IJER © Serials Publications
13(7), 2016: 3153-3167
ISSN: 0972-9380

FINDING ECONOMIC STRUCTURE AND CAPITAL STRUCTURE FOR A "GREENER" ECONOMY*

Trần Thị Thanh Tú [2], Bui Trinh[3], Nguyen Thi Nhung[4] and M.A. Nguyễn Phương Thảo[5]**

Abstract: *This study applies the Dynamic Leontief and Ghoshmodels to analyzetheinvesment and CO2 that is emitted in the production in Vietnam economy. From our research result, it could be concluded that the credit banking should adjust the investment base on the real economy. That means, when the credit banking financing for region I (agriculture, forestry and fisheries) which has the high power of dispersion on economy and the lower power of dispersion on import and on energy, as well as reducing financing for resgion 2 which has higher power dispersion on import and on energy and lower power of dispersion on economy will make the economy become greener. It's the role of green financing and banking to adjust the economy from the brown to a green one. This paper suggests 4 scenarios with the restructure of investment in 3 regions, however, in the context of Vietnam economy, applying scenario 1 or 2 or 3 will be more feasible. The restructure of the economy will be paralell with improving the efficiency of these regions as well as the supporting industry development. By doing that, the power of dispersion on import will be reduced, increase the powever of dispersion on export.*

Key words*: Input Output analysis, green banking, green financing*

1. INTRODUCTION AND AIM

After the global economic crisis originated from the U.S. in 2008, several international conferences were held to discuss the problems relating to global economic and environmental crises and to restore economic needs associated with sustainable development. In December 2012, more than 6,000 representatives of banks and international financial institutions had met and discussed the role of the banking sector amid recovering global economy.

[2,4] Faculty of Finance and Banking, University of Economics and Business, Vietnam National University
[3] Research fellow of Association of Regional Econometrics and Environmental Studies (AREES), Japan
[5] National Centre for Socio-Economic Information and Forecast, Ministry of Planning and Investment, Vietnam
** Email: tuttt@vnu.edu.vn

Many experts and researchers agreed that one of the reasons leading to the last global economic crisis was that many banks did not have control on their lending activities properly. The banks also were condemned for their investment in industries harmful to the environment. Besides, banking is one of the high -income sectors facing public discontent in the context of a lack of fairness in economic development. From these reasons, there was a need to strengthen the role of banks and financial institutions in protecting people and the environment to maintain a sustainable development for the economy.

In recent years, the term "Green banking" emerged as a strategic development direction in banking sector. Green banking is considered as any kind of initiative banking practices for sustainable development taking into account the social and environmental impacts through their own environmental-friendly internal operations and green financing for their customers.

The green banking practices were developed in various forms and conducted in many countries around the world. In 1992, the United Nations Environment Programme Finance Initiative (UNEP FI) was established and engaged a broad range of financial institutions in understanding the links among economic development, environmental protection, and sustainable development and promoted the integration of environmental considerations into all aspects of the financial sector's operations and services.

Enacted in 1969, the National Environment Policy Act is an environmental law of the USA which calls for productive harmony between nature and man. This Act requires federal agencies to assess the environmental impact of their operations and to integrate the social and environmental values in their proposed actions. Due to this act, the whole federal agencies have to prepare a detailed statement known as EIS (Environmental Impact Statement) which contains the environmental effects of the proposed federal agencies' actions (NEPA 2014).The United States also was the first nation to regulate the environmental responsibilities of stakeholders, including bank loans in the Reimbursement Act, Comprehensive Environmental (CERCLA) in 1980. Examples of green banking in the U.S. are Green Choice Bank in Chicago area and Green Bank in Dallas.

In the UK, the Green Investment Bank (GIB) was established in 2010 by agreement of the UK government coalition to address the problems such as failures of the free market, risk aversion, high transaction costs and lack of funds.By comparing GIB interventions to other possible policy vehicles, the analysis of Vivid Economics and McKinsey (2011) showed that GIB could improve green policy outcomes significantly by using targeted investment because of its ability to obtain policy objectives more efficiently. GIB's intervention helped to mobilize funds from equity markets and debt markets and enable pricing of risk in financial markets through enhancing transparency and widened investment flows into sustainable development projects.

Under the critical threat of environmental pollution, the financial sector of Bangladesh has played a key role in enforcing businesses to design their strategy and

action plans protecting the environment. Ullah (2010) has made a comparative analysis on green banking practices among different types of banks and found that the fundamental elements for the development of green banking had changed investment management, deposit administration, recruitment and social responsibility of business as well as raising public awareness.

Zhang et al (2011)analyzed the process of the green credit policy using observations and face to face interviews with twelve selected banks in China. They found that the green credit policy had not fully implemented in China due to the main following problems, namely, the wide-ranging effect on high-polluting and high energy-consuming industries, vague policy details unclear green credit standards, and lacking of environment information for banks to evluate loans.

In Vietnam, the "Green Finance" and "Green Bank" are considered as a part of the "Green growth" as indicated in the National Strategy for the period 2011 - 2020 and Vision to 2050 issued by the Prime Minister in September 2012. However, how to improve the role of green bank in the Green Growth is an important question for not only for policy makers but also researchers. Therefore, this paper tries to apply the Input Output model to estimate the impact of green sector on the economic growth in Vietnam, then suggest how to improve the role of green bank toward to greener economy.

Thisstudycontinuesresearchontheimpact of energy and air emissions in a changingeconomicstructure (KiyoshiKobayashi et al. 2011). Thisstudyappliesthe Dynamic Leontief and Ghoshmodels to analyzetheinvesment and CO2 thatisemitted in the production. Then, we can see sectors that have the high capital requirement, low production efficiency; use more energy and emit more emission in the environment in Vietnam economy. This research also set a plan to change this situation. It is important to notice that the concept of capital and growth was mentioned by economists such as Adam Smith, David Ricardo, Karl Marx and Roy F. Harrod (1939), Evsey Domar (1946) Robert Solow (1956).

This study includes five parts: Part I: Introduction, Part 2: Overview the previous research of green finance role in the green growth strategy and the previous studies using input output table (I/O table) in analyzing sector structure and economic growth. Part 3: Methodology and data sources to analyse the sector structure towards a green economy. Part 4: Discussions and recommendations to develop the impact of the green finance and banking sector to economic restructuring towards green growth.

2. LITTERATURE REVIEW

In recent years, the term "Green banking" emerged as a strategic development direction in banking sector. There are numerous studies suggested definitions of Green Banking. Green Banking refers to the banking business conductedin such areas and in such a way that helps the overallreduction of external carbon emission and internal carbonfootprint. To aid the reduction of external carbon emission,banks should finance

green technology and pollutionreducing projects. To reduce internal carbonfootprint, banks should apply decrease their massive use of energy e.g. lighting, air conditioning, electronic/electrical equipments, IT, high paper wastage, lack of green buildings etc. (Rahman et al.2013).

Bihari (2011) emphasizes that green banking promotes social responsibility where banks consider before financing a project whether it is environment-friendly and has any future environmental implications. Green banking helps to shift banks' objectives from "profit only" to "profit with responsibility".

Lalon (2015) supposed that Green Banking is any form of banking from which the country and nation gets environmental benefits. A conventional bank becomes a green bank by directing its core operations toward the betterment of environment. It means developing inclusive banking strategies which will ensure substantial economic development and promoting environmental-friendly practices.

Singh and Singh (2012) supposed that Green banking is like a normal bank, which considers all the social and environmental factors with the goal to protect the environment and conserve natural resources. It is also called as an ethical bank or a sustainable bank. Green banking means combining operational improvements, technology and changing client habits in banking business. On the aspect of banking professionals, green banking involves sustainability, ethical lending, conservation and energy efficiency.

Meena (2013) identified that green banking refers to the banking business that helps the overall reduction of external carbon emission through financing green technology and pollution reducing projects. The banking sector can play an intermediary role between economic development and environmental protection because it provides major sources of financing for industrial projects which cause maximum carbon emission. Green banking is a component of the global initiative by a group of stakeholders to save environment. Green financing is considered as a part of green banking. Green financingmakes great contribution to the transition to resource efficient and low carbon industries, for example financing green technology and pollution reducing projects.

Input-output analysis is an importantly quantitative economic technique that shows the interdependencies between the various branches of a national economy and even between the various branches of different, possibly competing economies (Thijs Ten Raa, 2009). The input – output model illustrates inter-industry relationships within an economy, showing how output from one industrial sector may become an input of another industrial sector. The input-output table or matrix contains a series of rows and columns of data that quantify the supply chain for different sectors in the economy. In the inter-industry matrix, column entries typically represent inputs to an industrial sector, while row entries represent outputs from a given sector. This format therefore shows how dependent each sector is on every other sector, both as a customer of outputs from other sectors and as a supplier of inputs.By using I-O models,

economists can estimate the change or direct (initial), indirect (secondary) and induced (tertiary) impacts in output across industries due to a change in output in just one or more specific industries.

The input output theory was developed by Wassily Leontief, who received the Nobel Prize in economics for this contribution in 1973. The first I-O tables built for the U.S were 1919 and 1929 I/O tables in 1936. In 1941, this work was published under the name "The Structure of the U.S Economy". His input-output tables, which show how changes in one sector of the economy can affect other sectors, have been used by the World Bank, the United Nations and the U.S. Department of Commerce. Moreover, the I/O model is considered as the center in the system of national accounts (SNA) of the United Nations, published the first in 1953.

Thijs Ten Raa (2009) listed three reasons for what until now, most countries built their input output tables: (i) its transcendence (input-output analysis transcends free market economies and when Input-output models are applied correctly, they can be powerful tools for estimating the economy-wide effects of an initial change in economic activity), (ii) its globalization including international trade and environmental impacts, (iii) its practice (the OECD in Paris has organized and maintained a consistently international input-output database which facilitates worldwide use.

In the previous decades, there are a lot of studies in extension of basic I/O model, including Social Accounting Matrix - SAM (Richard Stone, 1961), System of National Account – SNA, Demographic - Economic modeling (Miyazawa, 1966), regional input-output (I-O) models (Rebecca B. et al, 2011), Multiregional input-output (MRIO) models based on a set of interconnected input-output tables of various countries (Miller and Blair, 2009) and inter–regional model (Miyazawa et al, 1976), These extension I/O models were built and applied by most countries in the world for analyzing and forecasting the economy (Pyattans Roe, 1977; Cohen & et al, 1984; Pyatt and Round, 1985 and many other researches). Moreover, there are many different applications of this model such as I/O analysis, SAM analysis and CGE model. These analyses are mainly based on the basic relationships in I/O model and SAM.

Miyazawa expanded I/O model to a demographic model - economic modeling and this model has been completed by Bateyand Madden (1983). The model introduced the concept of Leontief inverse matrix and expand Leontief extended system for Keynes multipliers, which can analyze the relationship between income groups and respective consumer groups. Additionally, the model was also used to analyze the structure of income in order to quantify the relationship between income from production and income from non-production.

Nowadays, the green economy makes significant developments at a global scale, the environmental protection industry has become an increasingly important part of all the national economies in the world. It is expected to become a future pillar of all countries. In order to improve SNA, in 1993 the United Nations introduced the first System of Environmental and Economic Accounts (SEEA) which added the

environment account. If traditional I/O model is the center of SNA, "Hybrid IO model" is the center of SEEA system. This model is also known as "Green I/O model" or "I/O expansion model for the environment" and different other names.

There are a lot of studies using Input-output model in order to estimate environment effect in China. Yu Fan et al (2016) used an externalized input-output model in order to develop China's first environmental protection industry. By measuring and analyzing various coefficients from the perspective of the industry chain, the research results indicated that the development of environmental protection activities and related environmental investment should give priority to industries such as primarily manufacturing industries, the wholesale and retail marketing industries, the financial industry and some sectors in the second industries because concentrating on these industries will provide relatively higher benefits. In addition, the research provides an useful tool for developing scientifically sound polices to simulate the economy and provide positive effects on investments. In another research to measure China's provincial green economic efficiency during 1995–2012, Xueping Tao et al (2016) used non-separable input–output approach. The research results indicate that (i) there are larger interregional differences in green economic efficiencies. (ii) Energy and CO2 emission are the key factors for green economic efficiencies. (iii) Different regions have different energy-saving and CO2 emission reduction potentials.

In Vietnam, there are also many researches on using input-output model to analyze and forecast the economic, which are related to the economic structure. Trinh Bui, Pham Le Hoa, Chau Giang Bui (2008) introduced the basic concepts of the import multiplier, this research allowed us to calculate the power of dispersion on import of all economic sectors. Based on the input output table, the research by Kwang MK, Bui Trinh, F. Kaneko, T. Secretario (2007) pointed out the economic structure of Vietnam, and calculated the index of dispersion, sensitivity and dispersion import to show the weakness of economy in the periods. The research named "The impact of energy and air emissions in a changing economic structure: Input-output approach" (Bui Trinh, Kiyoshi Kobayashi and Dance Central Athletics, 2011), presented an attempt to estimate air emission when changing economic structure. The methodology used in this study was based on Miyazawa's concept of the inter-relational income multiplier, it was designed to analyze the structure of income distribution by final demands in the standard Leontief's system. In addition, there are other several studies analyzing input output model and economic structure in Vietnam such as the ones by Trinh Bui, Kiyoshi Kobayashi, Vu Trung Dien Hoa and Pham Le Nguyen (2012), etc.

In Vietnam, most researches and reports acquiescence that the rate of GDP contribution of region II (include industry and construction sectors) and region III - services need to increase and they think that this is the right direction of economic development. Thus, the idea of economic restructuring is to promote the region II and region III. The rate of investment of these areas is increasing, with around 43% in 2005 and over 49% in 2015. However, the rate of value added in its output of these sectors is decreasing significantly. These ratio is 34.1% in 2000 (caculated by I/O table in

2007) and fell to 21% in recent years (caculated by new I/O table) (Bui Trinh, 2016). This means that these areas are more and more inefficient; the investment of these areas is increasing in order to compensate for their inefficiencies.

3. METHODOLOGY

3.1. The emission estimation

The expantion input output model for final household consumption and income, as presented in matrix form below:

$$\begin{pmatrix} X \\ T \end{pmatrix} = \begin{pmatrix} A & C \\ V & 0 \end{pmatrix} \begin{pmatrix} X \\ T \end{pmatrix} + . \begin{pmatrix} f \\ g \end{pmatrix} \quad (1)$$

Where: X is the vector of output;

T is the total income of household groups included production and non-production (non-production income includes income from property and income from transfer;

A is the direct input coefficients matrix

V is the coefficient matrix of value added of income groups;

C is the s corresponding matrix of household consumption coefficients

f is a vector of final demand except housekols

g is a vector of exogenous income of income groups

Sonic and Hewings (1993) extended the framework by the equation:

$$\begin{pmatrix} X \\ T \end{pmatrix} - \begin{pmatrix} (I - A - CT)^{-1} & BCK \\ KVB & K \end{pmatrix} \begin{pmatrix} X \\ T \end{pmatrix} . \begin{pmatrix} f \\ g \end{pmatrix} \quad (2)$$

Where:

B = (I-A)-1 is the Leontief inverse matrix

(I-A-CT) -1 is the enlarged Leontief inverse matrix; the elementary of this matrix includes direct impact, indirect impact and induce effects, they contain elements which are larger than those of the (I-A) -1matrix, because they include extra output required to meet the consumption groups output effects.

BCK is the matrix of consumption multilplier

KVB is the matrix of incommultilplier

K is Miyazawa matrix multipliers or Keynes matrix.

The input output expansion model for the environment

Called:

$$U = \left\langle \frac{(I - A - AT)^{-1}}{KVB} \middle| \frac{BCK}{K} \right\rangle$$

From the equation (2) we have:

$$\left\langle \begin{matrix} X \\ T \end{matrix} \right\rangle = U.\left\langle \begin{matrix} f \\ g \end{matrix} \right\rangle \quad (3)$$

The basic relation of environmental-economic linkage is shown in equation form as follows:

$$E = Ej.U.\left\langle \begin{matrix} f \\ g \end{matrix} \right\rangle \quad (4)$$

E is a matrix of value of emission by production and consumption and Ej is a matrix of emission coefficient that was discharged by economic activity and household consumption.

In the hybrid IO model, it is possible to estimate the total amount of each type of waste produced when a unit of final use is produced. Total waste here is understood as direct waste generated in the process of producing one unit, and waste generated indirectly in the production process of an industry which used other industry's products for their input.

3.2. Dynamic Input output model and Gohsh model

The standard relation of Leontief form:

$$X = (I\text{-}A)^{-1}.Y \quad (5)$$

Where : $A = (a_{ij})_{nxn}$; n is the number of sector or size of the matrix A; $aij = X_{ij}/X_j$

Xij is product sector i consumed by production sector j

Xj is the output of sector j

A is the matrix of intermediate coefficient.

$(I\text{-}A)^{-1}$ is the Leontief's inverse matrix.

Equation 5 shows the gross output depends on the input structure and final demand (Y).

Transposed the I/O frame structure of equation (5), we have:

$$X = (I\text{-}A^{*\prime})^{-1}.V \quad (6)$$

$A^* = (a^*_{ij})nxn$ with $a^*_{ij} = Xij/ Xi$ and V is the value added vector.

$A^{*\prime}$ is the matrix transpositionof A.

$(I-A^{*\prime})^{-1}$ is the Ghosh'sinverse matrix.

Equation (6) presents the gross input depend on the intermadiate demand structure and value added (V)

Put: $k_i = K_i/X_i$

$k = (k_i)_{1xn}$và $K = (K_i)_{1xn}$

Multiplied two side of equation (6) with k, we have:

$$K = k(I-A^{*\prime})^{-1}.V \quad (7)$$

$$\Delta K = k_1(I-A^{*\prime})^{-1}.\Delta V \quad (8)$$

Noticed: $\Delta K = K(t+1) - K(t) = I(t)$

From equation (8), we have:

$$I(t) = k_1(I-A^{*\prime})^{-1}\Delta V \quad (9)$$

3.3. Data sources

The study based on data from the input output table in 2012 by the General Statistics Office (GSO) that is the newest input output table in Vietnam. This I/O table has distributed FISIM and exchange in USD. In addition, this study used data on waste from the World Resources Data to calculate the cost of waste (caculated by USD).

In addition, due to data limitations (Vietnam has not data on capital stock) the authors used data from the results of the Vietnam annual enterprise surveys to estimate capital stock in 2012.

4. EMPIRICAL RESULTS

In principle, the sector has the power of dispersion that is higher than average rate (> 1) and the lower power of dispersion on import and on energy (<1) are the priority sectors that need to be focused for sustainable development. The result calculated from the I/O table in 2012 shows the current economic structure, with the mining sector, other industrial sectors and construction sector have the high power of

Table 1
The power of dispersion, power of dispersion on import and power dispersion on energy

	Power of dispersion index	*Power of disperson on import index*	*Power of dispersion on energy index*	*Ratios of Value added per Gross output*
1 Agriculture, forestry and fisheries (Region 1)	1.1244	0.9282	0.4982	0.4186
2 Mining (Region 2)	0.9155	0.9712	1.1251	0.4896
3 Industry and construction (Region 2)	1.0727	1.0757	1.3170	0.2713
4 Services (Region 3)	1.0154	1.0774	0.8947	0.5982

Source: Caculated from Input output table in 2012, GSO

dispersion on import and on energy while region I (agriculture, forestry and fisheries) has the high power of dispersion on economy and the lower power of dispersion on import and on energy.

Calculated the capital requirement for the three sectors to get a unit of value added (VA) when using domestic and imported input, we can indicate that the capital requitment to get a Value-Added unit when using the domestic input is much lower than that using imported input. This means that the invesment efficiency will be improved if Vietnam develops supporting industries. In addition, the result also shows the region 2 needs a huge amount of investment to get a value-added units compared to Region 1 and Region 3.

The result shows that the region 2 need a huge capital to get a value-added unit but its value-added rate is low (23%) compared to the region 1 and region 3 (48%

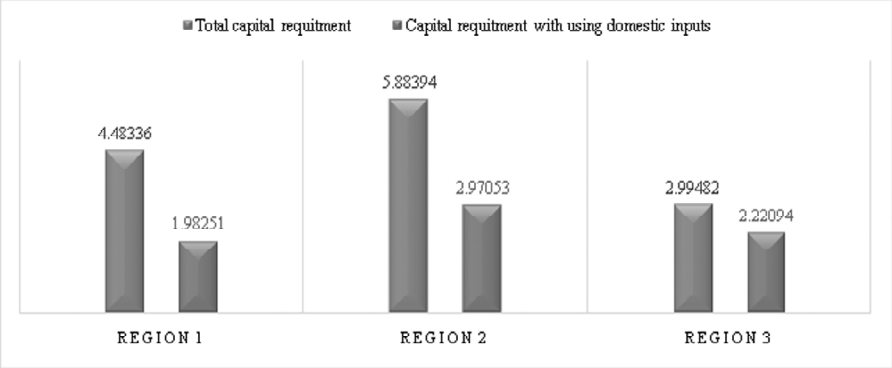

Figure 1: Capital requirement for a unit value added

Source: Caculated from the Vietnam annual enterprise surveys in 2012 and Input output table in 2012

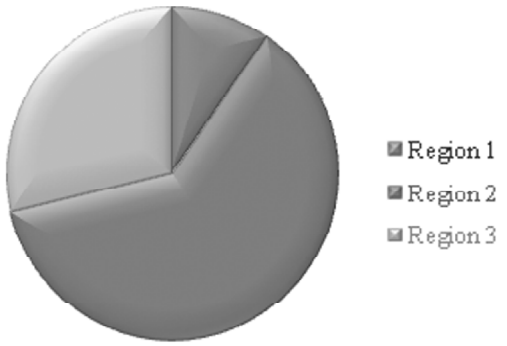

Figure 2: The percentage of CO2 emission

Source: Caculated from input output table in 2012 and the data of CO2 of World Resources: www.wri.org/sites/default/files/pdf/wrr05_dt_all.pdf

and 54%). Moreover, the amount of CO2 emissed into the environment of region 2 was the highest among three sectors, with 62% of total waste CO2 while agriculture, forestry and fisheries sector accounted for about 10% and the service sector accounted for 28.

Thus, we can see that the Vietnam economic growth is not high (as announced) and ruined environment with the current input structure, the sector structure and the investment efficiency. The result shows that the policy direction and the misunderstanding of industrialized led to the current situation.

From the research results through analyzing the input output model, this research offer a number of different scenarios in order to improve production efficiency and make a "greener economy". Policy makers may choose different scenarios with different purposes. However, the current economic structure needs to change even economic merely.

Table 2
Scenarios for the change of economic structure

Unit: %

	Chaneg of capital (K)	*Change of value added (GVA)*	*Change of CO2*
Scenario 1: Output of region 2 decreases 10%, that of region 3 increases 10%	-1.65	4.60	-3.98
Scenario 2: Output of region 2 decreases 10%, that of region 1 increases 10%	-1.53	5.05	-3.57
Scenario 3: Output of region 2 decreases 10%, that of region 1 increases 5%, that of region 3 increase 5%	-1.53	5.05	-3.48
Scenario 4: Production efficiency of region 2 increases 10%	-	8.29	-10.14

These scenarios of economic structure will lead to the change of investment structure

Table 3
The change of investment structure

Unit:%

	Current structure	*Scenario 1*	*Scenario 2*	*Scenario 3*	*Scenario 4*
Region 1	9.86	9.94	15.21	12.56	9.86
Region 2	67.84	61.58	62.11	61.84	67.84
Region 3	22.30	28.48	22.68	25.59	22.30
	100.00	100.00	100.00	100.00	100.00

Scenario 1: Output of region 2 decreases 10%, that of region 3 increases 10%: In this scenario, by reducing the output of region 2 and increasing the output of region 3 by 10%, the change of value added (GVA) increased by 4.6%, whereas reducing the CO_2 emession nearly 4%. This will help to have a greenest economy with the large

reduction of CO_2 emission. By doing this, the investment in region 2 is also reduced from 67.84% to 61.58% in the total investment and s slightly increasing investment in region 3 from 22.3% to 28.48%.

Scenario 2: Output of region 2 decreases 10%, that of region 1 increases 10%: By declining the output of region 1 by 10% and raising output of region 1 which has the high power of dispersion on economy and the lower power of dispersion on import and on energy, leading to the high change in the GVA, by 5.05% and reducing the CO_2 emission by 3.57%. This seems to be more feasible than scenario 1when developing agricultural sector now in Vietnam is the most important of National Development Strategy in the period 2016-2020. To achieve the growth of GVA by 5.05% in this scenario, the investment structure is also changed a large increase investment in region 1 from nearly 10% to more than 15%, whereas a slight reduction in investment in region 2 and 3.

Scenario 3: Output of region 2 decreases 10%, that of region 1 increases 5%, that of region 3 increase 5%: This scenario provides the same reduction output in region 1 as scenario 2, and a devides halfly decline in region 2 and region 3 by 5%. This provides the same reults in GVA increase and CO_2 reduction asn in the scenario 2. However, the change in investment have a little difference with a slight decline in investment in region 2 and 3, and a large increase in region 1. This also a feasible solution in the context that Vietnamese Govement have been pursued many policies to support for services and agriculture sectors.

Scenario 4: Production efficiency of region 2 increases 10%: This is the best scenario but the hardiest sollution. In the scenario, the economy will be growed at the hight ratio whereas the CO2 emission is lowest. That means the economy become greener. However, to improve the efficiency of the region 2 from xxxx to xxxx by 10% increasing, equivelant to the regional countries such as Malaysia, Indonesia is challangeble responsibility. However, in this scenario, the investment structure will not be changed.

5. SUGGESTIONS AND CONCLUSIONS

Restucturing the invesment towrard a greener economy: Many researches shows the Vietnam investment depending on 70-80% from the bank credit. Then, banking system paly a key role in the Vietnam economy development. From our research result, it could be concluded that the credit banking should adjust the investment base on the real economy. That means, when the credit banking financing for region I (agriculture, forestry and fisheries) which has the high power of dispersion on economy and the lower power of dispersion on import and on energy, as well as reducing financing for resgion 2 which has higher power dispersion on import and on energy and lower power of dispersion on economy will make the economy become greener. It's the role of green financing and banking to adjust the economy from the brown to a green one.

Building and promulgating policies and measures that encourage developing the green banking: The international experiences in developing green banking and the results of research showed that the Government played an important role in supporting the implementation of green banking. Specifically, the Government should have policies on taxes, fees and credit support to banks providing services and green products. In the current period the Government can support a pilot on a green bank model as the model of Green Investment Bank from UK or Green Bank in Bangladesh to draw experience in deploying broadly throughout the system. To restructuring the economy toward a greener one, the development of region 1 should be enhanced by encouraging policies or incentive tools for bank credit from the Government.

Building policies to encourage enterprises to implement green investment: An issue for the green banking activities is that the enterprise-customers are not excited about the green investment activities to access to green credit that banks provide. Therefore, the Government should develop policies such as tax preferential policies and fees as well as financial loan suitable for the business sector to encourage enterprises to invest in technological innovation in the direction of green technology, green jobs, especially in agricluture and services to create competitive advantages of these regions. This is a necessary because the cost of constructing systems to minimize environmental pollution or to clean production are often quite large, causing significant difficulties for businesses that want to deploy these systems, especially in the case of the small and medium enterprises which make up the majority of Vietnam's economy.

Raising consumer's awareness in using green products: To encourage enterprises to invest in green investment it is also necessary to raise awareness of consumers in using goods and cleaning products. Therefore, the Government should take the measures to support in raising the customers' awareness through changing consumption habits of "green" goods and products.

We can say that deployment of green banking is an inevitable trend in the development strategy of Vietnam's commercial banks. The role of green banking and finance for a greener economy can not be deined. Toward a greener *development*, the Vietnam economy should be restructured by increasing the investment in agriculture industry and services and reducing the investment in construction and mining. This paper suggests suggests 4 scenarios with the restructure of investment in 3 regions, however, in the context of Vietnam economy, applying scenario 1 or 2 or 3 will be more feasible. The restructure of the economy will be paralell with improving the efficiency of these regions as well as the supporting industry development. By doing that, the power of dispersion on import will be reduced, increase the powever of dispersion on export.

Reference

Ana-Isabel Guera, Ferran Sancho (2010). 'A comparison of input-output models Ghh reduces to Leontief' UniversitatAutonoma de Barcelona

Blanca Gallego, ManfrededLenzen (2005). 'Aconsistent input-output formulation of shared producer and consumer responsibility'. Economic system research, vol. 17, pp 365-391

Bui Trinh (2016).'The problem of GDP of Vietnam'. Saigontime

Bui Trinh, Kiyoshi Kobayashi, Trung-Dien Vu, Pham Le Hoa (2012).'New Economic Structure for Vietnam Toward Sustainable Economic Growth in 2020'. Global Journal of Human Social Science, Vol. 12 Issue 10

Diezenbacher. E (1997).'In vindication of Ghosh model: a reinterpretation as a price model. Journal of regional science', Vol 37, pp 629-651

Domar, Evsey (1946).'Capital Expansion, Rate of Growth, and Employment'. Econometrica. 14 (2): 137–147.

Ghosh A (1958).'Input-output approach in an allocation system'. Economica 18, pp 58-64.

GSO (2015).'Vietnam input-output table, 2012'. Statistics publishing house

Harrod, Roy F. (1939).'An Essay in Dynamic Theory'. The Economic Journal. 49 (193): 14–33.

ImreDobos, PéterTallos (2011).'A Dynamic Input-Output Model with Renewable Resources'. Budapesti Corvinus Egyetem Vállalatgazdaságtan Intézet

Kaeufer, K. (2010).'Banking as a Vehicle for Socio-economic Development and Change: Case Studies of Socially Responsible and Green Banks'.Presenting Institute, Cambridge, MA.

Kiyoshi Kobayashi, Trinh Bui, Trung Dien Vu (2011).'The impact of energy and air emissions in a changing economic structure: Input-output approach'. VNU Journal of Science, Economics and Business 27, No. 5E (2011) 20 25

Zhang. B, Y. Yang, J. Bi. (2011).'Tracking the implementation of green credit policy in China: Top-down perspective and bottom-up reform'.Journal of Environmental Management 92 (2011) 1321e1327

Lenzen. M. Pade. L and Munksgaard (2004).'CO2 multopliers in multi-region input-output model'. Economic system research, 16, pp 69-78

Leontief W (1936).'Quantitative input and output relations in the economic system of the United State'. Review of economic and statistics, Vol 28, pp. 105-125

Miyazawa. K (1966).'Internal and external multipliers in the input-output model'. Hitotshubashi journal of economics, 7, pp 38-55

Nath. V, Nayak. N., Goel A. (2014).'Green Banking Practices – A Review Impact'. International Journal of Research in Business Management, 2014; 2(4): 45-6

R.E. Miller, P.D. Blair (2009).'Input-output Analysis'. Foundations and Extensions (2nd edition), Cambridge University Press

Rebecca B., Zoe O.A. (2011).'Input-Output Models for Impact Analysis: Suggestions for Practitioners Using RIMS II Multipliers'. Presented at the 50 th Southern Regional Science Association Conference March 23-27, 2011 New Orleans, Louisianahttp://www.bea.gov/papers/pdf/WP_IOMIA_RIMSII_020612.pdf

Solow, Robert M. (February 1956).'A contribution to the theory of economic growth'. Quarterly Journal of Economics (Oxford Journals) 70 (1): 65–94.

Thijs Ten Raa (2009).'Input-output economics: theory and applications: featuring Asian economies'. World Scientific

Ullah, M. M. (2010).'Green Banking in Bangladesh-A Comparative Analysis'.Retrieved February 20, 2013, from http://www.wbiconpro.com/610-Maruf.pdf

UNEP Financial Initiative (2014).'Stability and Sustainability in Banking Reform: Are environmental risks missing in Basel III'.University of Cambridge Institute for Sustainability Leadership

United Nations Environmental Programme Finance Initiative (UNEP FI) (2011).'UNEP FI Guide to Banking & Sustainability'. UNEP Finance Initiative Switzerland

Vivid Economics and McKinsey (2011).'The economics of the Green Investment Bank: costs and benefits, rationale and value for money'.https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/31741/12-554-economics-of-the-green-investment-bank.pdf

Xueping Tao, Ping Wang, Bangzhu Zhu (2016).'Provincial green economic efficiency of China: A non-separable input–output SBM approach'. Applied Energy 171 (2016), pp. 58-66

Yu Fan, Shunze Wu, Yuantang Lu, Yutao Wang, Yunhao Zhao, Shunqing Xu, Yujie Feng (2016).'An approach of measuring environmental protection in Chinese industries: a study using inputeoutput model analysis'. Journal of Cleaner Production 137 (2016) pp.1479 – 1490

Zhang. B, Y. Yang, J. Bi. (2011).'Tracking the implementation of green credit policy in China: Top-down perspective and bottom-up reform'. Journal of Environmental Management 92 (2011) 1321e1327