Economic Analysis of Emerging Markets in Asia

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PREFACE

We have seen emerging markets pushing the world economy in Asian developing countries, particularly since around 2000. Economic growth in this area continued throughout the Coronavirus pandemic and after, except for China, and this growth is dependent upon emerging industries. This book addresses topics concerning such industries and their unique characteristics.

Chapter 1 considers the One Commune One Product (OCOP) project in Vietnam, whose main economic sector is agriculture. In Vietnam, high value products and new farming methods are necessary for farmers to increase their incomes. It is also necessary to protect farms from the rising sea level in the Mekong Delta caused by global climate change. The author studies the experience of the One Village One Product (OVOP) project in Japan, the first such project implemented in Asia, which has influenced the agricultural sectors of a number of developing countries. This paper shows OCOP in Hau Giang Province as a case study from which we can understand how to expand OCOP in Vietnam. Chapter 2 considers problems of income inequality and industrialization in Vietnam, compared to other ASEAN countries. The statistical analysis shows possibilities for sustainable economic development for Vietnam within the global economy. Chapter 3 considers externalities of piracy. In developing countries, piracy is widespread, often hindering the proper development of businesses. Asia is a center of piracy, but the effects on original creators are complicated when piracy has positive externalities affecting creators' own and other companies. The author selects three global industries in which to analyze and classify externalities of piracy, suggesting

methods to remedy market distortion stemming from the externalities. Chapter 4 considers the game industry, which has been rapidly growing around the world. Game companies producing console games supply software for online games and deploy strategic pricing to compete with online game producers. The pricing is a key factor for survival in the market, especially for Japanese game makers. Chapter 5 considers a new economic sector for the Lao economy, which is heavily dependent upon exports of copper and hydroelectricity. However, most employees belong to the agricultural sector, wherein productivity is very low. To enhance productivity, the author explains the success of a financial scheme regarding cash transfers. Considering what is effective to reduce poverty and increase income or the productivity of farmers, a new technology in the financial sector to support the daily lives of ordinary people is examined. Chapter 6 surveys the current economic situation in Laos, describing the background for the discussions in Chapter 5.

Contributors in this book presented papers at the workshop "Economic Analysis on Emerging Markets in Asia", held at Waseda University in October 2024. Comments and discussions there were very helpful to improve our manuscripts. The topics selected for this book could not comprehensively cover the problems of emerging markets, but focusing on problems in Asian emerging and developing countries should be beneficial not only for researchers but also for businesspersons, lawmakers, and policymakers.

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CLIMATE CHANGE AND DEVELOPMENT OF ONE COMMUNE ONE PRODUCT IN HAU GIANG PROVINCE

Tran Dinh Lam*

I. INTRODUCTION

Climate change is a global environmental phenomenon characterized by the rise in greenhouse gas concentrations in the atmosphere, including carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). This increase leads to unpredictable variations in temperature, precipitation patterns, and seasonal timing. These changes have far-reaching impacts, not only disrupting ecosystems but also significantly affecting economic activities, particularly agricultural production.

Climate change causes significant impacts on the planet, including a rise in global temperatures, which accelerates the melting of polar ice and glaciers, leading to rising sea levels. Additionally, rainfall patterns have become increasingly erratic, with some regions experiencing sharp decreases or increases in precipitation, resulting in droughts or floods. Weather patterns are also being disrupted, with phenomena like El Niño and La Niña occurring more frequently, causing widespread effects on global temperatures and precipitation.

Climate change significantly impacts agriculture, both directly and indirectly, through various mechanisms. Rising temperatures can extend growing seasons in some regions but may also cause heat stress to crops and livestock, reducing productivity. Higher temperatures also accelerate the proliferation of pests and diseases, posing a greater threat to agricultural yields (Aydinalp & Cresser, 2008). Changes in rainfall

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patterns exacerbate these challenges, with reduced rainfall and prolonged dry seasons causing severe droughts that deplete irrigation water sources and affect crops such as rice, corn, and fruit trees. Conversely, sudden heavy rains can lead to flooding, soil erosion, and crop destruction, while also reducing soil fertility. Rising sea levels result in saltwater intrusion into coastal farmland, significantly diminishing the productivity of salt-sensitive crops like rice and fruits, with particularly severe consequences in low-lying areas such as the Mekong Delta in Vietnam. Additionally, extreme weather events, including hurricanes, tornadoes, and prolonged heat waves, further damage crops, complicating cultivation and harvesting efforts for farmers.

The socio-economic consequences of climate change include crop failures and reduced agricultural productivity, which directly impact farmers' incomes and threaten national food security. Harsher farming conditions often force many farmers to migrate to urban areas or other regions in search of alternative employment. As agricultural yields decline, the resulting scarcity drives up the prices of agricultural products, adversely affecting consumers and exerting pressure on the broader economy.

Adopting smart farming practices tailored to climate change is a crucial solution to mitigate its impacts and adapt effectively. This shift includes utilizing drought- and salinity-tolerant crop and livestock varieties, alongside water-saving irrigation techniques such as drip and sprinkler irrigation. Key strategies include adjusting crop structures to suit changing climatic conditions and managing soil and water resources efficiently through crop rotation, intercropping, and the application of organic fertilizers (Tín et al., 2018). Additionally, minimizing greenhouse gas emissions by reducing the use of chemical fertilizers and pesticides and increasing reliance on renewable energy sources like solar and wind in agricultural production can further enhance resilience and sustainability.

Climate change poses a significant challenge to global agricultural production. Addressing its negative impacts requires coordinated efforts among government agencies, international organizations, and farming communities to implement effective adaptation strategies and promote sustainable development (Hồng et al., 2019). Such collaboration is essential to ensure the resilience and growth of agriculture in the face of a rapidly changing climate.

II. SEVERE IMPACTS OF CLIMATE CHANGE ON PRODUCTION AND MEKONG DELTA LIVELIHOODS

According to the World Bank, Vietnam is highly vulnerable to the impacts of climate change and rising sea levels. Recently, the country has experienced increasingly complex landslides, heavy rains, and storm activity. The Mekong Delta, in particular, has been severely affected by recurring droughts and saltwater intrusion. During the dry seasons of 2015 and 2019, the damage across 13 provinces and cities in the region amounted to VND 7,900 billion (around USD 317 million). These events led to the destruction of hundreds of thousands of hectares of rice fields and left countless of Natural Resources and Environment (2020); Vietnam is one of the five countries most severely affected by climate change (Sơn et al., 2024). If sea levels rise by one meter by 2100, nearly 38.9% of the Mekong Delta region will be submerged. The United Nations predicts that by 2050, up to 1 million people in the Mekong Delta may be displaced due to recurring floods and droughts. The coastal areas of this region are particularly vulnerable, given their high population density and reliance on agriculture and fisheries, both of which are heavily dependent on weather and water resources. The IPCC (2007) analysis of the impacts of rising sea levels identifies the lower Mekong River basin as being especially susceptible to the effects of climate change (Bernstein et al., 2008). These findings highlight the urgent need to develop practical solutions that help communities minimize the risks posed by climate change, such as leveraging local resources, producing high-quality and reputable agricultural products, and promoting the unique strengths of each locality. This approach is essential for ensuring resilience and long-term sustainability.

The Government of Vietnam has implemented numerous policies and strategies aimed at enhancing the adaptive capacity of individuals and localities to climate change, particularly through initiatives like the National Target Program for Climate Change Adaptation (2008), which is designed to strengthen efforts in this area in the future. However, adapting to climate change remains a highly complex and challenging issue. As this is a relatively new field, many localities lack sufficient experience and expertise to effectively address the challenges it presents.

Small-scale production alone cannot sustain a stable and effective model; therefore, it is essential to promote and implement the VietGAP or OCOP models. One advantage is that the Government of Vietnam is

actively supporting the development of these models to further assist farmers. In line with this, the government issued Decision No. 01/QD-BCDTW on August 22, 2018, to implement the One Commune One Product (OCOP) program. This initiative is based on the OVOP (One Village One Product) model from Oita Prefecture, Japan, and aims to enhance local agricultural products and support rural development.

III. LIVELIHOOD TRANSFORMATION FOR LOCAL COMMUNITIES THROUGH OCOP PRODUCTS

3.1. Central OCOP

The OCOP program is an initiative aimed at developing the rural economy by improving human factors and leveraging internal resources to increase product value. It serves as both a solution and a key component in the implementation of the national target program for rural development. The program focuses on developing locally advantageous agricultural, non-agricultural, and service products, with implementation driven by private sector enterprises, collective economic models, and cooperatives.

Under this program, the government plays a pivotal role in establishing and promulgating the legal framework and policies necessary for its implementation. The government is responsible for guiding the planning of production areas for goods and services, as well as managing and overseeing product quality standards. Additionally, the government provides support across various stages, including training, coaching, technical guidance, the application of science and technology, branding, trade promotion, product advertising, and offering credit assistance to producers.

Currently, all 63 provinces and cities in Vietnam have OCOP products, with 67% classified as 3-star products, 31.2% as 4-star products, 0.8% as potential 5-star products, and 42 products achieving the 5-star rating (Linh Anh, 2023). According to the Central Coordination Office for New Rural Area, OCOP products are primarily developed by cooperatives (38.1%), enterprises (24.2%), and production establishments/ business households (34.9%), with the remaining products coming from cooperative groups. With a total of 5,362 participants, the program has successfully highlighted the potential, comparative advantages, and regional cultural characteristics of the products.

The Prime Minister has also approved a project on science development, technology application, and technology transfer to promote a circular economy in agriculture until 2030, as outlined in Decision No. 540/QD-TTg. The goal of promoting and developing a circular economy in agriculture is to enhance added value, protect the environment, create jobs, and foster green, sustainable agricultural development.

3.2. Introduction to the OVOP at Oita Prefecture

The OVOP movement was launched in Oita Prefecture, Japan, in the 1980s under the direct leadership of Governor Morihiko Hiramatsu. The program aims to encourage each locality to develop its own unique products by utilizing local resources and knowledge. Its goals are to enhance the value of local products, thereby fostering sustainable economic development, and to reduce reliance on external resources by focusing on the internal strengths and creativity of the community.

The concept of One Village, One Product (OVOP) originated in Japan and later spread across Southeast Asia (Igusa, 2006). Research into Oita Prefecture's One Village, One Product model emphasizes encouraging local communities to identify opportunities for producing new products and promoting local industries. This approach empowers each locality to address its own challenges, discover its resources, and leverage local intelligence and efforts as a practical model for the Vietnamese economy. With the strong spirit of the Japanese people as inspiration, each locality is encouraged to create branded products for the domestic market, with the potential to expand into international markets. Through the enthusiasm and determination of local leaders, communities are empowered to regain their economic footing with confidence and self-esteem. The successful coordination between local leaders and businesses has boosted local incomes, and Oita's success has served as a model for other regions in Japan and numerous countries worldwide.

The success story of Oita Prefecture has inspired Southeast Asian countries, prompting them to reconsider their development paths. Despite this success, the model has not yet fully addressed issues of rural-to-urban migration, limited job opportunities for rural workers, and the growing disparity between the rich and poor regionally. Policymakers have become increasingly aware of the challenges posed by poverty, environmental degradation, and regional imbalances. In response, the regional governments have shifted its focus toward human development, emphasizing sustainable growth, the nurturing of human resources, and

the importance of internal factors and local organizations in driving this development. Similarly, South Korea's development of the new village model began with a strong foundation of local communities, united by a common philosophy and committed to development. Their success has since spread globally. As a model based on harnessing internal resources and empowering local communities, it remains highly relevant today. With the continued positive evolution of this model, many Asian governments in the 1980s recognized its importance and began developing their own action programs, applying the "One Village, One Product" movement to establish and strengthen local industries in their respective countries (Anh, 2013).

> *"The Oita's OVOP movement propagated as follows by local government.*
>
> *(1) Local government directly called for the grass-roots leaders to take initiative of movement.*
>
> *(2) Local leaders asked the people to find at least commerciable One Product in each town and village.*
>
> *(3) Movement was publicized widely through mass media and galvanized their competitive spirit.*
>
> *(4) Prefectural government took initiative to propagate OVOP products in the global market in the big cities, including exhibition of OVOP products.*
>
> *(5) Prefecture research organizations mobilized technical supports for product development.*
>
> *(6) Training and education were offered to regional and industrial leaders.*
>
> *(7) Effective channels of distribution and marketing of OVOP products were established and promoted.*
>
> *(8) However, the uniqueness of OVOP was that the movement was mainly left under the hand of local people, and the local government only gave technical support, encouragement, and marketing promotion, not much of financial subsidies, because too much dependence on government might weaken the dynamism of the movement.*
>
> *Because of it, the basic principle of OVOP put strong emphasis on the three points.*

(1) Local yet global

-- Creating globally accepted products that reflect pride in the local culture

(2) Self-reliance and Creativity

-- Realization of OVOP through independent actions utilizing potential of the region

(3) Human resource development

-- Fostering of people with a challenging and creative spirit" (Igusa, 2006)

3.3. Case studies from Japan

The Japanese government is currently providing support and incentives for businesses to adopt natural farming models. This approach requires a synchronized effort and, as experts suggest, financial subsidies to ensure its success. Studying Japan's natural farming models offers valuable insights and practical lessons that can inform the development strategies of businesses in Hau Giang, helping them align with sustainable agricultural practices and enhance their competitiveness.

3.3.1. Year-round clean tomatoes by Higo Ayumi no Kai company (Sawamuara, personal communication, May 6, 2024)

The journey of Higo Ayumi no Kai toward organic farming has been long and fraught with challenges. There were moments when success seemed unattainable, but through the concerted efforts of the government and growing recognition from consumers, the company has not only persevered but also established its brand identity. Notably, it is the only enterprise in Japan capable of cultivating organic tomatoes year-round. These tomatoes, distinguished by their exceptional quality and flavor, have gained popularity across the country.

At the heart of natural farming lies the use of organic fertilizers derived from a blend of native organisms and locally sourced plants. The local government actively supports this practice by promoting the natural decomposition of grass as fertilizer, ensuring its availability to residents as needed. To further streamline the process, environmental companies collaborate to supply organic fertilizers to the community. Farmers passionate about small-scale natural farming often collect these fertilizers themselves to nourish their organic gardens. The superior quality of the produce is deeply rooted in the soil and the organic fertilizers essential for

healthy plant growth. The unwavering cooperation of the local government plays a pivotal role in supporting these initiatives.

Achieving a shared understanding and commitment is essential to smoothly implementing the philosophy of sustainable living and production. The overuse of herbicides and chemical fertilizers has rendered soil infertile, compacted, and polluted, adversely affecting human health and diminishing quality of life. With over 40 years of farming experience, a deep connection to rural life, and a passion for natural agriculture, Higo Ayumi no Kai aims to inspire surrounding communities to adopt organic farming practices. However, their mission cannot succeed if neighboring farmers continue conventional practices reliant on chemical inputs. Convincing others to embrace organic methods is vital for meaningful progress.

Initially, the natural farming model gained some traction but faced setbacks as farmers abandoned it due to lower yields and extended harvest times. By 2001, only six families remained committed to growing tangerines and vegetables under this approach. The company utilized locally available resources to continue its organic farming operations. Over a decade of dedicated efforts has significantly improved the quality of agricultural products, aligning them with the company's vision. Today, consumers directly purchase these products, eliminating the need for intermediary sales. This success demonstrates that when farmers earnestly focus on ecological agriculture, consumers respond with unwavering support.

According to the company's philosophy, plants, like humans, require nurturing and nourishment from clean, sustainable sources. The company produces its own organic fertilizers using local materials such as rice bran, red soil, fish meal, shellfish, shrimp, crab, and rapeseed residue. These ingredients are combined with green rice and field soil to create a nutrient-rich mixture with a pleasant aroma.

Additionally, the company develops fermented soaking solutions using seaweed, watercress, bamboo shoots, brown sugar, and Chinese herbal extracts such as cinnamon and licorice. These solutions, diluted for application, enhance plant nutrition and resistance. Remarkably, all biofertilizer containers are safe, fragrant, and even edible.

Higo Ayumi no Kai takes pride in its products, which are sold nationwide and have garnered attention from television stations and

newspapers for their innovative model. The company emphasizes the importance of educating communities about the interconnectedness of nature and human health, encouraging practices that minimize the use of chemical fertilizers and pesticides, which degrade soil fertility and harm the environment.

Restoring soil to its natural, nutrient-rich state is vital to sustaining plant life and ensuring long-term ecological balance. To promote this philosophy globally, the company initiated training programs for Nico Nico Yasai in Dak Lak Province, Vietnam, in February 2023 and again in March 2024. These programs provide valuable hands-on experiences for young people, equipping them with the knowledge and skills to develop similar sustainable models in Vietnam in the future.

3.3.2. Organic Earth Caretaker Farm - For the future of the earth and our children (Tatsuya & Tomy, personal communication, May 8, 2024)

Located in Hiratsuka City, Kanagawa Prefecture, Japan, Organic Earth Caretaker Farm transformed into a sustainable agriculture school in 2017. It serves as a hub for teaching natural and organic farming methods, bridging the gap between theoretical knowledge and practical application. Guided by the motto, "For the future of the earth and our children", the farm aims to systematically and comprehensively revolutionize sustainable agriculture through natural farming practices. It calls on individuals and communities to support organic farming models as a means to combat global warming and climate change.

The farm emphasizes the need to reconsider modern agricultural development, advocating for harmony with nature and humanity. As environmental destruction and rapid industrialization in agriculture intensify, the impact of severe weather patterns grows each year, contributing to an increase in both physical and mental health issues. Organic Earth Caretaker Farm envisions a redefined agricultural paradigm—one that is environmentally friendly and sustainable for future generations.

Spanning 7 hectares, the farm cultivates a diverse range of crops, including potatoes, sweet potatoes, onions, cucumbers, tomatoes, cabbages, Chinese cabbages, radishes, and carrots—all grown without chemical fertilizers or pesticides. Half of the produce is sold through supermarkets, while the remaining 50% is delivered directly to 40 customers three times a week. Customers pre-register for direct delivery, with a 10-vegetable bags priced at approximately USD 20. These bags

are comparable in size to those sold in supermarkets. Additionally, customers can opt to support the farm's school of sustainable agriculture by contributing an extra USD 6, promoting agricultural education for younger generations.

New customers receive their first bag of vegetables, comprising 10 varieties, at half the price. Once the quality is confirmed, they are encouraged to place regular orders. This unique model has attracted local television coverage, highlighting the farm's achievements and its dedication to ecological farming.

A decade of commitment to developing an eco-friendly agricultural model has been key to the farm's success. The passion and dedication of its employees and management have played a pivotal role in advancing its mission. In addition to its farming activities, the company has published a guidebook on cultivating organic fruits and vegetables without the use of chemical fertilizers or pesticides.

Through its efforts, the farm's reputation has grown, and its vision has gained widespread recognition in society. Organic Earth Caretaker Farm stands as a testament to the power of collaboration between producers and consumers to foster a harmonious relationship with nature. Together, we can create a peaceful, sustainable future and protect the earth in a meaningful and practical way.

3.3.3. Ohito Organic Farm (According to field notes from May 11, 2024)

Located in Izunokuni City, Japan, Ohito Organic Farm has garnered significant attention from the government as a pioneering center for both crop cultivation and agricultural education. Beyond its role as a farm, it serves as a training hub where students engage in hands-on fieldwork to gain practical experience and access advanced techniques in natural vegetable cultivation.

The farm features a small supermarket that displays and sells a variety of organic agricultural products. All items are certified by the Ministry of Agriculture (MOA), ensuring their quality and traceable origins. Additionally, the farm is adapting its training programs to address the challenges posed by climate change, furthering its commitment to protecting the environment.

One of the farm's standout features is its integration of green tourism. Visitors can immerse themselves in the natural beauty of the

area while learning about sustainable production practices and ecological conservation. This aligns with Japan's broader initiative to promote environmentally friendly and sustainable green agriculture. By 2050, the government aims to cultivate 1 million hectares of organic farmland, representing 25% of the nation's agricultural area. The Ministry of Agriculture, Forestry, and Fisheries of Japan is actively working toward this goal by establishing organic production zones and creating 100 green cities by 2025, with plans to expand to 200 by 2030 (Ministry of Agriculture, Forestry and Fisheries, 2024).

Ohito Organic Farm is dedicated to fostering an organic, cooperative community that prioritizes public health and environmental sustainability. Its efforts extend to promoting the natural agricultural brand through partnerships with initiatives such as the Nousanbutsu Chokubaijo rest stop near Mishima. Here, the farm's products, along with goods from local farmers, are displayed and sold. Each product proudly features the farmer's name on the packaging, creating a strong connection between producers and consumers.

The rest stop also showcases premium products like locally grown rice, priced at approximately USD 24 for 3 kilograms, and the farm's renowned tomatoes, which have been featured in NHK interviews and advertisements. Farmers' names and photographs are displayed prominently at the entrance, underscoring the community's respect and appreciation for their contributions.

The lessons learned from Ohito Organic Farm offer valuable insights for other nations, including Vietnam, as they strive to adopt sustainable agricultural practices. As Japan prepares for a greener future with its vision of green cities and organic farming, Ohito Organic Farm serves as an exemplary model. Its approach highlights the importance of combining education, environmental stewardship, and community collaboration to ensure a safe and sustainable future for the planet.

By working together, we can advance towards a greener future and contribute to sustainable global development.

3.3.4. The Graduate School of Bioresource and Bioenvironmental Sciences (Ikemoto &Kamoshita, personal communication, May 9, 2024)

Ecological agricultural production companies in Japan actively collaborate with schools and research institutes to preserve and develop genetic varieties critical to agriculture. The Asian Research Center for

Bioresource and Environmental Sciences at the Graduate School of Agriculture and Life Sciences, University of Tokyo, exemplifies this collaboration through its research on "Smart and Sustainable Agriculture". A recent focus of the center is addressing the impact of saline intrusion on rice production in Vietnam, a pressing issue for sustainable agricultural development.

The research highlights several critical challenges, including changing rainfall patterns, the consequences of dam construction, and deforestation. Effective management of natural resources and strategic measures are essential to mitigating climate change risks and conserving biodiversity. These efforts aim to ensure the sustainable use of land and biological resources while optimizing natural resources, conserving water, and leveraging organic fertilizers to enhance soil health.

The university's laboratories and agricultural variety storage facilities are strategically designed to support research efforts. Within its 32,000 hectares of carefully preserved forest land, the campus houses primeval forests used for research and conservation. Adjacent to these forests are experimental rice fields featuring diverse varieties, along with areas dedicated to the cultivation of orchids and lotuses. Organic fertilizers, meticulously prepared by the university, are utilized for both crop and flower cultivation, reflecting a commitment to ecological principles.

According to the center, organic agriculture currently accounts for less than 1% of Japan's agricultural output. However, the government has set an ambitious goal to increase this to 30% by 2050, demonstrating a strong commitment to sustainable farming practices. Achieving this target requires comprehensive subsidy policies to support farmers, enabling them to confidently produce high-quality organic products while preserving a balanced ecological environment and adapting to climate change.

The shift towards ecological and organic agricultural models in Japan is the result of meticulous planning and cooperation between research institutes, businesses, government, and local communities. This collective effort is underpinned by a shared philosophy of enhancing community well-being. The approach focuses on improving quality of life by minimizing health risks associated with toxic chemical accumulation in agricultural practices while preserving soil fertility and preventing degradation.

Such a transformation demands significant collaboration across various sectors. Japan's experience in developing sustainable agriculture offers valuable insights for Vietnam, where a majority of the population is still engaged in traditional farming. Adopting these principles can help mitigate future risks, adapt to climate change, and foster a truly fulfilling and sustainable life for people.

3.4. Training from Japanese experts

Studying the operational models of Japanese enterprises provides invaluable lessons for agricultural production companies aiming to embrace natural adaptation. Through visits and training programs, the enterprises have demonstrated remarkable enthusiasm for knowledge transfer and organizational excellence. This approach has greatly benefited Nico Nico Yasai, an enterprise initially established and managed by Japanese professionals in Dak Lak Province, Vietnam, before expanding operations to Moc Chau Province. The company's products are sold in FamilyMart supermarkets across Ho Chi Minh City and Hanoi, as well as directly to consumers. Despite its efforts, the company's production capacity has not been sufficient to meet the growing market demand, reflecting the strong interest in natural adaptation agricultural products in Vietnam. In addition to its commercial success, Nico Nico Yasai has hosted Japanese students for experiential learning and volunteer activities, fostering cross-cultural exchanges and further strengthening its commitment to sustainable agricultural practices.

3.4.1. Training on Japanese natural agriculture in Dak Lak Province (Shiokawa, personal communication, February 10 & 11, 2023)

On February 10–11, 2023, Nico Nico Yasai Company organized a training program on Japanese natural agriculture in Ea Na Commune, Krong Ana District, Dak Lak Province. This initiative sought to introduce and replicate organic vegetable production methods in Vietnam, catering to the increasing interest in sustainable agriculture. In recent years, organic vegetable farming, which avoids the use of chemical fertilizers, has gained considerable attention from Vietnamese consumers. Many regions, particularly the Central Highlands, have adopted natural agriculture models, with products distributed to major cities like Hanoi and Ho Chi Minh City. The training program, held in collaboration with the Japan Natural Agriculture Association, brought together a range of stakeholders, including Japanese experts, distributors, business partners,

and over 20 farming households from the Central Highlands and Southeast regions.

On the morning of February 10, 2023, Japanese experts shared their insights into the development of natural agriculture in Japan and offered practical guidance on organic production. Mr. Teruhiko Sawamura discussed his 43 years of experience growing natural vegetables in Kumamoto Prefecture, focusing on soil improvement techniques. Representatives from the Japan Organic Agriculture Association introduced principles for vegetable care based on growth cycles and the use of natural fertilizers. Meanwhile, Mr. Shiokawa Minoru, the founder of Nico Nico Yasai, reflected on the challenges faced by organic producers in Vietnam over the past 15 years. He also introduced the Vietnamese edition of a book on natural vegetable cultivation, summarizing lessons learned from Japan and Korea.

Participants engaged in practical sessions on producing organic fertilizer using locally available materials such as herbs, eggshells, animal bones, vinegar, and molasses. Under the guidance of Japanese experts, attendees learned how to process fertilizers enriched with native microorganisms. The experts emphasized that stimulating the growth of beneficial local microorganisms is crucial for pest prevention and healthy plant growth. They also demonstrated how combining microbial fertilizers with other organic fertilizers, such as manure, can enhance production efficiency and improve poor soil quality. This approach aligns with the Japanese philosophy of producing safe and sustainable agricultural products for future generations.

The training program underscored the Japanese commitment to natural agriculture, which prioritizes providing clean and safe agricultural products while protecting human health and the environment. The philosophy includes avoiding chemical fertilizers, herbicides, and pesticides while advocating for sustainable land use. Japanese experts emphasized the importance of protecting ecological land with the same care as safeguarding human health, promoting the idea of cherishing the earth’s resources to ensure long-term well-being.

The training program emphasizes the collaboration between distributors and production companies, supporting the natural agricultural approach and promoting the commitment of Nico Nico Yasai to the community. It envisions the continued replication of organic agricultural

practices within local communities. The valuable experience gained through this initiative helps to connect and advance the humanistic principles of Japanese natural agriculture, aiming to foster sustainable agricultural production for public health in Vietnam. The Japanese expert group remains steadfast in its efforts, guided by the symbol of the turtle, representing the motto "slow but sure". They are dedicated to educating others and encouraging collective action to protect nature and preserve the land from the destructive effects of toxic chemicals. Their mission is to maintain the vibrancy of green spaces, ensuring that trees and plants remain environmentally friendly. By cherishing the country's resources and producing high-quality products that protect human health, this model aspires to create a truly fulfilling and sustainable life for people.

The training also attracted domestic students and international participants, including Japanese students, offering them opportunities to gain practical experience and deepen their understanding of sustainable agricultural practices.

3.4.2. Training at Manh Duong Farm in Krong Ana District, Dak Lak Province (Tenruhiko & Himeno, personal communication, February 2 & March 1, 2023)

On February 29 and March 1, 2024, experts from Japan participated in a research and training event at Manh Duong Farm in Krong Ana District, Dak Lak Province. The training, focused on ecological agricultural production, brought together young people from Binh Phuoc, Dak Lak, and Dak Nong Provinces, and several members from Hanoi with farms in Dak Lak. The experts shared their extensive experience in natural agriculture, emphasizing the importance of avoiding chemical fertilizers, pesticides, and herbicides and respecting nature by sourcing all nutrients directly from the soil.

During the training, the experts introduced homemade fertilizers made from natural ingredients such as asparagus, wild vegetables, rice bran, red soil, fish meal, shellfish, shrimp, crab, green rice, and field mud. These homemade fertilizers, brought from Japan, were applied to small plots at two farms associated with Nico Nico Yasai in Krong Pac, Ea Phe Commune, and Hoa Dong Commune. The experts guided the farm owners to mark the areas where the fertilizers were applied so that they could monitor the differences in plant growth.

To implement an effective production model, businesses must share their culture and philosophy regarding crop care. Fertilizers for plants are viewed similarly to food for humans: they must be both nutritious and clean. Following the guidance of the experts, the farmers created biofertilizers using vegetables, tomatoes, and bananas, which gave off a pleasant aroma. The experts tested the fertilizers by tasting them to evaluate their quality, providing valuable advice to their Vietnamese counterparts.

A key aspect of organic farming is the need to identify natural sources of organic fertilizers in the local environment. As part of their visit, the Japanese experts toured the local 333 sugarcane factory in Ea Knop Town to examine the quality of sugarcane sludge. They explored how this sludge could be combined with native microorganisms to create high-quality fertilizer for vegetables and fruits, a critical advantage in organic farming.

The heart of organic farming, as emphasized by the Japanese experts, is treating crops and livestock with the same care and affection as one's children. It is essential to use native microorganisms from the local area and manage organic fertilizers according to each nutrient cycle. The experts also shared research documents and articles on organic agricultural production, offering valuable resources for Vietnamese businesses to learn from.

The training sessions fostered discussions among ecological farmers about the production of organic fertilizers, the use of native microorganisms, and composting methods to create the highest quality fertilizers. The challenges faced in the production and sales processes were also actively discussed. The Japanese experts provided practical guidance, including a book edited to suit the specific conditions in Vietnam, which was warmly received by the farmers.

The training program also attracted the attention of the Vietnam-Japan Friendship Association in Dak Lak Province, which expressed its appreciation for the collaborative efforts between the Japanese and Vietnamese communities. The association praised the Japan Organic Agriculture Association for its dedication and unwavering enthusiasm in assisting young Vietnamese people in adopting natural farming practices. The model of cooperation established through these efforts is expected to create a prestigious brand that will earn the support of Vietnamese consumers.

In Vietnam today, there is a growing awareness of the importance of human health and environmental protection. As a result, the government is increasingly encouraging the development of agriculture that harmonizes with nature and avoids the use of chemical fertilizers and pesticides. This shift aligns with the broader trend of promoting sustainable agricultural practices for the well-being of both people and the planet.

IV. LESSONS LEARNT FROM OITA OVOP MOVEMENT FOR OCOP HAU GIANG

The One Village One Product (OVOP) movement of Oita Prefecture, Japan, stands as a highly successful model of local development, emphasizing the utilization of each region's unique resources and potentials. This approach has inspired numerous countries, including Vietnam, where it has been adapted as the OCOP (One Commune One Product) program. For Hau Giang Province, applying the lessons learned from Oita's success can play a key role in fostering sustainable local economic development and enhancing the value of local products.

4.1. OCOP at Hau Giang

In Hau Giang, the local government has launched a project with a detailed implementation plan under Decision 1964/QD-UBND and Government Decision 1048/QD-TTg, marking a significant step towards long-term, sustainable development for rural Vietnam. The research into this topic holds practical significance, particularly in adapting and establishing a production-to-distribution chain that connects local producers to consumers to bring reputable products to the local community. Currently, Hau Giang Province has recognized 266 OCOP products with ratings of three or more stars, including 92 four-star products and 174 three-star products, involving 125 participants (18 companies and 36 cooperatives) (Hau Giang Department of Agriculture and Rural Development, 2023).

By December 2022, Hau Giang had achieved recognition for 5 five-star OCOP products. Expanding the reach of OCOP products across society is a critical step for success. To achieve this, it is essential to establish a development philosophy for OCOP that is valued, supported, and promoted by the local community. This initiative will not only drive local economic growth but also motivate domestic enterprises to focus on

quality management, enhance product standards, and pursue opportunities for both domestic and export markets.

Implementing this model will serve as a significant milestone in development and promote internal factors that encourage domestic enterprises to manage their products effectively and explore opportunities for local consumption. Simultaneously, by improving quality, the focus will shift towards targeting export markets, gradually enhancing agricultural products through processing to increase export value and generate higher profits for businesses. This approach will also ensure that workers receive fair wages, allowing them to contribute to building the brands of provincial enterprises. As a result, it will reduce the need for labor migration to industrial parks in other regions.

The successful implementation of these models in Hau Giang can serve as a shining example for the entire country, transforming the development approach towards sustainability. By emphasizing green and clean agriculture rooted in natural methods, the province has an opportunity to elevate the reputation of Vietnamese agricultural products on the global stage, demonstrating the value of sustainable farming practices.

4.2. OCOP development philosophy for farmers, businesses, and local government in Hau Giang Province

Agriculture has played a pivotal role in the development of the nation, serving as a key factor in strengthening the country's internal capacity. During the 1986 renovation period, agriculture was instrumental in rescuing the economy from crisis and alleviating chronic hunger. In 2020, agriculture once again showcased its importance by helping localities leverage their strengths, providing essential agricultural products during the COVID-19 pandemic, and playing a significant role in mitigating the impact of the crisis. This underscores the need for a renewed understanding and approach to development that draws on the internal strength of the country, beginning with agriculture.

There must be a strategy to rebrand Vietnam's agriculture, promoting it as a powerful sector that can drive change, inspire society, and rally support across all sectors. Effective implementation of the OCOP model can positively impact social development, particularly in rural areas where the majority of the population resides.

Currently, in Hau Giang, the average per capita income has reached VND 87.45 million, a 31.89% increase compared to the previous period, ranking second in the Mekong Delta (Hào, 2024). This presents a strong opportunity to meet the growing consumption demand within society. By leveraging this opportunity, there is potential to encourage local enterprises to boost production and fulfill the rising demand from consumers.

The OCOP program in Hau Giang is centered around developing and enhancing local products, with a particular focus on agricultural products, handicrafts, and tourism services. The local government's goal is to improve the quality of these products to meet domestic demand while also aiming for export markets. By strengthening the local economy, the program seeks to create jobs, increase income levels for residents, especially in rural areas, and promote sustainable economic development. Additionally, the initiative aims to highlight and preserve the unique local potential, culture, and traditions, ensuring that they are maintained and celebrated during development.

4.3. Lessons learned for Hau Giang OCOP

4.3.1. Effective utilization of local resources

The success of the OVOP movement in Oita can be attributed to its ability to maximize local resources and potential, and developing high-quality specialty products that meet market demands. For Hau Giang, this lesson emphasizes the importance of focusing on key local agricultural products like Cau Duc pineapple, Hau Giang catfish, and U Minh Ha forest honey. By developing and enhancing these products, the region can increase economic values while simultaneously conserving local resources. Moreover, there should be a greater emphasis on processing agricultural products such as eel, snakehead fish, seedless lemons, and pomelo. For example, Cau Duc pineapple, similar to Oita's Shiitake mushroom, could be further developed into processed products like pineapple jam, juice, wine, candy, dried pineapple, and tubers, thus diversifying product offerings (Sau-Wa Mak, 2024).

4.3.2. Professional branding and marketing

Oita has been successful in establishing a strong brand identity for OVOP products, earning trust among both domestic and international consumers. Hau Giang must adopt a similar strategy by focusing on

building strong, recognizable brands for OCOP products, paying particular attention to quality, packaging, and clear labeling. Additionally, the province should leverage promotional opportunities at fairs, through e-commerce platforms, and by participating in international trade events. Drawing from Oita's success, Hau Giang must develop a strategic approach, determined to grow the local economy in a competitive market, supported by a diligent and hardworking population. Vietnam's robust education system offers a solid foundation for such development. If the province prioritizes intellectual property protection, including trademark registration for OCOP products, it could serve as a model for future development (Domon et al., 2021).

As of October 2024, Hau Giang has seven products competing for the prestigious 5-star OCOP rating, including boneless and spiced snakehead fish, Cordyceps sinensis wine, dried goat yogurt, green-skinned grapefruit, seedless lemons, five-leaf grapefruit, and clean Vi Thuy rice. By ensuring products meet 5-star standards, with clear quality benchmarks, traceability, and trademark registration, Hau Giang can establish a strong market presence and differentiate itself in both local and international markets (Thảo & Hân, 2023).

4.3.3. Capacity building for local communities

One of the key factors behind the success of the OVOP movement in Oita was the emphasis on skills training and community capacity building. Oita provided its people with valuable knowledge in areas such as production techniques, management, and marketing, which significantly contributed to the growth of the local economy and the success of its products.

For Hau Giang, replicating this model would require promoting comprehensive training programs for farmers and small businesses. These programs should focus on improving production management, enhancing marketing skills, and introducing digital transformation tools, including e-commerce strategies. By empowering local producers with these skills, they will gain the confidence and capability to develop quality products and expand their reach to new markets. Furthermore, it is essential to organize training sessions that teach food processing and preservation techniques, as well as the nutritional analysis of products. This would enable farmers and businesses to enhance the quality of their products, extend their shelf life, and ultimately improve the marketability of their goods.

4.3.4. Support policies and public - private partnership

Oita's success with the OVOP movement was largely due to strong government support, which provided financial, technical, and trade promotion assistance for OVOP products. The government also fostered cooperation between enterprises and farmers, ensuring close links within the value chain.

To replicate this model, the Hau Giang provincial government must develop specific support policies to promote the OCOP program. These policies should include offering preferential loans, technical assistance, and research programs through the Department of Science and Technology to foster innovation and development within the OCOP sector. Additionally, trade promotion programs should be established to help OCOP enterprises reach broader markets.

A critical step would be the creation of a provincial OCOP support fund, designed to provide financial resources for projects focused on new product development or expanding production capacity. This would enable businesses to invest in innovation and scale up their operations, contributing to the overall success of the OCOP initiative.

In addition, support for cooperatives and cooperative unions, such as providing 70% interest relief as outlined in Official Dispatch No. 4077/STC-HCSN (December 29, 2023), is an important step forward. However, more attention and encouragement are needed for businesses focused on producing OCOP products.

To promote OCOP products, it is essential to encourage organizations and unions within the province to purchase OCOP products as gifts during conferences and seminars. This initiative would provide significant support and encouragement to businesses engaged in the production of OCOP products.

4.3.5. Integration of tourism with local product development

Oita has successfully integrated local product development with tourism by creating experiential tours that highlight specific products (Schumann, 2016; Matsui, 2012). Hau Giang province can adopt a similar approach by developing eco-tourism experiences that combine local OCOP products, such as visits to Cau Duc pineapple gardens, sampling catfish cuisine, and exploring wild honey production areas. These initiatives would not only promote local products but also attract tourists. Additionally, organizing annual events like the Cau Duc

Pineapple Festival could serve as a platform to promote these products while drawing both domestic and international visitors.

Furthermore, it is essential to explore other tourism models, such as the Ngoc Dao Goat Dairy Farm, which has become a popular agricultural tourism destination in Hau Giang. This farm offers visitors the opportunity to engage with nature, aligning with the growing trend of green tourism. Specializing in dairy goats, the farm effectively combines livestock farming with tourism, utilizing natural grass resources and local jackfruit waste for goat feed, thereby reducing costs and increasing efficiency for farmers.

The Ngoc Dao goat-raising model is a notable example of local entrepreneurship. Through extensive research and adaptation of goat-raising techniques, the farm has produced valuable products, generating high income. Additionally, the model has created employment opportunities for local workers, contributing to increased income levels and supporting poverty reduction efforts in the region (Nhiên, 2023).

V. CONCLUSION

Climate change presents a significant challenge to global agricultural production. To mitigate its adverse effects, it is crucial to foster collaboration among government agencies, international organizations, and farming communities to implement effective adaptation and sustainable development strategies. Only through such coordinated efforts can agriculture be sustained and developed amidst a rapidly changing climate.

In the Mekong Delta, climate change has exacerbated difficulties for farmers, disrupting their lives and livelihoods. The region is increasingly vulnerable to natural disasters and epidemics, and the economic disparity between rural and urban areas continues to widen. One promising solution is to harness nature's potential to produce unique OCOP products that reflect the distinct identity of Hau Giang province. Reducing reliance on traditional rice production, as has been practiced in the past, will allow for greater focus on developing OCOP products. A collective effort, where all stakeholders—government, businesses, and local communities—work together, is essential for creating dedicated products for both domestic and export markets.

The success of Oita Prefecture's OVOP (One Village One Product) movement provides valuable insights for Hau Giang. Oita's approach,

which maximized local resources, established strong branding, and received robust government support, offers a proven model for enhancing the OCOP program in Hau Giang. By applying these lessons, the province can increase the value of its local products and foster sustainable economic growth. Successful implementation of this strategy requires close coordination among the government, businesses, and the community, with the overarching goal of sustainable development and improving the quality of life for local residents.

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WHICH INDUSTRIAL SECTORS HAVE A COMPARATIVE ADVANTAGE IN VIETNAM? THE EV'S POTENTIALITY IN THE ERA OF NEW TECHNOLOGY WITH IP RIGHTS

Tadashi Kikuchi*

I. INTRODUCTION

The pace of globalization in the Vietnamese economy has been accelerating since the beginning of the 21st century. Ever since it joined ASEAN in 1995, Vietnam has been eager to become a regular member of WTO. Toward this political goal, Vietnam began reducing its tariff in 1996 under the condition of Common Effective Preferential Tariff (CEPT) scheme, and in 2006, the tariff on main imports was set to below 5%. In addition, at the conference of the 37th ASEAN Economic Ministerial Meeting (AEMM) in Vientiane, Laos on 28 February 2006, it was declared that ASEAN countries would convert into a union market in 2015. Under the strong government initiative, Vietnam aimed to achieve twice the income of the 1990s in 2010 and simultaneously industrialize its economy by 2020. Today, Vietnam is aiming to achieve a high average income of 7,500 dollars in 2030, and then become a high-income country in 2045[1].

It appears to be a difficult challenge for a developing country, which is a later comer to the market economy, to not only reform the domestic economy through the "Doi moi" reforms but also to adapt itself to the external globalization. However, it should be remembered that sustaining development is necessary for economic growth as truth that Schumpeter mentioned (Schumpeter, 2005). Therefore, sustainable economic development should be studied within the framework of reforming economy under current global integration. The purpose of this paper is to identify a political strategy for ensuring the continued development of the Vietnamese economy in coming future for decades. The next section

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1 Vietnamese per capita income is 4,110 USD in 2022. Also, it was 639 USD in 2005, which is double of 1997 and more than seven times of that as started Doi moi in 1986.

shows that an export-oriented economic policy led by those Vietnamese manufacturing that have comparative advantages will increase output and at the same time reduce the labor-income gap in the past. Using the numerical analysis, section 3 describes the effects of unionization of the markets of the ASEAN countries in 2015. Section 4 mentions several political strategies necessary for the sustainable economic development of the Vietnamese economy under the era of globalization. The final section comprises a brief summary and comments.

II. COMPARATIVE ADVANTAGE OF VIETNAMESE EXPORTS

This section first shows which Vietnamese manufacturing enjoyed comparative advantage in the past. Next, it indicates that promoting the output of manufacturing sectors that have a comparative advantage also decreases the labor-income gap among manufacturers. For this purpose, two data sets—trade data from *ComTrade* (SITC) and industrial data from *International Yearbook of Industrial Statistics* (ISIC) - are combined to build Vietnamese data sets here for the year 2000[2]. Table 1 presents the results of the calculation of the revealed comparative advantage by using Balassa's index, this index was used because it is well known and more accurate than other indexes[3].

When Balassa's index of a certain sector is greater than one, the sector is said to have a comparative advantage in Vietnamese manufacturing. Of the thirty sectors considered in this paper, twenty-six have comparative advantages. However, almost all these are sectors that produce primary agricultural products like rice, frozen sea food, coffee, and products manufactured by low-skilled labor such as traveling bags, men's shirts, and bamboo crafts. It should be noted that the revealed comparative advantage index is calculated from trade data. The volume of trade is a part of the total output, obtained after subtracting the amount of consumption from the total outputs. Therefore, in order to investigate the growth potential of a national economy, it is necessary to use domestic industrial data. Figure 1 is a brief representation of the weight of the Gini inequality on the labor income of the Vietnamese manufacturing sector from two aspects – both production and export.

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2 The code of Classification of Commodities by Industrial Origin (CCIO) is used here.

3 For more detail, see Ballance *et al*. (1987).

Table 1. Revealed comparative advantage of Vietnamese manufacturing for year 2000

	SITC	Item	BAL_{ik}
1	042	Rice	34.75
2	036	Crustaceans and molluscs, fresh, chilled, frozen, salted, etc.	32.87
3	075	Spices	19.45
4	232	Natural rubber latex; rubber and gums	19.21
5	071	Coffee and coffee substitutes	17.09
6	851	Footwear	14.88
7	074	Tea and mate	11.44
8	035	Fish, dried, salted ,or in brine; smoked fish	10.87
9	842	Outerwear for men and boys, textile fabrics not knitted or crocheted	8.46
10	057	Fruit and nuts, fresh, dried	5.29
11	845	Outerwear knitted or crocheted, not elastic nor rubberized	4.72
12	831	Travel goods, handbags ,etc. of leather, plastics, textile, others	4.33
13	034	Fish, fresh, chilled or frozen	4.08
14	333	Crude petroleum and oils obtained from bituminous minerals	3.86
15	663	Mineral manufactures, nes	3.53
16	847	Clothing accessories, of textile fabrics, nes	3.38
17	843	Outerwear for womens, girls, infants, textile, not knitted or crocheted	2.73
18	785	Cycles, scooters, motorized or not; carriages for the invalid	2.65
19	658	Articles made wholly or chiefly of textile materials	2.35
20	635	Wooden goods	2.19
21	098	Edible products and preparations, nes	2.16
22	322	Coal, lignite, or peat	2.09
23	899	Other miscellaneous manufactured articles	2.03
24	821	Furniture and its parts	1.65
25	651	Textile yarn	1.40
26	054	Vegetables, fresh or simply preserved; roots and tubers	1.33
27	334	Petroleum products, refined	0.51
28	5	Chemicals and related products	0.19
29	776	Thermionic, microcircuits, transistors, valves, etc.	0.15
30	764	Telecommunication equipment, nes; parts and accessories	0.13

(Data source: UN, ComTrade (SITC, ver.2))

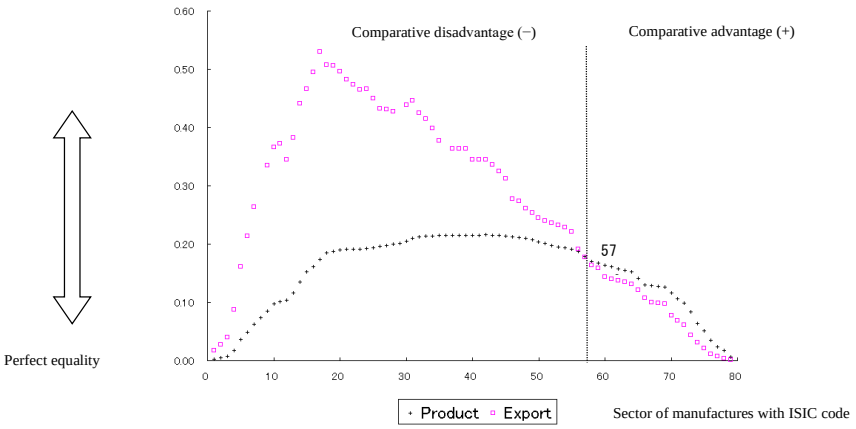

Figure 1. Effects of production and export on the Gini inequality

(Data source: UNIDO, International Yearbook of Industrial Statistics and the United Nations ComTrade for 2000. The data of SITC version 1 and ISIC version 2 has been combined by the author)

The figure reveals an interesting fact: The Vietnamese government could reduce the inequality of labor income by approximately 4.74%—from 0.401 to 0.382—by promoting the comparative advantage sectors, which are from No. 57 to No. 80 in Figure 1. The list of these sectors is presented in Table 2.

It should be also noted that in this section, the methods of analysis use only the labor input; in the next section, the analysis will consider all input materials, including labor.

Table 2. Comparative advantage sectors of Vietnamese manufacturing for the year 2000

No	ISIC	Item
57	3511	MANUFACTURE OF BASIC INDUSTRIAL CHEMICALS EXCEPT FERTILIZERS
58	3121	MANUFACTURE OF FOOD PRODUCTS NOT CLASSIFIED ELSEWHERE
59	3512	MANUFACTURE OF FERTILIZERS AND PESTICIDES
60	3134	SOFT DRINKS AND CARBONATED WATER INDUSTRIES
61	3133	MALT LIQUORS AND MALT
62	3132	WINE INDUSTRIES
63	3131	DISTILLING, RECTIFYING, AND BLENDING SPIRITS
64	3529	MANUFACTURE OF CHEMICAL PRODUCTS NOT CLASSIFIED ELSEWHERE
65	3845	MANUFACTURE OF AIRCRAFT
66	3115	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS
67	3523	MANUFACTURE OF SOAP AND CLEANING PREPARATIONS, PERFUMES, COSMETICS, AND OTHER TOILET PREPARATIONS
68	3522	MANUFACTURE OF DRUGS AND MEDICINES
69	3521	MANUFACTURE OF PAINTS, VARNISHES, AND LACQUERS
70	3844	MANUFACTURE OF MOTORCYCLES AND BICYCLES
71	3832	MANUFACTURE OF RADIO, TELEVISION AND COMMUNICATION EQUIPMENT, AND APPARATUS
72	3843	MANUFACTURE OF MOTOR VEHICLES
73	3849	MANUFACTURE OF TRANSPORT EQUIPMENT NOT CLASSIFIED ELSEWHERE
74	3116	GRAIN MILL PRODUCTS
75	3140	TOBACCO MANUFACTURE
76	3112	MANUFACTURE OF DAIRY PRODUCTS
77	3122	MANUFACTURE OF PREPARED ANIMAL FEEDS
78	3530	PETROLEUM REFINERIES
79	3852	MANUFACTURE OF PHOTOGRAPHIC AND OPTICAL GOODS
80	3825	MANUFACTURE OF OFFICE, COMPUTING, AND ACCOUNTING MACHINERY

(Data source: UNIDO, International Yearbook of Industrial Statistics for 2000)

III. TRADE AND POLITICAL STRATEGY OF THE VIETNAMESE MANUFACTURING SECTOR IN THE ASEAN ECONOMY COMMUNITY IN 2015

Without exception, the manufacturing of all ASEAN countries will be extensively and intensively influenced by the establishment of ASEAN Economic Community (AEC); therefore, it is necessary for Vietnam, who became a member of ASEAN late in 1995, to have prior knowledge of the following: *1)* which countries would be competitors; and *2)* which manufacturing sector would increase or decrease the total output in the new era of Free Trade Areas. Based on the theory of comparative advantage, Graham's (1923) method of numerical analysis provides more information that will answer to the two questions mentioned above. Here, comparative advantage is measured only by the cost of one unit of output; therefore, only at a later stage are labor, capital,

tariff, and transporting costs, etc. considered. It must be mentioned that these days producers like multinational companies can select the market where they want to locate their factories, sell goods and service as well. In this context, the AEC is a common market to all players within and outside ASEAN region; therefore, each country has to determine its own trade policy in order to win the game. In this paper, which chiefly considers the industrialization of the Vietnamese economy, author enumerates which countries would be strong competitors against Vietnamese manufacturing. In order to conduct a simple and clear analysis, author divided the countries, including Vietnam, into groups of three. The number of manufacturing sectors for which each group would compete is shown in Tables 3 and 4.

Table 3. Cost per unit of manufactured goods in ASEAN *(in USD)*

No	ISIC	Description	Rank	Vietnam	Thailand	Malaysia	Singapore	Indonesia	Philippines	Laos	Cambodia
1	1730	Knitted and crocheted fabrics and articles	1	0.61	0.61	0.68	0.79	0.73			
2	1820	Dressing and dyeing of fur; processing of fur	1	0.66	0.91	0.70					
3	3230	TV and radio receivers and associated goods	1	0.65		0.88	0.81	0.69	0.68		
4	3420	Automobile bodies, trailers & semi-trailers	1	0.60	0.72	0.70	0.72	0.63			
5	1520	Dairy products	2	0.73	0.80	0.76			0.50		
6	155	Beverages	2	0.45		0.67	0.71	0.49	0.40		
7	2230	Reproduction of recorded media	2	0.70		0.78	0.57				
8	3110	Electric motors, generators, and transformers	2	0.64	0.73	0.74	0.83	0.44	0.68		
9	3430	Parts/accessories for automobiles	2	0.56		0.66	0.56				
10	191	Tanning, dressing, and processing of leather	3	0.60	0.79	0.64	0.78	0.78	0.52		0.28
11	1920	Footwear	3	0.70	0.67	0.72	0.77	0.67			
12	202	Products of wood, cork, straw, etc.	3	0.73		0.65	0.78	0.57			
13	2320	Refined petroleum products	3	0.75	0.89		0.92	0.53	0.67		
14	2710	Basic iron and steel	3	0.81	0.87	0.86	0.83	0.73	0.68	0.48	
15	273	Casting of metals	3	0.67		0.78		0.62	0.46		
16	3130	Insulated wire and cable	3	0.72		0.74	0.63	0.74	0.60		
17	3150	Lighting equipment and electric lamps	3	0.63		0.58	0.71	0.62			
18	3320	Optical instruments and photographic equipment	3	0.75	0.85	0.85	0.59	0.52			
19	3410	Motor vehicles	3	0.66	0.90	0.75	0.68	0.51	0.71	0.68	0.65
20	1600	Tobacco products	4	0.56	0.20	0.78		0.56	0.51	0.25	0.79
21	1810	Apparel, except fur apparel	4	0.60	0.71	0.67	0.75	0.57	0.48	0.76	0.49

(Data source: *International Yearbook of Industrial Statistics* from UNDP. Vietnam (2000), Thailand (2000), Malaysia (2001), Singapore (2002), Indonesia (2002), the Philippines (1999), Laos (1999), and Cambodia (2000))

In the above table, data pertaining to two countries—Brunei and Myanmar—have been omitted; thus, only eight countries are included here. As the productivity ranking of Vietnamese manufacturing that is indicated in the column "Rank" shows, the cost performance of Vietnamese manufacturing is relatively high, even though the amount of output is not sufficient to enjoy economies of scale. In addition, in seven manufacturing sectors, Vietnamese manufacturing would face strong competition against the Philippines and Indonesia as can be seen in the figure below.

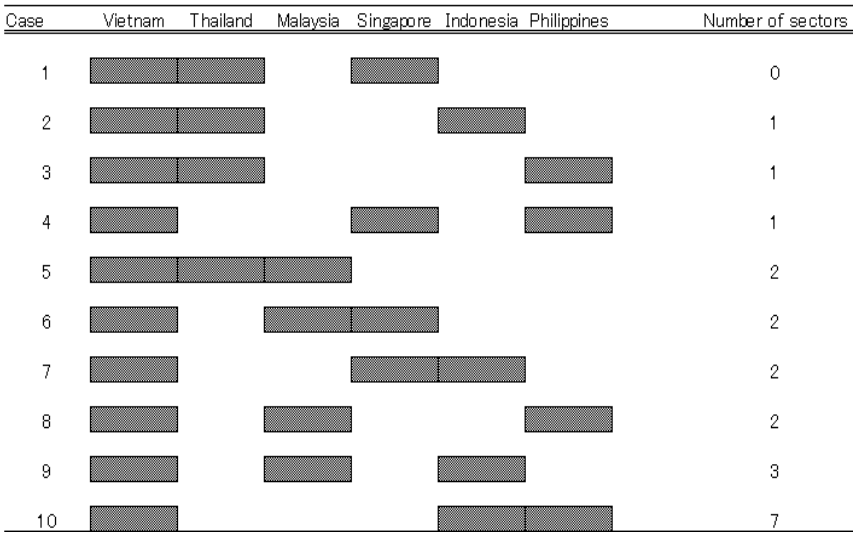

Figure 2. Competitors of Vietnamese manufacturing in AEC (by three-country group)

(Data source: International Yearbook of Industrial Statistics from UNDP. Note that two countries – Laos and Cambodia – have been omitted; thus, only six countries are included here.)

Vietnamese manufacturing has no common competitors in Thailand and Singapore because of its cheap cost per unit of goods. Further, Vietnamese manufacturing has some advantage in cases 2, 3, and 4 in Figure 2. Because in each case, footwear (No. 11: Table 3), tobacco products (No. 20: Table 3), insulated wire and cable (No. 16: Table 3), Vietnam has a relatively high productivity—the third among ASEAN countries. This implies that the Vietnamese government can easily determine the competitor in each sector, for instance, Thailand and Indonesia have a higher productivity in the footwear (No. 11: Table 3) than Vietnam.

The next section shows results of data-simulation of the nonlinear programming methods proposed by Graham (1923) which are shown in the following table. For instance, in case 5 to 10, in Table 4, each shows there existed more than two sectors in which the three countries compete on the market of ASEAN Economic Community established in 2015. Therefore, through this kind of simulations, we could guess and have implication that which manufacturing sectors would increase or decrease the total output on its new market economy, integration of AEC on going today and future.

Table 4. Changes in the share of manufacturing in AEC by 2015
(by the three-country group)

Case 5

No	ISIC	Description	Vietnam %	Thailand %	Malaysia %	Output Mill. USD	Change of output in AEC Growth rate (%)
1	1730	Knitted and crocheted fabrics and articles	5.3	38.8	55.9	580.1	-47
2	1820	Dressing and dyeing of fur; processing of fur	14.7	14.7	70.5	79.1	345

Case 6

No	ISIC	Description	Vietnam %	Malaysia %	Singapore %	Output Mill. USD	Change of output in AEC Growth rate (%)
7	2230	Reproduction of recorded media	0.04	99.1	0.8	9,395	-38
9	3430	Parts/accessories for automobiles	7.4	86.4	6.2	1,107	415

Case 7

No	ISIC	Description	Vietnam %	Singapore %	Indonesia %	Output Mill. USD	Change of output in AEC Growth rate (%)
18	3320	Optical instruments and photographic equipmen	12.3	85.8	1.8	228.7	1,855
19	3410	Motor vehicles	5.7	6.4	88.0	5,029	-5

Case 8

No	ISIC	Description	Vietnam %	Malaysia %	Philippines %	Output Mill. USD	Change of output in AEC Growth rate (%)
10	191	Tanning, dressing, and processing of leather	18.4	22.1	59.5	406.5	269
5	1520	Dairy products	15.6	29.6	54.9	2,002	-27

Case 9

No	ISIC	Description	Vietnam %	Malaysia %	Indonesia %	Output Mill. USD	Change of output in AEC Growth rate (%)
4	3420	Automobile bodies, trailers & semi-trailers	1.4	51.0	47.7	185.3	1,323
12	202	Products of wood, cork, straw, etc.	3.1	29.0	67.8	5,437	-41
17	3150	Lighting equipment and electric lamps	8.9	64.8	26.2	482.9	495

Case 10

No	ISIC	Description	Vietnam %	Indonesia %	Philippines %	Output Mill. USD	Change of output in AEC Growth rate (%)
3	3230	TV and radio receivers and associated goods	9.0	62.6	28.3	2,452	120
6	155	Beverages	21.2	11.9	66.8	3,078	-31
21	1810	Apparel, except fur apparel	1.0	68.9	30.1	4,340	-32

(Data source: International Yearbook of Industrial Statistics from UNDP.
In case of 10, only three sectors out of ten can be easily illustrated)

For example, in case 5—which includes Vietnam, Thailand, and Malaysia—the share of the Vietnamese dressing and dyeing of fur sector was 14.7%. After the Free Trade Area, AEC, started, the share of this sector is expected to increase by over 3.4 times by simulation here; therefore, it would be better for Vietnam to transfer resources from other sectors, such as knitted and crocheted fabrics and articles and to invest them in dressing and dyeing of fur sector in order to compete favorably against the two other countries.

If we adopt the same perspective on trade policy and strategy, each sector—such as parts/accessories for automobiles in case 6; optical instruments and photographic equipment in case 7; tanning, dressing, and processing of leather in case 8; lighting equipment and electric lamps in case 9; and TV and radio receivers, and associated manufacturing in case 10—would be promising industrial sectors in the AEC market. These

results would imply an interesting suggestion that selecting these sectors would have been foremost under the era of globalization.

IV. SEEKING FOR SUSTAINABLE DEVELOPMENT THROUGH INDUSTRIALIZATION OF VIETNAM IN THE ERA OF AEC

In the process of a country's continuous development, the rate of increase in both consumption and investment accelerates further development. With regard to investment, as observed previously, industrialization led by comparative advantage sectors and formation of the huge market will provide the Vietnamese economy fair chances to achieve sustainable development. In this section, it suggests that some manufacturing sectors were protected from both a high tariff on final goods and a low-tariff effect on input materials. On one hand, a tariff cut is inevitable in all Vietnamese manufacturing sectors for more multinational companies to enter into Vietnamese market. On the other hand, the more consumption requires an increase of the income. This is the main reason why it is believed that equitable development is necessary for sustainable development as well as for social welfare in Vietnam.

Japanese companies began entering into the Vietnamese domestic market in the 1990s after embargo was lifted in 1994. The following figure displays the number of Japanese companies that participated in the markets of some ASEAN countries. It is shown that there is no clear evidence to support the fact that at that time Japanese companies preferred the Vietnamese market to that of other nations.

Vietnam have to continue making efforts to create favorable conditions like reducing tariffs, which prevent multinational companies from entering into Vietnamese market. However, nominal tariff rate is not sufficient to measure real and effective protection of goods. Next, by calculating the "Effective rate of protection (ERP)[4]", it shows that some manufacturing sectors in Ho Chi Minh City that account for approximately 23.7% of the national GDP in 2000 were protected from abroad with high tariff rate and also enjoyed the advantage of procuring raw or importing intermediated products and materials at relatively lower prices than other sectors do. The results obtained by calculating the ERP are shown in the following figure.

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[4] For more details see Baldwin (1970).

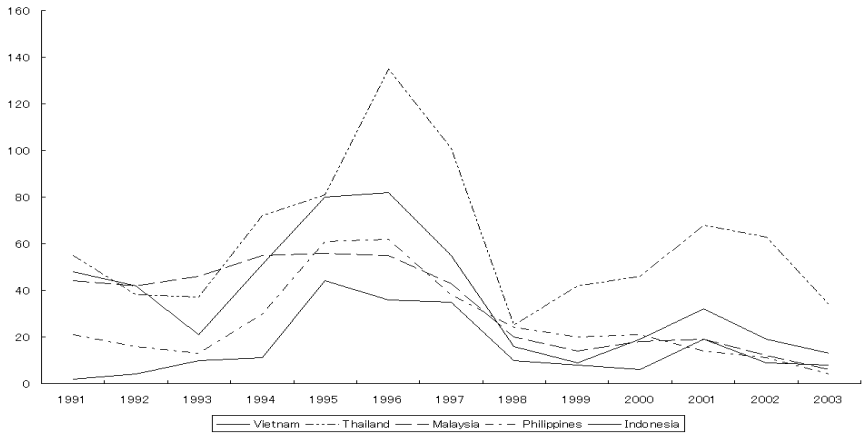

Figure 3. Comparison of the influx of Japanese companies into the Vietnamese domestic market and neighboring markets

(Data source: Kaigasi shinshutu kigyo souran for 2004, Nikkei-shinpo publishing company)

The larger the value of ERP, the lesser the rate of tariff at which the manufacturing sector can import raw material. Therefore, some sectors like "Transport equipment", "Tobacco product", and "Beer and malt liquors" might have enjoyed favorable merits from both high tariff rate and obtaining raw or middle materials at relatively lower prices in 2005.

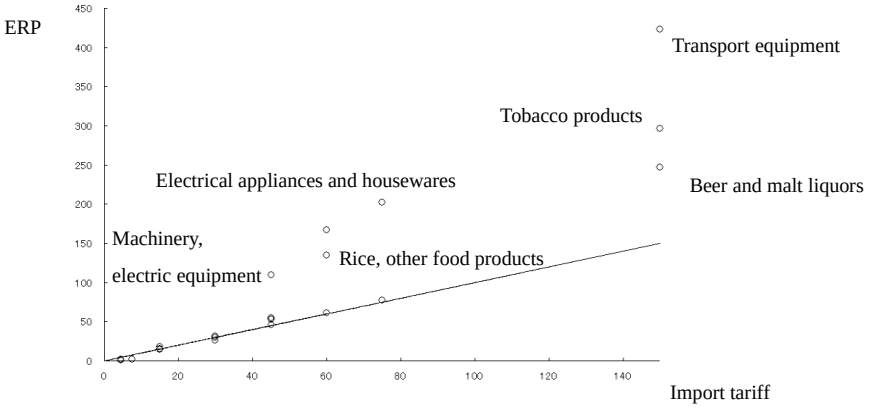

Figure 4. Effective rate of protection (ERP) of manufactured goods in Ho Chi Minh City

(Data source: Vietnam General Import-Export Tax Form 2005, HCM General Publishing House. Input coefficient of 2000 from Canh (2004) is used for calculating the ERP.)

As mentioned earlier, with regard to sustainable development, Vietnamese politicians and researchers on the Vietnamese economy should pay greater attention not to increase the inequality between the rich and the poor, especially, while the labor structure is changing dynamically from agricultural to manufacturing through the process of industrialization. On the basis of the two sectors —agriculture and industry—model by Delta (1992), it shows that the Vietnamese economy succeeded in reducing the income gap between agricultural and national economies on an average during the latter half of the 1990s, as a result of the "Doi moi" socio-economic reforms that aimed at converting Vietnam into a market-oriented economy. Here, the calculated trend is represented with a dashed line (-----) in the following figure. In addition, by simulating under three conditions, cases (1), (2), and (3), it is shown that the Vietnamese economy would lose the labor-income equality and display some vulnerability toward sustainable economic development, and even might increase income gap, as new investment becomes sluggish and the price of agricultural products falls as compared with that of manufactured goods.

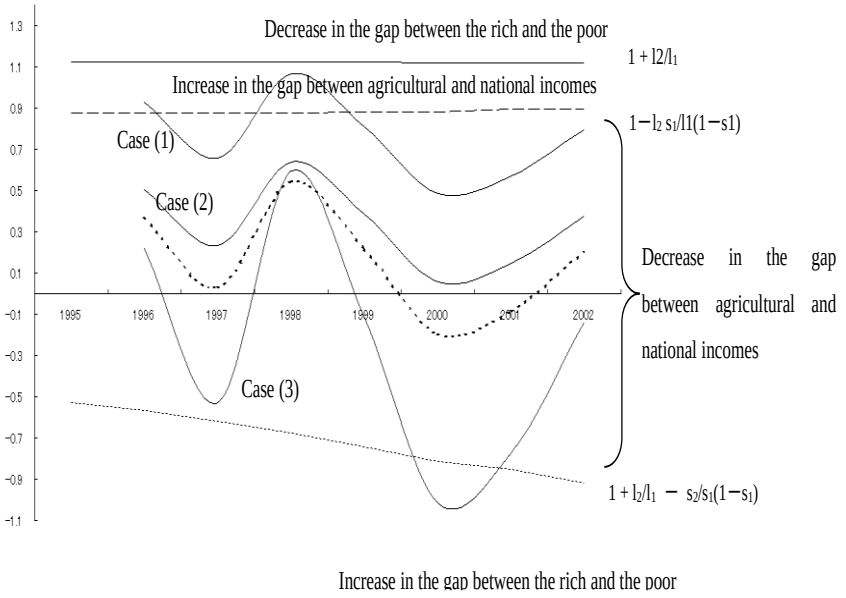

Figure 5. The path of sustainable and equitable development:
Two sector—agriculture and industry—model

(Data source: WB, ILO and FAO)

The conditions of each simulation and the notations used in the figure are as follows:

-- case (1): Price of agricultural products (+15%) and investment (+ 5%)

-- case (2): Price of agricultural products (+ 5%) and investment (+ 5%)

-- case (3): Price of agricultural products (- 5%) and investment (- 10%)

-- l1: The ratio of labor in agriculture to total labor

-- l2: The ratio of labor in manufacturing to total labor

-- s1: The ratio of agricultural output to total output in money base

-- s1: The ratio of manufactured output to total output in money base

It should be noted that in Figure 5, it is assumed that the Vietnamese economy is composed of two sectors—agriculture and manufacturing—and service sectors are not considered. This is mainly because, for sustainable development of developing countries, labor in agriculture should be transferred to the manufacturing sector but not the service sectors. Although the above results depend on this simple assumption, they might have meaningful political implications for the Vietnamese economy to succeed in industrialization.

V. CONCLUSION

In this paper, the author presented some of the necessary conditions for the Vietnamese economy to achieve sustainable development under global economy, particularly in the era of the ASEAN Economic Community established in 2015. The Vietnamese government has to continue to establish favorable business conditions for multinational companies in order to ensure that its market is preferred to those of other ASEAN countries. Further, policymakers should not be shortsighted for industrialization. The fluctuation in the prices of agricultural products and investment therein should be closely monitored in order to ensure that the gap between the rich and the poor is not widened. Vietnam is a relatively small country and lacks the necessary investment funds to compete with its rival among ASEAN countries. Therefore, policymakers and researchers have to exchange opinions to find out the comparative advantages of Vietnamese economy. Based on both economic theory and the data analysis mentioned above, focusing on export-oriented industries that have comparative advantage would contribute to not only increasing

output but also decreasing the gap between the rich and the poor in Vietnamese economy. Further, newly established common free trade market, ASEAN Economic Community will drastically change the amount of output of each ASEAN country. Therefore, the Vietnamese government must ensure and identify which nations would be its competitors in the corresponding manufacturing sectors. For instance, applying a traditional numerical simulation method based on comparative advantage as discussed by Graham (1923) temporarily helps find solutions to this issue. However, in order to enjoy "gains from trade" and "economies of scale", reducing visible and invisible tariff should be the highest priority on the list of economic reforms of Vietnamese economy. The worse scenario is selecting a certain industry with less research, and put too much expectation on it. For instance, electric vehicle, EV cars, has high potential on Vietnamese market and others in ASEAN regions. However, through the history of Vietnamese manufacturing, in this paper, there is not enough evidence that it had invested in rich research and development or advantages on its supporting industries. This implies that EV cars in Vietnam are a sort of assembling type of manufacturing industry. From this viewpoint, it is out of discussion whether the industry holds promising potential for the future. Nonetheless, the author shows another finding that a typical Vietnamese EV car maker, VinFast's stock price shows stable movement with a downward trend, after initially fluctuating in October 2023 due to speculation in the global stock market, particularly the National Association of Securities Dealers Automated Quotations (NASDAQ) in the U.S.A. According to the result of studying its data generating process, the author found that it moves with trend stationary process. The estimated value fits very well original data. The author admits that it is necessary to research additionally to seek for more exact findings. Based on our field research in August 2023 and September 2024 in Ho Chi Minh City, there are several consumers in the market who are concerned that EV car's batteries do not have sufficient longevity. Also, as interviewing on the field research, the author encountered poor information on certificates of origin where EV car's core parts like vehicle engine come. For ensuring protection of the rights on Intelligent Property (IP), we might be patient to wait for until exactly true information prevails on the market. The author hopes that findings and lessons in this paper would be helpful for policy-oriented researchers in considering the future vision of Vietnamese economy with sustainable development.

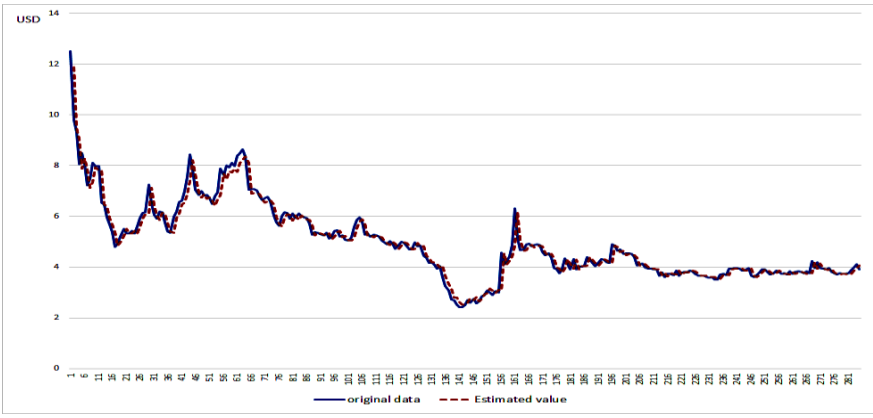

Figure 6. Stock data of VinFast Auto
(VFS: 29 September, 2023 - 14 November, 2024 (Daily data))

(Data source: NASGAQ market price in U.S.A.)

The Data Generating Process is estimated as below:

$$Y(t) = 0.11126 - 0.00011123\,t + (0.936158)\,Y(t-1) + \varepsilon(t)$$

Stock data of VinFast Auto (VFS: 2 October, 2023 - 14 November, 2024 (Daily data))

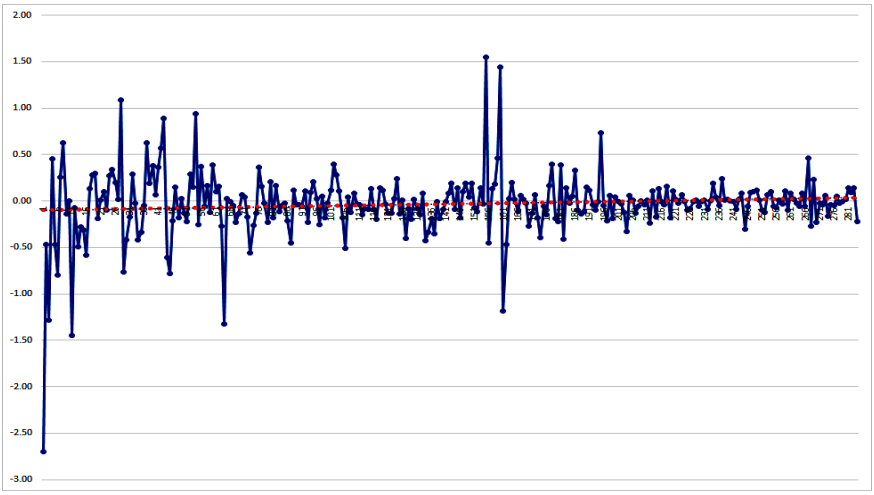

Figure 7. Difference data plot

(Data source: NASGAQ market price in U.S.A.)

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EXTERNALITIES OF PIRACY IN EMERGING INDUSTRIES

Koji Domon

I. INTRODUCTION

Any developing country progressing to become an emerging or a developed one has experienced the problem of piracy[5]. Recent rapid economic growth in Southeast Asia has resulted in domestic and international infringements of intellectual property rights, and authorities are seriously coping with them. By law, these infringements are illegal, but economics often considers their merits, created by externalities, for a whole society.

Externalities have been considered for market analyses in economics since Marshall (1920)[6]. A typical externality is seen in the phenomenon of environmental pollution, the analysis of which was used by Coase (1960) in establishing the field of Law and Economics. Behind economic regulations to remedy market distortions caused by externalities, lawmakers have enacted laws that basically utilize economic rationales even though they do not take economic arguments into consideration. In the modern era, for example, new anti-trust laws for giant Internet platforms which seek to account for network externalities in a two-sided market[7] are considered in both academia and policymaking. Industries often face externalities that complicate our considerations and sometimes contradict intuitive and usual stereotypes of illegality.

Intellectual property rights (IPRs) are a key element in promoting and creating high-value products. They were internationally instituted in the 19th century[8], and since then we have revised international treaties and

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5 For example, in the 18th century, there were many pirated books in Europe and the US. Copyright laws and an international treaty were enacted to address the problem. See Shirata (1998) and Miyazawa (2017).

6 Externalities in this paper take place in the situation that the behavior of agents influences others not through the market but through direct effects on utility or production functions, a so-called "technological externality", as defined by Viner (1931). As to the history of classic externalities, see Mishan (1971).

7 See Rysman (2009).

8 The first international treaty on IPRs is the Paris Convention for the Protection of Industrial Property in 1883. See: https://www.wipo.int/treaties/en/ip/paris/ summary_paris.html.

domestic laws each time a new technology has emerged. The extent to which copying or imitating is ruled to be illegal or not depends not upon creators' rights or needs, but upon social benefits, which have been heavily influenced by the technologies of digitalization and the Internet since the 1990s. Nowadays, copying of both non-physical and physical goods is easy due to such technologies, causing social controversies regarding how IPRs should be applied.

I shall survey the theoretical discussions of externalities in Law and Economics, focusing on the content, fashion, and food industries, and consider the externalities of piracy. Piracy or copying in these industries is a global issue, and, in most cases, developing countries with cheap labor and lax law enforcement are production and distribution centers in supply chains[9]. Profitable markets in developed countries are the main targets, and original creators and producers from these countries claim piracy or copying. However, such claims are often not accepted in court, or creators and producers gradually realize positive side-effects of copying, i.e., positive externalities, on their profits. The following sections consider the effects of externalities on determinations of illegality concerning IPRs.

II. PIRACY IN APPAREL INDUSTRIES

Fast fashion companies like Zara, Uniqlo, and H&M have been rapidly growing in this century, and newcomers like Shein in China are aggressively competing with the incumbents by selling extremely cheap products via online stores. Behind the growth of the industry, many fashion designers insist that infringements of their design rights or copyrights are occurring, and thus file suits against giant fast fashion companies. However, designers have lost most cases, and their rights have not been upheld in court. This phenomenon is called the "Piracy Paradox" by Raustiala and Sprigman (2006). From an economic perspective, the judgements can be explained by the negative and positive effects of copying on society and on fashion industries. In general, IPRs are necessary for society to incentivize creators by protecting their ability to profit from their creations for a certain duration. Regarding fashion apparel designs, the court mostly does not accept the claims of original creators[10].

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9 See "2024 Special 301 Report", Office of the United States Trade Representative: https://ustr.gov/sites/default/files/2024%20Special%20301%20Report.pdf.

10 It is obvious that laws regarding fashion designs differ in each country. In the US, they are protected mostly by trade dress and design patents, while in Japan they are protected by design rights. See Ieda (2019).

A piece of apparel has unique characteristics, different from other products. Raustiala and Sprigman (2006, 2021) have explained them, stressing that design rights in apparel industries are not necessary. There are several factors behind this reasoning, which can be considered from an economic perspective. Apparel industries have expanded successfully without strict laws regulating design rights. This may suggest that the current situation does not create a problem for society, despite designers' complaints, but the success of an apparel company, in particular a fast fashion one, may not be related to lax laws. There are companies apparently facing and combatting IPR infringements in other industries, particularly in the Internet industries, which have also grown and made huge profits. This indicates that profits stemming from growing demand surpass the negative effects of knockoffs. To prove this, we need an empirical analysis, and just a descriptive explanation is not enough[11].

The second factor is the traditional positive externality in demand influenced by the consumption of others. The fashionability of apparel can exist only when others look at us. At the end of the 19th century, Veblen (1899) termed such consumption "conspicuous consumption", and later Leibenstein (1950) theoretically analyzed this phenomenon as a "snob effect". At the early stage of diffusion, the value of a nice design is high due to its scarcity, i.e., a snob effect, and then other consumers purchase similar or the same apparel due to a bandwagon effect, which creates a new trend. However, this trend does not continue for a long time, because the definition of a trend requires that it end in a short time. The diffusion process of apparel designs differs from that of durable goods invented by new technologies like the PC, smartphone, etc.

Standard economic theory would support apparel knockoffs due to the externality of expanded demand if the effect continues for a long time, compensating designer's profit losses. Nonetheless, by definition, a trend is a short-term phenomenon, particularly in the apparel industry, where every year or season sees changes. Proponents insist that knockoffs support rapid demand expansion within the whole industry. In other words, without knockoffs, less demand might decrease total profits. In conventional economics, an externality has either a positive or a negative effect, but trends in fashion confound this simple characteristic because

[11] Appel, Libai and Muller (2018) explain the process of apparel diffusion as acceleration, substitution, and overexposure, and then simulate it by market data.

they change the impact of externalities over time, i.e., positive at the early stage and negative later.

Another factor affecting demand is the variety of products, differentiated by design, which is not considered as an externality. In general, we often see design right infringement suits filed over apparel with similar designs. Whether a similarity is illegal or not is controversial in court, but in economics, variety brings about a positive effect on consumer utility, as expressed in the Dixit-Stiglitz utility function[12]. If each designer created an original similar product at the same time, no one could claim an infringement. The likelihood of such cases, however, is almost zero; far more frequently an original design is mimicked by other producers. While knockoffs of apparel have almost the same appearance as originals, and consumers realize that they are cheaper versions of the original, i.e., a vertical product differentiation, a mimic or apparel similar to the original is likely to be considered as a horizontally differentiated product, creating variety. Increasing the level of product variety increases a consumer's utility, and the variety, which is defined as the number of producers, benefits consumers when we ignore the effect of increasing competition on social economic welfare. We can theoretically obtain optimal variety in a static analysis, and no variety, i.e., a monopoly, is not socially optimal. Because of the positive effect of variety on demand, similarity of apparel products can be acceptable for society. However, we see a lot of cases in court where a plaintiff insists that piracy and infringement of design right or copyright against her or his product has taken place. Criteria for the judgement are not clear in an economic sense, even though judges offer reasons in court. The problem here is that similarity without a bandwagon effect is acceptable even though there may be claims of infringement. Knockoffs can create a bandwagon effect, but not a variety effect, because their appearance is the same as an original.

III. PIRACY OF DIGITAL CONTENT

In this century, the Internet has accelerated piracy of digital content due to easy copying and transmission. Before the Internet, we faced

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[12] This function is used to analyze a monopolistic competition where competitors' prices are given. See: Dixit and Stiglitz (1977). Because there is no game theoretical strategy, this model is theoretically different from oligopolistic competition models that are used for an analysis of copying.

problems of copying by photocopying, tape dubbing, and CD burning (Liebowitz, 1985; Johnson, 1985). Compared to those days, the piracy level has gotten worse due to the Internet, reminding us of the case of Napster, which built a free platform for file sharing[13]. This service caused social discussions about the illegality of copying, since the concept of "fair use" allows listeners to copy personally, and then lend, CDs to friends. In addition, economists insisted that listeners downloading music files in the service were likely to purchase original CDs through the promotion effects of sharing. We shall call this effect an internal externality of piracy.

We can see two other types of externality caused by piracy in digital products. One is an externality which takes place when original creators have multiple sources of revenue. In the 2010s, this externality caused controversies concerning whether peer-to-peer (P2P) file sharing of music files benefited musicians or not (Andersen & Frenz, 2010; Barker & Maloney, 2015; Liebowitz, 2016). The other is a network externality, caused by software piracy, whose origin goes back to telecommunication networks (Rohlfs, 1974; Oren & Smith, 1981). In this discussion, piracy has a positive effect on all users of the same software due to the compatible file format, inducing some consumers to purchase original software with high quality (Conner & Rumelt, 1991; Takeyama, 1994). The definition of this externality is that a product's value increases with the number of subscribers or users due to technical factors, as seen in PC software and file formats. It is not caused simply by the appearance of products as seen in apparel causing bandwagon effects.

The first type of externality, which we shall call an inside externality of piracy, exists in content industries that have related multiple markets. The IPR infringement issues faced by content industries create challenges for them that firms solely engaged in the manufacture of lines of goods do not face. For example, in the 2000s, a main source of profits for musicians was the sale of CDs and legal downloads competing with piracy. Around the 2010s, musicians noticed that when their music was listened to by many people, even through illegal websites, they could increase total profits because audiences at live concerts increased. After the 2010s, profits from live concerts exceeded those from digital media in

[13] Landes and Lichtman (2003) characterize Napster's infringement compared with classic problems of copying in terms of liability. P2P has changed infringement liability on platforms like Napster.

developed countries[14], and musicians began to use SNSs as promotional tools attracting listeners to live performances, as well as gaining revenues from the advertisements. Not all, but most, musicians now upload their music files on websites where we can watch them free and do not have to take the risk of viruses included in illegal files. However, to avoid the fees of subscription services or to store files offline, P2P file-sharing for illegal content that is stolen from legal websites is still alive, though the number of users seems to be much smaller than in the 2000s[15]. Such illegality is less of a social issue than we experienced in the 2000s, suggesting that most musicians think less about it than before.

Content piracy of anime and manga, whose industries also produce character goods in the secondary market, has a similar characteristic of inside externality of piracy. At illegal websites in developing countries, where original producers from foreign countries find it difficult to file suit in court, youths and kids have access to websites with no authorized content from abroad. However, the character goods they often purchase do include authorized merchandise. Revenues and royalties from these character goods are sometimes greater than those from anime and manga sales. This relationship between pirated content and original character goods thus shows an inside externality of piracy.

Recently, such pirated content also influences demand for inbound tourism. In Asia, members of the young generations familiar with anime and manga, which are illegally uploaded to websites, are interested in visits to spots described in the content, i.e., anime and manga pilgrimages (Seaton & Yamamura, 2015; Tung, Lee & Hudson, 2019). Illegal content increases the demand for inbound tourism, resultant in an increase in profit for tourism industries. We can call this an outside externality of piracy. Piracy has been considered as a problem solely of original creators, who should be incentivized properly for their contributions to society. However, regarding these forms of piracy, policymakers can

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[14] In 2014, revenues from live concerts exceeded those from CDs for the first time in Japan, and live concerts have now become the main source of revenue in the music industry (Digital Content Association of Japan, 2014). In developing countries, such a phenomenon has existed since copy technologies were invented. See: Domon and Nakamura (2007).

[15] In Japan, the number of P2P users even in 2014 was drastically decreasing compared to that in the 2000s (Association of Copyright for Computer Software, 2014, https://www2.accsjp.or.jp/activities/pdf/p2psurvey2014.pdf).

recognize compensation not only from copyright infringers but also from tourism industries.

IV. PIRACY OF PROCESSED FOOD

There are many frauds in the food industry: lying about origins, using different ingredients, falsifying expiration dates, etc.[16]. Concerning IPR, we often see fake or confusing trademarks and package designs intentionally created to cheat consumers. Unlike nondeceptive fake watches and bags, which consumers instantly realize are fakes, food is purchased by consumers who care less about appearance than about quality and taste. Food is classified as credence goods (Darby & Karni 1973), for which consumers cannot realize the quality of the product before consumption. To inform consumers of food quality, labels, trademarks, and packaging can be effective (Bonroy & Constantatos, 2008). The appearance of food makes the first impression by which consumers estimate the quality and taste. Consumers look at the package before purchasing processed food, and at the shape and color when purchasing fresh food. To address externality of piracy regarding food, we focus on infringements of IPRs by way of similar packaging, which confuses consumers seeking to obtain trustable information.

While there are perfect deceptive packages[17], we also see packages similar to an original product, which sometimes lead to suits filed over IPR infringement. As we saw with cases of design right infringement in apparel, there are cases in which illegality is not easy to judge. A food package with colors, pictures, shapes, names, etc. is designed to attract consumers, representing an image of taste. After an original food becomes popular, other companies enter this market by using similar images of the original food. Because, without similarity, newcomers would face difficulty getting consumers to notice their food products, they may imitate a package with nondeceptive intention, simply seeking to create a category of processed food. The category created by similar packages helps a consumer to search for the food smoothly. This effect is explained as marketing, benefiting retailers because consumers save time

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[16] Japan Food Industry Association (2010) and Domon (2021) discuss counterfeits of Japanese food in Asia.

[17] We can easily find images of counterfeit packages by searching on the Internet. Chinese manufacturers have the knowledge to produce perfectly copied packages, exporting them into Asia. See: Domon (2021).

when shopping (Kuksov, 2004; Rafiq and Collins, 2006; Richards, Hamilton and Yonezawa, 2017).

The phenomenon we consider here is also seen in biological evolution, where mimicry in nature explains how spices have dynamically evolved and how prey strategically fights with a predator. Mimicry creates a positive mutual externality among mimics or prey by similarity of appearance. This phenomenon resembles categorization of food packages[18]. A similar package creates a positive external effect on the demand for categorized processed food. We can define this as an *externality of categorization*. A knockoff or counterfeit package damages the reputation of an original producer, since the quality of fake food is generally much lower to increase profits by cheating consumers. In developing countries, we can see such food in marketplaces, but retailers in developed countries seldom deal with cheating food products. A problem in developed countries is the extent of similarity in packaging by which consumers will not be confused and will be able to distinguish an original from a similar package. An original producer is not likely to sue a newcomer's similar package because proof of the infringement is difficult, as seen in apparel designs, and besides, an original producer unintentionally realizes an *externality of categorization*. She or he also does not frequently change the package design, keeping the same design because it is an important clue or signal for consumers. This differs from apparel designs.

V. INTERNALIZATION OF EXTERNALITIES

Each industry has unique characteristics which are not reflected by IP laws without the concept and descriptions of specific externalities, but IPR holders realize the effects on real businesses and adjust their exercise of IPRs to maximize profits when they face infringements. The Coase theorem explains internalization of externality given a property right, and we can consider whether such internalization regarding externalities of piracy is successful or not.

The first item we address is the externality taking place in apparel and food packages, affecting demand for all producers. An original producer is affected by three effects of similar design products, i.e., a positive externality on demand, a negative effect by more competitors,

[18] Sherratt (2008) mentions this relationship between mimicry and marketing.

and a negative or positive externality on incentives for creators. If the sum of the first and third externality is greater than the second, competitive effect, an original producer accepts and does not sue similar designs. In usual discussions of externality, an agent generating a positive externality should be subsidized by authorities to achieve optimal social benefits. In this case, if an original producer filed suit and succeeded in prohibiting newcomers' sales, the net positive externalities would vanish and damage all producers. To avoid that, a royalty transferred from part of newcomers' benefits to an original producer can internalize an externality, leading to a socially optimal outcome.

An original producer compares monopoly profits, which are brought about by perfect protection of IPR, with those under royalty, and sues newcomers if the former is greater than the latter. However, monopoly may not be optimal for social economic welfare. The discrepancy of incentives between creators and authorities often causes conflict in court. From the view of social economic welfare, a royalty scheme may be better than a monopoly, and the court can allow new entries under the condition that they pay creators royalties and creators accept that, even if profits decrease. To utilize a positive externality, either a monopoly or an injunction may not be socially optimal.

The second item is an internal externality of piracy that works as promotion of original content. This piracy is illegal, and an original creator can win in court if he or she detects and sues pirates. However, there are, for example, musicians who do not mind such piracy due to its promotion effect, as I explained in Section 3. Since an original creator cannot monopolize the market due to piracy, she or he compares the negative competitive effect with the positive promotion effect. If the former is smaller than the latter, the musician neglects piracy or makes music files free on the Internet. In the converse case, an original creator may sue pirates, dependent on the suing cost. In this case the incentive for a creator to produce original content declines unless pirates themselves compensate for her or his damages. Such compensation is impossible, and piracy in this case should be strictly enforced from the view of social economic welfare. Internalization of the externality can be achieved by a penalty to pirates.

The third item is an inside externality of piracy that is different from the above because the creator has multiple or derivative markets related to original content, like the relationship between music CDs and live

performance markets. In developing countries, musicians have often made profits not from CD sales, but from live performance tickets, which are influenced by the number of listeners. Pirated CDs create a positive externality for sales of tickets. In this case, different from an internal externality of piracy, there is no competitive effect of piracy. Therefore, an original creator can ignore piracy[19].

The fourth item is an outside externality of piracy. For example, anime content, whether it is legal or not, affects inbound tourism in Japan. In this case, piracy is not beneficial to the content creator. However, due to a positive externality of piracy for the tourism industry, the creator's damages from piracy may be compensated by benefits for the tourism industry. In this case, if the damages are smaller than the benefits, authorities can internalize the externality by a transfer of the benefits to the creator. In the converse case, piracy must be stopped by strict enforcement. This structure is the same as that typical of pollution, as Coase considered, in the sense that the victim is separated from the beneficiary. So, the usual measures to remedy an externality are applicable.

VI. CONCLUDING REMARKS

A new technology always creates emerging industries and new IPRs. For economic growth, we must cope with emerging markets where existing IPRs do not cover new phenomena. There are such markets in Asian developing and emerging countries where piracy is widespread but high-end products are necessary for economic growth. This paper summarized how externalities of piracy may be properly remedied from the view of socioeconomic welfare.

So far, researchers have separately addressed each problem concerning externalities of piracy. However, we could find common characteristics and classify these externalities. With digitalization and high-speed data transmission on the Internet, we are facing various externalities, and merely condemning piracy under existing laws is not the best solution for society. I hope that my considerations here can contribute to further discussions of regulation of externalities in Law and Economics.

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[19] In Vietnam, musicians have produced CDs to induce pirates to copy and sell illegal versions of the CDs. See Domon and Nakamura (2007).

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THE STRATEGIES OF GAME PLATFORM COMPANIES

Zhang Zhengyi

I. THE CURRENT SITUATION OF THE GAMING MARKET

With the popularity and development of video games, the gaming market has now developed into a huge industry and is still growing at a high speed. According to a survey report by Statista Market Insights (2023), the global gaming market was $384.9 billion in 2023 and is expected to reach $521.6 billion by 2027, with an average annual growth rate of 7.9%. This has far surpassed the $94.45 billion filmed entertainment industry, and the $29 billion music industry. The market size of the smartphone gaming market is $286.6 billion, accounting for 74.4% of the overall gaming market, and the console gaming market is $50 billion, accounting for 13%. According to the Newzoo's (2023) report on the gaming industry, there are more than 3.3 billion gamers in the world, more than half of whom come from the Asia-Pacific region, which accounts for more than 1.79 billion people, or 53 per cent of the total, and this number is still growing at a high rate. There are more than 15 game development companies with market capitalizations above $10 billion. The world's top ten companies related to game development are primarily companies from the United States, Japan, and China, of which the largest, Microsoft, has a market capitalization of $320.5 billion; according to its 2023 financial report, the total revenue of its gaming division is $15.46 billion, accounting for 8% of the company's total revenue. The second largest company, Tencent, has a total market capitalization of $524.1 billion, with its gaming division accounting for $24.99 billion, or 30 per cent, of its total revenue in 2023. The third largest company, Sony, has a market capitalization of $119.7 billion, and its 2023 gaming revenue was $29 billion, or 27 % of its total revenue.

By analyzing the financial statements of each gaming company and comparing revenues, it is easy to see that Sony's revenues are balanced between hardware (PlayStation) and game sales: Hardware sales accounted for 48% of total revenues, while game sales were 42%. Tencent, on the other hand, derives almost all of its gaming revenue from games it has launched in the smartphone market. Microsoft, however,

generates revenue not only from hardware and software for its Xbox platform, but also from the smartphone game market. In the gaming market competition of the 1980s, traditional game companies launched their own game consoles and developed games based on them to gain profits in the market, and they rarely sought to launch their own games on other game platforms. Currently, some traditional game companies are starting to launch their games on third-party platforms, such as the smartphone market. I believe the main reasons are as follows.

1. With the development of handheld phones and the popularity of high-speed Internet, the current user retention of smartphones is very large: as of 2023, global smartphone retention was about 6 billion [20]. This scale of retention presents cross-age and cross-region characteristics, and the user's daily use time is very long; the user's game playing time is also very long.
2. The arithmetic power of smartphones has been greatly enhanced, increasing by about 8-10 times in the past few decades, and the number and quality of games that can be run have been greatly improved compared to those of the first-generation ones.
3. Game companies can make use of the launch of their own games in the smartphone market to provide publicity for the hardware and software sales of their own platform games, and externalities of their game platforms will in turn influence smartphone market sales.

Through theoretical analysis and a model of product differentiation and externality impact, this paper will explore how traditional gaming companies make such strategic choices in today's gaming market, not abandoning their own platforms while actively entering the smartphone gaming market.

II. PRODUCT DIFFERENTIATION

The shift in strategy by traditional gaming companies to actively embrace new markets is driven not only by the prospect of substantial profits in the expansive smartphone market but also by the potential to enhance consumer affection for their games. By launching games in the

[20] Tech Insights. "Global Smartphone Installed Base Forecast by Operating Systems for 88 Countries - 2007 to 2028".

smartphone market, these companies can leverage positive externalities to bolster the development of their own platforms, thereby achieving higher profits. Because this phenomenon is analogous to the impact of advertising, studies of how advertising affects product differentiation within markets can inform strategic analysis.

Tremblay and Polasky (2002) explored the mechanisms and outcomes of advertising's influence on competition through subjective horizontal and vertical product differentiation in the market. The authors argue that horizontal differentiation stems from consumers' subjective perceptions of product characteristics, while vertical differentiation arises from advertising effects or brand value, leading consumers to form varied judgments about product quality. Advertising reduces competition intensity by increasing subjective differentiation, allowing firms to charge a premium even for homogeneous products. In horizontally differentiated markets, advertising often results in symmetric equilibria, whereas in vertically differentiated markets, it leads to asymmetric equilibria. Consequently, advertising enhances subjective differentiation in the market regardless of whether the products themselves exhibit significant differences. Under vertical differentiation, advertising can create a perceived quality advantage for higher-tier products.

Tremblay and Martins-Filho (2001) studied the mechanisms through which firms in vertically differentiated markets influence price competition via quality choices and persuasive advertising. The paper extends the vertical product differentiation model by incorporating brand loyalty and persuasive advertising, analyzing how firms use advertising to enhance market position and mitigate price competition. Unlike informational advertising, persuasive advertising alters consumers' subjective preferences, enhancing perceived brand value and increasing their willingness to pay. Advertising boosts market demand and profits for high-quality firms while reducing price competition by amplifying brand differentiation. High-quality firms are more likely to use advertising to widen the gap with lower-quality brands, thereby avoiding intense price competition.

In the process of developing and competing with differentiated products, Wauthy (1996) noted that firms typically begin by developing the product itself, later engaging in price competition based on the product's inherent characteristics. In vertical product differentiation models, firms strategically choose products with varying quality levels to

avoid intense price competition. Consumers' purchasing decisions are driven by their preferences for quality, and the distribution of these preferences significantly influences market outcomes. When the distribution of consumer preferences is wide, the market tends to be partially covered, allowing firms to increase profits by adopting greater quality differentiation. When the distribution of consumer preferences is narrow, competition intensifies. In this case, firms mitigate price competition by increasing the degree of quality differentiation.

Gabszewicz and Wauthy (2014) examined two-sided markets with network externalities, where competition between platforms leads to further product differentiation and influences consumer choices between platforms, thereby enabling differentiated pricing. Even when platforms are initially symmetric, competition naturally results in vertical differentiation, characterized by differences in platform quality. In equilibrium, two platforms can coexist: one with a larger network size and the other smaller, both securing positive market shares and profits.

Baake and Boom (2001) argued that the degree of product differentiation by firms is often inversely proportional to the magnitude of externalities. Once consumers develop loyalty or "stickiness" toward a firm's product, the firm can achieve high profits even when reducing its product differentiation. However, stronger network externalities intensify price competition among firms, making competitive pricing a more critical factor in such markets.

Nguyen (2014) examined the effects of third-degree price discrimination by monopolists in vertically differentiated markets, demonstrating the feasibility of pricing differentiation for products offered by the same company when product differences exist. This pricing strategy enables firms to achieve higher profits while simultaneously harming certain consumers, with the consumer losses outweighing the firm's gains. As a result, third-degree price discrimination leads to a reduction in overall social welfare.

III. MODELS

I use the vertical model of product differentiation mentioned above to analyze the strategies of traditional game development companies when choosing the proportion of inputs for product development as well as pricing. Traditional game companies such as Sony, Microsoft, and Nintendo each have their own gaming platform, and they can also

distribute the games developed by their companies to other gaming platforms, such as smartphone platforms. Therefore, we can divide their revenue sources into two parts, the revenue from selling hardware and software on their own platforms and the revenue from selling their games on the smartphone market, as shown in Figure 1.

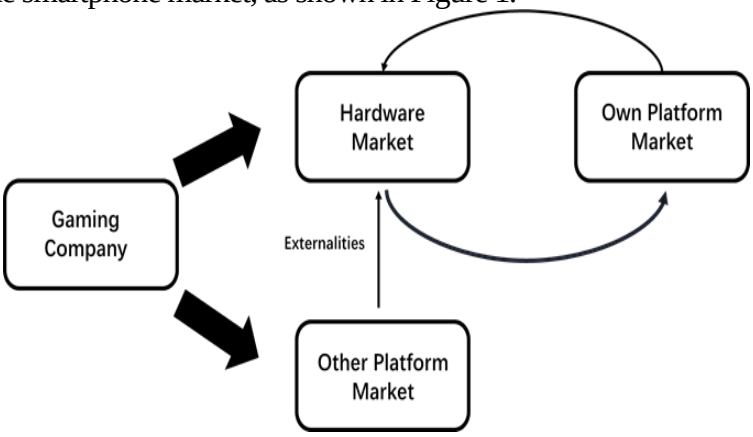

Figure 1. Market composition of gaming company participation

In this study, it is assumed that there is significant product differentiation between platforms, effectively segmenting them into two distinct markets. As a result, no direct product competition exists between the platforms.

In the two different markets, game companies face different competitive conditions. Gaming companies have absolute control and pricing power on their own platforms, and these users are extremely loyal to their games, so we can view competition on their own platforms as a separate and exclusive market. On the smartphone platform, game companies face fierce competition not only from traditional game companies, but also from many emerging game companies that develop software only for the smartphone market, or other platforms. We view this market as an oligopolistic market with multiple competitors based on a circular product differentiation model. Whereas we define the total profit of a traditional game development company as π_T, the total revenue consists of π_o derived from smartphone platforms and π_m from its own platforms, respectively.

$$(1)\pi_T = \pi_o + \pi_m \qquad (1)$$

First, let's look at the gaming platform for smartphones. There are a large number of players in this market, which translates into a wide variety of differentiated game genres, and there is intense game-to-game competition. We follow Salop's (1979) model of oligopolistic competition, where consumers are uniformly distributed on a circle of total length (market size) l. Firms compete on price in this product-differentiated market, and we let the pricing of the games in the market be $P_i \ (\mathrm{i} = 1,2,\ldots,\mathrm{n})$, where n is the number of all the games present in the market. $P_j \ (\mathrm{i} = 1,2,\ldots,\mathrm{n})$ is the pricing strategy of the other games, and we define the variability between products as t. Under the condition of maximising consumer utility, we obtain the need for each game as

$$d_i = \frac{P_j - P_i + \frac{l}{n}}{t} \qquad (2)$$

The profit a game company can make on each game is

$$\pi_o^i = P_i d_i - FC \qquad (3)$$

Since the development cost of a game is much higher than the cost of its later distribution for copying and selling, we only consider fixed costs in the expenses section. All the games are symmetric, so we can solve for the competitive equilibrium state, where the pricing of each game is $P_i^* = \frac{t}{n}$ and the need for each game is $d_i^* = \frac{l}{n}$.

Due to the different standards enforced by different game platforms and the different code implemented during game development, we have tentatively decided that the same game can only be provided to a single game platform. A traditional game company with a relatively long game development cycle cannot increase its game production in a short period of time. Therefore, we set the maximum production capacity of games that a company can develop per unit of time as s. And since a traditional game company would consider launching a game on its own game platform, or launching its own game on a smartphone platform, and would use this percentage of investment as part of its profit maximization strategy, we denote this percentage by θ.

$$\pi_o = (P_o d_o - FC)\theta s \quad (4)$$

Based on the calculations, we can obtain the pricing strategy of the gaming company on the smartphone platform as $P_o^* = \frac{t}{n+\theta s}$ when its total game sales in the smartphone market are $Q_o^* = \frac{\theta s l}{n+\theta s}$. At this point, the total profit made by the gaming company from the smartphone platform is

$$\pi_o = \left(\frac{tl}{(n+\theta s)^2} - FC\right)\theta s \quad (5)$$

In terms of the revenue that game companies can obtain from their own gaming platforms, it generally comes from two parts, revenue from the hardware and revenue from the game software. Due to the high voice and pricing power of game companies on their own platforms, as well as the huge product differentiation from the technical level, we believe that game companies have a monopoly on their own gaming platforms. To simplify the model to better analyze the impact of externalities between different platforms, we bundle their hardware revenues with their software revenues, treating the two parts of profits as the same commodity, which is convenient to calculate later.

Game companies launching games in the smartphone market can use that market to publicize the features of their own games and attract more players to join their own game platforms to play games. Also, since the difference between the number of users on smartphone platforms and the number of players on a single company's game platform is very large, and since almost all game players on game platforms own smartphones, we believe that the externality impact of smartphone platforms will largely determine the market size of a game company's own game platform. Hence, we define the profit of the game company's own game platform as

$$\pi_m = [(\alpha Q_o^* - b_m P_m)P_m - FC](1-\theta)s \quad (6)$$

where P_m is the price strategy of the game company on its own game platform and α is the magnitude of the effect of the externality.

For simplicity of the model, we set the cost of game development to be consistent across platforms.

The total profit made by the gaming company from the two platforms can then be expressed as

$$\pi_T = \pi_o + \pi_m = \left(\frac{tl}{(n+\theta s)^2} - FC\right)\theta s + [(\alpha Q_o^{\ *} - b_m P_m)P_m - FC](1-\theta)s \quad (7)$$

Game companies often complete the development process of the game first, deciding which platform to target for development of the game, and the pricing strategy is only carried out in the release session after development is completed, so we will start by calculating the game's exclusivity price, which, under the condition of maximizing profits, is

$$\frac{\partial \pi_T}{\partial P_m} = 0 \Rightarrow P_m^{\ *} = \frac{\alpha\theta s l}{2b_m(n+\theta s)} \quad (8)$$

Theorem 1: As gaming companies allocate a larger proportion of their investments to smartphones and other markets, they can adopt higher pricing strategies on their own platforms under profit-maximizing conditions.

$$\frac{\partial P_m^{\ *}}{\partial \theta} = \frac{\alpha s l n}{2b_m(n+\theta s)^2} > 0 \quad (9)$$

Bringing the price strategy into the original profit function, we get the game company's profit as

$$\begin{aligned}\pi_T &= \left(\frac{tl}{(n+\theta s)^2} - FC\right)\theta s + \left[\left(\frac{\alpha\theta s l}{n+\theta s} - \frac{\alpha\theta s l}{2(n+\theta s)}\right)\frac{\alpha\theta s l}{2b_m(n+\theta s)} - FC\right](1-\theta)s \\ &= \left(\frac{tl}{(n+\theta s)^2} - FC\right)\theta s + (1-\theta)s\left(\frac{\alpha^2\theta^2 s^2 l^2}{4b_m(n+\theta s)^2} - FC\right) \quad (10)\end{aligned}$$

Therefore, we can get the optimal split ratio of inputs from game companies to the two platforms

$$\frac{\partial \pi_T}{\partial \theta} = 0 \Rightarrow \theta^* = \frac{\alpha + 2b_m\sqrt{\frac{9\alpha^2 l^2}{16{b_m}^2} + \frac{3lt}{b_m}}}{3\alpha^2 l} \quad (11)$$

Finally, the equilibrium solution is brought to the profit function, which gives the maximum profit of the gaming company as

$$\pi_T = \left(\frac{tl}{\left(n + \frac{\alpha+2b_m \sqrt{\frac{9\alpha^2 l^2}{16 b_m{}^2} + \frac{3lt}{b_m}}}{3\alpha^2 l} s \right)^2} - FC \right) \frac{\alpha+2b_m \sqrt{\frac{9\alpha^2 l^2}{16 b_m{}^2} + \frac{3lt}{b_m}}}{3\alpha^2 l} s$$

$$+ \left[\left(\frac{\alpha - \frac{\alpha+2b_m \sqrt{\frac{9\alpha^2 l^2}{16 b_m{}^2} + \frac{3lt}{b_m}}}{3\alpha^2 l} sl}{n + \frac{\alpha+2b_m \sqrt{\frac{9\alpha^2 l^2}{16 b_m{}^2} + \frac{3lt}{b_m}}}{3\alpha^2 l} s} - \frac{\alpha - \frac{\alpha+2b_m \sqrt{\frac{9\alpha^2 l^2}{16 b_m{}^2} + \frac{3lt}{b_m}}}{3\alpha^2 l} sl}{2\left(n + \frac{\alpha+2b_m \sqrt{\frac{9\alpha^2 l^2}{16 b_m{}^2} + \frac{3lt}{b_m}}}{3\alpha^2 l} s \right)} \right) \frac{\alpha - \frac{\alpha+2b_m \sqrt{\frac{9\alpha^2 l^2}{16 b_m{}^2} + \frac{3lt}{b_m}}}{3\alpha^2 l} sl}{2b_m \left(n + \frac{\alpha+2b_m \sqrt{\frac{9\alpha^2 l^2}{16 b_m{}^2} + \frac{3lt}{b_m}}}{3\alpha^2 l} s \right)} - FC \right] \left(1 - \frac{\alpha+2b_m \sqrt{\frac{9\alpha^2 l^2}{16 b_m{}^2} + \frac{3lt}{b_m}}}{3\alpha^2 l} s \right) \quad (12)$$

IV. NUMERICAL EXAMPLE

To better analyze the relationships between variables, we substitute real-world data from 2023 into the model and set the following values:

a. Market size l: The number of users on the Steam platform, $l = 150\ million$.

b. Number of games n: The total number of games available on Steam in 2023, $n = 14{,}000$.

c. Game differentiation t: A parameter greater than 0 like 1, representing the degree of differentiation between games.

d. Sony's total game output s: The total number of games released by Sony in 2023, $s = 33$.

e. Other platform investment ratio θ: A ratio in the range $0 \leq \theta \leq 1$, representing the proportion of Sony's resources allocated to other platforms.

f. Externality impact α: A positive value in the range $0 \leq \alpha \leq 1$, representing the effect of externalities.

g. Curve slope b_m: For simplicity, the slope is set as $b_m = 1$.

h. The fixed costFC is set at \$100 million.

Using these values and settings, we can further calculate and analyze the relationships between variables, particularly the effects of externality impact α and game differentiation t, on investment ratio θ and profit.

Theorem 2: The smaller the impact of externalities, the more platform-based gaming companies should focus on releasing games in the mobile market.

Substituting into the numerical example, we have:

$$\theta^* = \frac{\alpha + 2\sqrt{1.265625 * 10^{16}\alpha^2 + 4.5 * 10^8}}{450 * 10^8\alpha^2} \qquad (13)$$

$$\frac{\partial\theta^*}{\partial\alpha} < 0 \qquad (0 < \alpha < 1)$$

Unless the impact of externalities is extremely large, with its value far exceeding 1, companies should, given the current market size comparison, allocate more resources to developing games for their own platforms.

Theorem 3: The larger the scale of the mobile market, the more resources should be invested in developing games for that market.

Let α=1, and substitute it into the expression for θ^*. The resulting equation becomes:

$$\theta^* = \frac{1}{3l} + \frac{\sqrt{9l^2 + 3l}}{6l} \qquad (14)$$

$$\frac{\partial\theta^*}{\partial l} > 0$$

For firms, given a certain level of externality impact, the larger the user base of another platform, the greater the value of releasing more games on that platform.

Theorem 4: For traditional gaming companies, externalities have a positive effect on profits. As the impact of externalities increases, these firms earn higher profits.

Under this numerical example, by differentiating the profit π_T with respect to α, we can obtain:

$$\frac{\partial \pi_T}{\partial \alpha} > 0$$

Additionally, by substituting θ^* into $P_m{}^*$, we can obtain:

$$P_m{}^* = \frac{\left(\alpha + \frac{\sqrt{9\alpha^2 l^2 + 48ltb_m}}{2}\right)s}{6b_m\alpha\left(n + \frac{\alpha + \frac{\sqrt{9\alpha^2 l^2 + 48ltb_m}}{2}}{3\alpha^2 l}s\right)} \quad (15)$$

Theorem 5: When the impact of externalities increases, gaming companies can secure a more favorable pricing environment and adopt higher monopoly pricing strategies.

By substituting the numerical example and differentiating with respect to α, we can obtain:

$$\frac{\partial P_m{}^*}{\partial \alpha} > 0$$

V. CONCLUSION

This paper introduces the current state of the gaming market, noting that amid the growth of the smartphone market, traditional gaming companies are no longer solely focused on their own platforms; they are also actively developing and launching games on other platforms. This not merely because companies can earn some profit from releasing games on alternative platforms, but also because the externality effects exerted by the smartphone market on a company's own platform enable higher profits on that primary platform. In the model analysis, the gaming platform seeks to maximize profits by adjusting both its pricing strategy and the proportion of its development investment allocated to different platforms. A positive relationship exists between the firm's investment in other platforms and its monopoly pricing strategy: the greater the investment in the smartphone market, the higher the optimal price set on

its own platform to achieve greater profits. Additionally, externality effects have the opposite effect compared to platform investment. Under conditions of strong externalities, channeling more resources back to the firm's own platform can yield higher returns, which may be related to the relative scale of the platform. Moreover, the larger the market scale of external platforms, the more incentive there is for the company to increase its investment in those external markets, ultimately benefiting its overall profit. The magnitude of externalities positively influences both the firm's profits and pricing strategy. As externality effects increase, firms should set higher prices to achieve greater returns. However, there are still some limitations that need to be addressed in future research. The model relies on certain simplifying assumptions, such as treating all games in the external market as symmetrical, which may not fully capture the complexity of real-world competition. The numerical examples can only partially reflect the relationships among variables and cannot produce general conclusions. Future studies might incorporate additional external factors, such as changes in consumer behavior and the competitive strategies of emerging companies.

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THE IMPACT OF COMMODITY DEPENDENCE ON STRUCTURAL CHANGE, POVERTY, AND INEQUALITY IN LAOS AND THE POTENTIAL FOR IMPROVEMENT IN THE AGRICULTURAL SECTOR

Soulita Vansilalom

I. INTRODUCTION

Commodity dependence refers to an economic situation where a country's export earnings and government revenues are highly reliant on a narrow range of raw materials (e.g., oil, gas, minerals, or agricultural products). According to the United Nations Conference on Trade and Development (UNCTAD), a country is considered commodity-dependent if over 60% of its total merchandise exports come from commodities. This negative economic circumstance of resource-rich countries results from large reliance on a single or a few commodity exports and limited diversification of products. It leads to macroeconomic instability due to the volatility of commodity prices and hampers other sectors, particularly manufacturing (Corden & Neary, 1982). Capital and labor force as well as export products emphasize some particular sectors that are resource-based.

In the short run, commodity dependence has a positive impact on economic growth by generating income through export revenue. However, by concentrating on specific products without diversifying via sufficient investment in other sectors, a country's economy is vulnerable to global economic conditions, especially when commodity prices fluctuate.

Structural transformation refers to the process by which economies shift from agriculture-based sectors (low-productivity) toward more industrialized and service-oriented sectors (high-productivity) as they develop. Countries with resource endowments, however, are found to have difficulty in transforming economic structure. This is because their economies are more likely to move from agriculture to low-productivity service sectors such as retail and wholesale instead of high-productivity manufacturing and service sectors (Csordas, 2021). There is, however, potential for commodity-dependent countries to achieve structural change if they can manage and utilize

their commodity revenues to invest in infrastructure and human capital, as well as to promote other sectors to diversify their economy for example in the case of Malaysia (Ahmad, 2016).

Laos is one of the resource-rich countries in Southeast Asia that experienced decades of high economic growth. This study aims to investigate the impact of commodity dependence on their structural transformation according to three criteria: (1) resources shifted to industry, (2) production transitioned from low-productivity to high-value-added, and (3) diversified exports. Furthermore, the study will examine the changes' impact on poverty and inequality. The paper will also determine an essential sector for the country's economic and social development and identify how to minimize the challenges in it.

II. OVERVIEW OF COMMODITY DEPENDENCE IN LAOS

Laos is a small landlocked country with resource endowments such as forestry products, minerals, and hydropower. The country transitioned from a centrally-planned economy to a market-oriented economy in 1986 under the implementation of the New Economic Mechanism (NEM). The government's strategy was to attract Foreign Direct Investment (FDI) inflow, particularly in hydropower and mining sectors. The economy relies heavily on exports, with them accounting for roughly 30% - 40% of GDP. Overall, 77% of total exports from 2019-2022 were resource-based products. Leading primary commodity exports include electricity, copper, and forestry products, which account for 28.2%, 7.6%, and 7.2% of total exports, respectively[21]. Thailand, China, and Vietnam have been the main trade partners of Laos since 2007. The country's reliance on export revenue and FDI inflow, which focuses on only a few export products and specific sectors, has resulted in the Dutch Disease type of impact on other sectors, especially manufacturing. Moreover, concentrating on only a few markets has made the economy more vulnerable to external economies. The Lao economy has experienced high economic growth of more than 6% per year since 1986. The GDP and income per capita have been increasing, whereas poverty has been significantly reduced from 1992 to 2019. Despite this economic growth, Laos has yet to successfully move to a high-productivity economy.

[21] According to United Nation Conference on Trade and Development (UNCTAD). https://unctad.org/topic/commodities/state-of-commodity-dependence

III. ANALYSIS ON THE IMPACTS OF COMMODITY DEPENDENCE

3.1. Impact on structural transformation

The main contribution to the Lao economy is the export of resource-based products. One of the main products being exported is copper, which remained the second highest export for more than two decades, but the price cycle of copper has had an impact on the Lao economy. As shown in Figure 1, copper's price began to increase dramatically from early 2000. The export of refined copper increased from 13.2% in 2005 to 37.3% by 2008[22]. This rise coincided with an opening for FDI, especially in mining and hydropower, as reflected by a 42.7% to 78.2% increase in resource-based exports between 2000 to 2015. Meanwhile, the export of non-resource-based products declined to 21.8% from 57.3% during the same period (Asian Development Bank, 2017). According to the Investment Promotion Department (IPD) within the Ministry of Planning and Investment (MPI), 95.7% of this FDI was in mining and hydropower, and only 2% went to the agricultural sector in 2019.

Even though the resource boom significantly assisted economic growth, its contribution to job generation has been minor. From 2000 to 2020, the share of the agriculture sector to GDP declined from 52.1% to 16.6%. Meanwhile, the contribution of industrial and services sectors to the economy has been increasing every year. The gradual increase in the contribution of the industrial sector contrasts to a decline in the share of agriculture, which signals the transformation from a low-productivity sector to a high-productivity sector. Despite this, the industrial sector is still dominated by resource-based electricity and mining industries. Specifically, mining in Laos is considered low-productivity as the products from mining are not being processed to add value. Instead, they are being exported as primary products to neighboring countries at a relatively low price.

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[22] According to The Observatory of Economic Complexity. https://oec.world/en/profile/country/lao

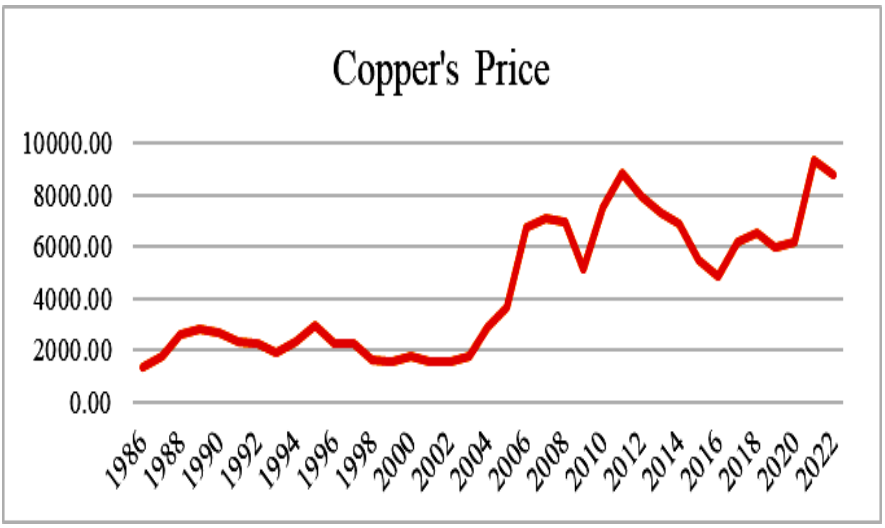

Figure 1. Commodity price cycles (Copper)[23]

Additionally, mining and hydropower are capital intensive, so increasing the investment in these sectors does not facilitate job creation. According to the 9th NSEDP report, in 2020 only 0.7% and 0.5% of total employment belongs to hydropower and mining sectors, respectively. Although the share of employment in agriculture has been reducing for the past two decades, it remains high. It accounts for more than 61% of jobs whereas 13% come from industrial sectors (0.7% from electricity and 0.5% from mining[24]) and 25.6% from services sectors (24.1% retail and wholesale trade[25]) in 2019 (Figure 3). This indicates that nowadays, while industrial and service sectors are large contributors to the country's economy, agriculture is the main sector that provides the majority of employment. Furthermore, although hydropower and mining are large contributors to the GDP, there is cause for concern. As resources are limited, focusing on mining may not be beneficial for the economy in the long term. Also, producing electricity from hydropower comes with a higher risk for damaging the environment, including marine animals as well as households residing in surrounding areas. There are also potential impacts on agricultural production.

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23 Source: World Bank Commodity Price Data.

24 9th Five-year National Socio-economic Development Plan (2021-2025)

25 9th Five-year National Socio-economic Development Plan (2021-2025)

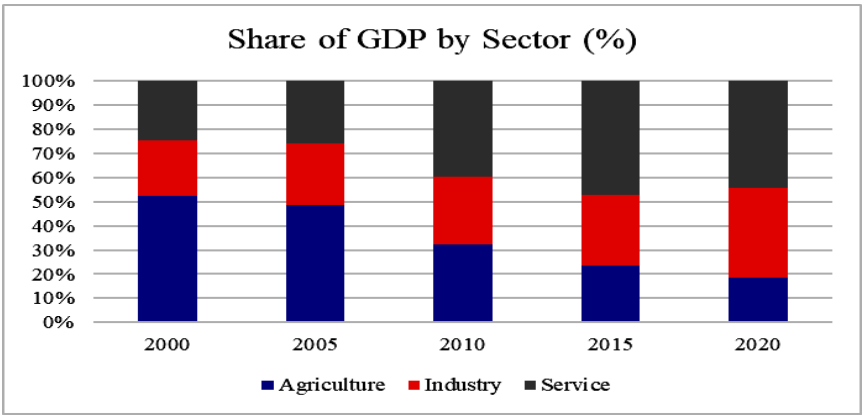

Figure 2. Contribution of each sector to GDP[26]

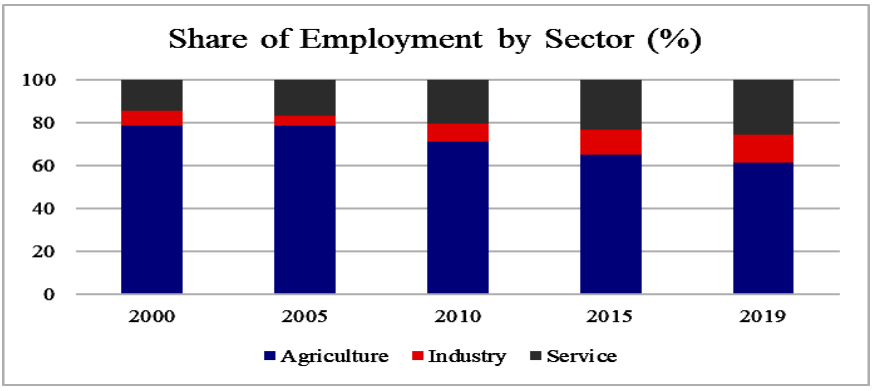

Figure 3. Employment distribution in sectors[27]

3.2. Impact on poverty reduction and income inequality

The boom in resource exports helped the Lao economy to grow and resulted in a high GDP growth per annum and a continued increase in per capita income. As shown in Figure 4, income per capita increased almost four times from 1992 to 2019. Poverty has declined significantly during the same period, from 46% in 1992 to just over 18% in 2019. However,

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[26] Source: Author's illustration. Data extracted from the 5th to 9th Five-years National Socio-Economic Development Plan (NSEDP)

[27] Source: Author's illustration. Data from the year 2000 to 2015 is extracted from the 5th to 8th Five-years National Socio-Economic Development Plan (NSEDP)
Data in 2019 is extracted from International Labour Organization (ILO)

the increase in industry does not contribute to poverty reduction like the agricultural sector because the agricultural sector provides livelihoods for 94% of poor households. Poverty reduction was mainly the result of agricultural growth as a consequence of the increase in farm income and crop sales (World Bank, 2020).

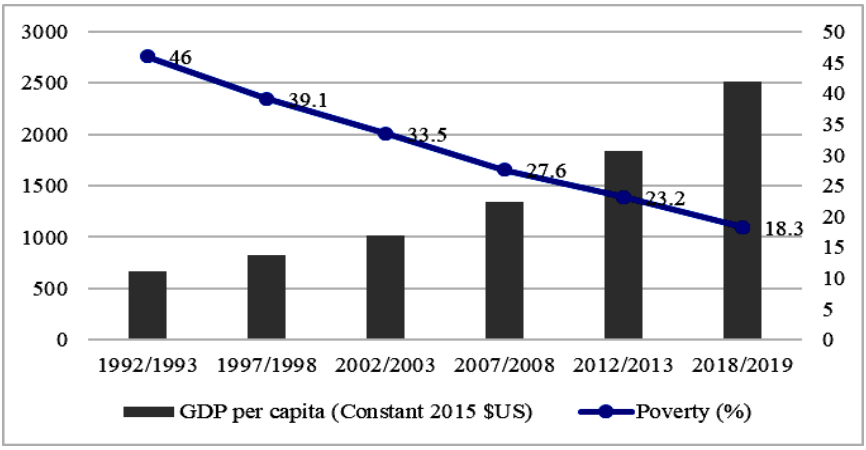

Figure 4. Per capita GDP and poverty reduction from 1992 to 2019[28]

Although poverty has been reduced, income inequality has increased. This might be due to an increase in wage differences between sectors following the commodity boom. As shown in Table 1, income inequality at the national level measured by the Gini coefficient rose to 0.38 in 2019 from 0.30 in 1992. Similarly, at the sub-national level, the inequality gap increased particularly in the northern region. According to the 6th Lao Expenditure and Consumption Survey (LECS6) from 2018 to 2019, poverty is higher in agricultural households. This indicates that income has been unequally distributed. Because agriculture is a seasonal activity and highly vulnerable to weather and natural disasters, self-employed and seasonally employed people are most affected. Despite the decrease in poverty rates among these two types of workers, it is considered as high coverage of around 20% to 25% respectively, and it is almost 5 times higher than those working in other sectors in 2019 (LECS 6).

[28] Source: Author's illustration using data of GDP per capita (Constant 2015 $US) from World Bank Indicator and data of poverty rate from Lao Expenditure and Consumption Survey (LECS1, LECS2, LECS3, LECS4, LECS5, and LECS6).

To summarize, Lao's economic structure has not been fully transformed by commodity dependence. Regarding the first criterion of structural change, it is obvious that the Lao economy increased its focus on investment in the industrial sector, specifically hydropower and mining. This suggests a shift from the agricultural to the industrial sector. Despite this, Lao has failed to provide employment. The share of employment in the agricultural sector remains relatively high and plays a significant role in creating job opportunities for households in rural areas. Regarding the second criterion, which refers to the shift of production from low- to high productivity, the Lao economy has yet to succeed. The majority of goods produced are primary goods and not likely to be processed to increase their value prior to supply to the domestical and international markets. Finally, the last criterion of diversification of exports remains a critical challenge for the Lao economy to manage. Export products from Laos are still dominated by a few resource-based and primary products. This indicates that the revenues from the commodity boom have not been maximized via investments in diversifying the economy for sustainability.

Table 1. Income inequality measured by Gini coefficient[29]

	1992-1993	**1997-1998**	**2002-2003**	**2007-2008**	**2012-2013**	**2018-2019**
National	0.30	0.37	0.36	0.38	0.36	0.38
North	0.27	0.35	0.31	0.35	0.32	-
Center	0.32	0.33	0.31	0.34	0.34	-
South	0.32	0.32	0.31	0.32	0.37	-
Rural	0.29	0.32	0.31	0.33	0.32	0.39
Urban	0.31	0.38	0.35	0.36	0.35	0.35

The dependency on commodities does not facilitate an economic structure transformation in Laos. Rather, it makes the economy weaker in the long run because of a lack of planning and strategy for sustainable development. One potential sector that can benefit the Lao economy is the agricultural sector. Laos possesses vast agricultural lands that contain good soil combined with tropical weather appropriate for most

[29] Source: Author's illustration using data from Lao Expenditure and Consumption Survey (LECS1, LECS2, LECS3, LECS4, LECS5, and LECS6).

agricultural activities. Investment in agriculture should be promoted to improve the quality standards of agricultural products in parallel with increasing the scale of production to respond to internal and external demands. Furthermore, as the agricultural sector plays a significant role in job creation, an increase in agricultural investment will not solely benefit the Lao economy but also improve the living standards of people, especially poor households living in rural areas.

IV. CURRENT OVERVIEW OF THE AGRICULTURAL SECTOR IN LAOS

The Lao agriculture sector has been growing in recent years. The major agricultural product is rice. Rice production occupies 72% of the country's agricultural land, with 62% of farming households engaged in cultivating rice[30]. Rice production in Laos is considered to be highly productive, but it is lower than in neighboring countries such as China and Vietnam, as measured in productivity by production per area (Table 2); 96% of the rice produced in Laos is consumed domestically, and the remaining product is mostly exported to Vietnam and China. Therefore, rice exported internationally contributed only a small share of the country's total agricultural exports.

The main agricultural export destinations from Laos are China (banana), Thailand (cassava, maize), and Vietnam (coffee). The major contributors to Laos' agricultural exports have been changing over time. While bananas were the main agricultural export product in the mid-and late 2010s, as supported by Chinese investors running large plantations in northern and central regions, cassava has become the largest agricultural export in recent years (Figure 5). The rise of cassava production and export is in response to an increase in demand for raw cassava from the three major trade partners (China, Thailand, and Vietnam) for bioethanol as well as domestic demand for cassava starch. In comparison to other countries in the region, the productivity of cassava in Laos is relatively high (Table 2). Also, coffee has remained one of the largest agricultural export products for more than two decades. Moreover, the production of coffee has moved from Robusta to high-value Arabica recently[31].

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[30] Resilient and Low Carbon Agriculture in Lao PDR - Priorities for a Green Transition. World Bank 2023

[31] Developing The Agribusiness Potential in The Laos-China Railway Corridor - Opportunities and Challenges. World Bank 2022

Table 2. Lao agriculture productivity as compared to other neighboring countries[32]

Country	Average crop productivity, 2017-2021 (Kg/ha)				Livestock stock, 2021 (n. heads)	
	Rice	Maize	Cassava	Coffee	Cattle	Pig
Laos	4,106	5,661	32,800	96	2,258,176	4,468,192
China	7,030	6,228	16,000	152	60,522,044	454,807,281
Thailand	2,983	4,464	21,200	32	4,627,914	7,743,876
Vietnam	4,792	4,792	19,400	135	6,365,300	23,533,400

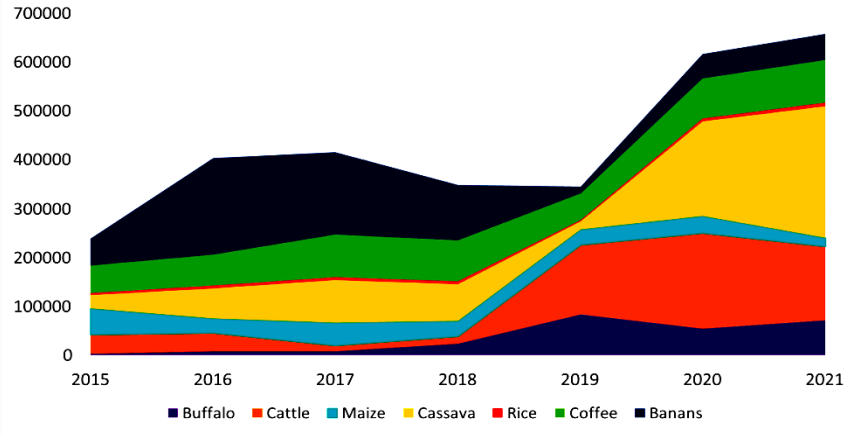

Figure 5. The main agricultural and live-stocks export from Laos ($ thousand)

Agricultural production in Laos, nowadays, has been growing with the support of Chinese investors. Currently, there are 933 agricultural projects in Laos run by Chinese nationals. Most of them follow the "2+3 system"[33], in which labor and land are provided by Laos, while capital, expertise, and markets are from foreign investors. However, some Chinese investors lease land in Laos to run agricultural activities by themselves. The rise of Chinese investors in the agricultural sector increases Lao agricultural exports, especially cassava, potatoes, coffee, bananas and sugar. 90% of agricultural exports go to China, Thailand, and Vietnam and most of them are primary products. However, according to the Ministry of Industry and Trade (MIT), most agricultural

[32] Source: World Bank 2023, Data extracted from FAOSTAT

[33] Radio Free Asia: https://www.rfa.org/english/news/laos/exports-02092024141323.html

products exported to China are products produced by Chinese and not Lao farmers. This is due to some conditions imposed in China on importing agricultural products from Laos. They only accept products produced by Chinese investors that meet their quality standards. In this case, although the export of agricultural products has increased significantly, Laos benefits only through tax, tariff, land concession, and transportation fees. Although there was an increase in agricultural exports to neighboring countries, revenue obtained from these exports was minimal and will not overcome the prolonged trade deficit.

Regarding this issue, it is crucial to improve Laos farmers' agricultural production quality to qualify for international markets which will open the opportunity for more exports. This requires a deep understanding of limitations and challenges within the agricultural sector.

4.1. Challenges in the agricultural sector in Laos

Laos has potential in terms of agricultural production as the country possesses an enormous land area that is suitable for growing crops. Despite this, there are a number of challenges remaining. According to the agricultural census, between 2019 and 2020, 52% of agricultural households are smallholder farmers who are poor, have low levels of education, and face difficulties on the supply side of operations such as limited access to financial institutions, infrastructure, and advanced technology. These limit their farms' productivity and affect their market participation. Therefore, most of their agricultural production is for their families' consumption and not for supply to the market.

Another challenge is land ownership, as most households living in rural and remote areas do not have official land ownership certificates which are a constraint to doing agricultural activities. Most poor households do not possess enough land to do farming for their subsistence and therefore sell their labor to those who own large agricultural lands to receive salaries in a return. In the case of some households who have difficulty finding off-farm employment, they normally rent land to do farming and have to pay lease fees to the landowner in the form of a certain percentage of their production as agreed in the leasing contract. However, due to challenges in accessing financial institutions[34] such as the unavailability of micro-finance, and

[34] IFAD. https://www.ifad.org/en/w/countries/laos

difficulty receiving credit from banks due to the lack of guarantee to borrow money, they cannot effectively use their land. For example, fertilizer cannot be sufficiently applied to accelerate production which results in low productivity.

Infrastructure including irrigation, water supplies, and transportation remains a challenge for the agriculture industry's growth. Despite an increase in government investment in irrigation, irrigation coverage in Laos is still considerably lower than in other countries in the same region such as Thailand, Vietnam, and Malaysia. Transportation, especially the connection between remote, rural areas and cities, is a major constraint for delivering agricultural products from smallholders where Laos-China railway cannot access. Agricultural products exported to Vietnam are mostly produced in the central and southern parts of Laos but exported to Vietnam through the eastern corridor and border checkpoints in provinces in the northeast. Therefore, it takes a longer time to export the products to Vietnam, especially with poor road conditions.

Further, a lack of access to information and inadequate integration of social media platforms in marketing for agriculture is a significant issue. As most agricultural activities take place in rural areas amongst poor farmers, access to the internet and the use of smartphones is limited. This makes accessing information regarding market demand difficult and limits producers from producing large amounts of products and supplying beyond their local markets. Moreover, social media platforms have not been utilized in the agricultural sector as revealed by low dissemination and promotion of domestic agricultural products on social media. Thus, it is less likely that consumers will understand the availability of agricultural products produced.

Moreover, the health condition of farmers is a challenge for the productivity of the agriculture sector. Poverty, malnutrition, and agriculture are interrelated. Poverty can cause individuals to be undernourished, which hinders their cognitive development and productivity. When those individuals enroll in the labor market, it leads to lower production, especially in agriculture production as the majority of malnourished workers are in farming. Anemia in adult workers reduces productivity levels, which results in economic loss. The annual economic loss due to the increase in number of anemia anemic laborers was estimated to increase from 82 million USD in 2013 to around 151 million USD in 2020 (Saykham, 2021). It was also found that the potential loss in

productivity due to the undernutrition of workers could be around 135 million USD in 2020. These figures were supported by Tiwasing et al. (2019), who studied the relationship between micronutrient intake and labor productivity of rice-farming households in Thailand. The study suggests that a lack of nutritious food consumption by workers interrupts productivity by reducing their time spent at work, increasing work absences and lowering outputs. The results also show that an increase in calcium, vitamin A, and iron can improve the earnings of the households as well as the outputs of agricultural production.

4.2. Enhancing agricultural production

To strengthen the agriculture industry, several challenges should be addressed. Improving agricultural production should not focus only on new technologies but also investment in human capital. This strategy will increase agriculture production and export potential as well as improve the quality of life for farming households. First, the action that would have immediate results is to increase access to formal financial resources by introducing bank branches and providing training to educate farming households about financial literacy. Access to formal financial institutions will increase the investment of households in agricultural activities, while financial knowledge will help to minimize the risk of debt traps and increase the chance of re-investment in agriculture.

Second, infrastructure must be improved; especially transportation. Domestic markets should be better linked across cities and provinces and for international trade by utilizing the Lao-China Railway for exporting goods to surrounding countries. This will provide opportunities for farmers to access the broader market and will incentivize them to increase production to supply the demand from local and international markets. Third, Laos must adopt more up-to-date technology in agriculture production to reduce the impact of weather, especially amidst climate change. This requires support from the government and FDI to provide technology and expertise. The rise in innovation integration will accelerate output and minimize the risk of production loss due to natural disasters.

Apart from investment in physical capital, investment in research and development (R&D) is essential. To improve the quality of agricultural production, human resources need to be enhanced by

focusing on technical capacity building for agriculture that involves individuals. By promoting education for agricultural production through improved curriculums and providing specific training directly to current and potential farmers about methods of producing agricultural products that respond to the current challenges of climate change and advanced technology use, the situation can be improved. Laos must enhance the collaboration between related institutions such as universities, the Ministry of Agriculture, the Ministry of Education and other related organizations to carry out more scientific research related to improving agricultural production. This would ensure the effectiveness and productivity of agricultural production and will help to improve the quantity as well as quality of the agricultural products, allowing them to reach a standard required by many importers. Importantly, Laos must consider promoting sustainable agricultural production to attract more trading partners from developed countries as the demand for clean and sustainable products is increasing, especially in European countries. Therefore, by emphasizing sustainable agricultural, production will potentially increase.

Value addition to agricultural products is necessary, as most agricultural exports are primary goods. Export prices for primary products are relatively cheaper than processed goods, which results in a trade deficit for the Lao economy. Therefore, improving the quality of agricultural goods and adding value to products by turning primary goods into either semi-finished or finished products with packaging strategies is needed. Moreover, sustainable agriculture should use all parts of products by utilizing waste to make by-products. For instance, rice husks and coffee pulp can be turned into fertilizer products.

In parallel, there must be a focus on long-term investment in human resources, especially on young children to build healthy workers. Building inclusive healthcare and education for households in rural areas to produce better health and skills for future workers with an aim of enhancing the productivity of human resources will result in higher productivity in the long run. Since most households living in rural remote areas are poor, access to education and health services remains a challenge. The widely used modality is implementing cash transfer programs aimed at improving the health of poor households via additional income from the program. Laos has been implementing a conditional cash transfer program (CCT) in four provinces since 2020.

V. IMPACT EVALUATION OF THE CONDITIONAL CASH TRANSFER PROGRAM

Although the CCT program has been implemented in four provinces (Phongsaly, Huaphanh, Xiengkhouang, and Oudomxay), this study will only evaluate its impacts on children in Phongsaly province from 2020-2022, by using a complementary method between Propensity Score Matching (PSM) and Difference-in-Difference (DiD). The reason for choosing Phongsaly province as a study case is because the province has the highest prevalence of stunted growth of all provinces. It was 54% in 2017 compared to 13.8% in the capital of Vientiane[35]. The province is located in the far-northern part of Laos, which is a mountainous area and has limited access to infrastructure. Therefore, studying the impact of the CCT program on Phongsaly province will be illustrative.

Figure 6. Prevalence of stunting by provinces in 2017 (Author's illustration)[36]

In terms of methodology, DiD is a common method that can be used for evaluating the impact of a CCT program (Gitter & Barham, 2008; Lagarde et al., 2009). DiD compares the differences pre- and post-implementation of the program between individuals participating in

[35] Lao Social Indicator Survey II (LSIS II) 2017

[36] Using data from Lao Social Indicator Survey II (LSIS II) 2017

the program (treated) and non-participating individuals (control) (Gertler et al., 2016). However, while DiD requires data from at least three time points (Unnikrishnan et al., 2022), the dataset used in this paper contains only two time points (baseline and midline) and does not have data available before the baseline; in this case, the parallel trend assumption of DiD is "untestable".

The PSM is thus carried out before performing DiD to match samples and ensure that the samples selected have similar characteristics. The approach of combining PSM and DiD in policy evaluation was initially proposed and employed by Heckman et al. (1998) and there are several studies that apply this methodology for impact evaluations of interventions such as Abadie (2005), Smith and Todd (2005), and Stuart et al. (2014). This complementary method helps to minimize selection bias issues that potentially affect the estimates of DiD (Austin, 2011). Moreover, Chen et al. (2024) suggested that integrating PSM with DiD enhances the likelihood of achieving the parallel trend assumption between samples in treated and control groups.

The results of the study suggested an impact of CCT in improving the height-for-age of children by a 0.22 standard deviation with less likelihood of children who enrolled in the CCT program experiencing stunted growth as compared to children who did not receive cash transfers. However, the results are not sufficient to see a significant impact, as COVID-19 may have had an impact on the efficiency of the implementation of the program. In terms of food consumption, the CCT program was found to have a significant impact by improving the variety of food consumed, as beneficiaries consumed more diverse food groups than non-beneficiaries. This is a good indicator of improved nutrition in the participating households (Table 3).

Table 3. Result of impact evaluation of CCT program

Variables	HAZ	Stunted (1/0)	Dietary Diversity
DiD(β_3)	0.218	-0.061	0.076*
	(0.164)	(0.051)	(0.043)
Observation	1,140	1,140	1,140

*, **, *** denote p-value < .1, .05, .01 respectively. Value in parentheses is Huber–White robust standard error.

(Source: Author's estimation)

The results of the impact evaluation indicate that CCT program has potential to improve nutrition for participating households. In this case, the CCT program would facilitate increased agricultural productivity because, as suggested by Tiwasing et al. (2019), an increase in nutritious food consumption helps to increase a household's earnings and increase rice production. This indicates that the CCT program will indirectly improve agricultural productivity by improving the health and nutrition status of households. However, the efficiency of the program's implementation should be improved to increase its impact on improving the nutrition status and health outcomes of households beyond increasing dietary diversity.

VI. CONCLUSION

Laos is a resource-rich country that falls into the commodity dependence classification. The economy is hindered by its dependance on income from exporting resource-based products, particularly hydropower and mining. A commodity boom has had a positive impact on the Lao economy by contributing to economic growth and an increase in income. However, the growth did not fuel structural transformation. While Laos' economic structure has moved from the agriculture to industrial sector as indicated by their respective share of the GDP, the industrial sector is dominated by resource-based industries that do not absorb employment. Although there has been a reduction in employment share in the agriculture sector, it is still considered a high employer compared to other industries. Furthermore, outputs have remained in low-productive goods rather than high-value-added products. Additionally, export products have not been diversified with a large contribution of total export still coming from resource-based products: electricity and copper.

The commodity boom continues to have positive impacts on income generation but not necessarily on poverty reduction. It even widens the income gap. Due to a lack of information on wages, this analysis could not identify the impact of wage differences across sectors.

The unsuccessful transformation of the economic structure during the commodity boom may be caused by many factors involving policy, regulation, and incentives from the government to stimulate investment in other sectors, which need further exploration.

Commodity dependence in the case of Laos reveals the difficulty in transforming economic structures. Moreover, this study recommends the agricultural sector as a potential place for Laos to pursue economic development.

6.1. Recommendations

To focus on and promote investment in the agricultural sector and enhance agricultural production through several pathways, the following can be done:

- Invest in human resources for both populace health and capacity building to improve labor productivity.
- Enhance land tenure security to increase land ownership rights and increase agricultural investment.
- Increase research and development (R&D) for agricultural production to improve the quality and productivity of the production
- Improve infrastructure, particularly irrigation, finance, internet, and transportation to facilitate and support agricultural investment and production and ensure the quality of agricultural products to achieve standards imposed by major export markets.
- Promote more processing of agricultural products domestically to increase their value before exporting to domestic and international demands. Increase the diversity of domestic products, especially inelastic agricultural products that are necessary for daily consumption, to help stabilize consumer prices in the country.
- Maximize use of the Laos-China Railway to expand markets and export more agricultural products to surrounding countries.
- Expand markets to other countries within and outside the region, particularly European countries where the demand for sustainable agricultural products is high by beginning to emphasize clean and low-carbon agricultural production.

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THE LAO ECONOMY AFTER THE COVID-19 PANDEMIC: INSIGHTS AND RECOMMENDATIONS FOR FUTURE GROWTH

Toun Phetvongxay

I. INTRODUCTION

The Lao People's Democratic Republic (Lao PDR) has a small, open economy with significant growth potential driven by its rich natural resources and strategic location in Southeast Asia. With a population of around 7 million people and a GDP per capita of approximately 2,075 USD per person, Laos has undergone a remarkable transformation since 1986, shifting from a centrally planned economy to a liberalized and open market economy via the so-called New Economic Mechanism (NEM) which refers to a country opening to international trade and attracting foreign direct investment. This transition has brought significant socio-economic changes, particularly during the rapid economic growth of the 2010s when the country achieved an average GDP growth rate of around 7% per year from 2014 to 2018, largely driven by the growth of industrial and service sectors.

However, the growth momentum has been disrupted by the global pandemic, which exposed the economy to both internal and external shocks. As a result, GDP growth has fallen below pre-pandemic levels, primarily due to declines in electricity exports, lower foreign investment, and constraints on private consumption. Meanwhile, the annual inflation rate reached a peak of 31.23% in 2023[37], driven by sharp currency depreciation and rapidly rising commodity prices. Furthermore, public debt has surged to a level exceeding current GDP, raising concerns about government financial management and macroeconomic stability.

Apart from the above challenges, the Lao economy continues to grapple with several chronic issues that have not been adequately resolved, including a lack of economic sector diversification, ongoing trade deficits, and local currency instability. Despite these challenges, the service sector has shown rapid growth in the post-pandemic period,

[37] Annual Report 2023, Bank of the Lao PDR, https://www.bol.gov.la/en/fileupload/28-06-2024_1719576615.pdf

offering potential improvement for economic recovery, and opportunities to leverage the country's resources and strategic location for future development.

This paper conducts a comprehensive study on the changes of the Lao economy in two different periods: pre-pandemic (2014-2018) and post-pandemic (2019-2023) to answer the three following questions:

- How has Lao's economy changed after the pandemic? (at the Macroeconomic level such as GDP growth, exchange rate, inflation rate and public debt to GDP)
- How has the pandemic highlighted the underlying problems of the Lao economy?
- What recommendations can be made for future growth strategies?

By exploring these questions, this paper seeks to provide useful recommendations to identify strategies for sustainable development and room to address the current existing issues.

II. LITERATURE REVIEWS AND RELEVANT DISCUSSIONS

The World Bank, Lao economic monitor, November 2023 reported that despite current macroeconomic instability, economic growth continued to recover in this year, as contributed to by a steady improvement in tourism, transportation and logistics services as well as foreign investment. Nevertheless, GDP was expected to grow at 3.7% in 2023, which was slightly lower than the projection in May 2023, primarily reflecting higher-than-expected kip depreciation and inflation, labor shortages, and unfavorable weather.

The Asian Development Bank (ADB) (ADB, 2023) reported that economic growth in the Lao People's Democratic Republic (Lao PDR) was projected to be lower than expected because of weaker growth of the People's Republic of China, natural disasters, and macroeconomic difficulties resulting mainly from unsustainable public debt and Lao kip depreciation.

Several research papers and journals explored the Lao economy before and after the pandemic outbreak. Jumlongnark (2024) examined the present condition of the Lao economy by analyzing key economic indicators such as GDP, inflation rate, exchange rate, public debt to GDP, and unemployment rate. The findings reveal that the country is

undergoing an economic downturn, and the economy has encountered challenges, including lower GDP growth, a high unemployment rate, inflationary pressures, and unfavorable exchange rates.

Keokhoungning et al. (2023) examined the impact of COVID-19 on the energy sector in Laos during 2020, with results suggesting that the sudden reduction in economic activity did not drastically disrupt operations; however, revenue was reduced. To improve the efficiency of cost reduction and increase exports, strategic sizing and placement of solar energy installations should be taken into account.

Kyophilavong and Toyoda (2008) analyzed foreign capital inflows in the natural resource sector's impact on the Lao economy and highlighted how foreign capital inflows in the natural resource sectors encourage economic growth. Meanwhile, capital inflows have increased prices and appreciated real exchange rates, which leads to declining exports.

Kyophilavong (2012) focused on the impact of the Global Financial Crisis (GFC) and the declining demand for world trade through declining real GDP in the global economy using an IMF projection. The simulation results show that the GFC has a negative impact on the Lao economy by declining real GDP, welfare, and trade balance.

Phetpaseuth (2017) investigated the factors contributing to low levels of Foreign Direct Investment (FDI) to Lao PDR in order to provide recommendations for the Lao government and relevant institutions. The results reveal several significant variables, particularly infrastructure, market and economy sectors, political and government regulations, human resources, and financial availability. These factors are the main issues that the government and policymakers need to review.

Keothephar (2024) investigated the dynamic relationship between external debt, inflation rate, and the exchange rate of the Lao kip (LAK) against the US dollar over the period of 2000 to 2021. Results obtained by utilizing time series data and the Autoregressive Distributed Lag (ARDL) model reveal that there is a significant long-term positive relationship between external debt and the inflation rate with the exchange rate. Policymakers must ensure a stable and controlled inflation environment by utilizing inflation targeting and other monetary policies to ensure that inflation is under control. This will stabilize the exchange rate and prevent economic vulnerability.

III. OVERVIEW OF THE LAO ECONOMY IN PRE-PANDEMIC AND POST-PANDEMIC PERIODS

3.1. Pre-pandemic period

Lao PDR was one of the fastest-growing economies in ASEAN during the 2010s. This remarkable growth was a product of its plentiful natural resources which have fueled significant export opportunities, especially in sectors like hydropower and minerals. Additionally, the inflow of FDI from major economies, especially China, has played a crucial role in supporting the Lao economy. The growth in this period was mainly supported by the construction of Lao-China railways and the expansion of hydropower plants. In order to gain an overview of the economic situation, we will take a look at important macroeconomic variables from 2014-2018, which is 5 years before the pandemic outbreak. We will focus on GDP growth, exchange rate, inflation rate, and government debt to GDP in order to comprehensively understand the economic landscape during this period.

3.1.1. GDP growth

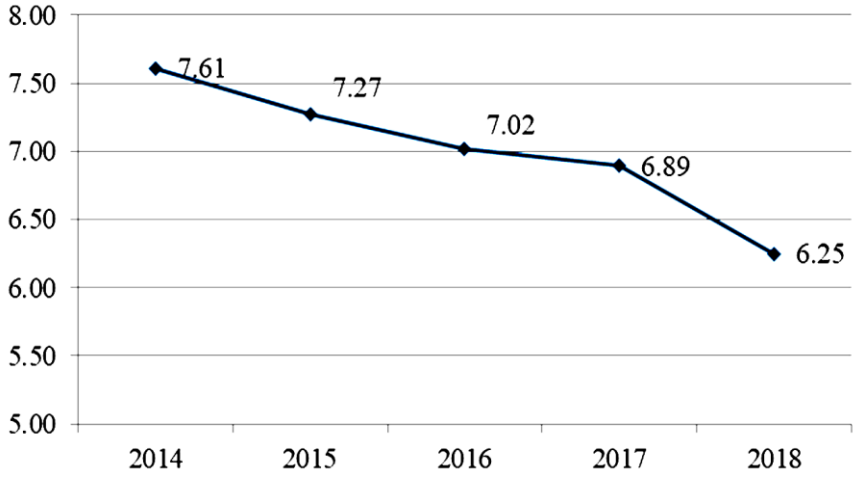

Figure 1. GDP growth rate 2014-2018[38]

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[38] According to the data from World Bank, https://databank.worldbank.org/source/world-development-indicators#

From 2014 to 2018, the GDP growth rate was consistent, averaging 7.0% per year. This period of growth not only highlighted the country's economic potential, but also its ability to attract international investors seeking to tap into the country's rich resources and strategic location within the region. In this period, the main exports were electrical energy, mining, and agricultural products, while import products were mainly fuels and oil, machinery and equipment, vehicles, and consumer goods.

3.1.2. Exchange rate

Exchange rate to relative currency, particularly USD, exists in the normal range between 8,042.42 to 8,401.33 LAK/1 USD, which is not much different from the previous period. The exchange rate plays virtual rules to the inflation rate in Lao PDR, particularly because the country is highly import-oriented. A significant portion of Laos's consumer goods, raw materials, and essential goods are imported, particularly from Thailand, Vietnam and China, making the economy vulnerable to the fluctuation of exchange rates, not limited to LAK to USD, but also other main currencies, particularly the Thai Baht.

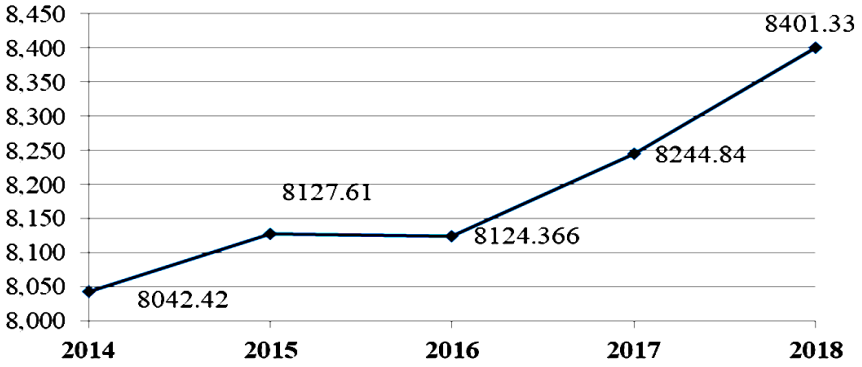

Figure 2. Annual exchange rate of LAK to USD from 2014 to 2018[39]

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3.1.3. Inflation rate

The inflation rate remained relatively low and stable between 2014 and 2018, fluctuating within the normal range of 0.83% to 4.13 %. On

[39] According to the data from World Bank, https://databank.worldbank.org/source/world-development-indicators#

average, the rate moves approximately 2% per year. Food price is a significant component of the consumer price index (CPI) and showed moderate movement. Transportation costs, which can heavily influence overall price levels, also remained manageable during this period.

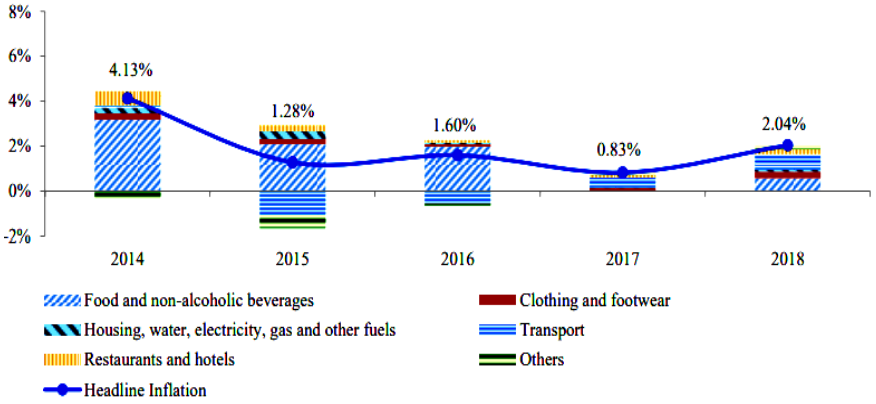

Figure 3. Headline inflation rate 2014-2018[40]

3.1.4. Government debt to GDP

Government debt to GDP was stable around 49.4% - 57% during this period. According to the report of the Bank of the Lao PDR, as of the end of 2018, total bilateral debt was registered at USD 6,377.19 million. The top lender of the Lao PDR is China, accounting for 53.5% of total bilateral debt, followed by Thailand at 21.12%, Russia at 4.2%, and Australia at 2%, respectively[41].

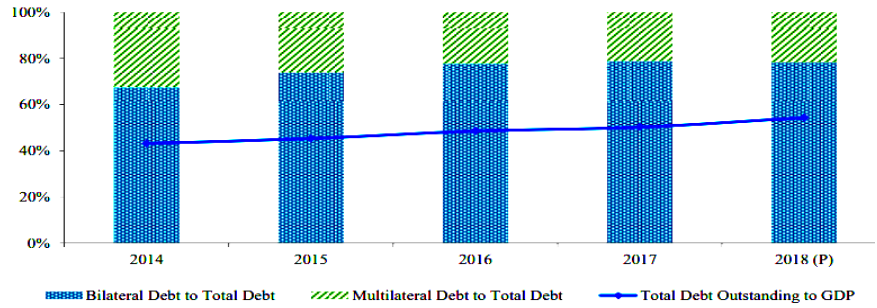

Figure 4. Public debt to GDP 2014-2018[42]

[40] According to the Annual Report 2018, Bank of the Lao PDR
[41] According to the Annual Report 2018, Bank of the Lao PDR
[42] According to the Annual Report 2018, Bank of the Lao PDR

3.2. What happen in post-pandemic period?

Laos faced multiple challenges after the pandemic outbreak. All variables changed rapidly compared to the pre-pandemic period. GDP growth decreased below the pandemic level due to a decline in electricity and mining exportation. Additionally, some mega construction projects such as Lao-China railways and hydropower dam have been completed. Therefore, the contribution of the construction sector to the GDP declined. On the other hand, there have been some limitations of government expenditure due to the heavy debt burden and constraints of private consumption and investment because of high inflation and sharp currency depreciation.

3.2.1. GDP growth

GDP growth rate significantly declined in the pre-pandemic period. Although there are signs of recovery, the average growth rate is still at 4.16% (a decrease of 2.84% from pre-pandemic average growth). The main reasons for this situation are decreasing demand on electricity imports from main trading partners, lower amounts of foreign investment, and constraints in private consumption. Breaking it down by economic sector, the growth in the industrial sector declined to 3.1% from 4.4% in 2022. In contrast, the service sector, particularly tourism-related activities, has been rebounding with a growth rate of 5.6%, contributing approximately 35.8% to the GDP.

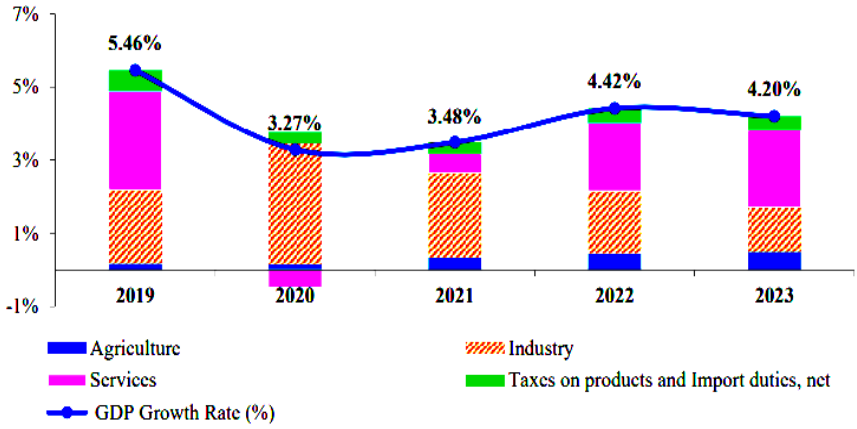

Figure 5. GDP growth by sector 2019-2023[43]

[43] According to the Annual Report 2018, Bank of the Lao PDR

3.2.2. Exchange rate

The exchange rate of the main currency fluctuated between 8,679.40 to 22,036.00 LAK to 1 USD. The Lao kip depreciated sharply, as we can see at the end of 2023 when the exchange rate of LAK to 1 USD reached 17,688.87, a depreciation of approximately 26% over one year and 110% over 5 years. Consequently, variations in the exchange rate not only affect the purchasing power of consumers but also impact the operational costs for businesses reliant on imported inputs and the overall investment environment. This situation exerts additional pressure on the inflation rate and overall economic stability in Laos. The main causes of sharp currency depreciation are internal and external factors. *Firstly,* the global economic landscape has changed rapidly after the pandemic outbreak. Many countries, particularly the United States, raised their interest rate to combat high inflation, which caused other currencies to depreciate against the USD. *Secondly,* the demand for foreign currency increased significantly due to a decline in exports and the necessity to pay for foreign debt as it matured. This combination of factors has exerted considerable pressure on the Lao kip, contributing to its sharp depreciation.

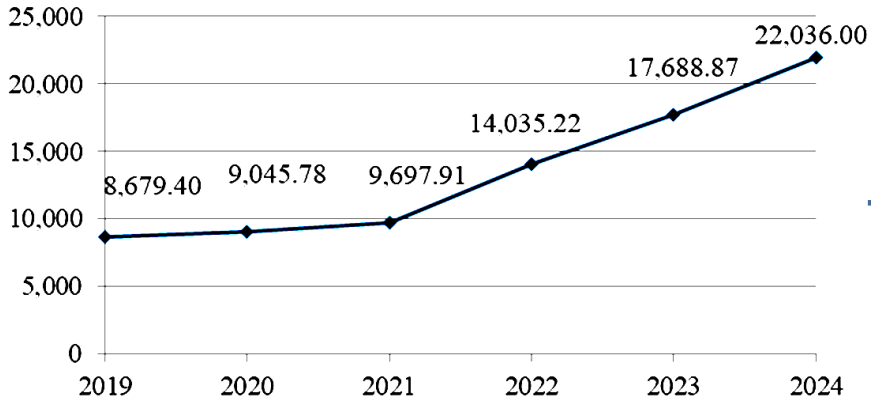

Figure 6. Exchange rate of LAK to USD 2019-2024

(Generated by the author)

3.2.3. Inflation rate

The inflation rate gradually increased after the COVID-19 pandemic. The rate reached double digits in May 2022 at 12.81%, which was followed by prolonged inflation until the present time. The rate reached its peak in February 2023 at 41.26%. The main factors

contributing to this inflation were rises in global commodities such as fuel and oil due to geo-political tension combined with the sharp depreciation of the local currency against major global currencies. When the value of the Lao kip depreciates, the cost of imported goods rises rapidly, leading to increased prices for consumers and contributing to overall inflation. "A prolonged period of high inflation has changed the job market in the Lao PDR, affected household living standards, and undermined human development", according to the World Bank's household survey 2024.

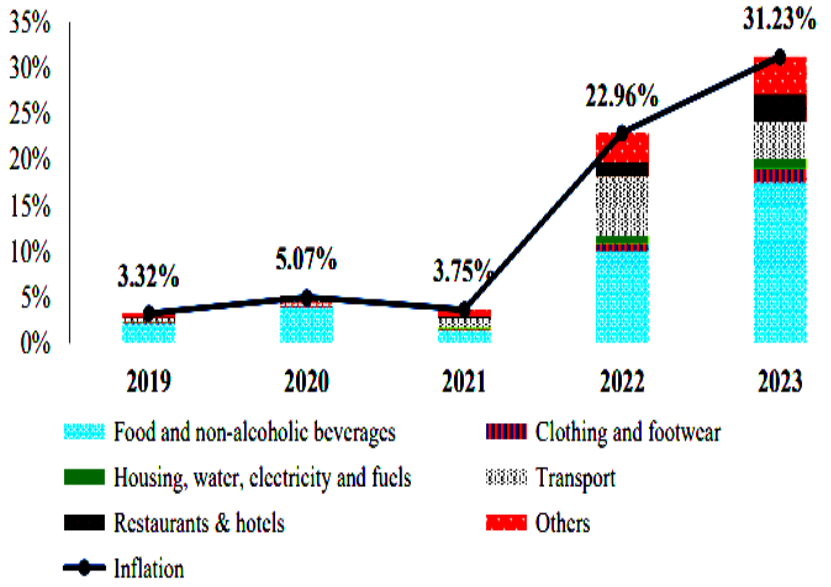

Figure 7. Inflation rate 2019-2023[44]

3.2.4. Public debt to GDP

When the debt to GDP increases at a high rate, the government becomes concerned about financial management. Public debt to GDP in Laos gradually increased from 60.58% to 122.81% in 2023, which exceeded the current GDP level. The pandemic exacerbated an economy already struggling to balance revenue and expenses. During the pandemic, many economic activities were shut down, making it difficult to generate income to service debt obligations. On the other hand, it was necessary for the government to boost the economy. As a result, the debt level has been increasing in the post-pandemic period.

[44] According to the Annual Report 2023, Bank of the Lao PDR

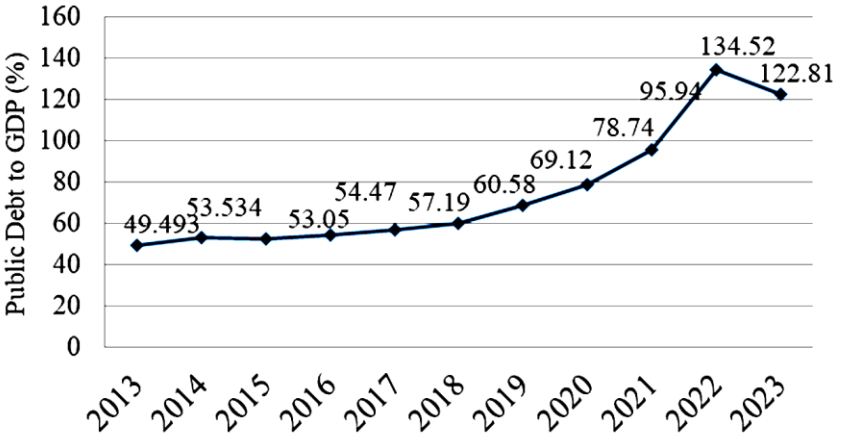

Figure 8. Government debt to GDP 2013-2023[45]

(Generated by the author)

3.2.5. Other consequences of current economic issues

The economic situation has had several spillover effects on Lao society, particularly resulting in labor migration, lower human resource development, and increasing poverty levels, which will have a significant impact on the nation's long-term growth. While there is an urgent need to promote FDI in the country, Laos is confronting a labor shortage problem exacerbated by the outflow of labor to other countries as driven by high pressure caused by hyperinflation and a low minimum wage. According to data from the Embassy of the Republic of Korea in Laos in 2024[46], the majority of Lao migrant workers are in Thailand, Japan, South Korea, and Malaysia. Approximately 228,000 workers are in Thailand and around 13,000 in South Korea. The resulting shortage of labor in Lao gradually disrupts local businesses and FDI, hindering their ability to maintain smooth operations. Meanwhile, the education sector also faces significant challenges due to the low number of students enrolling in schools. According to the data from Vientiane Times[47], there has been a

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[45] Author generated graph utilizing the data from World Bank, https://data.worldbank.org/indicator/GC.DOD.TOTL.GD.ZS?locations=LA

[46] Laos faces a rise in overseas migrant workers amid low wages https://overseas.mofa.go.kr/la-en/brd/m_1893/view.do?seq=515

[47] Lao National University Sees Record Low in 2024 Entrance Exam Enrollment Amid Job Market Concerns, https://laotiantimes.com/2024/08/21/lao-national-university-sees-record-low-in-2024-entrance-exam-enrollment-amid-job-market-concerns/

significant decline in students who take the enrollment exam for the National University of Laos, which decreased from 15,000 in 2016 to only 5,457 in 2024. These issues create significant concerns for the nation's long-term economic development, particularly the labor market and the country's capacity to attract FDI in the future.

IV. UNDERLYING ISSUES OF THE LAO ECONOMY

Researching the current economic situation in Laos allows for the identification of root-cause problems of its economic issues which have existed for a long time but have never been fully addressed. Particularly, a non-diversified economic sector, long-term trade deficit, and instability of local currency have been problems for decades. The author of this paper views COVID-19 as a trigger, not a cause that is fueling the current challenges of the Lao economy. To move forward and mitigate potential risks, the country may need to consider how to address the following structural challenges.

4.1. Non-diversified economic sector

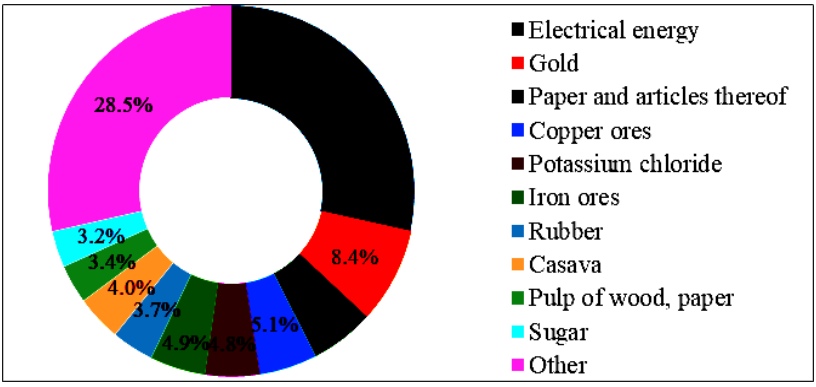

Figure 9. Export products in 2023[48]

(Generated by the author)

The Lao economy has been relying heavily on natural resource exports for years, which makes it vulnerable to external shocks (pandemic shocks, geopolitical tensions) and internal issues (natural disasters, environmental concerns). This leads to limitations in revenue

[48] Export by Products 2023, Ministry of Industry and Commerce, https://laotradestat.moic.gov.la/estat/search/summary?

sources and instability. Similarly, the overreliance leads to other issues, particularly a low foreign reserve level, trade imbalance, and currency depreciation. Figure 9 illustrates the main export products in 2023, which are mainly electrical energy (28.5%) and gold (8.4%), followed by paper and articles thereof (5.6%). Meanwhile, other potentially promising sectors such as tourism and agriculture, have not developed as expected.

4.2. Chronic trade deficit

A trade deficit is a result of a non-diversified economy. This is occurring while the Lao economy is attempting to reduce its dependency on imports and failing to promote domestic products. Moreover, export products are mainly primary goods, which typically generate low revenue compared to intermediate or processed products. This reliance on raw material exports limits Lao's ability to seek higher export values. As a result, a chronic imbalance of trade has existed for many decades. Figure 10 shows trade balance statistics of the Lao PDR starting from 1985. Since the beginning of its economic transition in 1986, the country has always experienced a trade deficit, except for in 2022 as the export of natural resource increased as combined with a diminishing demand on imports due to domestic economic challenges (sharp currency depreciation and high inflation).

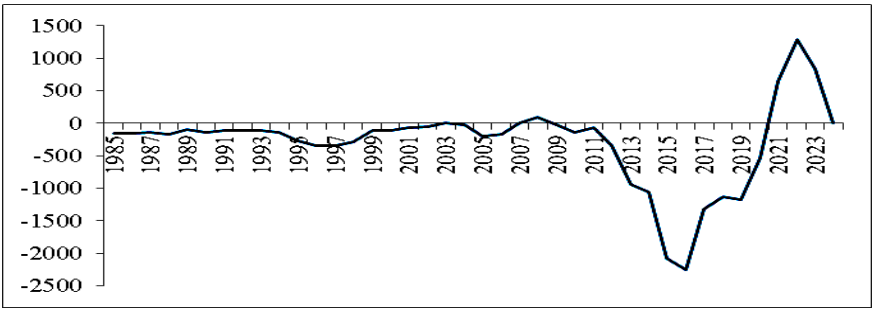

Figure 10. Net-trade in goods and service (USD million) 1985-2023[49]

(Generated by the author)

To enhance resilience against external shocks, promote a sustainable trade environment, and increase job creation, Laos can benefit significantly from boosting domestic production, particularly in the food and consumer goods sectors. Moreover, the country should consider

[49] According to the data from World Bank, https://data.worldbank.org/indicator/BN.GSR.MRCH.CD?locations=LA

adding more value to its exports to generate higher income to support its economic growth.

4.3. Instability of local currency value

Currency depreciation can boost exports for some economies. However, for import-oriented countries, the impact is reversed. Laos faces difficulties controlling its currency value due to two main factors. *First*, multiple currencies (USD, Thai Baht, and Chinese Yuan) have been widely used in the Lao PDR for years due to low trust in the local currency and a lack of strict controls on foreign currency payments. Additionally, currency exchange activities are mainly conducted in "unofficial markets", making it hard for the government to control them and further impacting the volatility of local currency. The instability of the Lao kip and high inflation rates also encourage demand to hold foreign currency and other assets as a safe haven, which is making the Lao kip depreciate more. The COVID-19 pandemic revealed how in attempts to boost the economy, many countries implemented expansionary monetary policies. However, Laos faced challenges in adopting such measures effectively. Thus, addressing the currency instability issue and promoting confidence in the Lao kip are necessary to ensure sustainable economic growth and resilience against future external shocks. Figure 11. shows the long-term trend of the Lao kip from 1990 to 2024, which depreciated in an upward trend, particularly after the pandemic outbreak.

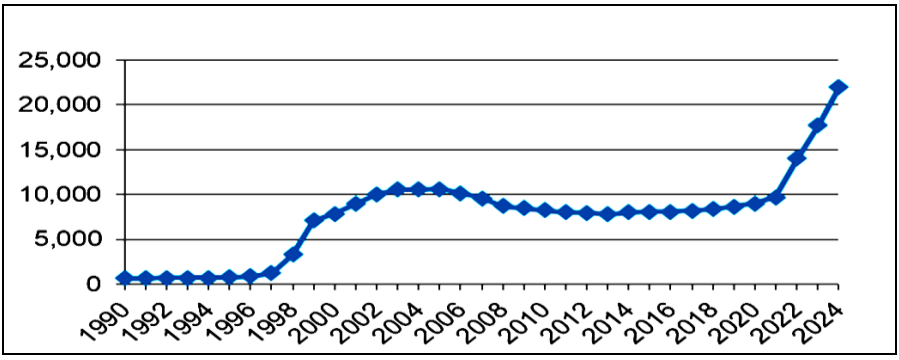

Figure 11. Exchange rate of LAK/USD 1990-2024[50]

(Generated by the author)

[50] According to the data from World Bank of the Lao PDR, https://data.worldbank.org/indicator/PA.NUS.FCRF?locations=LA

V. RECOMMENDATIONS FOR FUTURE GROWTH

In order to ensure the stability of Laos's economic growth, a long-term growth strategy must be established and the above fundamental issues must be addressed. This paper aims to provide recommendations on sustainable growth in order to mitigate future risks, particularly via diversification of economic sectors; promotion of exports through regional integration and trade agreements; stabilization of local currency value; and digitalization of economic activities.

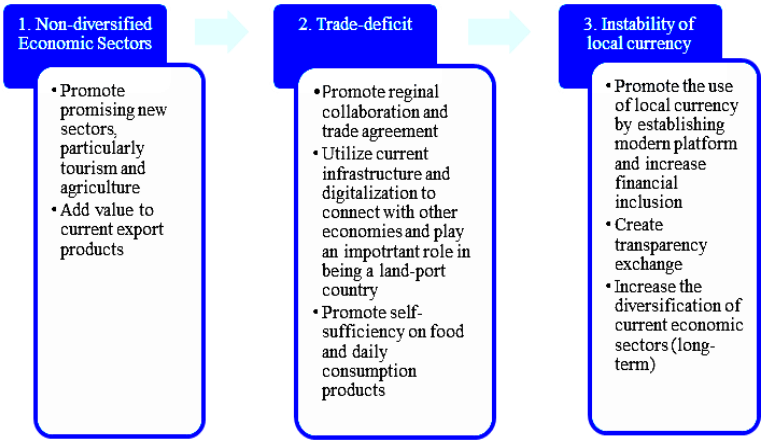

Figure 12. Three underlying issues of the Lao economy

5.1. Diversification of economic sectors

Diversification of the economic sector is essential for sustainable growth. Laos has relied heavily on natural resources and electricity exports for years. However, these sectors are becoming increasingly unstable due to resource limitations and environmental concerns. Meanwhile, the tourism and agriculture sectors have shown promising growth after the pandemic. The country could consider further developing these two sectors along with manufacturing to promote new sources of income and increase self-sufficiency in domestic production.

5.1.1. Tourism sector

After the pandemic outbreak, the service sector became the principal contributor to the Lao economy, accounting for 35.8% of the GDP in 2023. The tourism sector, specifically, has been growing with good momentum. Figure 13 illustrates how the main contributor to the service

sector is relevant tourism activities such as accommodation and food service activities, followed by transportation and information-communication activities. The number of tourists has been recovering to numbers nearly the same as pre-pandemic levels. This has contributed to a significant rebound in the tourism sector post-pandemic. Promoting the tourism sector can be beneficial to both local people and government revenue. However, Laos has room to improve its tourism sector to be more sustainable. Firstly, is must improve infrastructure to ensure connectivity for tourists. Secondly, it must shift focus to comparative sectors such as eco-tourism, cultural experiences, and agricultural tourism, which could create more jobs for local people utilizing their own unique values. Lastly, it must connect tourism with digitalization in order to enhance online visibility and access a wider target group all around the world. This can be done via several measures, especially launching digital marketing campaigns and establishing a platform to access up-to-date information easily. Such strategic initiatives will not only contribute to economic recovery but also promote sustainable development in Laos.

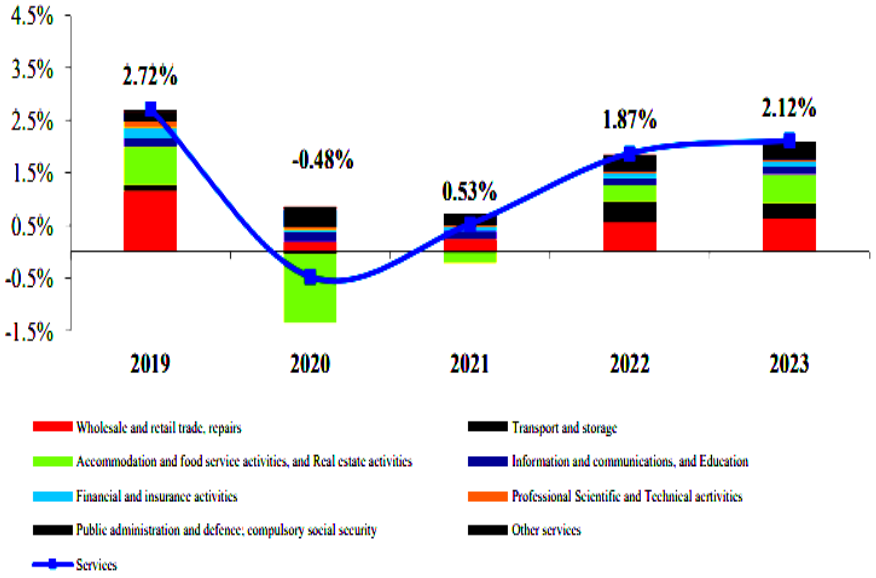

Figure 13. Service sector to GDP 2019-2023[51]

[51] According to the Annual Report 2023, Bank of the Lao PDR

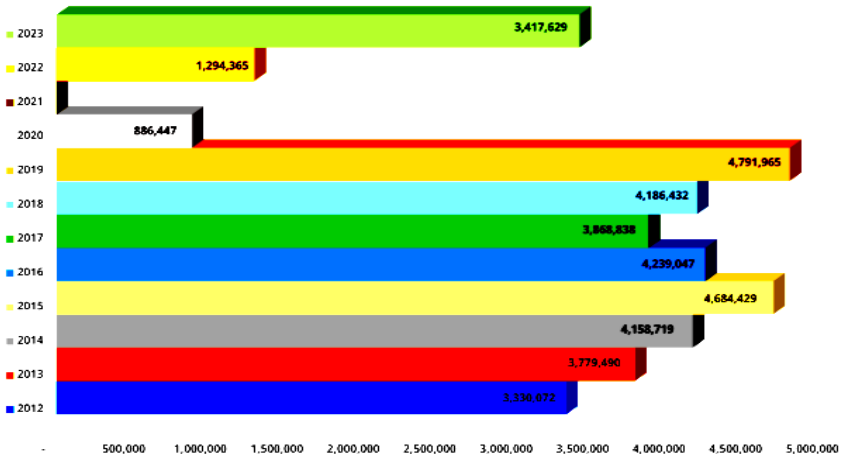

Figure 14. Number of foreign tourists 2012-2023[52]

5.1.2. Agriculture sector

With over 70% of the population employed in the agriculture sector[53] and large amounts of agriculture land relative to the country's population, Laos has significant potential for its agriculture sector. In 2023, the agriculture sector expanded by 3.7%, represented 21% of GDP and contributed to GDP growth by 0.5%. However, agriculture products accounted for only 11% of its total exports[54]. Given the high demand for agri-food, particularly organic food products, in many countries, such as the European Union and China, Laos has the opportunity to develop its agriculture exports by utilizing its access to large markets under unilateral quota-free, duty-free export agreements. However, ensuring quality and understanding markets are crucial for success. These can be accomplished via comprehensive market research and quality control. Furthermore, Laos can improve its agriculture sector by promoting the role of institutions to support know-how and training for farmers, as well as provide supportive policies to enhance export capacities.

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[52] According to the Statistical Tourism Report 2023 conducted by Ministry of Information, Culture and Tourism

[53] According to World Bank, Employment in agriculture (% of total employment), 2022, https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS?locations=LA

[54] According to the data from Ministry of Industry and Commerce, Department of Foreign Trade, https://laotradestat.moic.gov.la/estat/

5.1.3. Current exporting products

Although Laos earned significant revenue from its hydropower and mining sector exports, these are preliminary raw materials or primary products. Adding value to current export products, particularly mining, will not only generate more income but also create more jobs and further sustainability. The government could consider specific policies to process raw materials domestically before exporting them and thus allow for more economic benefits while creating more jobs for local people.

Regarding electricity exports, there is strong demand among ASEAN countries. However, money earned from this sector is still limited due to the narrow customer base and low-price flexibility resulting from the contract-based market system. To increase the value of electricity exports, the Lao government can consider establishing additional platforms for energy exports utilizing a market-based approach, which will allow more price flexibility, access and diversified buyers. It is also essential to ensure proper environmental management and enhance local capacity for exports. Table 1 illustrates the structure of electricity trade in ASEAN as of 2021. Laos was the largest net exporter, followed by Myanmar and Malaysia, respectively.

Table 1. Structure of electricity trade in ASEAN[55]

GWh	**Electricity trade balance**	**Electricity imports**	**Electricity exports**
ASEAN	778	40,897	40,119
of which			
Thailand	31,354	33,356	2,001
Vietnam	659	1,588	929
Singapore	0	0	0
Philippines	0	0	0
Myanmar	-1,317	0	1,317
Malaysia	-977	77	1,054
Lao PDR	-33,299	1,519	34,817
Indonesia	973	973	0
Cambodia	3,385	3,385	0
Brunei Darussalam	0	0	0

[55] Executive Connectivity in ASEAN, December 2023, https://www.enerdata.net/publications/executive-briefing/energy-connectivity-asean.pdf

5.2. Promoting trade activities utilizing regional integration and free-trade agreement

Leveraging regional connectivity and free-trade agreements provides Laos the opportunity to change from a landlocked to land-linked nation, then upgrade to a regional land-port. The Lao-China railway is a crucial component in connecting Laos to world markets and other economies in the region. According to a report from The Global Times[56], the Lao-China railway transported 4.22 million tons of cargo in 2023, which was an increase of 94.91% compared to the previous year. This trend provides evidence of how trade activities can be promoted through effective infrastructure. To ensure Laos's strategic position, it is crucial to invest more in infrastructure linking to railways while promoting logistics operations and digital customs facilities to serve as a transit hub for regional trading. This can be done by setting up a long-term strategy to promote PPP and FDI to contribute to infrastructure development and logistics businesses, as well as ensuring transparency and a favorable trading environment. These strategies will help Laos to maximize its competitiveness and play a crucial role in regional trading.

5.3. Ensuring stability of local currency

The stability of a country's local currency is significant for its development as it impacts domestic price levels and trust from foreign investors. The Lao government has been promoting the use of the Lao kip for several decades through advertisement campaigns and monetary policies; however, it has not been sufficient. The use of multiple currencies and an unofficial exchange market is still a common practice in Laos. In the short term, the government can consider several measures. First, it can promote an efficient and up-to-date local currency payment system and establish a foreign exchange market system to encourage the use of the Lao kip and eliminate unofficial markets. Second, Laos can impose strict control on foreign currency payments inside the country, which will further promote the use of only the Lao kip. In the long term, this can be done by promoting economic diversification, encouraging exports, promoting financial inclusion and improving the government's financial discipline regarding the state budget and public debt management.

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[56] China-Laos Railway Transports 4.22 million Tons of Freight in 2023, Global Times, dated Jan 03, 2024. https://www.globaltimes.cn/page/202401/1304712.shtml

5.4. Digital economy

The digital economy, particularly e-commerce, showed significant growth potential during and after the pandemic. This growth is largely driven by a rapid change in consumer behavior and the expansion of local logistic companies, which has rapidly increased trading activities. However, the regulatory framework governing e-commerce and related activities remains insufficiently developed under current legislation. By leveraging digital tools and enhancing infrastructure, Laos has the opportunity to connect its market to other economies such as China, Thailand, and Vietnam, which are not only trade partners but also potential large consumer bases. Combined with the diversification of economic sectors and digitalization, this connection will enable Laos to encourage greater trade and effectively link local producers with regional markets. Nevertheless, several key considerations must be addressed, particularly expanding digital infrastructure, promoting reliable e-commerce platforms, and issuing fundamental regulations to protect customers and producers.

VI. CONCLUSION

In the wake of the pandemic, the Lao economy faces multiple challenges to ensure its economic stability and maintain positive growth. Several key economic indicators have shown signs of an economic downturn, especially a slow GDP growth rate, sharp local currency depreciation, skyrocketing inflation, and high levels of public debt to GDP. The author of this paper views COVID-19 as a trigger, not a total cause fueling the current disruption of the Lao economy. Even in the pre-pandemic period, Laos experienced chronic problems which left it exposed to external shocks. In particular, the non-diversified economy, long-term trade deficit, and instability of local currency were matters of concern before COVID-19. To mitigate risks from future economic shocks, it is necessary to put more effort into diversifying economic sectors, promoting trade and investment activities, ensuring financial stability, and integrating digitalization. To do so, a centralized and resilient strategic plan for the long term, as well as significant contributions from both the public and private sectors is needed. Addressing these fundamental issues and maximizing the country's comparative advantages will gradually assist the Lao economy in achieving more stable growth in the future.

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