
The Home Market Effect and Trade in Information Services

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Introduction

- Trade theory and the post-industrial economy
 - Manufacturing accounts for a declining share of US GDP (16% in '90, 13% in '03) and US employment (16% in '90, 11% in '04)
 - Yet, the vast majority of empirical research in international trade is about international specialization in manufacturing
 - Testing the Heckscher-Olin model
 - Searching for the impact of globalization on wages, productivity
 - Estimating the gravity model of trade
 - Does trade theory have anything to say about international trade in post-industrial economies?

Introduction

- Services are the most dynamic US export sector
 - US net exports of services are growing but of goods are falling
- What makes services different from manufacturing?
 - Greater skill intensity
 - Higher ratio of fixed costs in total costs
 - Lower transport costs but higher “cultural” trade costs
- Differences are extreme for information services
 - Software, movies, video games, music, internet publishing
 - Highly skill intensive
 - Bill Gates, Brad Pitt, Britney Spears are scarce factors
 - Pure fixed costs
 - For these services, only a single unit of “output” is produced
 - High cultural trade costs (for some products)
 - How well does *Austin Powers* translate?

Introduction

- Do differences in technology or trade costs between manufacturing & services matter for international trade?
 - Our argument:
 - For services that involve high fixed costs and are subject to high cultural trade costs, there will be a tendency for production to concentrate in countries that have *large national markets* and *strong cultural market potential*
 - This argument extends the logic of a home-market effect developed by Krugman (1980) and applied to manufacturing industries by Hanson and Xiang (2004)
 - Other work on the home-market effect: Davis & Weinstein (1999, 2003), Feenstra, Markusen & Rose (1998), Head & Ries (2001)
 - Other work on trade in cultural goods: Rauch & Trindade (2005)
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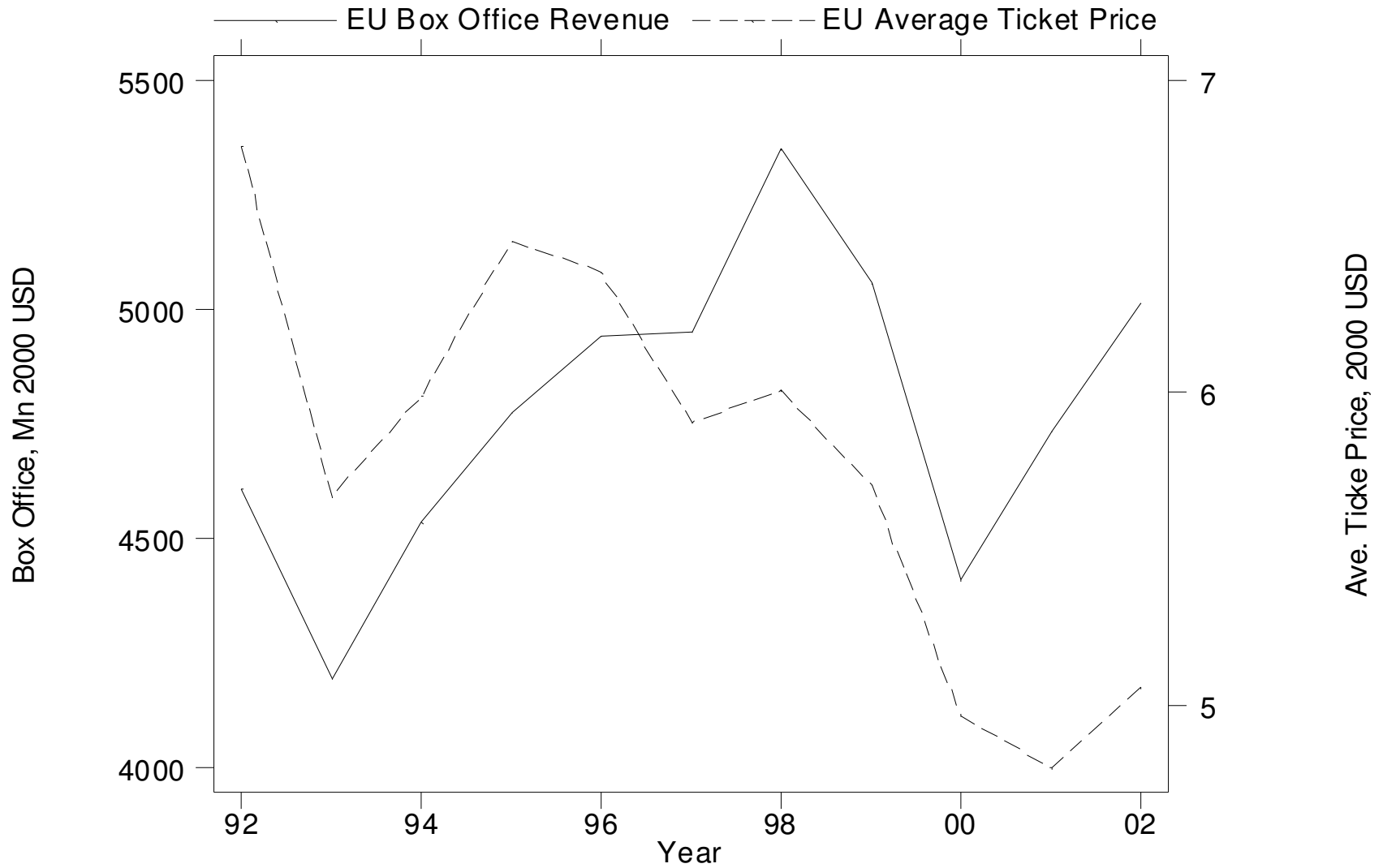
The Home Market Effect

- The home market effect is the tendency for differentiated-product industries to concentrate in large countries, making them net exporters of these goods
 - Many differentiated-product industries are characterized by high fixed costs in production, low elasticities of substitution between product varieties in consumption, and high trade costs
 - Fixed costs induce differentiated-product firms to locate in one place
 - Transport costs make large markets optimal production sites
 - Production of homogeneous goods is pushed into small countries
 - The home-market effect implies a link between a country's market size and its exports that doesn't exist in trade models that are based solely on comparative advantage

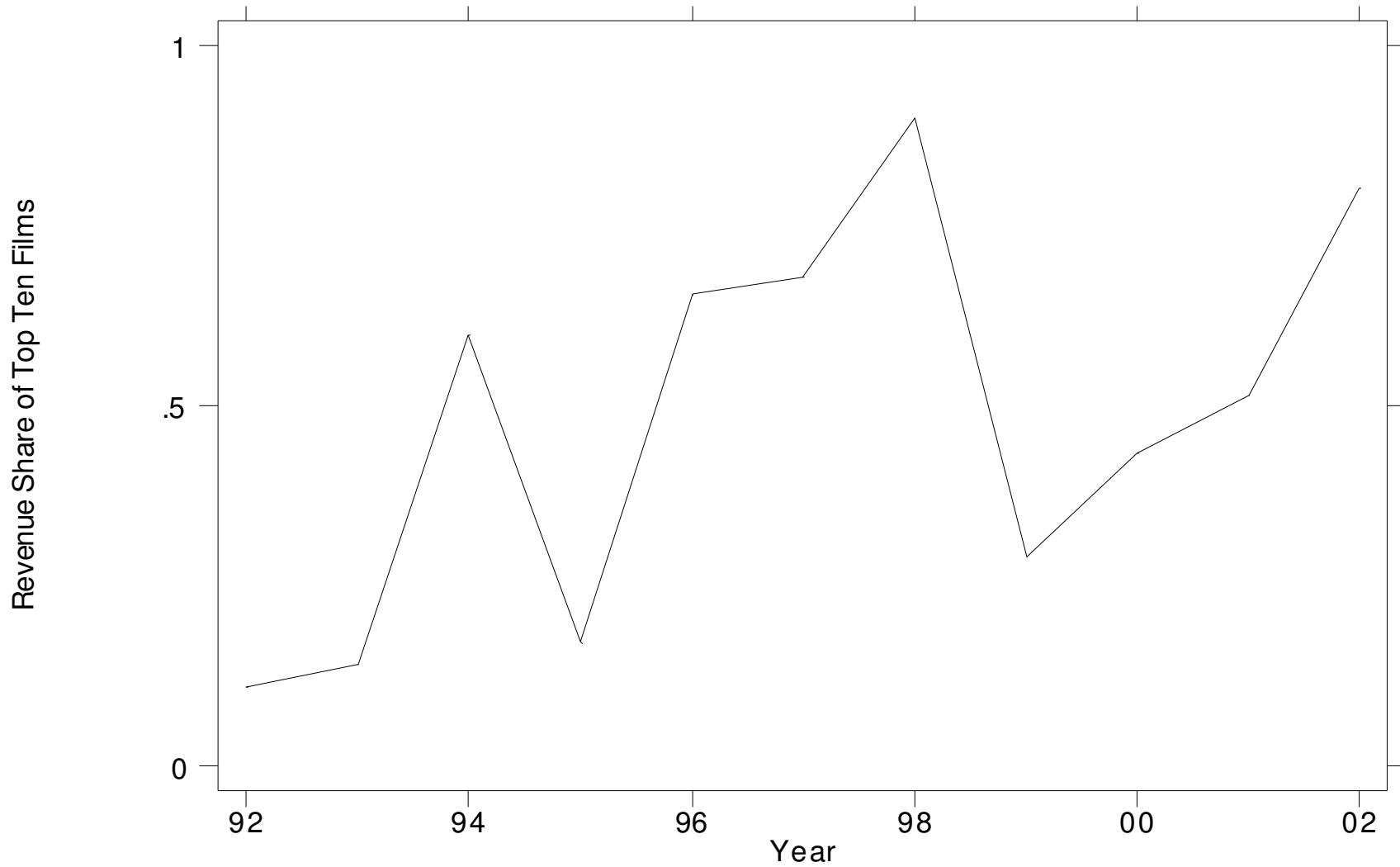
Research Plan

- Develop theory
- Assemble data on trade in information services
 - Movies (Screendigest.com, NielsenEDI.com)
 - Software (BEA)
- Test for strength of home-market effects and cultural trade costs in services versus manufactured goods

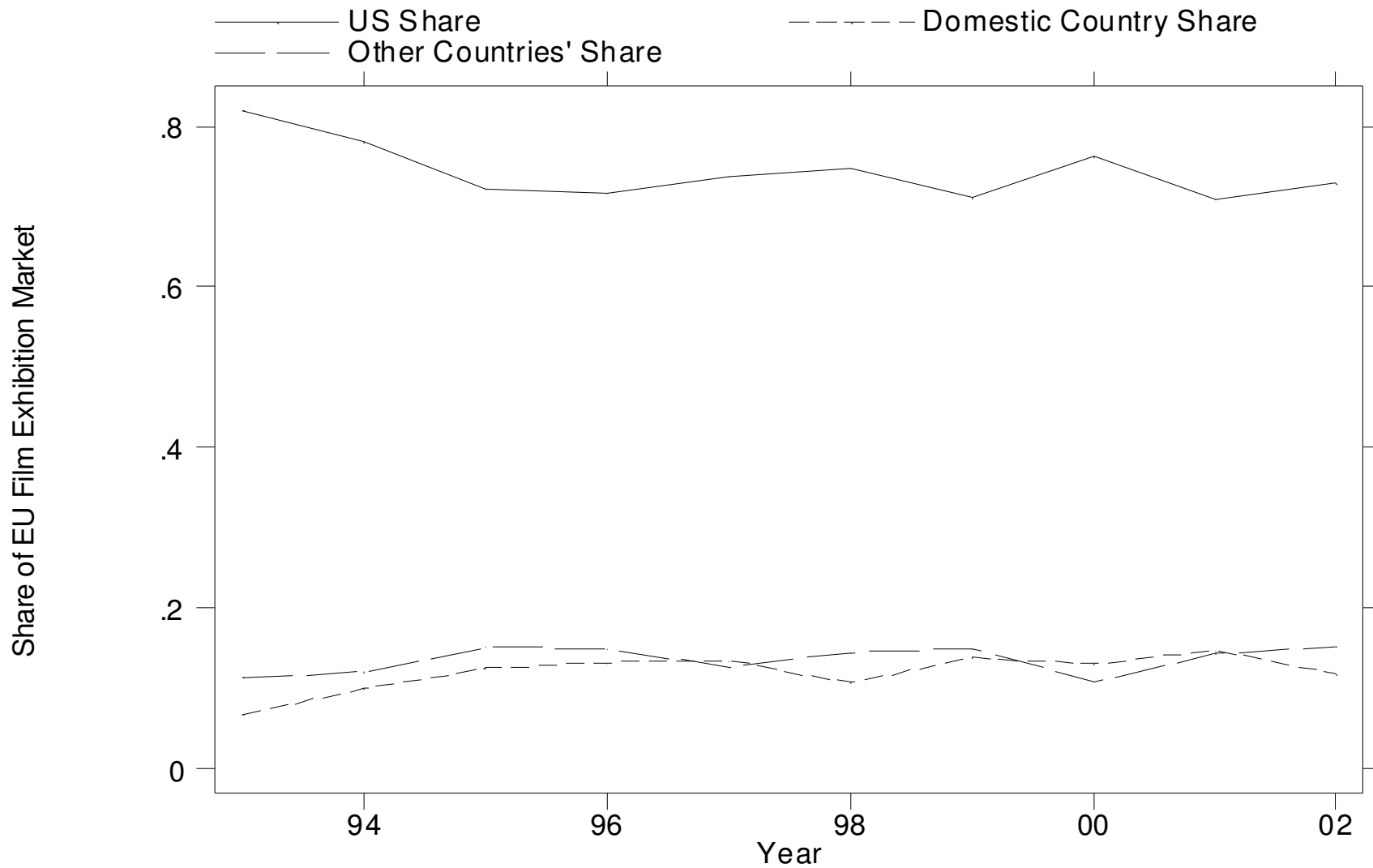
Box Office Revenue from Film Exhibition in EU (Screendigest.com)



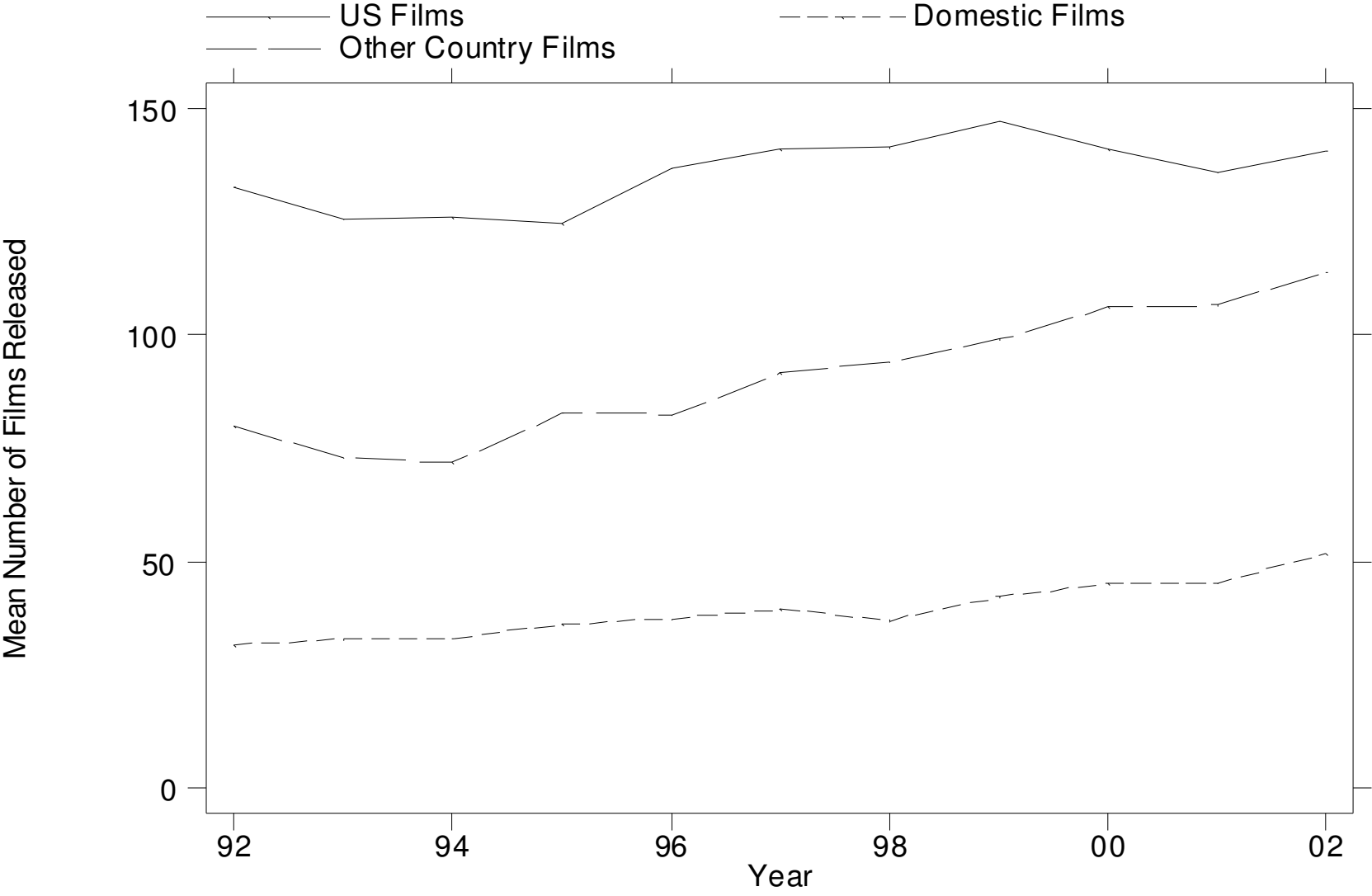
Top 10 Films Share of Box Office Revenue in EU



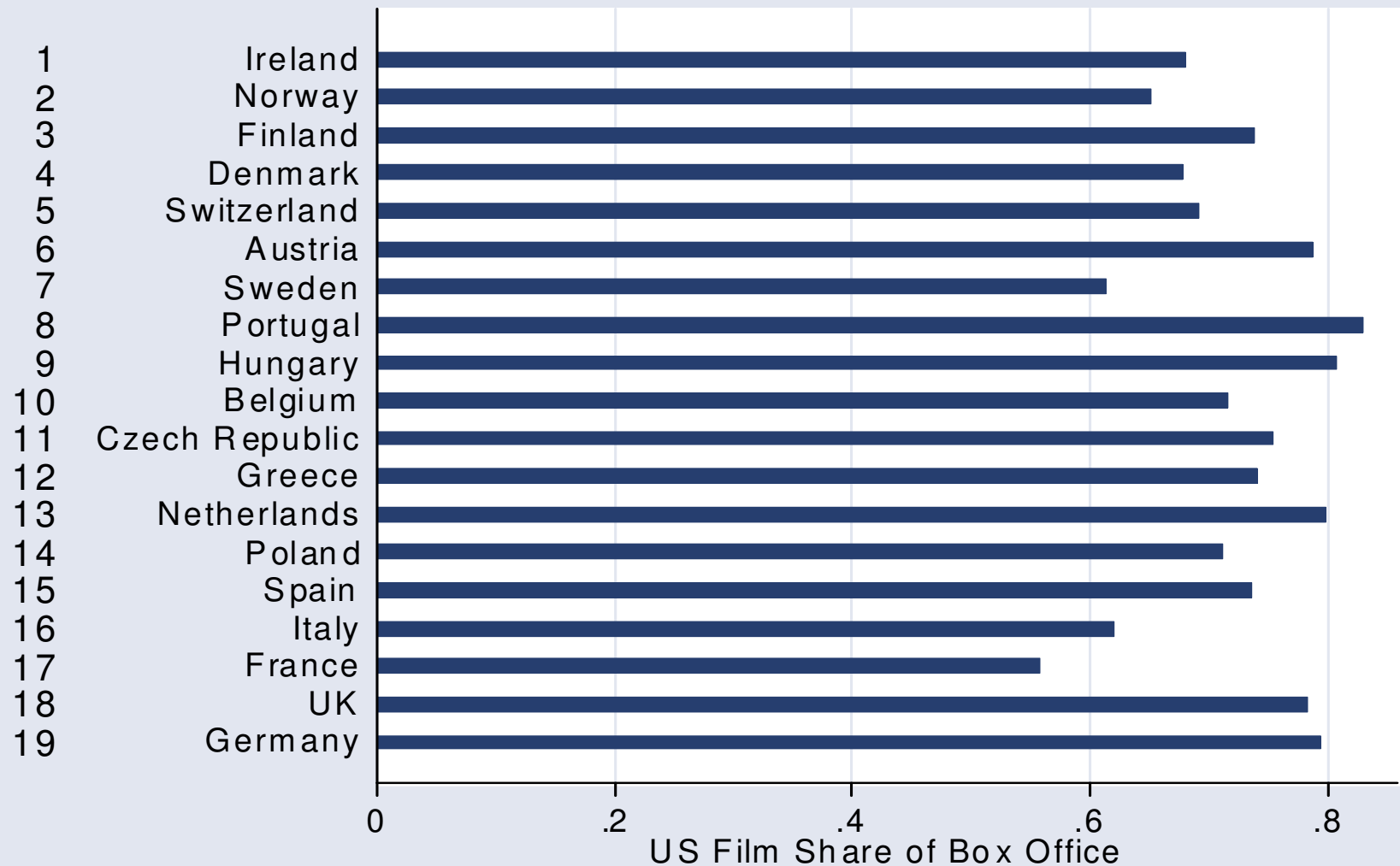
Share of EU Film Exhibition Market by Origin Country of Films



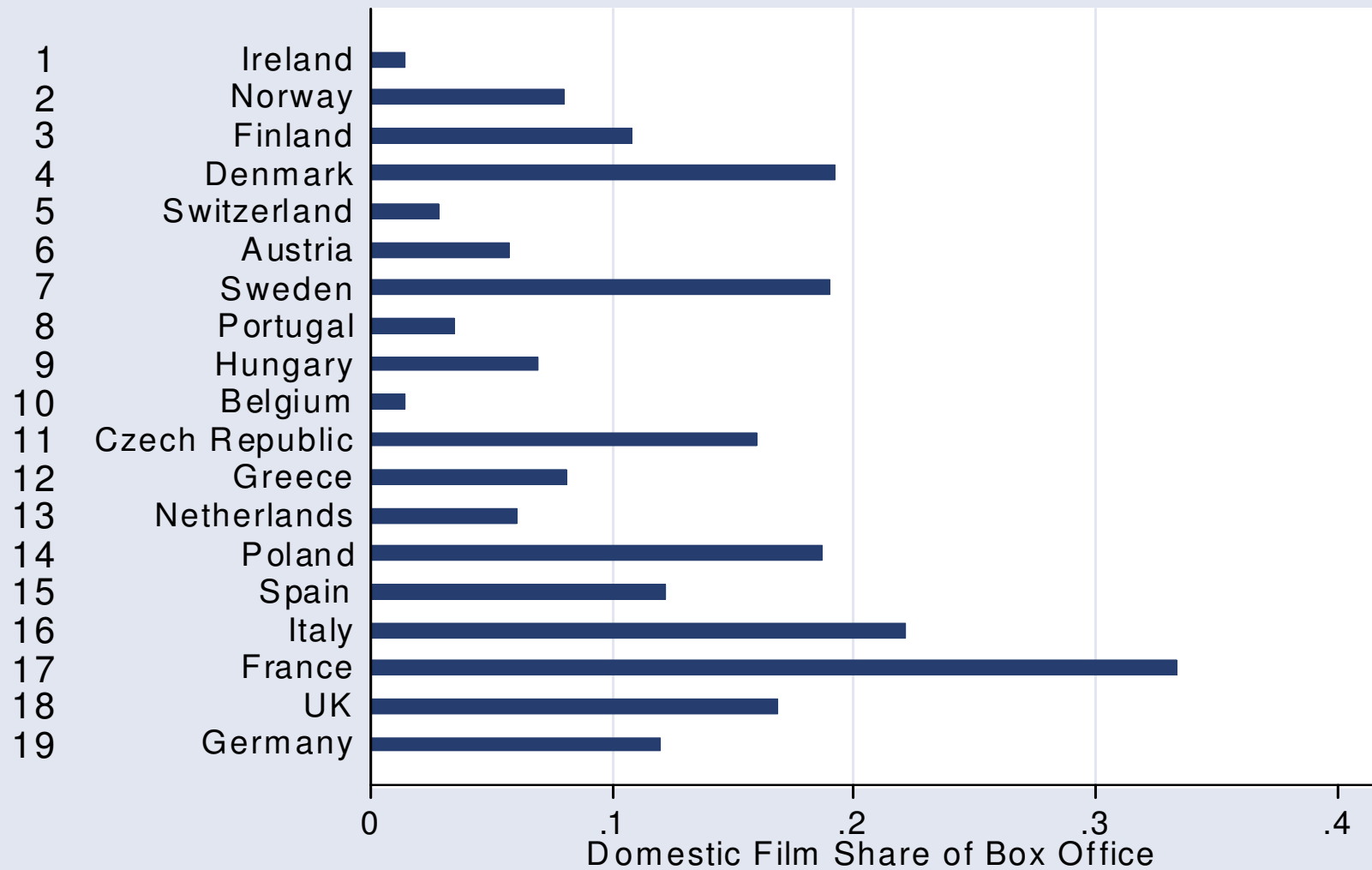
Number of Films Released by Origin Country of Film



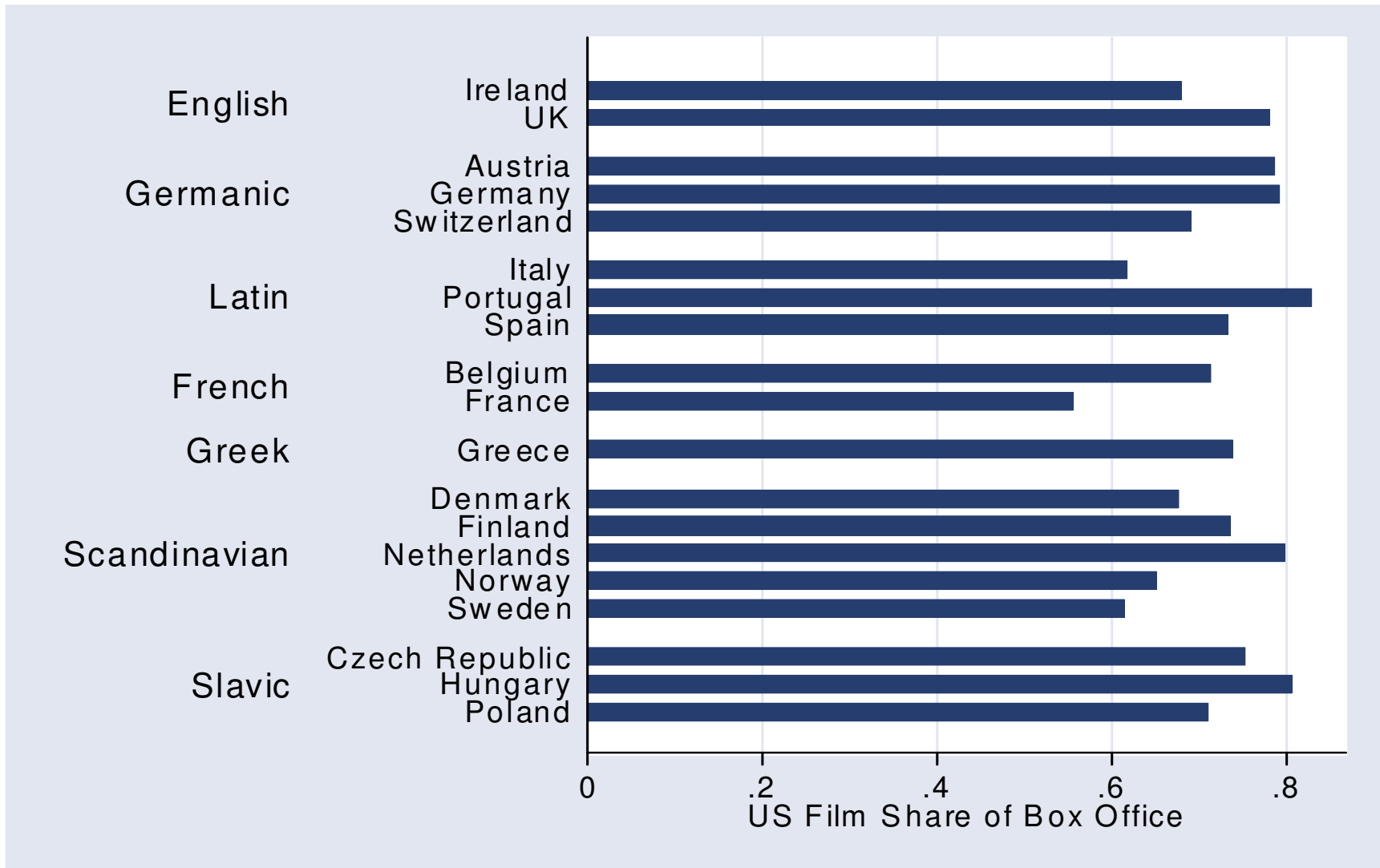
US Film Share of Box Office Revenue by Country Size



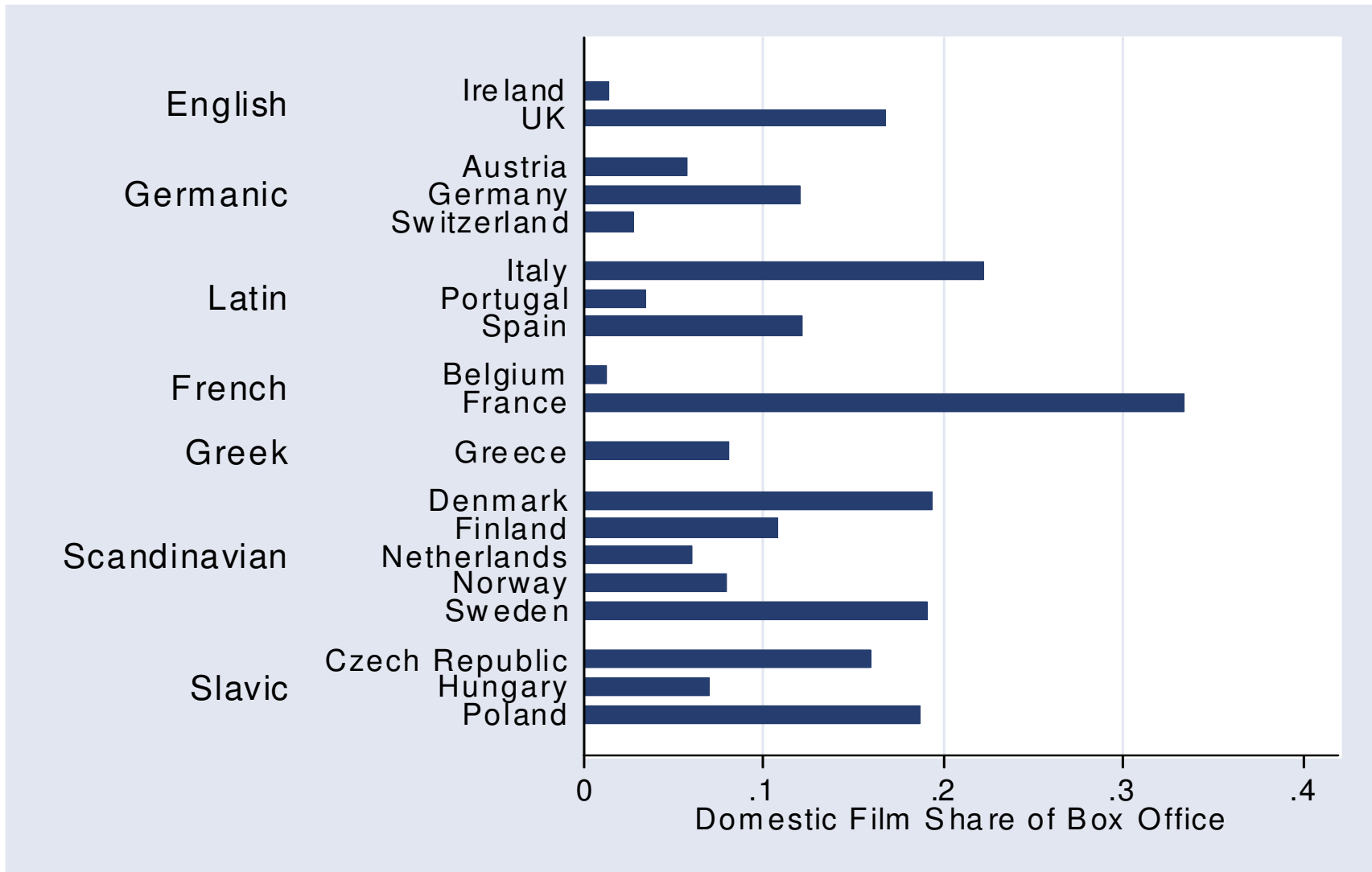
Domestic Film Share of Box Office Revenue by Country Size



US Film Share of Box Office Revenue by Language Group



Domestic Film Share of Box Office Revenue by Language Group



Theory and Empirical Specification

- Assume (i) many sectors of goods and services, (ii) individuals have CES preferences over varieties consumed within a sector
 - All goods and services involve fixed costs in production, which result in industries being monopolistically competitive
 - Services involve fixed cost in country where output produced and variable cost in country where output consumed (eg, movies)
 - Manufacturing goods are subject to iceberg transport costs and services are subject to iceberg cultural trade costs
- Consider exports by US (j) and Spain (h) of movies (m) to UK (k):

$$\frac{S_{mjk}}{S_{mhk}} = \frac{E_{mk} n_{mj} (P_{mjk} / P_{mk})^{1-\sigma_m}}{E_{mk} n_{mh} (P_{mhk} / P_{mk})^{1-\sigma_m}} = \frac{n_{mj}}{n_{mh}} \left(\frac{d_{jk}}{d_{hk}} \right)^{1-\sigma_m}$$

- n_{nj} is metric of no. of movie varieties produced in j, d_{jk} is cultural trade cost between j and k (fraction of movie lost in translation), and σ_m is elasticity of substitution between movie varieties

Theory and Empirical Specification

- Next, turn to manufacturing and consider exports by US (j) and Spain (h) of office machines (o) to UK (k) (an industry chosen for having a high substitution elasticity and low transport costs):

$$\frac{S_{ojk}}{S_{ohk}} = \frac{n_{oj}}{n_{oh}} \left(\frac{w_{oj}}{w_{oh}} \right)^{1-\sigma_o} \left(\frac{t_{jk}}{t_{hk}} \right)^{1-\sigma_o}$$

- where t_{jk} is iceberg transport cost between j and k
- Two important things to note:
 - Because services involve fixed costs but not variable costs in the exporting country, production costs affect service exports differently from manufacturing exports
 - In general equilibrium, interaction of country size, trade costs, and substitution elasticities will determine n_{mj}/n_{mk} and n_{oj}/n_{ok}

Theory and Empirical Specification

- Combine US-Spain relative exports of movies to UK and US-Spain relative exports of office machines to UK:

$$\ln \frac{S_{mjk}}{S_{mhk}} - \ln \frac{S_{ojk}}{S_{ohk}} = \ln \frac{n_{mj}}{n_{mh}} - \ln \frac{n_{oj}}{n_{oh}} + \sigma_o \ln \frac{w_{oj}}{w_{oh}} - (\sigma_m - 1) \ln \frac{d_{jk}}{d_{hk}} + (\sigma_o - 1) \ln \frac{t_{jk}}{t_{hk}}$$

- We can show that in general equilibrium a linear approximation to the above expression is given by the following (where b's vary by sector):

$$\ln \frac{S_{mjk}}{S_{mhk}} - \ln \frac{S_{ojk}}{S_{ohk}} = b_0 + b_1 \ln \frac{Y_j}{Y_h} + b_2 \ln \frac{X_j}{X_h} + b_3 \ln \frac{d_{jk}}{d_{hk}} + b_4 \ln \frac{t_{jk}}{t_{hk}}$$

- Controlling for differences in production costs between the two countries (X_j/X_k), US exports of movies relative to Spain (compared to relative exports in the control industry o) will be larger:
 - The larger is the relative size of the US market (Y_j/Y_k),
 - The smaller are US relative cultural trade costs in services (d_{jh}/d_{kh}), and
 - The larger are US relative transport costs in goods (t_{jh}/t_{kh})

Very Preliminary Regression Results

- Consider the following crude regression:

$$\ln\left(\frac{S_{US,k,t}}{S_{k,k,t}}\right) = \alpha + \beta \ln\left(\frac{Y_{US,t}}{Y_{k,t}}\right) - \theta \ln\left(\frac{d_{US,t}}{d_{k,t}}\right) + \varepsilon_{kt}$$

$$\ln\left(\frac{S_{US,k,t}}{S_{k,k,t}}\right) = \alpha_t - \beta \ln(Y_{k,t}) - \theta \ln(d_{US,t}) + \varepsilon_{kt}$$

- (where we use national language group to measure d)
- We estimate a value of 0.7 for β using population to measure size
 - A 10% increase in population size (relative to US) is associated with 7% smaller US film box office relative to domestic film box office
 - Controlling for country size, US box office relative to domestic box office is smaller for Latin, French, Greek, Scandinavian, Slavic language countries (with strongest effects for Scandinavia)

Data Requirements

- Trade data
 - Bilateral exports for US and other countries to a common set of importing countries in services and manufacturing
 - Choose service sectors with pure fixed costs, low σ , high d
 - Focus on information services (software, movies)
 - Choose manuf. sectors with (a) low σ & high t , or (b) high σ & low t
 - Select manufacturing sectors using results in Hummels (2001), Hanson & Xiang (2004), Broda & Weinstein (2004)
- Other data for exporting countries
 - GDP, controls for production costs (national factor supplies)
 - Bilateral cultural trade costs (language similarity, ethnic similarity)
 - Bilateral transport costs (freight rates, distance)

Trade in Information Services (NAICS 51)

- Software (NAICS 5112)
 - BEA trade data on Software Publishers, NAICS 511210
 - Trade data on other information services is not published (?)
 - Motion Pictures (NAICS 5121)
 - Screendigest.com (Cinema Intelligence online service)
 - Data on revenues from exhibition of motion pictures (mainly in larger countries) for films originating in US and a few other countries (and also revenue of top ten films released by country)
 - Data on other services (Television, Broadband, Video & DVD, Games) doesn't show international trade flows
 - NielsenEDI.com (Film Source online service)
 - Data on box office revenues by major film (how many per year?) and by country (coverage of Europe and where else?)
 - Other data sources
 - UNESCO has *number* (but not value) of long films imported by country pair for 1995-1999 (and number of long films produced in each country)
 - No data on trade in services in Comtrade or Eurostat
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NAICS 51 Information Industries (3 & 4 digit)

- **511 Publishing Industries (except Internet)**
 - 5111 Newspaper, Periodical, Book, and Directory Publishers
 - 5112 Software Publishers
 - **512 Motion Picture and Sound Recording Industries**
 - 5121 Motion Picture and Video Industries
 - 5122 Sound Recording Industries
 - **515 Broadcasting (except Internet)**
 - 5151 Radio and Television Broadcasting
 - 5152 Cable and Other Subscription Programming
 - **516 Internet Publishing and Broadcasting**
 - 5161 Internet Publishing and Broadcasting
 - **517 Telecommunications**
 - 5171 Wired Telecommunications Carriers
 - 5172 Wireless Telecommunications Carriers (except Satellite)
 - 5173 Telecommunications Resellers
 - 5174 Satellite Telecommunications
 - 5175 Cable and Other Program Distribution
 - 5179 Other Telecommunications
 - **518 Internet Service Providers, Web Search Portals, and Data Processing Services**
 - 5181 Internet Service Providers and Web Search Portals
 - 5182 Data Processing, Hosting, and Related Services
 - **519 Other Information Services**
 - 5191 Other Information Services
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ScreenDigest.com: Cinema Intelligence Online

(http://www.screendigest.com/online_services/intelligence/cinema/index.html)

- Top ten films of the year in 2003 and/or 2004 (revenue or admissions)
 - Austria, Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, UK
 - US; Brazil, Chile, Columbia, Mexico
 - Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia
 - Australia, Hong Kong, Japan, Singapore, Korea, Taiwan, Turkey; Israel

- Box office revenue by major countries of origin of films 1995-2003 or 2004
 - Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK
 - Canada, US; Argentina, Brazil, Chile, Mexico, Venezuela
 - Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovakia, Slovenia
 - Australia, China, Hong Kong, India, Indonesia, Japan, Malaysia, New Zealand, Philippines, Singapore, Korea, Taiwan, Thailand, Turkey; Egypt, Israel