100 Years after the Great Kanto Earthquake: Examining post-disaster policy responses

View from Kotobuki Junior School in Yokohama following the 1923 Great Kanto Earthquake [1923 photo]
Photo: Yokohama Central Library, public domain

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Just before noon on September 1, 1923, a massive, 7.9-magnitude earthquake struck the southern Kanto region, which includes Tokyo. According to a survey by the city of Tokyo in 1925, the total number of dead and missing people from the disaster in Tokyo Prefecture and six nearby prefectures stood at about 105,000, including 70,000 in Tokyo Prefecture and 32,000 in Kanagawa Prefecture. There was also massive property damage, amounting to 5.5 billion yen (about 7 trillion yen in 2010 prices).

Using the same 2010 prices for comparison, damage totaled about 8 trillion yen for the Great Hanshin-Awaji Earthquake in 1995 and about 17 trillion yen for the Great East Japan Earthquake in 2011. The Great Kanto Earthquake resulted in less damage than the other two. Compared with Japan's economic size then, however, the Great Kanto Earthquake damage turns out to have been much more severe.

The ratio of damage to the previous year's gross domestic product (GDP) came to 2.0% for the Hanshin-Awaji Great Earthquake and 3.5% for the Great East Japan Earthquake, far smaller than the ratio of the damage from the Great Kanto Earthquake to gross national product (GNP) in 1922, at 35.5%. The ratio of the damage from the Great Kanto Earthquake to Japan's national wealth, at some 53 billion yen excluding land assets in 1919, stood at 10.4%, meaning that the Japanese economy suddenly lost some 10% of its property assets. The massive earthquake that devastated the Tokyo metropolitan region inflicted tremendous damage on the then-developing Japanese economy.

Despite the enormous damage caused by the earthquake, its macroeconomic impacts were not comparatively significant. Real GNP contraction accelerated from 2.6% in 1922 to 4.6% in 1923 before a steep increase of 12.5% in 1924 indicated a V-shaped economic rebound.

However, the enormous loss of assets in one fell swoop had serious impacts on the Japanese economy. It is well established that the Great Kanto Earthquake dealt a serious blow to the financial system. A report prepared by the Economic Research Department of the Bank of Japan in 1933 identified three direct effects of the earthquake on the financial system: the destruction of collateral property supporting loans, unrecoverable loans caused by damage to borrowers, and declines in securities prices. The deterioration of bank balance sheets due to these effects led to the "Showa Financial Crisis" in 1927.

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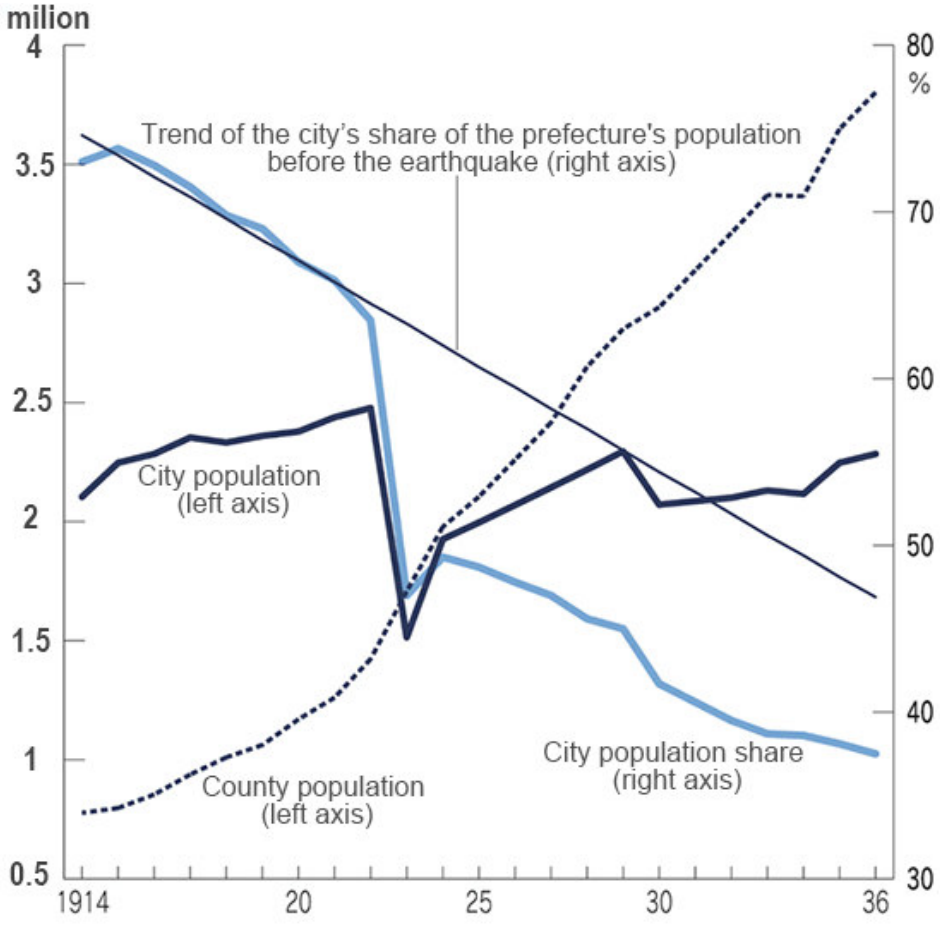
On the other hand, it should be noted that the Great Kanto Earthquake also had positive impacts on the economy and society. The changes that led to subsequent economic development included the impacts on the spatial distribution of population and economic activities.

Population distribution between the city of Tokyo and the counties in Tokyo Prefecture



Note: Even for years after the expansion of the city of Tokyo in 1932, the population of the city and that of the counties prior to the expansion are shown.
Source: Prepared by the author from Tokyo Prefecture's annual statistics.

The figure shows the population distribution trend in the city of Tokyo and the counties of Tokyo Prefecture. At the time of the earthquake, Tokyo Prefecture was comprised of the city of Tokyo and eight counties. The city of Tokyo consisted of 15 wards and covered a small area including today's Chiyoda, Chuo,

Minato, Bunkyo, and Taito wards, as well as parts of Shinjuku, Sumida, and Koto wards. The city accounted for only 3.8% of the entire Tokyo Prefectural area and 63.5% of the prefecture's population at the end of 1922. The damage caused by the earthquake was concentrated in the city center. The disaster destroyed 63.2% of buildings in the city and only 6.8% of those in the counties.

The population in the city of Tokyo plummeted from 2.48 million at the end of 1922 to 1.51 million at the end of 1923, with the city's share of Tokyo Prefecture's population plunging to 47.0%. In fact, before the earthquake, the population share for the city had been on a downward trend due to overpopulation. After the earthquake, however, the downward trend accelerated, and the previous trend of increase ended. The earthquake prompted people to rapidly and irreversibly move from Tokyo to suburban counties.

Long-term changes in spatial distribution due to the disaster were not limited to population. I have co-authored a paper with Associate Professor Imaizumi Asuka of Saitama University and Professor Ito Kaori of Tokyo University of Science, examining changes in the spatial distribution of manufacturing in Tokyo Prefecture. We divided 20 wards and counties, excluding the three remaining counties -- North Tama, South Tama, and West Tama -- into a highly affected group comprised of 10 wards with high building destruction rates and a less affected group consisting of five wards and five counties with low building destruction rates. Then we compared changes in the number of manufacturing workers in the two groups.

The number of manufacturing workers followed a similar moderate upward trend in both groups from the mid-1910s to 1922 before the earthquake. While the number in the less affected group continued the same upward trend after the disaster, however, that in the highly affected group turned downward. The gap between the two groups that resulted from the downturn remained even in the 1930s. The disaster had long-term impacts on the spatial distribution of not only the population but also manufacturing.

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The impacts of the disaster, which led to subsequent economic development, can also be observed at the corporate level.

In my joint research with Professor Okubo Toshihiro of Keio University and Professor Eric Strobl of the University of Bern (Switzerland), we analyzed the impacts of the earthquake damage on the motorization and survival of companies, using data for Yokohama City. In Yokohama, which was close to the epicenter, the building destruction rate reached 73.2%, indicating more serious damage than in the city of Tokyo. In this paper, we used detailed data about building damage in Yokohama, prepared by Takahama Tsutomu of Kozo Keikaku Engineering Inc. et al., and prime mover horsepower data by company in 1921 and 1925.

One of the key findings is the fact that companies in areas with higher rates of building destruction through the earthquake had a higher rate of increase in prime mover horsepower from 1921 to 1925. It suggests that the damage caused by the earthquake and the subsequent reconstruction promoted the motorization of factories. In addition, the higher the rate of building destruction, the greater the positive impacts of prime mover horsepower on the survival of companies. This indicates that the damage caused by the earthquake promoted a shakeout of companies based on efficiency. Given these findings, the earthquake may be viewed as having brought about the creative destruction in the economy.

A factor related to these developments was financial measures at the microeconomic level. In order to prevent the disaster from destabilizing the financial system, the government and the Bank of Japan responded swiftly to the disaster.

On September 7, the government implemented an emergency imperial ordinance to postpone borrowers' loan repayments for 30 days in disaster-affected areas. On September 11, the Bank of Japan issued a statement by Deputy Governor Kimura Seishiro titled "the Bank of Japan's Response to the Disaster," declaring that the central bank would provide funds to financial institutions regardless of conditions such as limit amounts, collateral types, or whether the Bank of Japan was a business partner. The central bank's liquidity provision to financial institutions was supported by the government under an order to compensate Bank of Japan losses on discounted bills regarding the disaster.

The effects of such aggressive liquidity provision were analyzed in my separate joint paper with Okubo and Strobl on Yokohama. The analysis found that the Bank of Japan's rediscount of bills for banks contributed to increasing the probability of their customer companies' survival towards 1925, while lowering their growth.

These effects are consistent with the fact that the central bank provided liquidity under looser conditions than usual, which is proof of the positive and negative aspects of the financial response of the government and central bank to the disaster.

The Great Kanto Earthquake, which destroyed property assets that amounted to more than one-third of GNP, had short- and long-term impacts on various aspects of the economy. In the event of a serious natural disaster in the future, it will be important to not only to minimize damage but also to avoid the negative impacts of any damage and make any impacts positive ones.

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*RIETI: http://www.rieti.go.jp/en/index.html

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