Responses to the comments from Referee 1

Thank you very much for your thorough reading of the manuscript and for providing constructive comments. Based on your feedback, we have made revisions to the manuscript. Below are our responses to each of the points you raised.

\*\*(1) Concerns about the quality of the underlying data\*\*:

Figure 2 on page 12 suggests that in the mining industry, labor inputs decreased by nearly 20% in some years and increased by almost 20% in others. Some other industries also show volatile movements, albeit to a lesser extent. In Figure 3, the TFP level of the petroleum sector drops by nearly 100% in one year. Mining and real estate also exhibit high volatility. These extreme short-run movements seem to influence the authors' estimation of long-run trends. Presumably, these reflect features of the underlying data, and the authors are not at fault. However, this does raise concerns about the robustness of their research outcomes. The authors may wish to comment on these features of the underlying data and how they might (or might not) affect their conclusions.

Thank you for your insightful comments regarding the data. To examine the robustness of our results with respect to the influence of short-term noisy fluctuations, we run an additional exercise to ensure that these noises in data do not affect our main results. Specifically, we conducted an exercise by adjusting the parameters used in trend extraction. In the baseline analysis, we extracted trends with cycles of 15.5 years or longer (q=8) and used them for analysis. In this additional exercise, we extracted trends with cycles of 20.7 years or longer (q=6) and analyzed them. We confirmed that the main conclusions are maintained: the common factor is the major driver of the trend growth rate of GDP (R^2=0.75). These findings are mentioned in Footnote 16. Although not included in this footnote, we also confirmed that our main conclusion is robust when using a shorter trend (e.g., a 12.4-year period with a frequency parameter of q=10).

In the previous version of the manuscript, we did not sufficiently explain that one of the purposes of extracting trends is to minimize the influence of such noisy indicators. To address this, we added the following explanation to the description of Table 2:

*Specifically, the standard errors shown in the middle of Table 2 are considerable for many industries. Since our primary focus is on long-run economic growth, we aim to eliminate high-frequency fluctuations. Therefore, we extract underlying trends from these noisy indicators.*

\*\*(2) Detailed explanation of the dataset\*\*:

The authors might want to explain the nature of the dataset used in the paper in more detail. For example, for labor input, does it account for changes in both the number of workers and the average hours worked per worker? Does it adjust for labor quality? If so, how?

The JIP dataset used in this paper provides labor input on a quality-adjusted man-hour basis. As you pointed out, various definitions of labor input are possible, so we have added a detailed explanation of how labor data is defined in the manuscript. Specifically, we added a new second paragraph in Section 3.1, explaining the construction of the JIP dataset. Additionally, we created Appendix A to provide further details.

*It is worth mentioning the definition of labor data in the JIP dataset. It represents quality-adjusted total labor hours, which reflects changes in both the number of workers and the hours worked per worker. Specifically, labor input is classified by gender, age, education, and employment status, and the growth rate of labor input is calculated as a weighted average of the annual hours worked for each category. The weights are based on labor cost shares, thus accounting for labor quality.*

\*\*(3) Uncertainty regarding policy implications\*\*:

I am still unclear about the major policy implications of the authors’ findings. For example, if common factors are found to be dominant and industry-specific factors turn out to be insignificant, how would that affect economists' recommendations to policymakers? What if the opposite were true? I apologize if this is an elementary question, but I feel I need to understand it to better evaluate the paper.

This research is primarily fact-finding and aims to clarify the economic environment surrounding Japan’s policy authorities. The analytical framework used here is not necessarily designed for normative discussions on which policies to adopt. Therefore, we have deliberately maintained a cautious stance regarding policy implications.

That said, there are several fact-based findings that may contribute to policy discussions:

First, growth patterns can differ across countries. While the rise and fall of industries are important in the U.S., this is not the case in Japan. Although understanding the reasons for these differences is beyond the scope of this study, the findings imply that there is no one-size-fits-all growth strategy for all countries.

Second, there has been a stagnation of investment-specific technological progress (ISTP) in both the U.S. and Japan during the 2010s. This might be related to the hypothesis proposed by Nick Bloom and Takahashi and Takayama [2023] that it is becoming more difficult to discover new ideas. We briefly mentioned this in Section 4.4. As a policy response to stimulate growth, increasing investment in universities or policies that support the discovery of new ideas could be considered.

Third, despite the stagnation in ISTP, Japan's supply capacity has not significantly deteriorated. In contrast, the U.S. has experienced a notable decline in supply capacity, which may explain the sharp rise in inflation as demand increased. Although ISTP has also slowed in Japan, the common factor has provided some support, mitigating a significant decline in supply capacity. Thus, supply constraints are not as tight in Japan, and the likelihood of experiencing inflation close to 10%, as in the U.S., is lower. Understanding these differences in supply constraints can provide important insights for monetary policy.

\*\*(4) Simplified dynamic model specifications\*\*:

The dynamic model specification is fairly simplistic, except for the rich structure of the input-output relationships across sectors. The production technology is Cobb-Douglas, and so is the utility from consuming various goods. The overall periodic utility function is logarithmic. The authors don’t necessarily need to generalize the model, but I would like to hear their thoughts on the consequences of these simplifying assumptions and whether the conclusions might change under different specifications. For example, the Cobb-Douglas assumption implies constant cost shares for inputs and constant expenditure shares for consumer goods. Would relaxing these assumptions change the results?

We conducted a robustness check, presented as the second exercise in Section 4.5 (Figure 15), to test the results under variable weights. As you suggested, if the production function or aggregators were not homothetic like Cobb-Douglas, factor and expenditure shares would not remain constant. However, since the results did not change when allowing for variable shares, we judge that the impact of assuming these functional forms is minimal.

In Section 4.5, we significantly expanded the second and third paragraphs to explain the results of the robustness check and relate them to the assumptions about functional forms.

\*\*(5) Clarification of the investment network in Figure 8\*\*:

Figure 8 on page 25 is intriguing (I wasn’t aware that the service industry is a major supplier of investment goods), but what exactly is meant by "investment network"? I thought the paper referred to two types of networks—an investment network and a production network. Am I misunderstanding something? If I’m correct, could the authors provide a similar representation for the production network?

In Figure 8, we only depict the investment network. We did not show a network diagram for the production network because its core-periphery structure is less clear and thus less informative (see the figure below for reference).

Network structure of the production network:

ダイアグラム

自動的に生成された説明

However, your comment makes us realize that an explanation is necessary. To clarify, we have added Footnote 22 to explain why we only show the investment network.

In addition, we did not clearly define the two types of networks in the earlier version of the manuscript. To improve readability, we added a sentence to define these terms explicitly under Equation (7) in Section 4.2:

*In this study, we refer to the network structure represented by the input-output matrix of intermediates as the 'production network,' and the network structure represented by the capital flow matrix as the 'investment network.'*

\*\*(6) Conflicting interpretations of the service industry’s role\*\*:

On page 24, the authors describe the service industry as having a low multiplier because it is located at the periphery of the production network. However, Figure 8 seems to suggest that this industry functions as a "hub" (as the authors themselves imply). Could the authors clarify this apparent contradiction?

This was our mistake, and I sincerely apologize for the confusion. We have rewritten the description in Section 4.3.2, clarifying that the service industry acts as a hub in the investment network as well.

In addition to the points explained here, we have also corrected typos that were discovered.

Once again, I sincerely appreciate the referee’s careful reading and constructive feedback. We have revised the manuscript based on almost all of the points raised, and we believe that these revisions have significantly improved the quality of the paper.