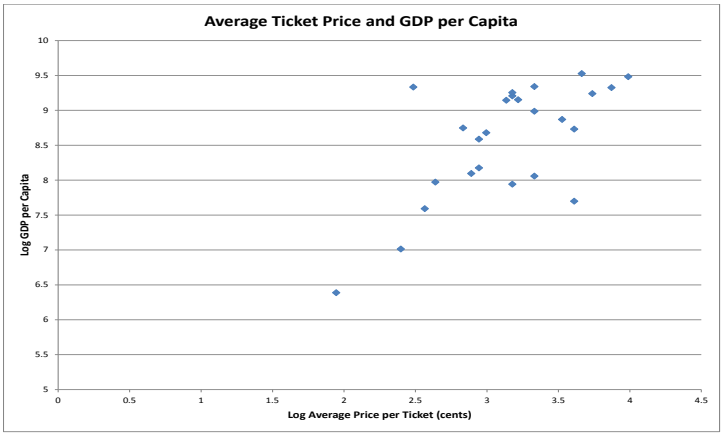
Higher income means more potential dollars. This effect could either work through higher ticket prices or by wealthier people going to the movies more often. There is evidence for both effects. Figure 4 shows average cinema attendance per capita and GDP per capita in 1950[9]. There is a strong correlation between attendance and income. Residents of wealthy

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

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 1950[10]. 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 (the "Penn Effect"). (Ticket prices are converted using nominal exchange rates.)

Figure 5: Average Ticket Price vs. GDP per Capita



In the model, firm size is determined by the number of varieties the firm has to sell. I identify the major eight studios, including UA, as the large firms. As described above, the industry consolidated quickly. Major studios released a much larger number of releases in a year compared to independents and dominated the market. In 1935, 65 percent of U.S. made

[10]The data sources are the same as for Figure 4.

features were released by one of the eight majors (Ramsaye various).

In reality, movies are not uniform in their earning potential. The big studios dominated the market for films with significant overseas earning potential. All the top grossing films were released by the majors. Big budget films and those with major stars and directors were generally released through the major studios. These were the movies that earned well overseas. They earned more of their revenue overseas than low budget films (Sedgwick & Pokorny 2010). Independents tended to specialize in lower budget genre or specialty films.

While UA was a smaller major and released fewer movies than some of the majors, UA distributed films that were mostly high budget and starred popular actors. It was founded by four of the most popular actors of the time and released the founders' work. In 1936, UA made as much in rental revenue as Paramount despite releasing fewer films (Ramsaye various).

4.2 Modes of Entry

To sell to a market, a studio needs personnel to 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).

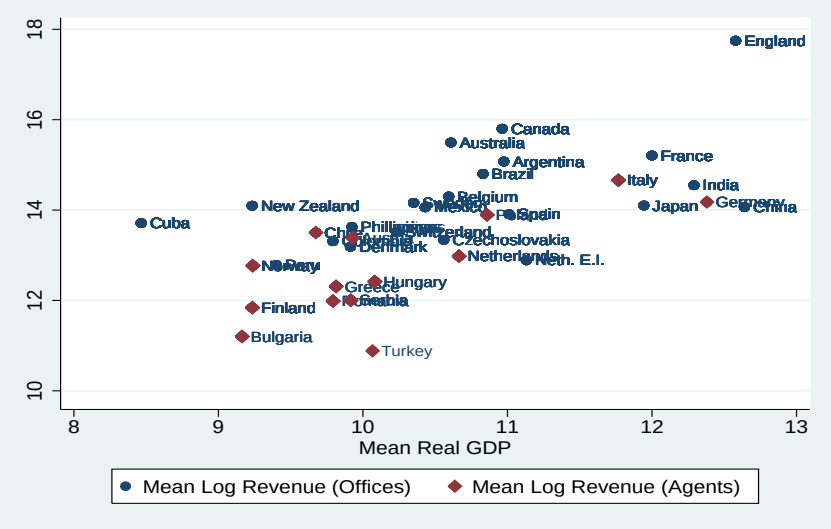
As discussed in the model, there were three organizational forms that UA used to sell to a market: Through an office, through a local licensed agent or as an outright sale of film rights. With an office, staff were direct employees of the company and all expenses were kept in-house.

Licensed agencies were domestic companies that distributed films on UA's behalf. Agents were not employees and paid for a portion 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.

UA maintained an extensive network of offices and most revenue was generated through this channel. Figure 6 shows the average revenue and GDP for offices and agents. The data support the prediction of a hierarchy of markets. Nearly every large market was served by an office. The exceptions, Germany and Italy, had hosted offices 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 agents. Peripheral markets, such as Iceland, 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.

Figure 6: Revenue: Offices vs. Agents

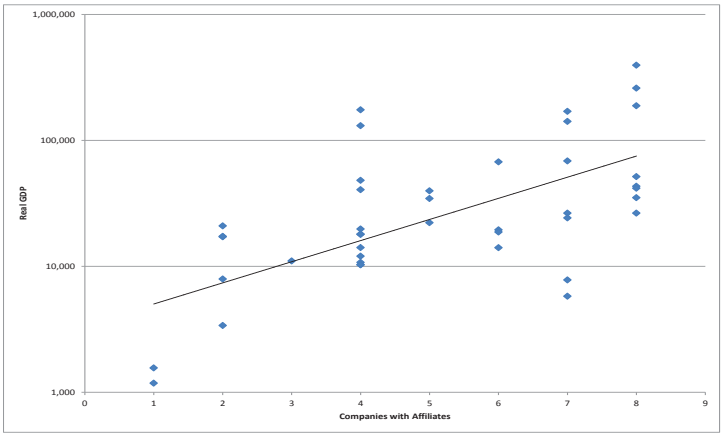


The data also support the model's prediction that more companies will set up offices in large markets. Ramsaye (various) reports the locations of sales offices for studios. Figure 7 shows the number of the eight major studios that have offices in a market and real GDP[11].

[11]I use the 1943 listing for RKO since its overseas offices were not listed in the 1935 book. RKO was in receivership which may explain the lack of listings (Sedgwick & Pokorny 2010).

All had offices in the major markets for U.S. films, such as the British Isles and Argentina. Peripheral markets only had offices from a couple of the "Big Five" major studios. For example, Norway had offices of four studios, all from the Big Five. UA used a licensed agent to sell to Norway.

Figure 7: Number of Offices and Market Size, 1935



The reason that the model generates its hierarchy is that offices generate more revenue than agents ($\tau < 1$) and the costs are higher ($q_i(\overline{c} - \gamma n_j) + \phi n_j > \phi^L$). The data support these assumptions.

Offices generate more revenue than agents in similar sized markets. Figure 6 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 revenues[12]. 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 office. Markets served by agents earn significantly less revenue. They also cost

[12]These and all subsequent estimates use GLS random effects estimation with year dummies. Standard errors are clustered by country. Coefficient estimates for year dummies and constants are not reported.

significantly less to serve, as shown in the second column.

Table 1: Agents vs. Offices

	Log Revenue	Log Total Cost
Log GDP	0.728**	0.565**
(SE)	(0.099)	(0.084)
Agent	−0.554**	−2.800**
	(0.165)	(0.184)
N	476	455
R^2	0.42	0.56

**: Significant at 1 percent level.

*: Significant at 5 percent level.

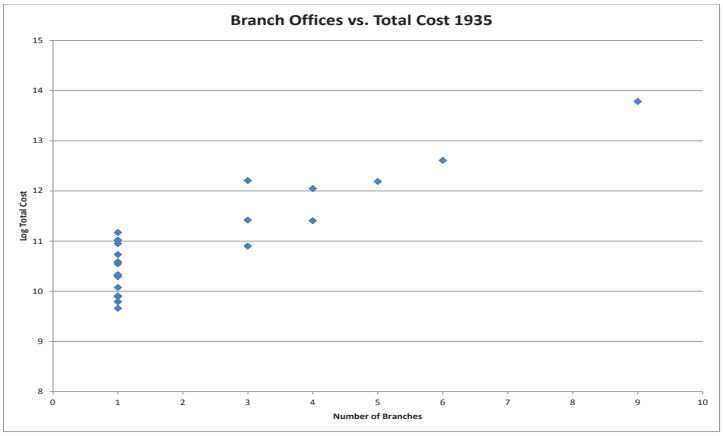
There is evidence that converting from an agent to an affiliate directly increased revenue. Agents were less likely to push a film for longer periods of time, at more locations and at more lucrative times (such as holiday weekends). Agents often handled films for more than one company, so would not have 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.)

Offices in large markets are more costly because they required more extensive branch 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 8 shows that there is a strong relationship between costs and the number of branches.

Figure 8: Branches and Total Cost



The model predicts that there are returns to scale in marketing for offices. Recall that the variable cost of selling a variety using an office is $\overline{c} - \gamma n_j$. The UA data support this assumption. Column 2 of Table 2 shows a statistically significant negative relationship between market size (log GDP) and log total costs per capita. This finding provides support

for Arkolakis (2010) who argues such returns to scale can explain goods trade patterns better than a single fixed cost of selling to a market.

The model does not have returns to scale for the agent mode. Costs are given by ϕ^L. Running the regression for agents (column 2 of Table 2) show that this mode does not have the same returns to scale. The coefficient on GDP is positive and not statistically significant.

Table 2: Log Total Cost per Capita Regressions

	Offices	**Agents**
Log GDP	0.266*	0.052
	(0.126)	(0.312)
N	418	37
$Adj. - R^2$	0.17	0.45

$**$: Significant at 1 percent level.

$*$: Significant at 5 percent level.

Additional evidence of the lower costs of agents comes from other studios. Sedgwick (1994) examines U.S. film exports to Great Britain in 1934. A number of small independents that did not have a British office released movies there. None of these films were high grossing and were more likely to be shown in small, secondary markets. While we cannot observe the costs these firms faced, unless these studios took big losses this pattern suggests that the distribution costs for these studios were also small.

The model predicts that despite being more costly to enter, large markets are more profitable. To test this prediction, I examine the relationship between margins for offices and market size. Specifically, I set $Margin = \frac{GrossRentals - TotalCosts}{TotalCosts}$. Figure 9 shows that larger markets tend to have higher margins. While both revenue and costs increase in market size, revenue increases faster.

The model assumes that all the firms varieties are sold to all markets, an assumption that is confirmed in the data. Figure 10 plots the number of releases in countries served by

Figure 9: Office Margins and Market Size

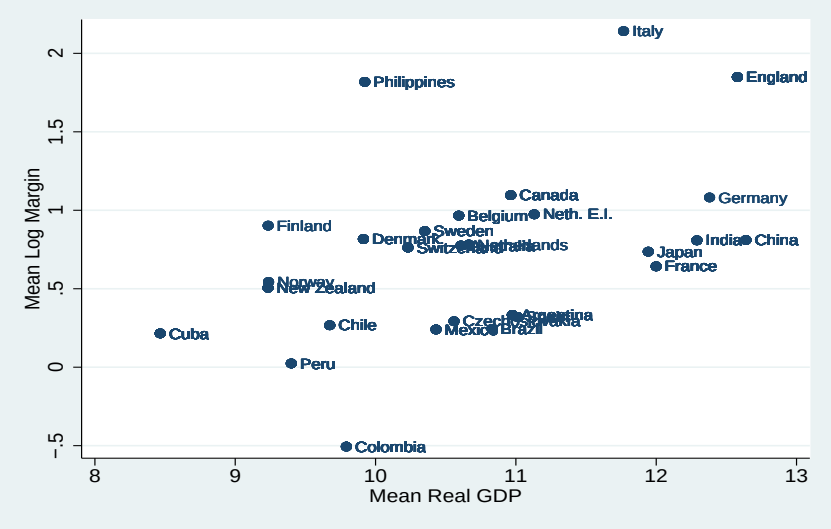
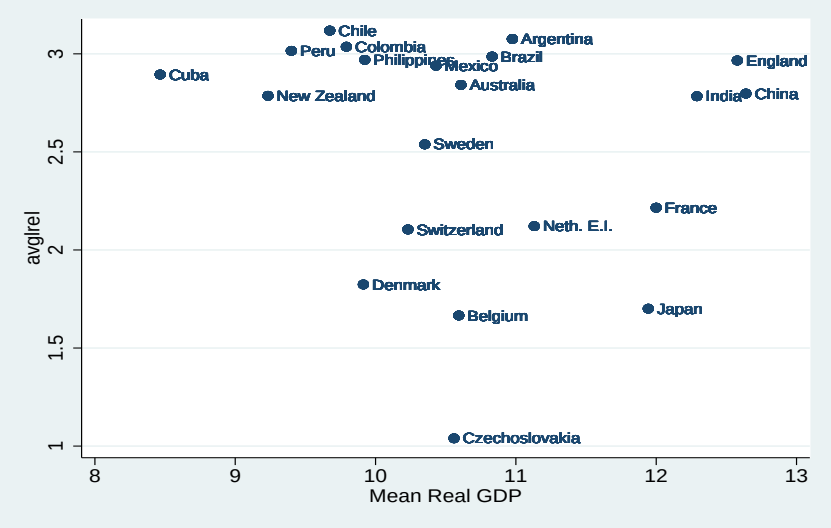
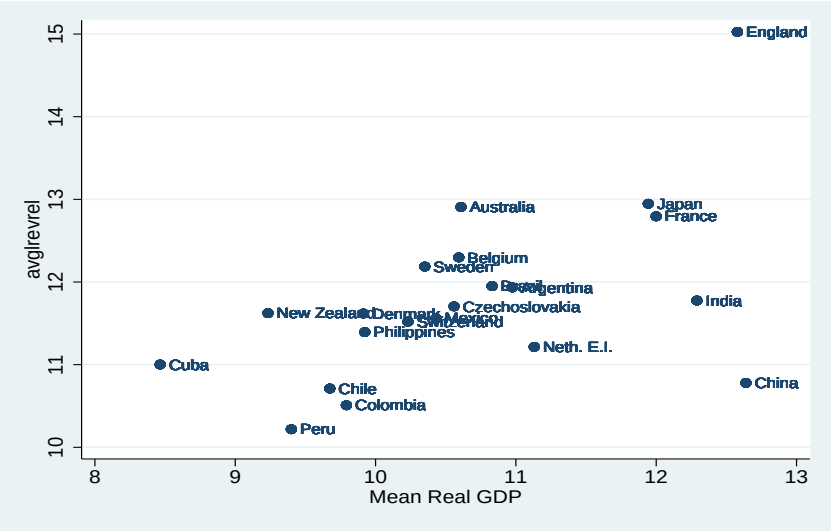


Figure 10: Log GDP vs. Log Releases



offices against log real GDP. (I do not have release data for agents.) There is not a strong relationship between the number of films released and the size of the market. Most of the countries that do not get the full complement of releases are countries directly affected by the fighting of World War Two. The constraints of war, rather than small market size, appear to be the main restriction on releases.

Figure 11: Log GDP vs. Log Revenue per Release



Each release earns more revenue in large markets. Figure 11 shows revenue per movie released plotted against log real GDP. In this case, there is a positive relationship between the two.

These relationships hold up in unreported regression analysis. The impact of market size (GDP) on the number of releases is negative and not statistically significant. The opposite is true of its impact on revenue per release.

Some of the findings contrast with other papers examining the effects of market size on export behavior, such as Melitz & Ottaviano (2008) and Mayer, Melitz & Ottaviano (2012). These papers predict that large markets have lower margins and more varieties. The lower

margins in large markets are due to stronger competition reducing monopoly rents. Competition in the movie industry may take the form of quality competition. Major studios spent more per film for bigger stars and more elaborate visuals than independents. As noted above, small independent's cheap genre films were relegated to secondary markets while major studio hits played in major urban theaters (Sedgwick 1994).

The invariance of varieties to market size may be due to movie exhibition having low variable costs. Print expenses were minor compared to the fixed costs of distribution and movie production. Once a film was made, the additional costs of offering it to a market that was already served by an office was small. For some goods trade, the marginal cost of producing more varieties is probably substantial. If a (small) market has low returns, it will not be profitable to add many varieties.

4.2.1 Fixed vs. Variable Costs

The HFT trade literature emphasizes fixed costs as a key determinant of trade. While the partition is not perfect, most of the costs listed under operating costs appear to be fixed costs (rent and salaries make up the vast majority of these costs) while those for print are appear to be more variable costs. 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.

To examine the degree to which operating costs are fixed costs, the upper panel of Table 3 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 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 3 show the releases regression restricting the sample to coun-

Table 3: 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.

tries with full samples of data[13]. 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.

Since 90 percent of total costs were operating costs, these results are evidence that fixed costs make up nearly all of the distribution expenses. It is a direct confirmation of the assumptions of HFT models, which assign a central role to fixed market entry costs.

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

5 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 UA's foreign office was based, to the "main city" in the CEPII gravity indicator dataset[14]. 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 4 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. However, this difference may also reflect the difference in the dependent variable. Data constraints prevent me from using the exact same data concept.

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 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.

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

Table 4: Margin Regressions: Distance

	(1)	(2)	(3)	(4)
Log Distance	0.144	0.111	0.126	0.220
	(0.134)	(0.098)	(0.162)	(0.194)
English		0.479**		0.608**
		(0.149)		(0.194)
Linguistic Dist.			0.091	
			(0.568)	
Lat. Diff.				−0.009**
				(0.003)
Long. Diff.				0.000
				(0.002)
N	513	513	498	513
$Adj. - R^2$	0.12	0.20	0.11	0.30

∗∗: Significant at 1 percent level.

∗: Significant at 5 percent level.

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. In many markets, there was widespread illiteracy which made language more of a barrier. 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.

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 native 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.

6 Conclusion

Historical information about intangible and services trade data is very thin. This paper adds a novel source of data on this trade for motion pictures, a major U.S. export during the 1930s and 1940s. It examines what modes motion picture firms use to export intangible assets. Small markets 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.

This analysis is an important first step in filling in historical trade in services statistics. The ITAs draw a distinction between sales by licensing agreements and sales by affiliates.

Licensing agreements are considered international trade in services. In contrast, U.S. affiliates abroad are considered foreign entities by the ITAs. Therefore, their sales are not exports since there is no cross border transaction. This paper shows that international services trade is concentrated in small markets. Though large markets like the United Kingdom generated significant sales, they generate little cross border activity.

A Omitted Proofs

This section reports the propositions proving the hierarchy of modes for mid-sized firms. There are four propositions: one each for smaller and larger mid-sized firms for two parameter cases: $\frac{\phi}{\theta+\gamma}$ greater than or less than $\frac{\phi^L}{\overline{c}}$.

A.1 Mid-Sized Firms Hierarchy ($\frac{\phi}{\theta+\gamma} \geq \frac{\phi^L}{\overline{c}}$)

Proposition A.1. *If $\frac{\phi}{\theta+\gamma} \geq \frac{\phi^L}{\overline{c}}$ and $\frac{\phi}{\tau+\gamma} < q_i \leq \frac{(\theta+\gamma)\phi^L}{(\theta-\tau)\overline{c}}$ then there exist $\overline{n}^{EL} < \overline{n}^{LO}$ such that the firm will serve markets of size:*

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

Proof. Since $q_i \geq \frac{\phi^L}{\overline{c}}$, $\pi^L \geq \pi^O$ for $n_j \approx 0$. The assumption $q_i > \frac{\phi}{\tau+\gamma}$ implies that $\frac{\partial \pi^O}{\partial n_j} > \frac{\partial \pi^L}{\partial n_j}$. From the proof to Proposition 2.1, this implies that firm's use exports for small markets and offices for large markets.

What remains to be proved is that $\overline{n}^{LO} > \overline{n}^{EL}$. This statement is true for the end points of the range $[\frac{\phi}{\tau+\gamma}, \frac{(\theta+\gamma)\phi^L}{(\theta-\tau)\overline{c}}]$. From Proposition 2.1, we have $\overline{n}^{LO} > \overline{n}^{EL}$ if $q_i = \frac{(\theta+\gamma)\phi^L}{(\theta-\tau)\overline{c}}$.

The agent/office cutoff $\overline{n}^{LO}$ is given by $\frac{q_i\overline{c}-\phi^L}{q_i(\tau+\gamma)-\phi}$ and the export/agent cutoff $\overline{n}^{EL}$ is $\frac{\phi^L}{q_i(\theta-\tau)}$. The limit of $\overline{n}^{LO}$ is infinity as $q_i \to \frac{\phi}{\tau+\gamma}$ while the limit of $\overline{n}^{EL}$ is $\frac{(\tau+\gamma)\phi^L}{(\theta-\tau)\phi} < \infty$.

There is no $q_i \in [\frac{\phi}{\tau+\gamma}, \frac{(\theta+\gamma)\phi^L}{(\theta-\tau)\overline{c}}]$ such that $\overline{n}^{LO} < \overline{n}^{EL}$. Since $\overline{n}^{LO} > \overline{n}^{EL}$ at the endpoints of the range and the cutoffs are continuous in q_i, there would have to be a q_i such that $\overline{n}^{LO} = \overline{n}^{EL}$. This condition requires $q_i^2(\theta-\tau)\overline{c} - q_i(\tau+\gamma)\phi_L + \phi^L\phi = 0$. The roots for this quadratic equation are given by:

$$\frac{\phi^L(\theta+\gamma) \pm \sqrt{(\phi^L)^2(\theta+\gamma)^2 - 4\phi^L\phi(\theta+\gamma)\overline{c}}}{2(\theta-\tau)\overline{c}} \tag{A.1}$$

For this equation to have real roots, it must be the case that $\phi^{L,2}(\theta+\gamma)^2 > 4\phi^L\phi(\theta+\gamma)\bar{c}$. However, by assumption $\frac{\phi}{\tau+\gamma} \geq \frac{\phi^L}{\bar{c}}$, so no real roots exist.

□

Proposition A.2. *If $\frac{\phi}{\theta+\gamma} \geq \frac{\phi^L}{\bar{c}}$, then for firms of size $q_i \in [\frac{\phi}{\theta+\gamma}, \frac{\phi}{\tau+\gamma}]$ there exists $\overline{n}^{EL}$ such that the firm will serve markets of size:*

1. *$n_j \leq \overline{n}^{EL}$ with export sales,*
2. *$n_j > \overline{n}^{EL}$ with licensed agents.*

Proof. Since export sales have no fixed costs and the other modes do, $\pi^O < \pi^E$ and $\pi^L < \pi^E$ if $n_j = 0$. Therefore, small markets ($n_j \approx 0$) will be served by export sales. By assumption, $\theta > \tau$, so $\frac{\partial \pi^L}{\partial n} > \frac{\partial \pi^E}{\partial n}$. Therefore, as $n \to \infty$, $\pi^L > \pi^E$.

Offices will never be used since they are never more profitable than licensed agents. $\pi^O < \pi^L$ if $n_j[q_i(\tau+\gamma) - \phi] < q_i\bar{c} - \phi^L$. Since $q_i \leq \frac{\phi}{\theta+\gamma}$, the LHS is negative. Since $\frac{\phi}{\theta+\gamma} \geq \frac{\phi^L}{\bar{c}}$, the RHS is positive. Therefore, $\pi^O < \pi^L$ for all n_j.

□

A.2 Mid-Sized Firms Hierarchy ($\frac{\phi}{\theta+\gamma} < \frac{\phi^L}{\bar{c}}$)

Proposition A.3. *Let $\frac{\phi}{\tau+\gamma} < \frac{\phi^L}{\bar{c}}$ and $\frac{\phi}{\tau+\gamma} \leq q_i \leq \frac{(\theta+\gamma)\phi^L}{(\theta-\tau)\bar{c}}$. There exists $q^* \in (\frac{\phi^L}{\bar{c}}, \frac{(\theta+\gamma)\phi^L}{(\theta-\tau)\bar{c}})$ such that firm of size $q_i \in (\frac{\phi}{\tau+\gamma}, q^*)$ will serve markets of size:*

1. *$n_j \leq \overline{n}^{EO}$ with export sales,*
2. *$n_j > \overline{n}^{EO}$ with offices.*

Proof. As before, export sales are used for the smallest markets ($n_j \approx 0$). For $q_i < \frac{\phi^L}{\bar{c}}$, agents are less profitable than offices for small markets: $\pi^L < \pi^O$ for $n_j = 0$. Since $\frac{\phi}{\tau+\gamma} < q_i$, profitability of offices increases faster than agents ($\frac{\partial \pi^O}{\partial n_j} > \frac{\partial \pi^L}{\partial n_j}$). Therefore, offices are always

more profitable than agents. Since $\theta > \tau$, $\frac{\partial \pi^L}{\partial n_j} > \frac{\partial \pi^E}{\partial n_j}$. Therefore, $\pi^E < \pi^O$ for n_j sufficiently large.

For $q_i \geq \frac{\phi^L}{\overline{c}}$, $\pi^L \geq \pi^O$ for $n_j = 0$. From Proposition 2.1, we know $\overline{n}^{LO} > \overline{n}^{EL}$ if $q_i = \frac{(\theta+\gamma)\phi^L}{(\theta-\tau)\overline{c}}$. Since $\overline{n}^{LO} < \overline{n}^{EL}$ if $q_i < \frac{\phi^L}{\overline{c}}$, there is a point q^* in between where $\overline{n}^{LO} = \overline{n}^{EL}$.

□

Proposition A.4. *If $\frac{\phi}{\theta+\gamma} < \frac{\phi^L}{\overline{c}}$, then there exists $q^{**} \in (\frac{\phi}{\theta+\gamma}, \frac{\phi}{\tau+\gamma})$ such that firm of size $q_i \in (q^{**}, \frac{\phi}{\tau+\gamma})$ will serve markets of size:*

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

Proof. As before, export sales are used for the smallest markets ($n_j \approx 0$).

$\pi^O < \pi^L$ if $n_j[q_i(\tau+\gamma) - \phi] < q_i\overline{c} - \phi^L$. Since $q_i \leq \frac{\phi}{\theta+\gamma}$, the LHS is negative. Since $\frac{\phi}{\theta+\gamma} \leq \frac{\phi^L}{\overline{c}}$, the RHS is also negative. Therefore, $\pi^O < \pi^L$ if $n_j > \overline{n}^{LO} = \frac{\phi^L - q_i\overline{c}}{\phi - q_i(\gamma+\tau)}$.

From Proposition 2.1, $\overline{n}^{LO} = \overline{n}^{EL}$ if $\overline{Q}(q_i) = q_i^2(\theta-\tau)\overline{c} - q_i(\tau+\gamma)\phi_L + \phi_L\phi = 0$. We have $\overline{Q}(\frac{\phi}{\theta+\gamma}) > 0$ since $\frac{\phi^2(\theta-\tau)\overline{c}}{(\theta+\gamma)^2} - \frac{\phi}{\theta+\gamma}(\tau+\gamma)\phi_L + \phi_L\phi = \frac{\phi^2(\theta-\tau)\overline{c}}{(\theta+\gamma)^2} > 0$. Since the assumption $\frac{\phi}{\theta+\gamma} < \frac{\phi^L}{\overline{c}}$ implies that $\overline{Q}(\frac{\phi}{\tau+\gamma}) < 0$, there exists $q^{**} \in (\frac{\phi}{\theta+\gamma}, \frac{\phi}{\tau+\gamma})$ such that $\overline{n}^{LO} = \overline{n}^{EL}$.

The n^{EL} and n^{LO} curves cross each other in the range $(\frac{\phi}{\theta+\gamma}, \frac{\phi}{\tau+\gamma})$. For $q_i \approx \frac{\phi}{\tau+\gamma}$, we have $\overline{n}^{LO} > \overline{n}^{EL}$. As $q_i \to_- \frac{\phi}{\tau+\gamma}$, $\overline{n}^{LO} = \infty$ while $\overline{n}^{LO} = \frac{\phi^L(\tau+\gamma)}{\phi(\theta-\tau)}$.

Since $\overline{n}^{LO} > \overline{n}^{EL}$ if $q_i \in (q^{**}, \frac{\phi}{\tau+\gamma})$ a firm uses agents if $n_j > \overline{n}^{LO}$ and offices if $n_j \in (\overline{n}^{EL}, \overline{n}^{LO}]$.

□

B 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.

GDP deflator 1929-1949: NIPA table 1.1.4, line 1. Accessed August 24th, 2011. 1928 is appended using the growth rate of the U.S. Index of the General Price Level, NBER Macro Database series m04051.

Population, Real GDP Appendices A and C, Maddison (1995).

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

C Summary Statistics

Table 5: Summary Statistics

Item	Obs.	Mean	Std. Dev	Min	Max
Played	630	3662167	1.10e+07	0	9.63e+07
Operating	591	747569.9	1355013	0	1.10e+07
Print	614	83661.64	132161.4	-31002.41	1290101
Releases	88	16.42045	6.394541	1	29

References

Abel-Koch, Jennifer (2011), Firm size and the choice of export mode, Discussion Paper 1105, Gutenberg School of Management and Economics.

Ahn, JaeBin, Amit K. Khandelwal & Shang-Jin Wei (2011), 'The role of intermediaries in facilitating trade', *Journal of International Economics* **84**, 73–85.

Akerman, Anders (2012), Wholesalers and economies of scope in international trade, mimeo, Stockholm University.

Anderson, James E., Catherine A. Milot & Yoto V. Yotov (2011), The North American trade costs in services, 1997-2007, mimeo, Boston College.

Arkolakis, Costas (2010), 'Market penetration costs and the new consumers margin in international trade', *Journal of Political Economy* **118**(3), 1151–1199.

Balio, Tino (1976), *United Artists: The Company Built by the Stars*, University of Wisconsin Press, Madison.

Bernard, Andrew B., Emily J. Blanchard, Ilke Van Beveren & Hylke Vandenbussche (2012), Carry along trade, mimeo, Dartmouth College.

Bernard, Andrew B., J. Bradford Jensen, Stephen Redding & Peter Schott (2007), 'Firms in international trade', *Journal of Economic Perspectives* **21**(3), 105–130.

Bernard, Andrew B., Jonathan Eaton, J. Bradford Jensen & Samuel S. Kortum (2003), 'Plants and productivity in international trade', *American Economic Review* **93**(4), 1268–1290.

Bernard, Andrew B., Marco Grazzi & Chiara Tomasi (2011), Intermediaries in international trade: Direct and indirect modes of export, Working Paper 17711, NBER.

Blum, Bernardo S., Sebastian Claro & Ignatius J. Horstmann (2012), Import intermediaries and trade: Theory and evidence, mimeo, University of Toronto.

Cassey, Andrew (2009), The location of U.S. states overseas offices, SES Working Paper 2009-10, Washington State University.

Chan-Olmsted, Sylvia M., Jiyoung Cha & Goro Oba (2008), 'An examination of the host country factors affecting the export of U.S. video media goods', *Journal of Media Economics* **21**(3), 191–216.

Chaney, Thomas (2011), The network structure of international trade, mimeo, University of Chicago.

Chung, Chul & Minjae Song (2007), Preference for cultural goods: Demand and welfare in the korea films market, mimeo, University of Rochester.

Das, Sanghamitra, Mark J. Roberts & James R. Tybout (2007), 'Market entry costs, producer heterogeneity, and export dynamics', *Econometrica* **75**(3), 837–873.

Dasgupta, Kunal & Jordi Mondria (2012), Quality uncertainty and intermediation in international trade, Working Paper 462, University of Toronto.

de Usabel, Giazka (1975), American films in Latin America: The case history of United Artists Corporation 1919-1951, Ph.D. thesis, University of Wisconsin.

Eaton, Jonathan & Samuel Kortum (2002), 'Technology, geography, and trade', *Econometrica* **70**(5), 1741–1779.

Ferreira, Fernando, Amil Petrin & Joel Waldfogel (2012), Trade and welfare in motion pictures, mimeo, University of Minnesota.

Gervais, Antoine & J. Bradford Jensen (2010), Are services tradable?: Evidence from U.S. microdata, mimeo, Georgetown University.

Gibson, Mark J. & Tim A. Graciano (2011), Cost of starting to trade and costs of continuing to trade, mimeo, Washington State University.

Gil, Ricard (2009), 'Revenue sharing distortions and vertical integration in the movie industry', *Journal of Law, Economics, and Organization* **25**(2), 579–610.

Gil, Ricard & Francine Lafontaine (2011), 'Using revenue–sharing to implement flexible pricing: Evidence from movie exhibition contracts', *Journal of Industrial Economics* .

Hanson, Gordon & Chong Xiang (2009), International trade in motion picture services, *in* M.Slaughter & M.Reinsdorf, eds, 'International Flows of Invisibles: Trade in Services and Intangibles in the Era of Globalization', University of Chicago Press and the NBER, Chicago, pp. 203–225.

Hanson, Gordon & Chong Xiang (2011), 'Trade barriers and trade flows with product heterogeneity: An application to U.S. motion picture exports', *Journal of International Economics* **83**, 14–26.

Hanssen, F. Andrew (2002), 'Revenue-sharing in movie exhibition and the arrival of sound', *Economic Inquiry* **40**(3), 380–402.

Helpman, Elhanan, Marc J. Melitz & Stephen R. Yeaple (2004), 'Export versus FDI with heterogeneous firms', *American Economic Review* **94**(1), 300–316.

Holloway, Isaac (2011), Foreign entry, quality, and cultural distance: Product-level evidence from U.S. movie exports, mimeo, University of British Columbia.

Holmes, Thomas J. (2005), 'The location of sales offices and the attraction of cities', *Journal of Political Economy* **113**(3), 551–581.

Maddison, Angus (1995), *Monitoring the World Economy 1820-1992*, OECD, Paris.

Marvasti, Akbar & E. Ray Canterbery (2005), 'Cultural and other barriers to motion pictures trade', *Economic Inquiry* **43**(1), 39–54.

Mayer, Theirry, Marc J. Melitz & Gianmarco I. P. Ottaviano (2012), Market size, competition, and the product mix of exporters, mimeo, Harvard University.

McCalman, Phillip (2004), 'Foreign direct investment and intellectual property rights: Evidence from Hollywood's global distribution of movies and videos', *Journal of International Economics* **62**, 107–123.

McCann, Fergal (forthcoming), 'Indirect exporters', *Journal of Industry, Competition and Trade* .

Melitz, Marc J. (2003), 'The impact of trade on intra-industry reallocations and aggregate industry productivity', *Econometrica* **71**(6), 1695–1725.

Melitz, Marc J. & Gianmarco I. P. Ottaviano (2008), 'Market size, trade, and productivity', *Review of Economic Studies* **75**(1), 295–316.

Morales, Eduardo, Gloria Sheu & Andres Zahler (2011), Gravity and extended gravity: Estimating a structural model of export entry, mimeo, Harvard University.

Ramsaye, Terry (various), *International Motion Picture Almanac*, Quigley Publishing, New York.

Ruhl, Kim J. (2005), Solving the elasticity puzzle in international economics, mimeo, University of Texas.

Ruhl, Kim J. & Jonathan Willis (2009), New exporter dynamics, mimeo, New York University.

Schatz, Thomas (1999), *Boom and Bust: American Cinema in the 1940s*, University of California Press, Berkeley.

Sedgwick, John (1994), 'The market for feature films in Britain, 1934: A viable national cinema', *Historical Journal of Film, Radio and Television* **14**(1), 15–37.

Sedgwick, John & Mike Pokorny (2010), 'Hollywood's foreign earnings during the 1930s', *Transnational Cinemas* **1**(1), 83–97.

Soloveichik, Rachel H. (2010), 'Artistic originals as capital assets', *American Economic Review: Papers and Proceedings* **100**(3), 110–114.

Soloveichik, Rachel H. (2011), 'Artistic originals as capital assets', *Survey of Current Business* pp. 43–51.

UNESCO (1955), *Film and Cinema Statistics*, United Nations, Paris.

Walsh, Michael D. (2008), The internationalism of the American cinema: The establishment of United Artists foreign distribution operations, Ph.D. thesis, University of Wisconsin.