

Economic Effects of Consumption by Visitors to Ishikawa Prefecture

— Analysis from 2015 Ishikawa Input–Output Table —

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1. Introduction

The opening of “Hokuriku Shinkansen” Bullet Train in 2015 increased the number of tourists and Ishikawa Prefecture benefited economically. From 2015 to 2019, the Hokuriku Shinkansen carried more than 8 million passengers annually. According to JR West, the number of Hokuriku Shinkansen passengers for the first year (from March 14, 2015 to March 13, 2016) was almost three times more than that of the original local main train line called “Hokuriku Main Line” in 2014, even before Hokuriku Shinkansen had existed (Table 1)⁽¹⁾.

Some results have shown that Hokuriku Shinkansen has increased the total tourist intake and might also change tourists’ consumption behavior during their stay in Ishikawa Prefecture, which have led to several positive effects such as economic effects. However, these effects differ from those in areas and include positive and negative effects. The so-called the Straw Effect, sometimes characterized by the development of a rapid transportation system, would be classified as a typical negative effect to the regions.

In the case of Hokuriku Shinkansen, a prominent negative outcome was decline in the number of direct flights from Ishikawa to Tokyo (from Komatsu airport to Haneda airport) from 12 one-way flights to 10 a day soon after the opening of Hokuriku Shinkansen because of the decrease in the number of the flight passengers.⁽²⁾ That is, owing to the reduction of flights, there was a regional economic decline in terms of sales at the airport shops and stores, decrease in the number of train, bus and taxi users who frequently traveled to the airport. Moreover, because JR West manages Hokuriku Shinkansen, the Hokuriku Main Line that was earlier run by JR West is now managed by a new local train company (IR Ishikawa railway), whose main stockholders are Ishikawa Prefecture, some municipalities, and local companies. Furthermore, because of the difference of the economic scale and the number of the train users, there was an increase in the train fare, which adversely affected local passengers. Therefore, an analysis of the effects of Hokuriku Shinkansen should include these factors and considered the total aspects of regional development such as economic development.

As of summer 2022, although there was a need to focus on the gradual and simultaneous recovery from the “COVID-19” pandemic and economic recovery, the negative effect of the pandemic continued to spread all over Japan, including Ishikawa Prefecture. In particular, its effects have continued to severely damage industries related to tourism, including the transportation industry. Recovery from the effect of the pandemic is expected in the near future; therefore, it is important to analyze the regional issues promptly and appropriately to develop tangible policies once the situation improves. Furthermore, because Hokuriku Shinkansen would be extended to the railroad

Table 1. Numbers of Hokuriku Shinkansen Passengers

1st year (March 14, 2015-March 13, 2016)	9,258
2nd year (March 14, 2016-March 13, 2017)	8,584
3rd year (March 14, 2017-March 13, 2018)	8,569
4th year (March 14, 2018-March 13, 2019)	8,694
5th year (March 14, 2019-March 13, 2020)	8,034
6th year (March 14, 2020-March 13, 2021)	2,813
7th year (March 14, 2021-March 13, 2022)	3,633

(Thousand)

Note: Passengers between Joetsu-Myoko Sta. and Itoigawa Sta.⁽³⁾

Source: Ishikawa Prefecture (2017), JR West (2018–2021)

line to Tsuruga of Fukui Prefecture in spring 2024, it will have a large economic effect on Hokuriku Area, including Ishikawa Prefecture. Thus, a steady analysis of Hokuriku Area about tourism is essential. For this purpose, this study aims to verify how the opening of Hokuriku Shinkansen has impacted Ishikawa Prefecture, especially economically. Using 2015 Ishikawa Input–Output Table, some economic effects have been analyzed.

2. Some Changes Brought About by the Launch of Hokuriku Shinkansen

The economic effects by Hokuriku Shinkansen would include not only direct effects by the opening of it but also indirect effects from other factors because there were many promotions of it by many institutions such as public sectors and JR West for Hokuriku Area at that time, which could have urged those who do not have to use it to visit Ishikawa Prefecture to recognize Ishikawa. It is true that Hokuriku Shinkansen shortens the travel time between Hokuriku Area and Tokyo Area; however, for people living in Kansai Area, for example, which also has a huge tourist demand for Hokuriku Area, they do not benefit from the time saved by visiting Ishikawa Prefecture because Hokuriku Shinkansen does not run between Hokuriku Area and Kansai Area. However, because of the continual promotion of Hokuriku Area, it could be inferred that improved publicity of Hokuriku Area could urge people living in Kansai Area to visit Hokuriku Area, including Ishikawa Prefecture. Of course, there are other aspects such as negative effects, mentioned earlier, arising from the opening of Hokuriku Shinkansen. Therefore, both positive and negative effects should be analyzed.

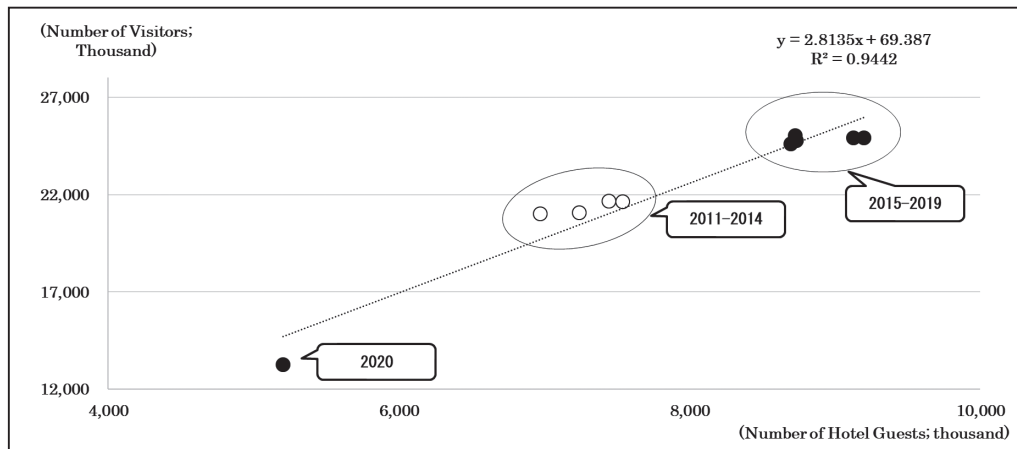
Therefore, first, it is necessary to confirm the number of visitors to Ishikawa Prefecture and their source as basic information. According to Ishikawa Statistical Information, the number of visitors to Ishikawa Prefecture from 2010 to 2014, which includes both day trippers and overnight or more trippers including foreigners, was on average 21,366,000, and the number of hotel guests in Ishikawa Prefecture was on average 6,999,000 at the same time. However, as an outcome of the Hokuriku Shinkansen, the number of visitors to Ishikawa Prefecture from 2015 to 2019 was on average 24,835,000, implying an increase of, on average, over 3 million people a year than the average between 2010 and 2014 (Figure 1), and the number of hotel guests in Ishikawa Prefecture was on average 8,149,000, implying that there was an increase of over 1 million people a year between the same years. From the viewpoint of the number of visitors from the three metropolitan areas⁽⁴⁾ in Japan, the number of visitors from Kanto

Area has increased more than other two areas. This could be called a typical Hokuriku Shinkansen effect (Table 2).

Generally, a convenient transportation system tends to expand the day trip zone, which might decrease the number of hotel-stay guests because of the time-saving effect. This trend sometimes negatively affects the economy of the regions because the total consumption of hotel-stay guests per person is usually more than that of day trippers. The opening of Hokuriku Shinkansen might also have a similar trend. For Ishikawa Prefecture, however, it did not seem to occur at least until 2019. Indeed, the number of hotel guests in Ishikawa Prefecture had increased until 2019 since the opening of Hokuriku Shinkansen; however, in detail, this might have been offset by the increase in the number of foreigners and decrease in the number of hotel guests for business purposes who might prefer a day trip to a hotel-stay trip due to cost-saving. Indeed, the number of foreigners had increased every year during those times.

Generally, there have been immense positive changes, such as economic effects, by the opening of Hokuriku Shinkansen for years. Indeed, many experts have stated that these effects in the first year were more than expected and probably considerably more since the second year too. The number of visitors to Ishikawa Prefecture has still increased at least until 2019, compared with 2014; therefore, Ishikawa Prefecture has had a significant impact.

Figure 1. Number of Visitors and Hotel Guests in Ishikawa Prefecture



Note: The numbers are from 2011 to 2020, and white circles are the numbers from 2011 to 2014 and black ones are from 2015 to 2020.

Source: Ishikawa Statistical Information (2012–2021), Japan Tourism Agency (2011–2021)

Table 2. Number of Visitors to Ishikawa Prefecture from Each Area in Japan

	Average from 2010 to 2014	Average from 2015 to 2019	Average Increase Rate	Average from 2020 to 2021
Total	21,366	24,835	16.2%	12,780
from Ishikawa	9,373	9,546	1.8%	5,738
from Toyama and Fukui	2,693	2,937	9.0%	1,483
from Kanto	2,386	4,252	78.2%	2,066
from Chukyo	2,052	1,990	-3.0%	1,047
from Kansai	2,559	2,729	6.6%	1,371
from Other Areas	2,302	3,380	46.8%	1,075

(Thousand) (Thousand)

Source: Ishikawa Statistical Information (2012–2021)

(However, the average number of visitors to Ishikawa Prefecture in 2020 and 2021 was nearly half the numbers from 2015 to 2019 and was said to be a severe problem.)

3. Economic Effects of the Launch of Hokuriku Shinkansen

This study analyzes tourists' consumption in Ishikawa Prefecture and some economic effects of the opening of Hokuriku Shinkansen, which should not be a "one-time effect" but a "continual effect." Therefore, a longitudinal analysis would be imperative, also considering the expansion of Hokuriku Shinkansen to Tsuruga, as mentioned earlier.

As a fundamental analysis, some statistics of Ishikawa Prefecture is used to obtain the basic information about the volume of tourists' consumption. To estimate the economic effects, 2015 Ishikawa I–O Table is mainly used, and the data of Japan Tourism Agency (2014–2021) are used for the industrial allocation of Ishikawa information about tourists' consumption. The study spans from 2014 to 2019 because Hokuriku Shinkansen did not exist in Ishikawa Prefecture in 2014 and there were no COVID-19 effects until 2019.

Basically, this study examines two main issues. First, the economic effects of tourists' consumption in each year were estimated in Ishikawa Prefecture through the I–O analysis. Second, the effects of the Hokuriku Shinkansen are analyzed in detail. Regarding the basis of these estimations, there is a need to define what economic effect could be derived from the opening of Hokuriku Shinkansen. To identify the effect, the first step for the estimation is how much the total consumption had been is speculated if there had not been the opening of Hokuriku Shinkansen, basically by the function of an approximation approach by using the total tourists' consumptions from 2001 to 2014. There is official information of real consumption before and after the opening of Hokuriku Shinkansen published by Ishikawa Prefecture, and it could be said that the differences between the real consumption and estimated consumption each year (from 2015) would approximately reflect the economic effect of the opening of Hokuriku Shinkansen because there were almost no huge impacts in Hokuriku Area except for the opening of Hokuriku Shinkansen between 2014 and 2019. Therefore, it could be inferred that the volume of the difference between 2014 and 2019 would be mainly the Hokuriku Shinkansen effect⁽⁵⁾ (Figure 2).

For these estimations, how the tourists' consumption was divided into industry-categories of 2015 Ishikawa I–O Table should be considered because both are obtained from different information sources and therefore they are not totally matched with each other. Indeed, there are six categories of tourists' consumption (Table 3), but there are 107 categories of 2015 Ishikawa I–O Table; therefore, some allocations are necessary. For example, it would not be the yeas and nays that "hotel fees" and "food and beverages" of the tourists' consumption are allocated to the categories of "Hotels" and "Eating and Drinking Services" in the 2015 Ishikawa I–O Table. However, "souvenirs" of the tourists' consumption must be divided into many industries, because there is no category of "souvenirs" in the 2015 Ishikawa I–O Table. Therefore, using the information and data of Japan Travel Agency, consumption items are allocated to some industries of 2015 Ishikawa I–O Table (Table 4).

The economic effect of tourists' consumption and the effect of the opening of Hokuriku Shinkansen are

defined in Tables 5 and 6 and Figure 3.

First, the total consumption by tourists in 2014 was about JPY 264.2 billion, and the economic ripple effect by that consumption was estimated as about JPY 303.3 billion. The total consumption by tourists in 2015, when there was the Hokuriku Shinkansen effect for the first time, was about JPY 322.3 billion, implying that about JPY 58.1 billion was more consumed than in 2014 (much of the increase in the number is considered as Hokuriku Shinkansen effects) and the economic ripple effect by that in 2015 was about JPY 374.8 billion, implying that about JPY 71.4 billion (the same assumption before) was more consumed than in 2014. From 2015 to 2019, there had been a gradual increase in the volume of total consumption by tourists and the economic ripple effects overall. However, because of the COVID-19 pandemic, the tourists' consumption severely decreased in 2020, which was almost 55% compared with that in 2019, and the economic ripple effect was JPY 205.3 billion, and it was almost 54.6% level of 2019 (Table 5). The year 2020 also hampered tourism owing to the COVID-19 pandemic, which is considered an eternal effect to Ishikawa Prefecture (indeed, all over Japan).

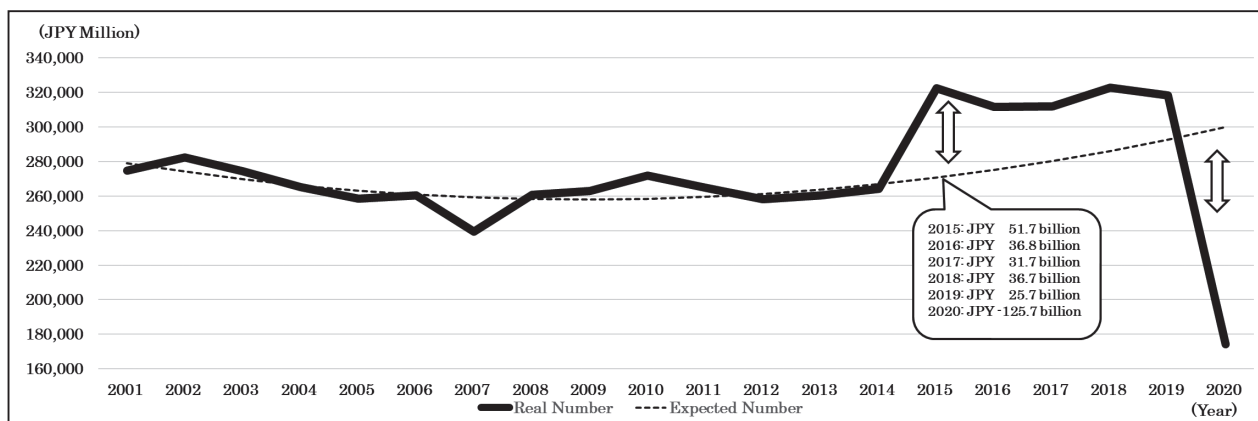
Second, the economic effects of the opening of Hokuriku Shinkansen extracted from total tourists' consumption was calculated according to the assumption explained earlier. The economic ripple effect in 2015 was estimated as about JPY 60.1 billion. From 2016 to 2019, using the same calculation, these effects were estimated to be increased from JPY 30.4 billion to JPY 43.2 billion. These numbers had also played considerably important roles in Ishikawa's economic development in those years. In this study, the differences between the volume of the real consumptions and that of the estimated consumptions were mainly defined as the Hokuriku Shinkansen effects. If so, the effect in 2020 could also be calculated. The negative effect of the COVID-19 pandemic was highly significant even with the Hokuriku Shinkansen effect. According to similar calculations in the past, the result stated that the negative impact was about JPY -148.2 billion (Table 6, Figure 3).

From another perspective, assuming the number of year 2014 is 1 at every category, the increase rates of the estimations from 2014 are calculated, the estimated numbers in increase rates of each economic effect were bigger than the tourists' consumptions. For example, the increase in the rate of tourists' consumption between 2014 and 2019 was about 20.5%, but that of economic ripple effects between 2014 and 2019 was about 23.9%, implying that Ishikawa Prefecture shows that tourism would have a relatively strong effect on Ishikawa's economy and it might be a tourism-oriented economic environment. This result shows that it might be effective for Ishikawa Prefecture to invest in the tourism industry (Table 7).

Next, the induced value-added by that in 2014 was about JPY 169.9 billion, and they were over JPY 200 billion in each year from 2015 to 2019. This induced value-added in each year was calculated using the 2015 Ishikawa I-O analysis; however, these estimations are different from the method used to calculate the GRP of Ishikawa Prefecture because each information is obtained from different information sources. However, except for this difference, assuming the precondition of how tourists' consumption contributes to the GRP of Ishikawa Prefecture (Table 8) and comparing both GRP and the estimated induced value-added, the contributed rate of the number of induced value-added to total GRP was about 3.84% in 2014. The rate of contribution in 2015 was about

4.57%, and especially that of Hokuriku Shinkansen effect accounts for about 0.73% of the total GRP of Ishikawa Prefecture. Since then, the rates had decreased gradually but was still about 4.42% in 2018 and about 0.50% of the Hokuriku Shinkansen effect⁽⁶⁾. This contribution is significant for the Ishikawa economy.

Figure 2. Tourists' Consumption in Ishikawa Prefecture and Consumption-Increase Effects by Opening of Hokuriku Shinkansen



Note: Function of an approximation approach is “ $y = 339.6x^2 - 6,041.5x + 284,812$ ($R^2 = 0.408$).”

Source: Made by Author using Ishikawa Statistical Information (2012–2021)

Table 3. Each Category of Tourists' Consumption in Ishikawa Prefecture

Consumption by Tourists	2014	2015	2016	2017	2018	2019	2020
Total	264,214	322,313	311,463	311,970	322,750	318,367	174,133
(Hotel)	73,653	96,650	94,547	96,280	101,756	99,306	56,937
(Foos & Drink)	71,406	84,527	82,941	84,531	88,960	88,790	50,219
(Souveniour)	65,358	77,326	73,271	72,186	72,580	71,885	35,803
(Transportaion Fee)	38,528	45,519	43,054	41,640	41,850	41,036	21,804
(Admission Fee)	9,528	11,173	10,703	10,382	10,511	10,275	5,479
(Others)	5,741	7,118	6,947	6,951	7,093	7,074	3,891

(JPY thousand)

Source: Ishikawa Statistical Information (2012–2021)

Table 4. Allocation to 2015 Ishikawa I–O Table of Tourists' Consumption

Consumption by Tourists	Allocations for 2015 Ishikawa I–O Table (107 categories)
(Hotel)	Hotels
(Foos & Drink)	Eating & Drinking Services
(Souveniour)	Beverages & Foods, Textile Products, Cosmetics, and so on
(Transportaion Fee)	Railway Transport, Air Transport, and so on
(Admission Fee)	Amusement & Recreational Services
(Others)	Personal Service

Source: Made by Author using Ishikawa Statistical Information (2012–2021), Japan Tourism Agency (2011–2021)

Table 5. Results of I–O Analysis by Tourists' Consumption in Ishikawa Prefecture

Economic Effects by Total Consumption		2014	2015	2016	2017	2018	2019	2020
Official Number	Tourists' Consumption	264,214	322,313	311,463	311,970	322,750	318,367	174,133
Estinmation by 2015 Ishikawa I–O Table	Ripple Effects	303,313	374,760	361,520	363,916	380,272	375,755	205,282
	Induced Value-Added	169,854	210,192	202,471	203,458	210,965	208,396	113,257

(JPY Million)

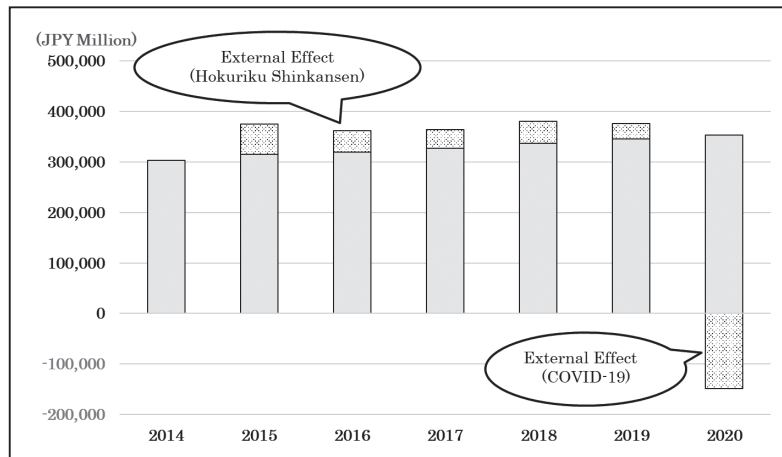
Source: Made by Author using Ishikawa Prefecture (2022)

Table 6. Results of I–O Analysis: Hokuriku Shinkansen and COVID-19

Economic Effects by Launch of Hokuriku Shinkansen		2014	2015	2016	2017	2018	2019	2020
Official Number	Tourists' Consumption	/	51,714	36,377	31,719	36,655	25,748	-125,689
Estimation by 2015 Ishikawa I–O Table	Ripple Effects		60,129	42,225	37,001	43,188	30,386	-148,172
	Induced Value-Added		33,725	23,649	20,687	23,960	16,852	-81,749

(JPY Million)

Source: Made by Author using Ishikawa Prefecture (2022)

Figure 3. Economic Ripple Effects: Hokuriku Shinkansen and COVID-19

Source: Made by Author using Ishikawa Prefecture (2022)

Table 7. Increase Rate (Number in Year 2014 = 1)

	2014	2015	2016	2017	2018	2019	2020
Tourists' Consumption	1.000	1.220	1.179	1.181	1.222	1.205	0.659
Ripple Effects	1.000	1.236	1.192	1.200	1.254	1.239	0.677
Induced Value-Added	1.000	1.237	1.192	1.198	1.242	1.227	0.667

Source: Made by Author using Ishikawa Prefecture (2022)

Table 8. GRP of Ishikawa Prefecture

2014	2015	2016	2017	2018
4,421,260	4,598,413	4,602,340	4,663,393	4,768,715

(nominal; JPY million)

Source: Ishikawa Statistical Information (2022)

Considering that there has been continuing economic effects of tourists' consumption and the opening of Hokuriku Shinkansen, it could be inferred that those effects have contributed to Ishikawa's economy. Although the negative effects by "COVID-19" has been severe since the early spring of 2020, it is important to continue the Hokuriku Shinkansen effect even during the post-COVID-19 pandemic period.

4. Conclusion

In this study, some economic effects of the consumption behavior of visitors to Ishikawa Prefecture were analyzed. Additionally, the economic effects of the opening of Hokuriku Shinkansen were also analyzed. From the perspective of tourists' consumption, which is significant for Ishikawa's economy, the Hokuriku Shinkansen effects

are also substantial. However, it has not been analyzed how the future tourism policy of Ishikawa Prefecture should develop, and it is important to analyze more regional effects.

To continue the tourism effects, including the Hokuriku Shinkansen effect, it is clear that development of regional attractiveness is more important and not just a more convenient transportation system. From the perspective of the economic development through regional tourism, how to develop a region economically would be a bigger issue to be solved.

Notes

- (1) According to JR West (2016), comparing the number of passengers between Itoigawa sta. and Joetsu-Myoko sta. of Hokuriku Shinkansen and the number of former passengers who used Joetsu Shinkansen via a super express of Hokuriku Main Line, which was the usual train-use pattern to Tokyo at that time, the number of the Hokuriku Shinkansen passengers was about 295% more than the number of former train line users.
- (2) It takes about 1 hour from Komatsu airport to Haneda airport by a direct flight and takes 2.5 hours from Kanazawa sta. to Tokyo sta. by Hokuriku Shinkansen. Including waiting time of flight schedule, the time needed for both transportations is almost the same. In that sense, it could be said that both are competitive.
- (3) The decrease in number of passengers in 2019 was partly a result of the disaster by severe rain in Nagano Prefecture.
- (4) Kanto Area consists of Tokyo, Kanagawa, Chiba, Saitama, Tochigi, Ibaraki, and Gunma Prefectures; Kansai Area consists of Osaka, Kyoto, Hyogo, Wakayama, Nara and Shiga Prefectures; and Chukyo Area consists of Aichi, Gifu, Shizuoka and Mie Prefectures.
- (5) The trial calculation of the ripple effect by Hokuriku Shinkansen in this study was about JPY 60.1 billion, but according to Hokuriku branch of Development Bank of Japan, the ripple effect by Hokuriku Shinkansen was JPY 67.8 billion. The difference would be caused by the method of the calculation, precondition of the calculation, and so on.
- (6) GRP of Ishikawa Prefecture in 2019 has not been officially published, as of June, 2022.

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