

Modeling Physical Production for Film and TV - Agglomeration Dynamics and Geographical Competition

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The film and television industry has recently undergone a significant shift in physical production away from Los Angeles to alternative hubs like Atlanta, Louisiana, the UK, Toronto, Vancouver, and Prague. Major studio executives publicly attribute this migration to several factors, including but not limited to: 1) More attractive **tax incentives** offered by competing regions. 2) Increasing **labor costs** in Los Angeles, exacerbated by recent labor strikes. 3) The **growth of skill and production capacity** in other locations, making them more viable long-term alternatives. These explanations may have a basis in reality, but they may also be specious arguments designed to further corporate interests. Understanding the dynamics behind this shift is critical for all parties - studios, policymakers and talent alike - who are invested in Los Angeles' production economy.

To begin, building a model that captures the historical growth of production in Los Angeles when it was the singular hub for the entire industry may illuminate industry specific agglomeration dynamics. In the early 1900s, fledgling creatives found a home in the city, far from where they could be sued by motion-picture camera patent holder Thomas Edison's company for using the technology. Large, empty spaces, consistent weather and a flow of "westward expansion" capital made the city a viable home for the industry. As pictures found commercial success, technological, financial and physical infrastructure investment increased the scale of productions, while a community of skilled laborers developed techniques. Audiences around the world consumed the art eagerly, and thus Los Angeles became the majority home of filmmaking.

By the end of the 20th century and into the beginning of the 21st, other locations began developing physical infrastructure of their own to try and lure the lucrative industry away. Soundstage square footage in London now mirrors the California city's footprint. Visual effects talent in New Zealand and Canada have attained best-in-class reputations. When a current television show needs a "New York" backdrop, they often opt to film in Toronto or Prague, whereas before they might have built a city street facade on a backlot in Burbank, simply because it's now less expensive even to travel with tax incentives. Skill pipelines across the world have advanced with the advent of social media. Agglomeration dynamics have begun to kick-in elsewhere - the rest of the world is catching up.

Skill and capacity growth loops are therefore likely at play, along with **cost and incentive loops**. **Labor market effects**, especially as a result of the most recent strikes, have certainly played a role and may have exacerbated a downward cycle. Of course, **financial success of the final product** in each of these hubs also influences studios' decisions of where to produce.

Without production, Los Angeles stands to lose an economic cornerstone. Local government and private companies have a few policy levers available to them that interact with the above dynamics, each of which comes with its own set of uncertainties and questions:

- **Adjusting Tax Incentives:** How competitive do California's incentives need to be to retain productions and the local economic boon they bring?
- **Investing in Workforce Training or Infrastructure:** Can improving skill levels and capacity in LA offset cost disadvantages? How does expanding studio space and resources in LA impact production retention?
- **Labor Costs:** What are the long-term effects of wage policies on location decisions?

At its core, the model aims to track the movement of productions between locations, along with the production resources in each location (which includes physical infrastructure like soundstages, along with skill-based infrastructure such as talent pool size and experience) via key stocks: **Productions Seeking a Home** (a pool of potential productions), **Productions in LA** (productions currently being filmed in Los Angeles), **Productions Elsewhere** (productions filmed in competing regions), **Production resources** (how capable a location is to handle productions, in terms of physical infrastructure and skill.)

At the heart of the model is a “production function” that outputs the quality of a movie (most easily measured by revenue) given key production considerations (for example, Labor skill L , Capital C (in the form of equipment and sets, etc., and T cutting-edge Technology). Total costs are based on the prices of each of these factors in a given location and their share in the production (a_x representing the share, which in aggregate will total one), as such:

$$Costs = p_L * a_L + p_C * a_C + p_T * a_T$$

$$Quality = (L/L_N)^{a_L} * (C/C_N)^{a_C} * (T/T_N)^{a_T}, \text{ where } N \text{ denotes a chosen normal level.}$$

New productions choose between competing locations based on a project's expected profit, generating demand for each advantageous factor that can inform the expansion or contraction of its infrastructure in a given location. Gaps between supply/demand can change the prices of each factor. Tax incentives contribute to the bottom line as a subsidy, for the sake of simplicity.

In summary, this model aims to provide insight into the competitive dynamics of film production location decisions and identify policy strategies that could help LA maintain its position as a global production center. It may be helpful to follow the following iterative design:

First, the **Baseline Model** – A simple stock-and-flow structure to explain how LA originally became the dominant production hub, focusing on key growth loops such as skill development and capacity expansion. A key formulation is likely the production function - what effect does the build-up of production resources have on average profitability? Introducing competing locations and modeling the agglomeration forces that drive productions away from LA comes next, followed by **Policy Exploration** – simulating different interventions to assess their effectiveness in accelerating or mitigating the trend of production flight from Los Angeles. This can include investments, technological disruptions (digital, AI, etc.) which might “reset” some of the production resource advantages, or cost disruptions (i.e. tax breaks in other locations), which might remove some of the advantages of agglomeration.

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