

Impact of the Kahramanmaraş Earthquake of 2023 on the Local Economy

Shingo NAGAMATSU^{*,**}

**Research Division for Social Resilience,
National Research Institute for Earth Science and Disaster Resilience, Japan
nagamatu@bosai.go.jp,*

***Faculty of Societal Safety Sciences, Kansai University
nagamatu@kansai.ac.jp*

Abstract

By collecting official statistical data, this study investigates the effect of the 2023 Kahramanmaraş Earthquake on the local economy and its recovery process. The affected provinces have less per capita GDP than the national average. Their strength lies in the manufacturing and agriculture rather than in the service and commercial sectors. Provinces that experienced severe damage during the earthquake lost their populations considerably, particularly the younger generation. The population loss, which led to labor shortage, might have become a major obstacle to economic recovery. The disaster had a great impact on the supply side, and failing to return to previous population levels will lead to a lack of demand in the economy.

Key words: Economic impact, Local economy, Demand and supply, Labor market

1. Introduction

This study analyzes the local economic impact of the Kahramanmaraş earthquake of 2023. The impact of disasters on an economy is not unique but depends on factors, such as demographic conditions, development stage (Albala-Bertrand, 1993), industrial structure (Nagamatsu, 2007), and market conditions (Vigdor, 2008). Although one and a half years have passed since the earthquake, it is difficult to identify its impact on the local economy owing to lack of adequate statistics, most of which will be released later. Given these conditions, this study attempts to analyze the impact of the disaster to the best of our knowledge.

Several papers sharing our concerns of the impact of disasters on a country's economy have been published. The World Bank published a Global Rapid Post-Disaster Damage Estimation (GRADE) (World Bank, 2023), which provides a basic damage assessment. The report estimated the direct damage from the disaster at USD34.1 billion, equivalent to 4 percent of Turkish 2021 GDP. The report also identified that some provinces had the highest poverty rates and hosted more than 1.7 million Syrian refugees, comprising almost 50% of the total population in the country.

Demirdag and Nirwansyah (2024) attempted to forecast

the economic impact of the earthquake using the economic base scenario used by international organizations, such as the IMF and the World Bank. Their primary finding was that the country would contract its GDP by approximately 2.75% (USD8.8 billion). Irfan and Hatice (2023) reported regional economic impacts on the agricultural sector. The affected provinces were critical for the national agricultural production because their share was approximately 20%.

Akkuş and KişLalioĖLu (2023) tested the differences in sectoral stock returns before and after the earthquake and found no significant difference, which indicates that the stock market was unaffected.

2. National Economic Context

The Turkish GDP per capita growth rate decreased in 2019 and 2020 owing to the pandemic, and the momentum for economic recovery was strong, experiencing 10.4% and 4.5% growth at constant 2015 USD in 2021 and 2022, respectively.

In contrast, the inflation rate increased to 72.3% by 2022 because of the following two major reasons: temporary and chronic. The temporary one is that, similar to many other countries, Turkey experienced an increase in demand during its economic recovery from the COVID-19 pandemic

and an increase in energy costs due to the Russia-Ukraine War. Chronic policy is a Turkish fiscal policy that pursues economic growth rather than stability, maintaining low interest rates to reduce the cost of borrowing, resulting in the devaluation of the Turkish lira. As Aksoy and Salim (2023) insists, it would be difficult to contain inflation because Turkey faces a massive demand for disaster recovery. An attempt to contain inflation will inevitably increase the interest rate and will be a significant obstacle for the most affected people and industries in finance recovery. The inflation rate in May 2024 remained as high as 75.5%, which accelerated during recovery.

3. Overview of the target provinces

We focused on the following 11 affected provinces designated by the Turkish national government (World Bank, 2023). We categorized them into three categories depending on the damage level, as was done in Demirdag and Nirwansyah (2024). The worst category consisted of Adiyaman, Hatay, Kahramanmaraş, and Malatya. The second category included Kilis, Gaziantep, and Osmaniye; the third category include Adana, Diyarbakır, Elazığ, and Şanlıurfa. **Table 1** summarizes the population and per capita GDP, ranking of per capita GDP among the 81 provinces in Turkey, and the undamaged building ratio.

Table 1 Basic statistics of the affected provinces.

	Population (Dec. 2022)*1	Per Capita GDP (USD)*1	Rank	Undamaged building ratio (%)*2
Worst Affected Provinces				
Adiyaman	635,169	4,780	72	23
Kahramanmaraş	1,177,436	7,319	42	26
Hatay	1,686,043	7,058	44	36
Malatya	812,580	5,646	62	36
Second Affected Provinces				
Kilis	147,919	7,152	43	39
Gaziantep	2,154,051	8,725	29	51
Osmaniye	559,405	6,393	53	56
Third Affected Provinces				
Şanlıurfa	2,170,110	3,887	79	77
Diyarbakır	1,804,880	4,322	77	86
Elazığ	591,497	6,179	55	93
Adana	2,274,106	8,194	33	98

Source: *1 TurkStat (<https://www.tuik.gov.tr/>)

*2 Demirdag and Nirwansyah (2024)

The affected areas included provinces with large populations, such as Kahramanmaraş and Hatay, which were very populous, exceeding one million. The total population of these 11 provinces is approximately 14 million. In terms

of per capita GDP, some provinces were impoverished. All provinces were below the national per capita GDP (USD 10,659). Some provinces, such as Adiyaman, Şanlıurfa, and Diyarbakır, had less than half of the national average.

Fig. 1 shows the sectoral share of production in 2022, representing the affected provinces' industrial structure. The affected provinces place more weight on agriculture and industry and less weight on services than at the national level. The markets of the agriculture and industry sectors are generally nationwide or global, which indicates that the demand in these markets is less susceptible to local events such as disasters (Nagamatsu, 2007). Among the affected provinces, Gaziantep and Kahramanmaraş have a significant share of industry at 50.0% and 48.7%, respectively. In contrast, Şanlıurfa and Kilis have the largest share of agriculture at 32.6% and 25.9%, respectively.

However, the demand for services is local and susceptible to local shocks. Hatay had the largest share in the service sector (35.5%).

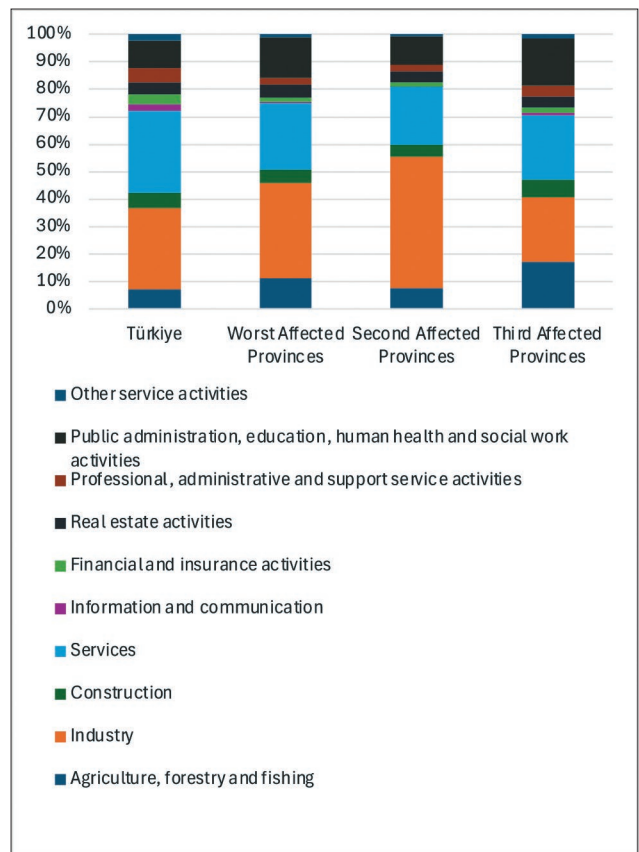


Fig. 1 The sectoral share of the production of the affected provinces in 2022.

Source: Gross Domestic Product by Provinces (2022), TurkStat (<https://www.tuik.gov.tr/>).

4. Demographic changes after the earthquake

The February 2023 earthquake induced large-scale demographic changes (Table 2). The annual growth rate is defined as the increase ratio between December 31 in the previous and current years. Therefore, the values for 2021 and 2022 do not include the earthquake's impact, whereas those for 2023 do. The table shows that the worst affected provinces lost 7.0% of their population by 2023, probably because of the earthquake. However, the second and third affected provinces do not exhibit as drastic demographic change as the worst affected provinces. Interestingly, some provinces, such as Kilis and Elazığ, exhibit higher growth in 2023 than in 2021 and 2022, which may have been due to the in-migration effect of the earthquake.

Notably, the demographic changes occur in the younger generation. Table 2 also shows the population changes for those aged less than 30 in almost all affected provinces, except Kilis, Şanlıurfa, and Elazığ; the younger than 30 population will decrease by 2023. This implies that the earthquake mobilized the population of relatively younger generations. We can assume that the reason for the loss of the younger generation is that they seek educational opportunities for their children. However, we do not have an apparent reason for this, because a decrease in the younger generation can be seen in 2021 and 2022, although it is smaller than that in 2023. Regardless of the reason, this trend significantly impacts the labor market in the short and long term.

Table 2 Annual population growth rates in the affected provinces.

	Total			Younger generation (< 30)		
	2021	2022	2023	2021	2022	2023
Worst Affected Provinces	0.4%	0.7%	-7.0%	-1.0%	-0.6%	-9.0%
Adıyaman	0.0%	0.5%	-4.8%	-1.6%	-1.0%	-6.6%
Kahramanmaraş	0.3%	0.5%	-5.2%	-1.2%	-0.9%	-7.4%
Hatay	0.7%	0.9%	-8.4%	-0.6%	-0.1%	-10.1%
Malatya	0.3%	0.5%	-8.6%	-1.0%	-1.1%	-11.3%
Second Affected Provinces	1.3%	1.1%	0.5%	0.3%	0.3%	-0.5%
Kilis	2.1%	1.4%	4.9%	1.6%	0.7%	4.1%
Gaziantep	1.4%	1.1%	0.5%	0.4%	0.3%	-0.5%
Osmaniye	0.8%	1.2%	-0.3%	-0.5%	0.0%	-2.0%
Third Affected Provinces	0.6%	0.8%	1.0%	-0.6%	-0.3%	-2.8%
Şanlıurfa	1.3%	1.3%	2.0%	0.4%	0.4%	1.0%
Diyarbakır	0.4%	0.8%	0.7%	-1.3%	-0.8%	-1.0%
Elazığ	0.0%	0.6%	2.2%	-1.3%	-1.1%	0.6%
Adana	0.2%	0.5%	-0.2%	-1.2%	-0.6%	-1.7%
Total	0.7%	0.8%	-1.6%	-0.6%	-0.3%	-2.8%

Source: TurkStat (<https://www.tuik.gov.tr/>)

5. Labor market of the affected provinces

The loss of the population, particularly in the younger generation, might have caused a loss of the labor force and increased labor costs due to the rise in wages in the labor market. Our interview survey conducted in October 2023 found that many industries suffered from a lack of labor. However, it is challenging to evaluate the impact of the earthquake on the labor market of the affected provinces because they do not have data on wages for each province. The only statistic available is the daily wage of male seasonal agricultural workers (Fig. 2). İzmir Province and earthquake-affected provinces are included in the figure for comparison. The figure shows the drastic increase in wages in Kahramanmaraş and Gaziantep. The wage leap can reflect the impact of the earthquake. However, Hatay and Malatya do not exhibit a wage increase similar to Kahramanmaraş, although the population decreases in these provinces are larger.

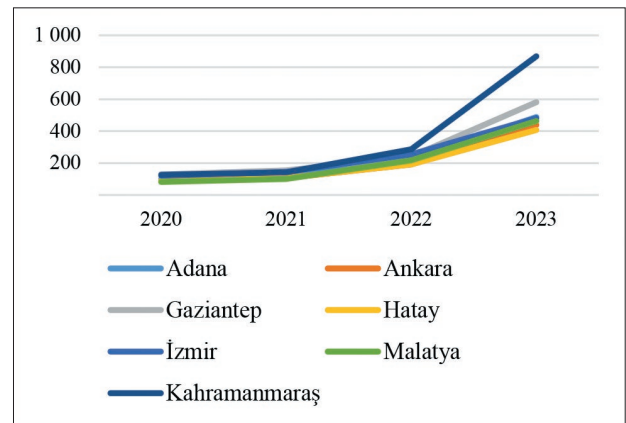


Fig. 2 Daily wages of seasonal agricultural male workers. Source: Agricultural Holdings Labor Wage Structure, TurkStat (<https://www.tuik.gov.tr/>).

6. Market for agricultural products

If we consider the output market for the affected provinces, such as agricultural products, we can see the impact of the earthquake. Fig. 3 shows the producer price index of the agricultural products. The numbers are percentages of the same month in the previous year. This figure clearly shows an increase in the price of olives, one of the major products of the affected area. The price of olives increased in October 2023, the first harvest season since the earthquake. This is partly because of the cold and rainy weather of the previous year, as well as the impact of the earthquake, which damaged the olive trees and mills in the region (Dawson, 2023).

One of the other major products in the region is nuts. In particular, the share of pistachio production in affected provinces is more than 90% of the national product. The price of nuts also increased during the first harvest season, in August 2023.

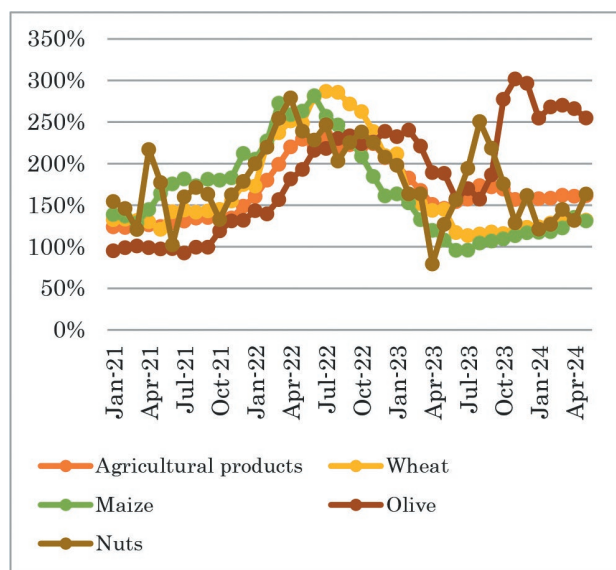


Fig. 3 Producer Price Indexes of major agricultural products. Source: Agriculture-PPI, TurkStat (<https://www.tuik.gov.tr/>).

7. Conclusion

A detailed analysis of the economic impact of the earthquake cannot be performed without reliable and holistic data. Nevertheless, some lessons can be learned from the earthquake. The impact of the Kahramanmaraş earthquake on the local economy was greater on the supply side than on the demand side for the following three reasons. The first reason is the huge physical damage to infrastructure and production facilities. As seen in the agricultural sector, the damage caused the production loss of olives and pistachios. Second, the major industries in the affected region are manufacturing and agriculture, most of whose demand is from outside the affected region; therefore, they are less affected by the earthquake. The third reason is the considerable population decrease in the worst affected region. Remarkably, the decline in the younger generation has already caused a lack of labor supply. Although we could not find direct evidence of this issue, our interview survey proved that the labor supply has become a bottleneck in the economic revival of the area.

However, this does not mean that the area does not have issues with the demand side of the local economy. Owing to the loss of population, the service sector must suffer from a loss of demand because most of the demand for the service sector is local.

It is critical for the affected economy to recover not only damaged facilities but also urban infrastructure, including houses; otherwise, the labor force would not recover. One major concern is that inflation may persist in the Turkish economy, which may hinder its recovery. The recovery of the

affected area under economic conditions is worth observing, and this will be a great lesson in how disasters affect the economy and recovery process.

Acknowledgments

This study was funded by J-RAPID (grant number 23-231039288).

References

- 1) Akkuş, H. T., and Kişlialioğlu, V. (2023): Investigating the Effects of Natural Disasters on the Stock Market on a Sectoral Basis: The Case of 2023 Kahramanmaraş/Türkiye Earthquake. *International Journal of Business and Economic Studies*, **5**(2). <https://doi.org/10.54821/uicd.1296562>
- 2) Aksoy, H. A., and Salim, Ç. (2023): Political and Economic Implications of the Turkish Earthquakes, SWP Comment 2023/C 19. <https://doi.org/10.18449/2023C19>
- 3) Albala-Bertrand, J.-M. (1993): Political economy of large natural disasters: With special reference to developing countries. OUP Catalogue.
- 4) Dawson, D. (2023): Signs Suggest a Weak Harvest in Turkey. *Olive Oil Times*. <https://www.oliveoiltimes.com/production/signs-suggest-a-weak-harvest-in-turkey/122246>
- 5) Demirdag, I., and Nirwansyah, A. W. (2024): Unravelling the Economic Impacts. *Journal of Regional and City Planning*, **35**(1), 21-43. <https://doi.org/10.5614/jpwk.2024.35.1.2>
- 6) Irfan, K., and Hatice, Ö. Ç. (2023): Major regional earthquakes on February 2023 in Turkey: Destructive effects, economic assistances and measures on agriculture Proceedings of the 2nd International Scientific and Practical Conference.
- 7) Nagamatsu, S. (2007): Economic Problems During Recovery from the 1995 Great Hanshin-Awaji Earthquake. *Journal of Disaster Research*, **2**(5), 372-380. <https://doi.org/10.20965/jdr.2007.p0372>
- 8) Vigdor, J. (2008): The Economic Aftermath of Hurricane Katrina. *The Journal of Economic Perspectives*, **22**(4), 135-154. <http://www.jstor.org.libproxy1.usc.edu/stable/27648281>
- 9) World Bank (2023): Global Rapid Post-Disaster Damage Estimation (GRADE) Report: February 6, 2023 Kahramanmaraş Earthquakes. <https://www.worldbank.org/en/news/opinion/2024/01/24/rebuilding-turkiye-from-earthquake-devastation-to-a-resilient-recovery>

(Received: July 16, 2024

Accepted: December 10, 2024

Published [online first]: February 14, 2025)

2023年カフラマンマラシュ地震の地域経済への影響

永松 伸吾^{*}, ^{**}

^{*}防災科学技術研究所

^{**}関西大学社会安全学部

要 旨

本研究は公式な統計データにより、2023年のカフラマンマラシュ地震が地域経済とその復興過程にどのような影響を与えたかを明らかにする。被災した州は、1人当たりGDPが全国平均よりも低く、サービス業や商業部門よりも製造業や農業に強みを持つ。地震により、甚大な被害を受けた州では、特に若い世代の人口が大幅に減少した。人口減少は労働力不足をもたらし経済回復の大きな障害となった可能性がある。本稿の主要な結論は、震災の影響はむしろ供給サイドにあるということだが、失われた人口を取り戻すことができなければ、今後は経済の需要不足につながる。

キーワード：経済的影響，地域経済，需要と供給，労働市場