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Carbon Pricing: Concerning the Strategic Utilization of Revenue – A Discussion

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1. Introduction

Japan is moving ahead with adopting growth-oriented carbon pricing, with the aim of achieving its 2050 carbon neutral objective. Utilizing the financial resources generated from carbon pricing for developing decarbonization technologies will no doubt have some effect in reducing greenhouse gas emissions and accelerating the uptake of clean energy technologies. However, the climate change problem is an extremely long-running and highly uncertain challenge, and given that the course of the world's climate policies has been growing uncertain, particularly in recent years, I believe that in order for Japan to realize a sustainable, decarbonized society, a strategy for strengthening the economic and social base that "appears circuitous but is in fact a shortcut" will be needed.

In "Carbon Pricing – The limits of the price elasticity coefficient and the policy considerations based on that – " (September 2024), a previous discussion in this series by the author, I indicated that as a result of energy's low price elasticity, the direct price effects of carbon pricing will be limited. Accordingly, in order to maximize the cost-effectiveness of carbon pricing, it will be necessary to focus on how those financial resources are applied. With that in mind, in this paper, I would like to consider resource allocation that is conducive to economic growth and decarbonization.

2. Changes in international climate change measures

From fiscal 2023, Japan began issuing GX economic transition bonds with the goal of investing 20 trillion yen in decarbonization measures over the coming 10-year period, as one part of its growth-oriented carbon pricing scheme. However, as Ogawa (2024)[ii] points out, the future of the world's climate policies is in an extremely uncertain state. The energy crisis sparked by Russia's invasion of Ukraine (spring 2022) has drawn out, and furthermore, far right political parties gained significant ground in the European Parliament election (June 2024). Around that time, far right administrations came into being even within Europe, in Italy, the Netherlands, France and Austria, for example. In addition, in the US in January 2025, President Trump signed, on his first day in office, an executive order to once again withdraw from the Paris Agreement. Trends such as these signify that the momentum of international climate change policies is weakening, and the risk is mounting that excess, focused investment in decarbonization policies is not completely guaranteed to generate economic returns. In circumstances such as this, where uncertainty is on the rise, it will be crucial for Japan to adopt "no regrets" measures that ensure it does not incur losses even if the intensity of global climate change measures eases.

3. The structural challenges facing Japan

In addition to energy security and climate change issues, Japan is facing a variety of challenges that include a gravely declining birth rate and ageing population, regional disparity, a cumulative fiscal deficit, and a mounting social security burden. A variety of socioeconomic challenges exist, but the declining birthrate is particularly serious. According to preliminary figures (2025)[iii] from the Ministry of Health, Labour and Welfare, there were 720,000 babies born in 2024, down 5% on the previous year and the smallest figure recorded in the 125-year period since records began being kept. Furthermore, according to the National Institute of Population and Social Security Research (2023),[iv] the number of births is predicted to fall below 700,000 in 2038 (2.09 million babies were born in Japan's second baby boom of 1973), and the total population of Japanese nationals is predicted to fall below 100

million people in 2048. A decline in population such as this will heighten the risk of medium- to long-term economic stagnation through a shrinking labor supply and declining productivity. Above all, the development of new technologies and cultivation of new industries will be essential for supporting a decarbonized society, and securing and training the human resources equipped with the advanced knowledge and skills to take charge of that will be more important than ever before.

4. The importance of investing in human resources

In order to sustain economic growth, to begin with it is essential to maintain the amount of human resources. According to the neoclassical growth model (Solow-Swan growth model)[v] in economics, the economic growth rate is determined by labor input, capital input and technological innovation, and because population growth contributes to increases in production output through increases in the labor force, it is considered to be one element of economic growth. In particular, decreases in labor input will be directly linked to declines in the growth rate, unless supplemented by other elements. In endogenous growth theory (Romer),[vi] population growth promotes an expansion in market scale and the accumulation of knowledge, and is considered to contribute to economic growth through technological innovation and enhanced productivity. In this way, securing the "amount" of human resources is a fundamental premise to the sustainable growth of the economy.

Furthermore, the "quality" of human capital is also extremely important. Human capital theory (Becker)[vii] suggests that lifting the knowledge and skills of individuals through education and training is directly linked to improved productivity of workers and so promotes the growth of the economy as a whole. Even in Japan's case studies, Fukao et al. (2020)[viii] report that the accumulation of human capital through education contributes to long-term economic growth. Maeda (2019)[ix] points out that enhancing the skills of workers through education and training contributes to improvements in Total Factor Productivity (TFP) by industry and for the macro economy. In this way, these theories and this prior research imply that lifting both the "amount" and "quality" of human capital will potentially lead in the long term to the training of human resources to take charge of decarbonization innovation, and to sustainable economic growth.

As a reverse example, there are more than a few cases of resource-rich countries that have failed to focus sufficiently on training human resources and diversify their industries as a result of being overly reliant on their resource revenue, thus falling into a "resource curse".[x] For example, in Venezuela and Nigeria, a reliance on oil resources has invited economic stagnation, and the countries are failing at sustainable economic growth.[xi]

In contrast to this, as a country not blessed with energy and mineral resources, Japan has a history of constructing the world's second-largest economy by training and utilizing its human resources to the utmost. In Japan, investment in measures to counter the declining birthrate, education,[xii] human capital and reskilling[xiii] remains at a low level when compared to other developed nations, and there is a need to refortify the country's human resources through bold investment.

Advances with diverse new technologies and industries, including improvements in energy efficiency, the spread of renewable energies and the cultivation of low carbon industries, will be vital to realizing a decarbonized society. The author believes that human resources possessing sophisticated knowledge and skills will support those technologies and industries, or in other words, that human resources themselves will be the largest source of decarbonization technological innovation in the long term.

5. Considering strategic investment allocation

A Cabinet Office public opinion survey (2024)[xiv] found that a large number of citizens recognize measures to deal with Japan's ageing population and declining birthrate as one of the country's most important challenges. Furthermore, a national survey (2023)[xv] by the National Institute of Population and Social Security Research points out that of the reasons that married couples cite for not having the ideal number of children, the biggest reason is that the burden of education costs is too large.[xvi]

Consequently, it could be said that investing revenue from carbon pricing not only in the development of decarbonization technologies directly but also in measures to counter the declining birthrate, education reform, and reskilling support would make it easier to gain the consent of citizens. If an expansion in the future working age population and improvements in productivity can be promoted, it will lead to an expansion in the domestic market, increased tax revenue and a strengthening of the fiscal base, and may potentially lead to a virtuous cycle in which the fruits of that growth are again reinvested in energy security and the development of decarbonization technologies. For the very reason that responding to global warming is a long-term challenge that will take centuries, an investment strategy that adopts a long-term perspective of "more haste, less speed" will be important.

That is to say, the author believes that carbon pricing revenue should be invested strategically according to a cycle of: "strengthening the economic base → promoting decarbonization technological innovation → realizing a decarbonized economy → …"

Carbon pricing is not simply assigning a price to carbon; it has the power to change the socioeconomic approach itself. Furthermore, how that revenue can be strategically utilized will have a major impact on the course of realizing a decarbonized and sustainable society. In light of that, in this paper, I have proposed that there be a focused allocation of resources into measures to counter the declining birthrate and train human resources as one means of strengthening the economic base, in addition to the current investment in developing decarbonization technologies. This is based on the belief that restrengthening the human capital that forms the base for economic growth, as outlined in this paper, will be essential to a sustained and flexible engagement with the long-term challenge that is decarbonization. Strengthening the economic base is a challenge that Japan should address, irrespective of progress with measures to counter climate change, and in that respect, it is a no regrets measure. To begin with, it will be important to consistently strengthen the foundation of the current economy and society, and the author believes that this is the very thing that will generate the greatest and surest returns, and provide the path to a sustainable decarbonized society.

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[i] This paper represents the personal views of the author, and does not necessarily represent the views of her place of work.

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[xiv] Cabinet Office (2024) "Public Opinion Survey on the Life of the People (August 2024 survey)"
https://survey.gov-online.go.jp/202412/r06/r06-life/gairyaku.pdf

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https://www.ipss.go.jp/ps-doukou/j/doukou16/JNFS16_ReportALL.pdf

[xvi] Among couples where the wife is aged below 35, close to 80% said the reason they do not have their ideal number of children is "because childrearing and education costs are too high", an overwhelmingly higher percentage than the other reasons cited, such as "it would hinder work" (20%) or "unable to bear the psychological and physical burden" (20%).