

# Income distribution, market size and the evolution of industry<sup>☆</sup>

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## Abstract

An industry typically experiences initial mass entry and later shakeout of producers over its life cycle. However, the timing of the evolution varies substantially across markets. By exploring the dynamic interactions between technology progress and demand diffusion, our theory suggests that the cross-market differences of industrial evolution are largely the result of underlying demand factors. Particularly, higher consumer income or larger market size tends to drive faster demand diffusion and earlier industry shakeout. A comparative study on the US and UK television industries supports the theoretical findings.

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## 1. Introduction

### 1.1. Motivation

As an industry evolves from birth to maturity, we typically observe that price falls, output rises, and the net number of firms initially rises and later falls (Gort and Klepper, 1982; Klepper and Graddy, 1990). In particular, the non-monotonic time path of firm numbers, termed as “shakeout,” has been the focus of many recent studies of industrial economics. The big question is when and why a shakeout will occur.

To answer this question, most existing theories emphasize supply-side factors, particularly inter-firm differences in technology. It has been shown that shakeout can be triggered by “emergence of dominant design” (Utterback and Suárez, 1993), “race of innovation” (Wang, 2007; Jovanovic and MacDonald, 1994), and “scale economies in R&D” (Klepper and Simons, 2000; Klepper, 1996). Some other explanations point to uncertainties in new product markets, for example, “uncertain profit” (Horvath et al., 2001) or “uncertain market size” (Barbarino and Jovanovic, 2007; Zeira, 1999; Rob, 1991) can also result in a mass entry and later shakeout.

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<sup>☆</sup> The views expressed herein are solely those of the author and do not necessarily reflect the views of the Federal Reserve Bank of Kansas City or the Federal Reserve System.

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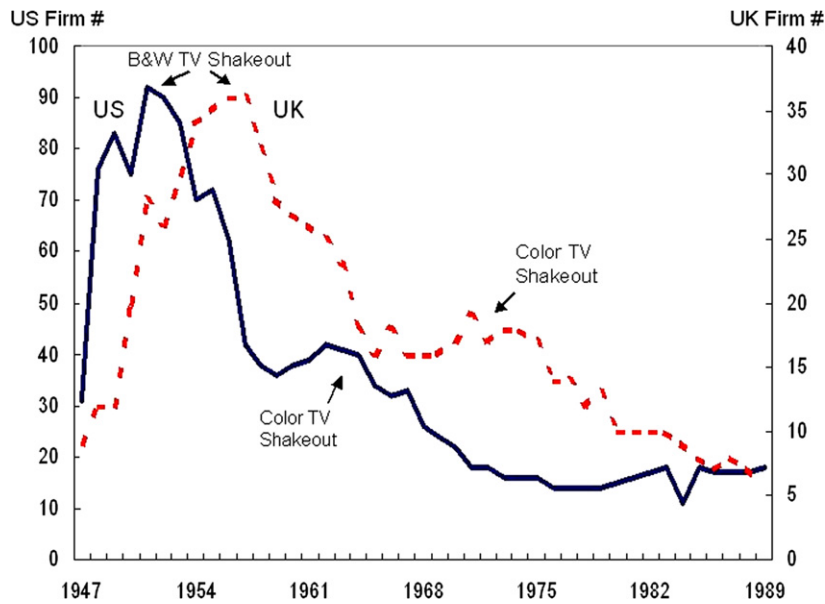


Fig. 1. TV industry shakeout: US vs. UK.

Although these theories have advanced our understanding of industry shakeout, some important issues are still underexplored. Particularly, the impacts of demand characteristics on industry life cycles have been largely overlooked.<sup>1</sup> As a result, it remains difficult to explain certain empirical facts. For example, Fig. 1 plots the number of firms in the US and the UK television industries.<sup>2</sup> The television was commercially introduced into the US and the UK at the same time after WWII, but the two markets were segmented for the following two decades by technical standards.<sup>3</sup> This natural experiment shows that the patterns of industrial evolution are very similar across countries, but the mass entry and shakeout of TV producers were uniformly lagged behind in the UK.

What can explain this cross-country difference of the timing of shakeout? The existing theories do not provide us adequate answers. Many industry studies (Klepper and Simons, 2000; Arnold, 1985; LaFrance, 1985) document numerous technological changes in the TV industry that may have a major cumulative effect on inter-firm heterogeneity, but they do not directly explain the timing of shakeout, let alone the cross-country differences. Market uncertainty could not have caused the shakeout either because at least the UK producers could easily learn from the US market experience. Moreover, the TV shakeouts, especially the Black & White TV shakeouts, had little to do with foreign competition since the TV import and export were negligible at the time.<sup>4</sup>

## 1.2. A new hypothesis

In this paper, we propose a demand-side theory to explain the industry shakeout. A new product, over its life cycle, typically experiences strong demand growth early on but this growth gradually diminishes as the market matures. This suggests that demand characteristics can have influential, sometimes critical, effects on industry evolution. Without taking that into account, the analyses on industry life cycle would be incomplete.

<sup>1</sup> An exception is Hopenhayn (1993), where some demand issues are discussed briefly.

<sup>2</sup> Data source: Simons (2002), *Television Factbook's* various issues.

<sup>3</sup> The UK adopted the 405-line screen standard in 1943, but other nations proceeded to adopt standard with higher resolutions. The UK standard remain anomalous through 1964, when some UK broadcasts began using the internationally common PAL 625-line color standard. Hence through 1964 and even later, the UK TV market was isolated from foreign competition. See Levy (1981).

<sup>4</sup> In the 1950s, the US and the UK were the two largest TV producers in the world, while imports and exports were nil for both countries. Imports started to increase in the 1960s as Japanese production took off, but did not reach 10% of domestic production until 1965 in the US, and until 1970 in the UK. Data sources: *Television Factbook* (US), *Monthly Digest of Statistics* (UK).

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